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SECTION EC

ENGINE CONTROL SYSTEM

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SFT SOL A/CIRC	P0750	0750	AT-165
SFT SOL B/CIRC	P0755	0755	AT-170
TCC SOLENOID/CIRC	P0740	0740	AT-146
THERMSTAT FNCTN	P0128	0128	EC-183
TP SEN 1/CIRC*5	P0222	0222	EC-257
TP SEN 1/CIRC*5	P0223	0223	EC-257
TP SEN 2/CIRC*5	P1223	1223	EC-455
TP SEN 2/CIRC*5	P1224	1224	EC-455
TP SENSOR*5	P0221	0221	EC-250
TPV SEN/CIRC A/T	P1705	1705	AT-175
TW CATALYST SYS-B1	P0420	0420	EC-297
VC CUT/V BYPASS/V	P1491	1491	EC-517
VC/V BYPASS/V	P1490	1490	EC-510
VEH SPD SEN/CIR AT*7	P0720	0720	AT-115
VEH SPEED SEN/CIRC*7	P0500	0500	EC-370
VENT CONTROL VALVE	P0447	0447	EC-321
VENT CONTROL VALVE	P1446	1446	EC-485
VENT CONTROL VALVE	P1448	1448	EC-491

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

*2: These numbers are prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

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[QR]

*4: When engine is running.

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

*6: The troubleshooting for this DTC needs CONSULT-II.

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

DTC No. Index

UBS002NS

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-138, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#) .

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
No DTC	Flashing*4	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	EC-69
U1000	1000*6	CAN COMM CIRCUIT	EC-138
U1001	1001*6	CAN COMM CIRCUIT	EC-138
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—
P0011	0011	INT/V TIM CONT-B1	EC-141
P0031	0031	HO2S1 HTR (B1)	EC-144
P0032	0032	HO2S1 HTR (B1)	EC-144
P0037	0037	HO2S2 HTR (B1)	EC-149
P0038	0038	HO2S2 HTR (B1)	EC-149
P0101	0101	MAF SEN/CIRCUIT	EC-154
P0102	0102	MAF SEN/CIRCUIT*5	EC-161
P0103	0103	MAF SEN/CIRCUIT*5	EC-161
P0112	0112	IAT SEN/CIRCUIT	EC-167
P0113	0113	IAT SEN/CIRCUIT	EC-167
P0117	0117	ECT SEN/CIRCUIT*5	EC-172
P0118	0118	ECT SEN/CIRCUIT*5	EC-172
P0125	0125	ECT SENSOR	EC-177
P0127	0127	IAT SENSOR	EC-180
P0128	0128	THERMSTAT FNCTN	EC-183
P0132	0132	HO2S1 (B1)	EC-185
P0133	0133	HO2S1 (B1)	EC-191
P0134	0134	HO2S1 (B1)	EC-200
P0138	0138	HO2S2 (B1)	EC-207
P0139	0139	HO2S2 (B1)	EC-213
P0171	0171	FUEL SYS-LEAN-B1	EC-220
P0172	0172	FUEL SYS-RICH-B1	EC-226
P0181	0181	FTT SENSOR	EC-232
P0182	0182	FTT SEN/CIRCUIT	EC-234
P0183	0183	FTT SEN/CIRCUIT	EC-234
P0217	0217	ENG OVER TEMP	EC-238
P0221	0221	TP SENSOR*5	EC-250
P0222	0222	TP SEN 1/CIRC*5	EC-257

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[QR]

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0223	0223	TP SEN 1/CIRC*5	EC-257
P0226	0226	APP SENSOR*5	EC-263
P0227	0227	APP SEN 1/CIRC*5	EC-269
P0228	0228	APP SEN 1/CIRC*5	EC-269
P0300	0300	MULTI CYL MISFIRE	EC-275
P0301	0301	CYL 1 MISFIRE	EC-275
P0302	0302	CYL 2 MISFIRE	EC-275
P0303	0303	CYL 3 MISFIRE	EC-275
P0304	0304	CYL 4 MISFIRE	EC-275
P0327	0327	KNOCK SEN/CIRC-B1	EC-280
P0328	0328	KNOCK SEN/CIRC-B1	EC-280
P0335	0335	CKP SEN/CIRCUIT	EC-284
P0340	0340	CMP SEN/CIRC-B1	EC-291
P0420	0420	TW CATALYST SYS-B1	EC-297
P0441	0441	EVAP PURG FLOW/MON	EC-301
P0442	0442	EVAP SMALL LEAK	EC-307
P0444	0444	PURG VOLUME CONT/V	EC-315
P0445	0445	PURG VOLUME CONT/V	EC-315
P0447	0447	VENT CONTROL VALVE	EC-321
P0452	0452	EVAP SYS PRES SEN	EC-328
P0453	0453	EVAP SYS PRES SEN	EC-334
P0455	0455	EVAP GROSS LEAK	EC-341
P0456	0456	EVAP VERY SML LEAK	EC-349
P0460	0460	FUEL LEV SEN SLOSH	EC-358
P0461	0461	FUEL LEVEL SENSOR	EC-363
P0462	0462	FUEL LEVL SEN/CIRC	EC-365
P0463	0463	FUEL LEVL SEN/CIRC	EC-365
P0500	0500	VEH SPEED SEN/CIRC*7	EC-370
P0506	0506	ISC SYSTEM	EC-372
P0507	0507	ISC SYSTEM	EC-374
P0605	0605	ECM	EC-376
P0650	0650	MIL/CIRC	EC-379
P0705	0705	PNP SW/CIRC	AT-103
P0710	0710	ATF TEMP SEN/CIRC	AT-109
P0720	0720	VEH SPD SEN/CIR AT*7	AT-115
P0725	0725	ENGINE SPEED SIG	AT-120
P0731	0731	A/T 1ST GR FNCTN	AT-124
P0732	0732	A/T 2ND GR FNCTN	AT-129
P0733	0733	A/T 3RD GR FNCTN	AT-134
P0734	0734	A/T 4TH GR FNCTN	AT-139
P0740	0740	TCC SOLENOID/CIRC	AT-146
P0744	0744	A/T TCC S/V FNCTN	AT-151

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DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0745	0745	L/PRESS SOL/CIRC	AT-159
P0750	0750	SFT SOL A/CIRC	AT-165
P0755	0755	SFT SOL B/CIRC	AT-170
P1065	1065	ECM BACK UP/CIRC	EC-383
P1102	1102	MAF SENSOR*5	EC-387
P1111	1111	INT/V TIM V/CIR-B1	EC-393
P1121	1121	ETC ACTR*5	EC-397
P1122	1122	ETC FUNCTION/CIRC*5	EC-399
P1124	1124	ETC MOT PWR	EC-406
P1126	1126	ETC MOT PWR*5	EC-406
P1128	1128	ETC MOT	EC-411
P1143	1143	HO2S1 (B1)	EC-416
P1144	1144	HO2S1 (B1)	EC-422
P1146	1146	HO2S2 (B1)	EC-428
P1147	1147	HO2S2 (B1)	EC-435
P1148	1148	CLOSED LOOP-B1	EC-442
P1217	1217	ENG OVER TEMP	EC-444
P1223	1223	TP SEN 2/CIRC*5	EC-455
P1224	1224	TP SEN 2/CIRC*5	EC-455
P1225	1225	CTP LEARNING	EC-461
P1226	1226	CTP LEARNING	EC-463
P1227	1227	APP SEN 2/CIRC*5	EC-465
P1228	1228	APP SEN 2/CIRC*5	EC-465
P1229	1229	SENSOR POWER/CIRC*5	EC-471
P1442	1442	EVAP SMALL LEAK	EC-475
P1444	1444	PURG VOLUME CONT/V	EC-477
P1446	1446	VENT CONTROL VALVE	EC-485
P1448	1448	VENT CONTROL VALVE	EC-491
P1456	1456	EVAP VERY SML LEAK	EC-498
P1464	1464	FUEL LEVEL SEN/CIRC	EC-507
P1490	1490	VC/V BYPASS/V	EC-510
P1491	1491	VC CUT/V BYPASS/V	EC-517
P1564	1564	ASCD SW	EC-526
P1572	1572	ASCD BRAKE SW	EC-533
P1574	1574	ASCD VHL SPD SEN	EC-543
P1610 - P1615	1610 - 1615	NATS MALFUNCTION	EC-68
P1705	1705	TPV SEN/CIRC A/T	AT-175
P1706	1706	P-N POS SW/CIRCUIT	EC-545
P1760	1760	O/R CLTCH SOL/CIRC	AT-180
P1805	1805	BRAKE SW/CIRCUIT	EC-549

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

*2: These numbers are prescribed by SAE J2012.

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[QR]

*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

*4: When engine is running.

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

*6: The troubleshooting for this DTC needs CONSULT-II.

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

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PRECAUTIONS

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

UBS002NT

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. 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 harness connectors.

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

UBS002NU

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

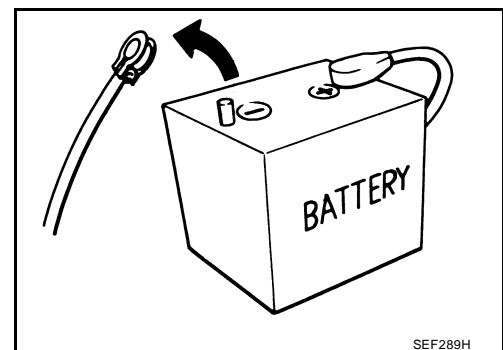
CAUTION:

- 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-64, "HARNESS CONNECTOR"](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the 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.

Precaution

UBS002NV

- Always use a 12 volt 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 battery ground cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.
- Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.

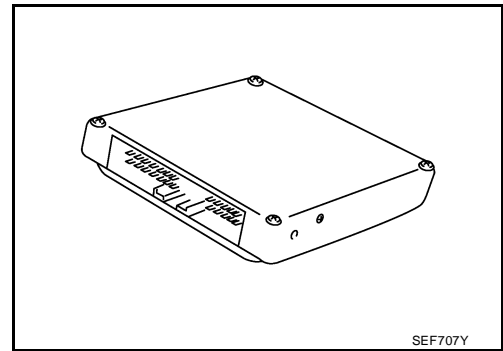


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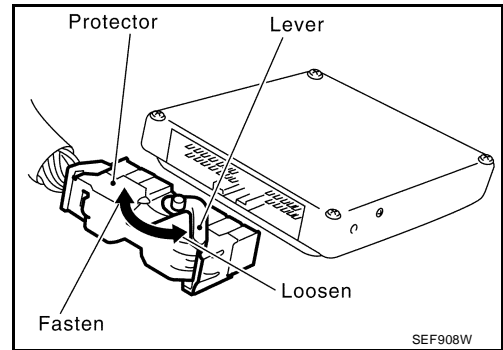
PRECAUTIONS

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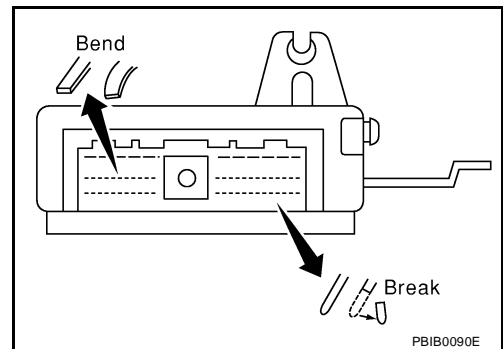
- Do not disassemble ECM.
- If battery cable is disconnected, the memory will return to the initial ECM values.
The ECM will now start to self-control at its initial values. Engine operation can vary slightly when the cable is disconnected. However, this is not an indication of a problem. Do not replace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



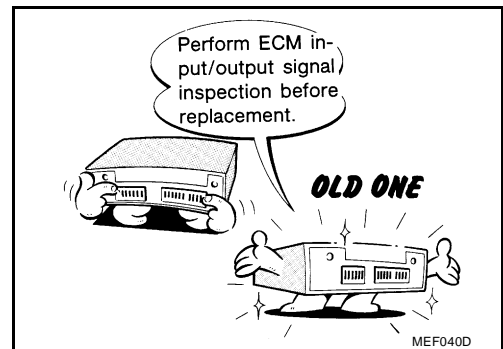
- When connecting ECM harness connector, fasten it securely with a lever as far as it will go as shown at right.



- 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.



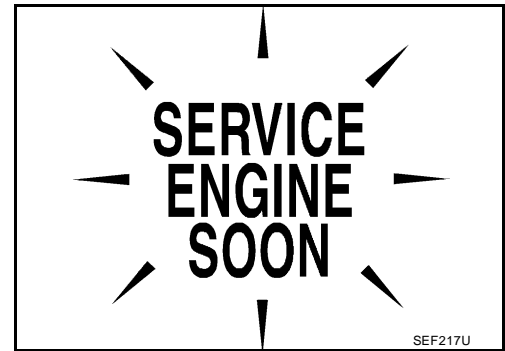
- Securely connect ECM harness connectors.
A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform "ECM Terminals and Reference Value" inspection and make sure ECM functions properly. Refer to [EC-99](#).
- 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 problems.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).



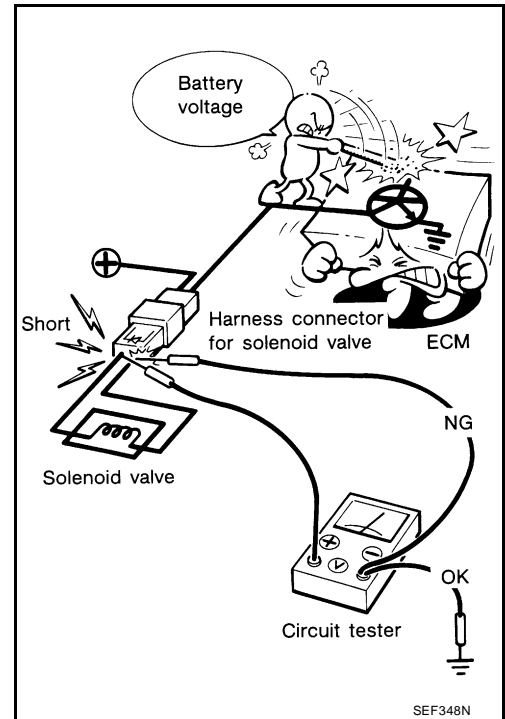
PRECAUTIONS

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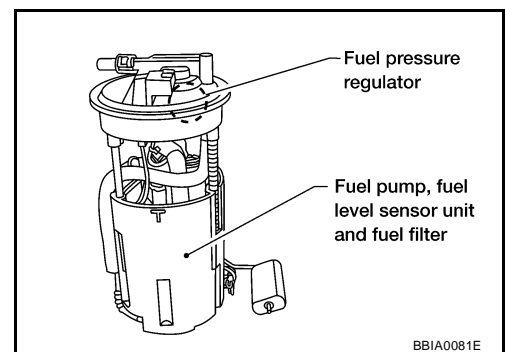
- After performing each TROUBLE DIAGNOSIS, perform “DTC Confirmation Procedure” or “Overall Function Check”.
The DTC should not be displayed in the “DTC Confirmation Procedure” if the repair is completed. The “Overall Function Check” should be a good result if the repair is completed.



- 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 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.



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



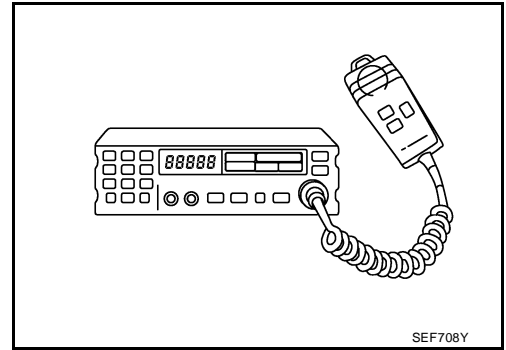
PRECAUTIONS

[QR]

- 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.



Wiring Diagrams and Trouble Diagnosis

UBS002NW

When you read wiring diagrams, refer to the following:

- [GI-12, "How to Read Wiring Diagrams"](#)
- [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#) for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- [GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#)
- [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#)

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PREPARATION

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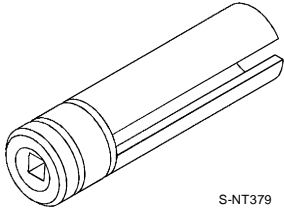
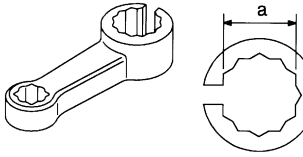
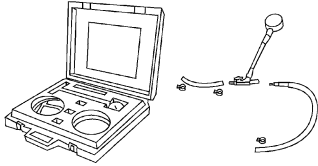
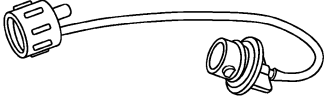
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PREPARATION

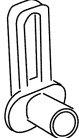
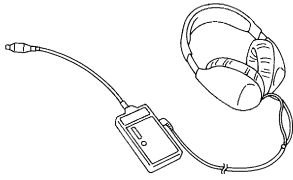
Special Service Tools

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

Tool number Tool name	Description	
KV10117100 Heated oxygen sensor wrench		Loosening or tightening heated oxygen sensors with 22 mm (0.87 in) hexagon nut
KV10114400 Heated oxygen sensor wrench		Loosening or tightening heated oxygen sensors a: 22 mm (0.87 in)
Fuel pressure gauge kit (J44321)		Checking fuel pressure
Fuel filler cap adapter (J45356)		Checking fuel tank vacuum relief valve opening pressure

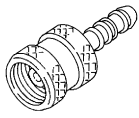
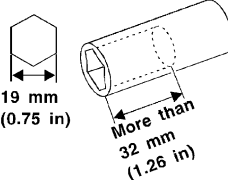
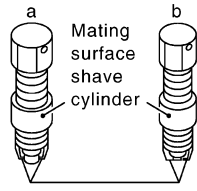

Commercial Service Tools

UBS002NY

Tool name (Kent-Moore No.)	Description	
Quick connector re- lease (J45488)		Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Part No. 16441 6N210)
Leak detector (J41416)		Locating the EVAP leak

PREPARATION

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Tool name (Kent-Moore No.)	Description	
EVAP service port adapter (J41413-OB)	 <p style="text-align: center;">S-NT704</p>	Applying positive pressure through EVAP service port
Socket wrench	 <p style="text-align: center;">S-NT705</p>	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner ie: (J-43897-18) (J-43897-12)	 <p style="text-align: center;">S-NT778</p>	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
Anti-seize lubricant ie: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 <p style="text-align: center;">S-NT779</p>	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

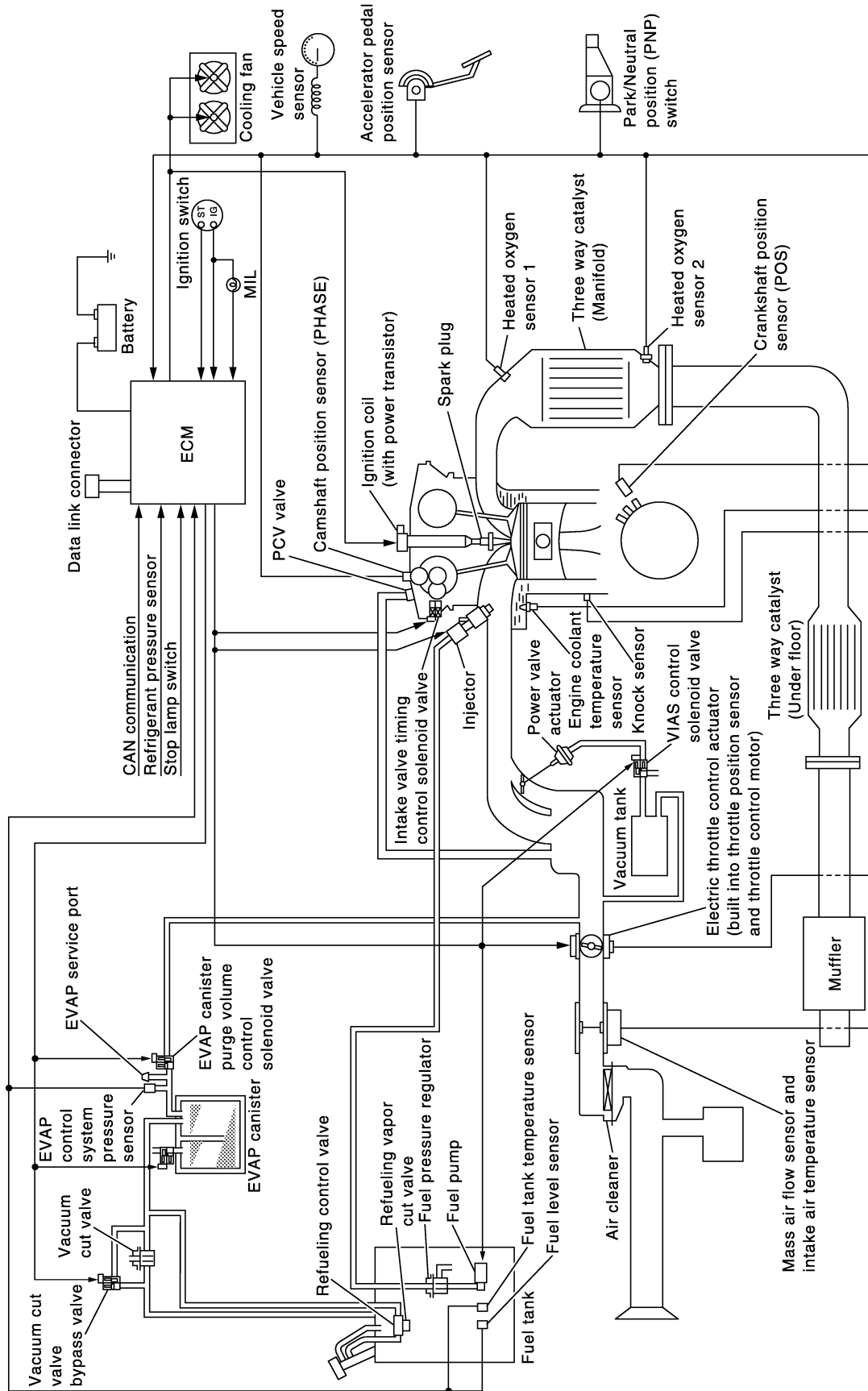
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ENGINE CONTROL SYSTEM

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System Diagram

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Vacuum Hose Drawing

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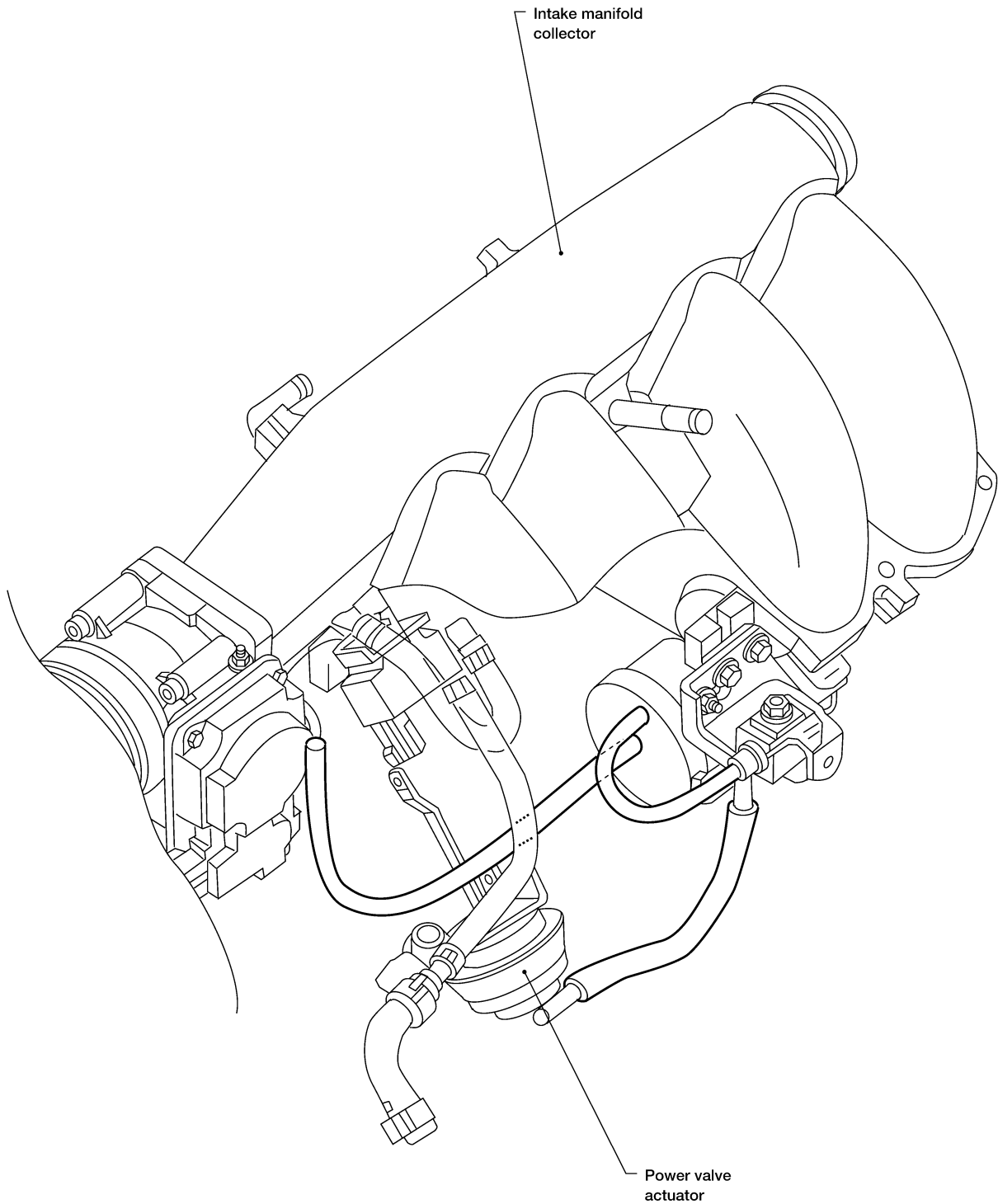
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Refer to [EC-28. "System Diagram"](#) for Vacuum Control System.

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ENGINE CONTROL SYSTEM

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System Chart

Input (Sensor)	ECM Function	Output (Actuator)	
<ul style="list-style-type: none"> ● Camshaft position sensor (PHASE) ● Crankshaft position sensor (POS) ● Mass air flow sensor ● Engine coolant temperature sensor ● Heated oxygen sensor 1 ● Throttle position sensor ● Accelerator pedal position sensor ● Park/neutral position (PNP) switch ● Intake air temperature sensor ● Power steering oil pressure switch ● Ignition switch ● Battery voltage ● Knock sensor ● Refrigerant pressure sensor 	Fuel injection & mixture ratio control	Fuel injectors	
	Electronic ignition system	Power transistor	
	Fuel pump control	Fuel pump relay *4	
	ASCD vehicle speed control	Electric throttle control actuator	
	On board diagnostic system	MIL (On the instrument panel)	
	Power valve control	VIAS control solenoid valve	
	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater	
	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater	
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve	
	Air conditioning cut control	Air conditioner relay *4	
	Cooling fan control	Cooling fan relays *4	
		ON BOARD DIAGNOSIS for EVAP system	<ul style="list-style-type: none"> ● EVAP canister vent control valve ● Vacuum cut valve bypass valve
	<ul style="list-style-type: none"> ● Stop lamp switch ● ASCD steering switch ● ASCD brake switch ● ASCD clutch switch ● Fuel level sensor*1 ● EVAP control system pressure sensor ● Fuel tank temperature sensor*1 ● Heated oxygen sensor 2 *2 ● TCM (Transmission control module) *3 ● Air conditioner switch*3 ● Vehicle speed sensor*3 ● Electrical load signal*3 		

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

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

*3: The signals are sent to the ECM through CAN communication line.

*4: These relays are built into IPDM E/R.

Multiport Fuel Injection (MFI) System INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Fuel injection & mixture ratio control	Fuel injectors
Camshaft position sensor (PHASE)	Engine speed and piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen 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	Gear position		
Ignition switch	Start signal		
Knock sensor	Engine knocking condition		
Battery	Battery voltage		
Power steering oil pressure switch	Power steering operation		
Heated oxygen sensor 2 *1	Density of oxygen in exhaust gas		
Vehicle speed sensor *2	Vehicle speed		
Air conditioner switch *2	Air conditioner operation		

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

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

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 both the crankshaft position sensor 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.

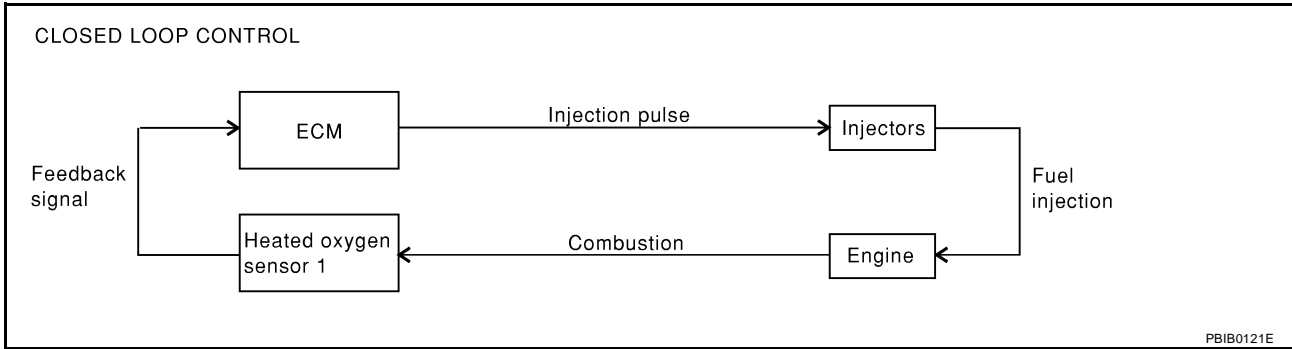
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D" (A/T 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 driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to [EC-185](#). 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 heated oxygen 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 heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from “N” to “D” (A/T models)
- When starting the engine

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen 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 film) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

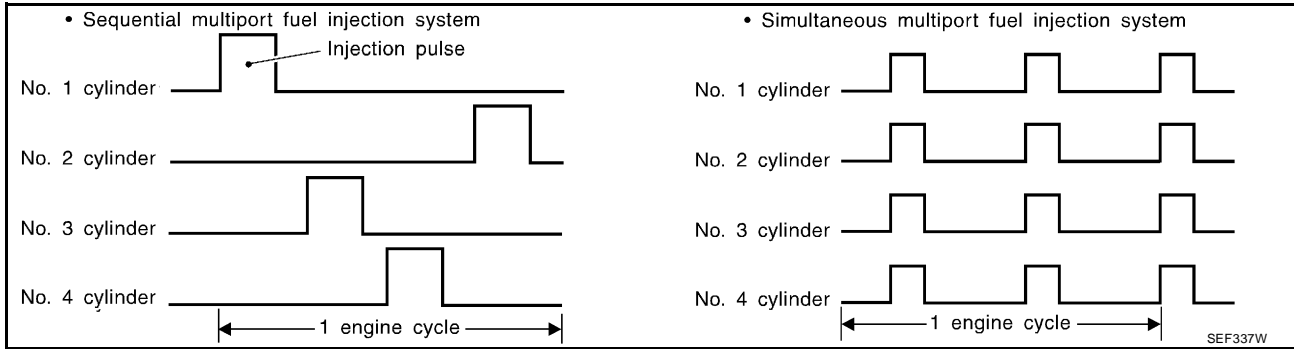
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.

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

“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen 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 injectors will then receive the signals two times for each engine cycle.

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

FUEL SHUT-OFF

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

Electronic Ignition (EI) System INPUT/OUTPUT SIGNAL CHART

UBS00203

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)	Engine speed and 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		
Ignition switch	Start signal		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage		
Vehicle speed sensor	Vehicle speed		

SYSTEM DESCRIPTION

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

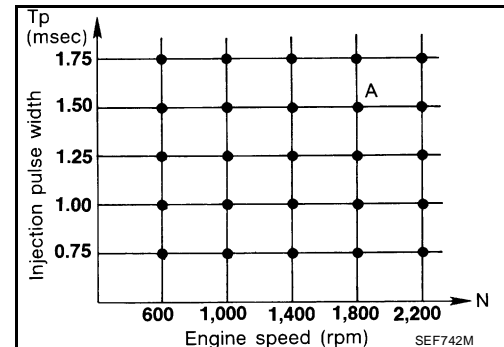
The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.

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

A °BTDC

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

- At starting
- During warm-up
- At idle



- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Air Conditioning Cut Control INPUT/OUTPUT SIGNAL CHART

UBS00204

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner "ON" signal	Air conditioner cut control	Air conditioner relay
Throttle position sensor	Throttle valve opening angle		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		
Power steering oil pressure switch	Power steering operation		
Vehicle speed sensor	Vehicle speed		

SYSTEM DESCRIPTION

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

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- 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.

Fuel Cut Control (at No Load and High Engine Speed) INPUT/OUTPUT SIGNAL CHART

UBS00205

Sensor	Input Signal to ECM	ECM function	Actuator
Park/neutral position (PNP) switch	Neutral position	Fuel cut control	Fuel injectors
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Vehicle speed sensor	Vehicle speed		

SYSTEM DESCRIPTION

If the engine speed is above 1,800 rpm with no load (for example, in neutral and engine speed 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 operate until the engine speed reaches 1,500 rpm, then fuel cut is cancelled.

NOTE:

This function is different from deceleration control listed under "Multiport Fuel Injection (MFI) System", [EC-31](#).

CAN communication SYSTEM DESCRIPTION

UBS00206

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 elec-

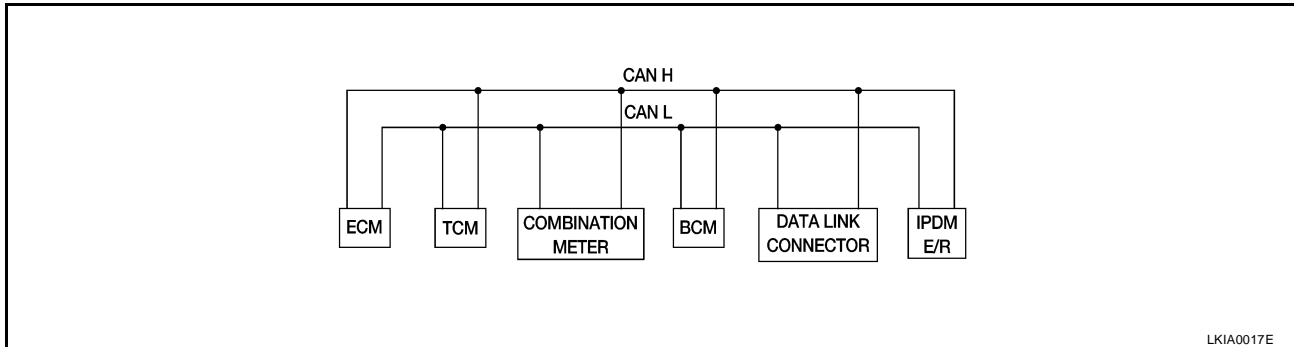
ENGINE CONTROL SYSTEM

[QR]

tronic 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.

FOR A/T MODELS

System Diagram



Input/Output Signal Chart

T: Transmit R: Receive

Signals	ECM	TCM	COMBINATION METER	BCM	IPDM E/R
Engine speed signal	T	R	R		R
Engine coolant temperature signal	T	R	R		
Accelerator pedal position signal	T	R			R
Fuel consumption monitor signal	T		R		
A/T warning lamp signal		T	R		
A/T position indicator signal	R	T	R	R ^(R range only)	
Air conditioner switch signal	R			T	
Air conditioner compressor signal	R				T
A/C compressor request signal	T				R
Blower fan switch signal	R ^(QR25DE)			T	
Cooling fan motor operation signal	R			T	
Cooling Fan Speed Request signal	T				R
Position Lights Request			R	T	R
Position Lights Status				R	T
Low Beam Request				T	R
Low Beam Status	R			R	T
High Beam Request			R	T	R
High Beam Status	R			R	T
Front Fog Lights Request				T	R
Front Fog Light Status				R	T
OD cancel switch signal		R	T		R
Brake switch signal		R	T		
Vehicle speed signal	R		T		
	R		T	R	
Oil Pressure Switch			R		T
Sleep Request1			R	T	
Sleep Request2				T	R
N range switch signal		R	T		

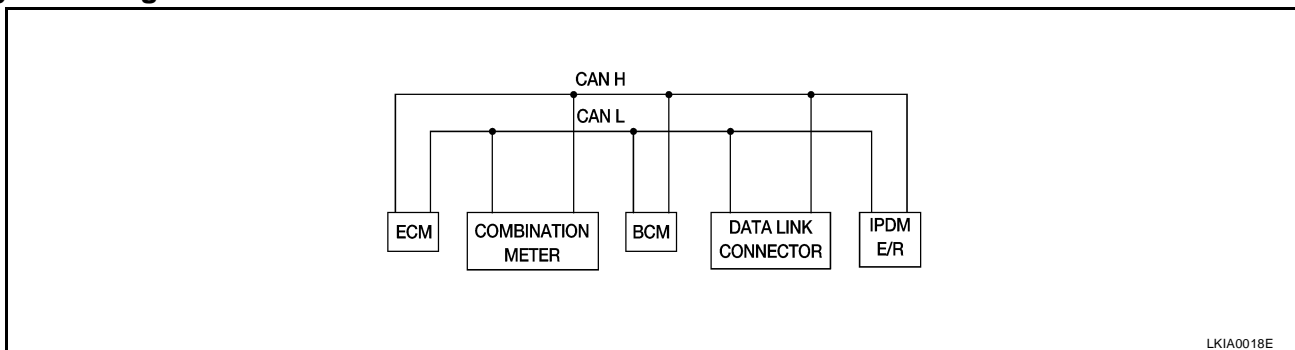
ENGINE CONTROL SYSTEM

[QR]

Signals	ECM	TCM	COMBINATION METER	BCM	IPDM E/R
P range switch signal		R	T		
Seat belt buckle switch signal			T	R	
Door switch signal			R	T	R
Tail lamp request			R	T	R
Turn indicator signal			R	T	
Buzzer output signal			R	T	
Trunk switch signal			R	T	
ASCD main switch signal	T		R		
ASCD cruise signal	T		R		
Wiper operation				R	T
Wiper stop position signal				R	T
Rear window defogger switch signal				T	R
Rear window defogger control signal	R				T

FOR M/T MODELS

System Diagram



LKIA0018E

Input/Output Signal Chart

T: Transmit R: Receive

Signals	ECM	COMBINATION METER	BCM	IPDM E/R
Engine speed signal	T	R		R
Engine coolant temperature signal	T	R		
Fuel consumption monitor signal	T	R		
Air conditioner switch signal	R		T	
Air conditioner compressor signal	R			T
A/C compressor request signal	T			R
Blower fan switch signal	R ^(QR25DE)		T	
Cooling fan motor operation signal	R			T
Cooling Fan Speed Request signal	T			R
Position Lights Request		R	T	R
Position Lights Status			R	T
Low Beam Request			T	R
Low Beam Status	R		R	T
High Beam Request		R	T	R
High Beam Status	R		R	T
Front Fog Lights Request			T	R

ENGINE CONTROL SYSTEM

[QR]

Signals	ECM	COMBINATION METER	BCM	IPDM E/R	
Front Fog Light Status			R	T	A
Vehicle speed signal	R	T			EC
Oil Pressure Switch		R		T	
Sleep Request 1		R	T		
Sleep Request 2			T	R	C
Seat belt buckle switch signal		T	R		
Door switch signal		R	T	R	
Tail lamp request		R	T	R	D
Turn indicator signal		R	T		
Buzzer output signal		R	T		E
Trunk switch signal		R	T		
ASCD main switch signal	T	R			
ASCD cruise signal	T	R			F
Wiper operation			R	T	
Wiper stop position signal			R	T	G
Rear window defogger switch signal			T	R	
Rear window defogger control signal	R			T	H



BASIC SERVICE PROCEDURE

Idle Speed and Ignition Timing Check IDLE SPEED

UBS00207

With CONSULT-II

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

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

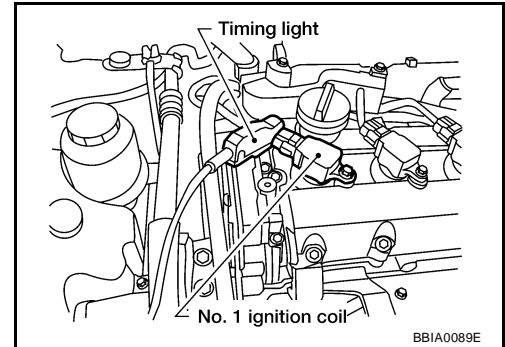
Check idle speed in "MODE 1" with GST.

IGNITION TIMING

Any of following two methods may be used.

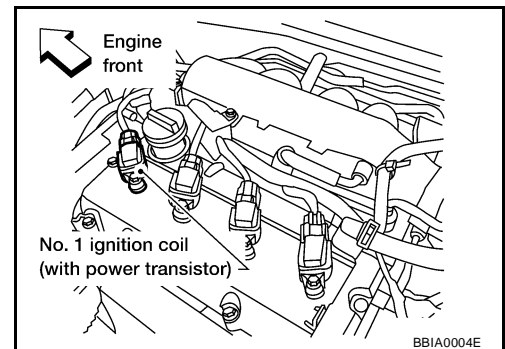
Method A

1. Remove the engine cover (if equipped)
2. Slide the harness protector of ignition coil No. 1 to access the wires.
3. Attach timing light to the wires.
4. Check ignition timing.

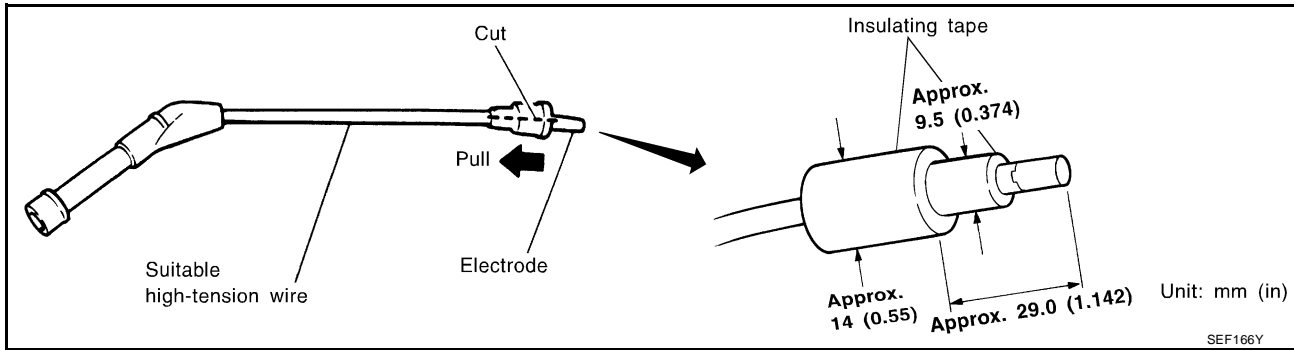
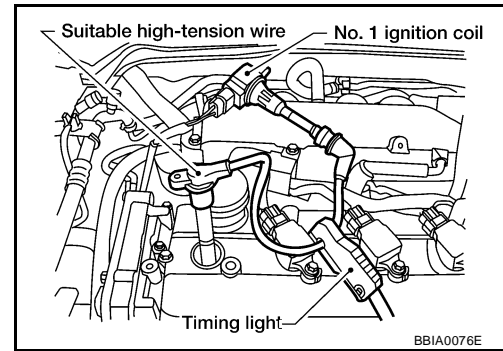


Method B

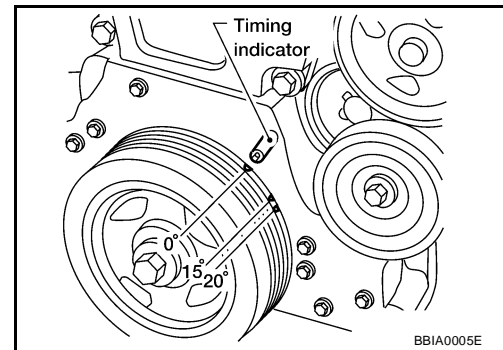
1. Remove No. 1 ignition coil.



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



- Check ignition timing.



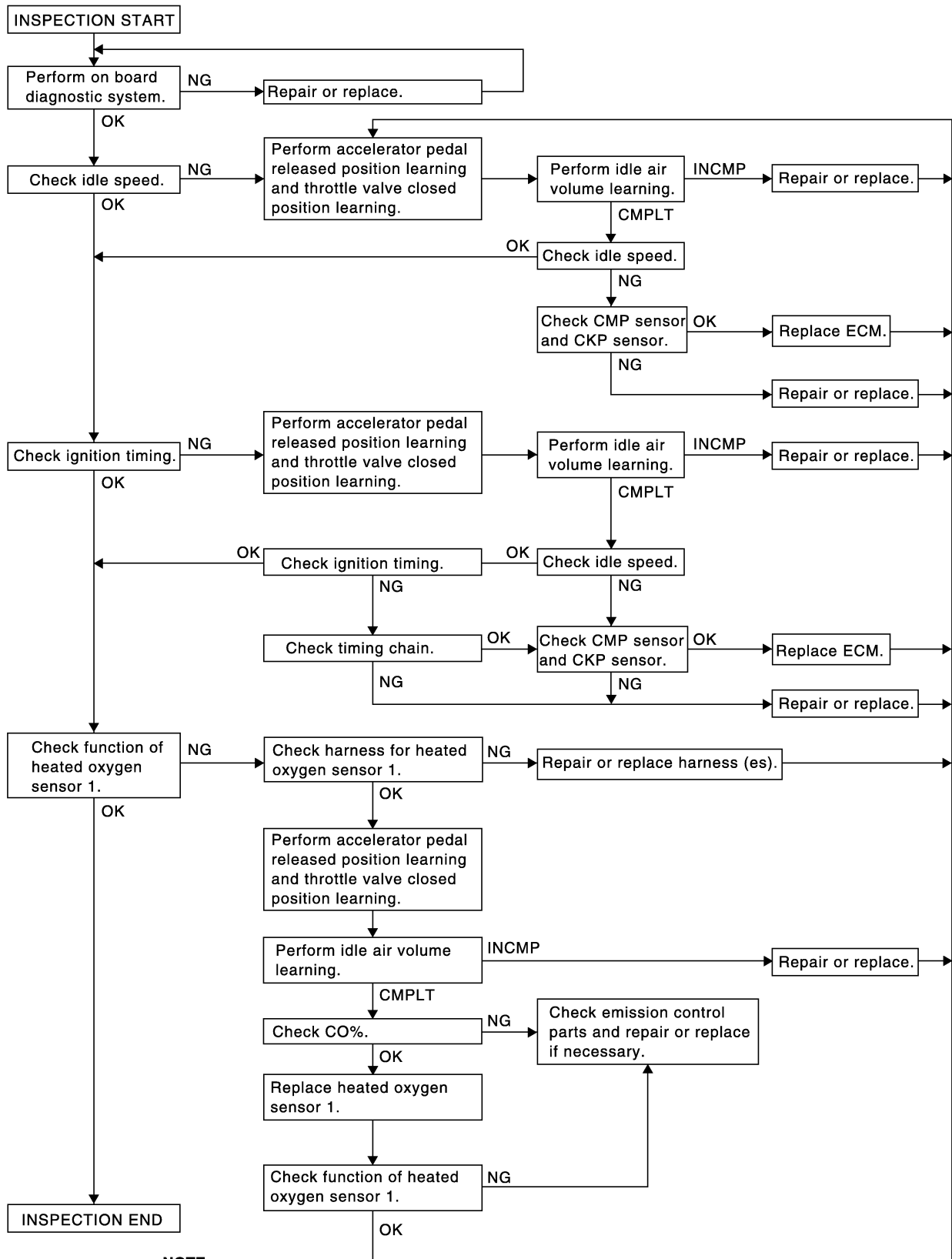
Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment PREPARATION

UBS00208

- Make sure that the following parts are in good order.
 - Battery
 - Ignition system
 - Engine oil and coolant levels
 - Fuses
 - ECM harness connector
 - Vacuum hoses
 - Air intake system
(Oil filler cap, oil level gauge, etc.)
 - Fuel pressure
 - Engine compression
 - Throttle valve
 - Evaporative emission system
- On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".
- On automatic transmission equipped models, when checking idle rpm, ignition timing and mixture ratio, checks should be carried out while shift lever is in "N" position.
- When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
- Turn off headlamps, heater blower, rear window defogger.

6. Keep front wheels pointed straight ahead.

OVERALL INSPECTION SEQUENCE



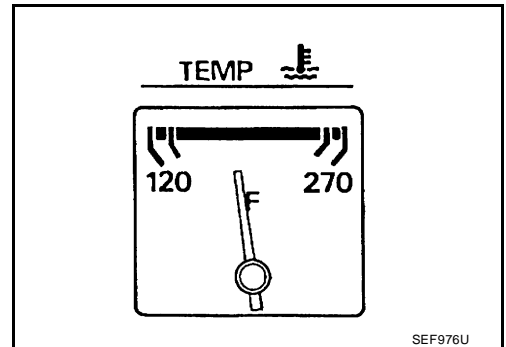
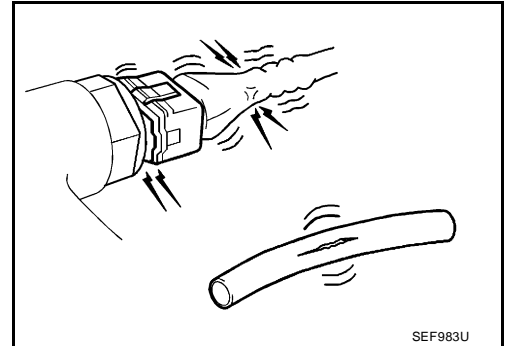
NOTE:

If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

INSPECTION PROCEDURE

1. INSPECTION START

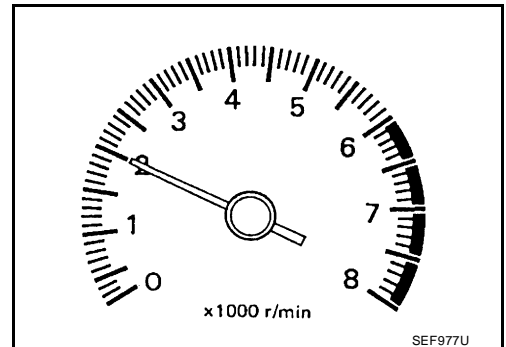
1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses for 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-II 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".

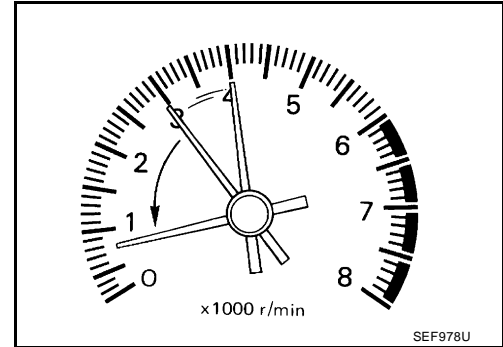
>> GO TO 3.

A
EC
C
D
E
F
G
H
I
J
K
L
M

3. CHECK TARGET IDLE SPEED

📖 With CONSULT-II

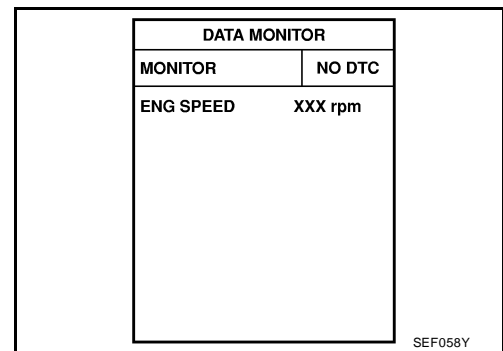
1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)



🚫 Without CONSULT-II

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

M/T: 700 ± 50 rpm

A/T: 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

1. Stop engine.
2. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-49, "Idle Air Volume Learning"](#) .

Which is the result CMPLT or INCMP?

CMPLT or INCMP

CMPLT >> GO TO 7.

INCMP >> 1. Follow the construction of "Idle Air Volume Learning".

2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

Ⓜ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 700 ± 50 rpm

A/T: 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 camshaft position sensor (PHASE) and circuit. Refer to [EC-291](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-284](#) .

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 a problem, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-68, "VIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.

M/T: $15 \pm 5^\circ$ BTDC

A/T: $15 \pm 5^\circ$ BTDC (in "P" or "N" position)

OK or NG

OK (With CONSULT-II)>>GO TO 19.

OK (Without CONSULT-II)>>GO TO 20.

NG >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-49, "Idle Air Volume Learning"](#) .

Which is the result CMPLT or INCMP?

CMPLT or INCMP

CMPLT>> GO TO 14.

INCMP >> 1. Follow the construction of "Idle Air Volume Learning".

2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

Ⓟ **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

ⓧ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 700 ± 50 rpm

A/T: 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.

M/T: 15 ± 5° BTDC

A/T: 15 ± 5° BTDC (in "P" or "N" position)

OK or NG

OK (With CONSULT-II)>>GO TO 19.

OK (Without CONSULT-II)>>GO TO 20.

NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-45, "TIMING CHAIN"](#) .

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 camshaft position sensor (PHASE) and circuit. Refer to [EC-291](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-284](#) .

OK or NG

OK >> GO TO 18.

NG >> 1. Repair or replace.

2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-68, "VIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

19. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

 **With CONSULT-II**

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time: RICH → LEAN → RICH

2 times: RICH → LEAN → RICH → LEAN → RICH

OK or NG

OK >> **INSPECTION END**

NG (Monitor does not fluctuate.)>>GO TO 21.

NG (Monitor fluctuates less than 5 times.)>>GO TO 28.

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

SEF646Y

20. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

⊗ **Without CONSULT-II**

1. Stop engine and set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to [EC-70, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#).
2. Start engine and run it at about 2,000 rpm for about 2 minutes under no-load.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

OK >> **INDPECTION END**

NG (MIL does not come on)>>GO TO 21.

NG (MIL comes on less than 5 times)>>GO TO 28.

21. CHECK HEATED OXYGEN SENSOR 1 HARNESS

1. Turn ignition switch "OFF" and disconnect battery ground cable.
2. Disconnect ECM harness connector.
3. Disconnect heated oxygen sensor 1 harness connector.
4. Check harness continuity between ECM terminal 92 and heated oxygen sensor 1 terminal 1. Refer to [EC-187, "Wiring Diagram"](#).

Continuity should exist.

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

OK or NG

OK >> GO TO 22.

NG >> 1. Repair or replace harness between ECM and heated oxygen sensor 1.
2. GO TO 4.

22. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Reconnect ECM harness connector.
2. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 23.

23. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-49, "Throttle Valve Closed Position Learning"](#).

>> GO TO 24.

24. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-49, "Idle Air Volume Learning"](#).

Which is the result CMPLT or INCMP?

CMPLT or INCMP

CMPLT (With CONSULT-II)>>GO TO 25.

CMPLT (Without CONSULT-II)>>GO TO 26.

INCMP >> 1. Follow the construction of "Idle Air Volume Learning".
2. GO TO 4.

25. CHECK "CO"%

With CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO"%.

Idle CO: 0.3 – 9.5% and engine runs smoothly.

OK or NG

- OK >> GO TO 28.
- NG >> GO TO 27.

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

SEF172Y

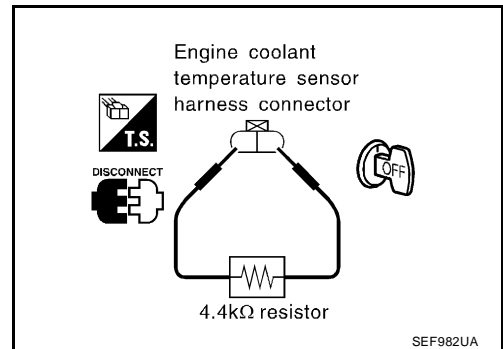
26. CHECK "CO"%

Without CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.
2. Turn ignition switch "OFF".
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO"%.

Idle CO: 0.3 – 9.5% and engine runs smoothly.

7. After checking "CO"%, turn ignition switch "OFF", disconnect the resistor from the terminals of engine coolant temperature sensor harness connector, and then connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.



OK or NG

- OK >> GO TO 28.
- NG >> GO TO 27.

27. RECONNECT HEATED OXYGEN SENSOR 1 HARNESS CONNECTOR

1. Turn ignition switch "OFF".
2. Reconnect heated oxygen sensor 1 harness connector.

>> GO TO 31.

28. REPLACE HEATED OXYGEN SENSOR 1

1. Stop engine.
2. Replace heated oxygen sensor 1.

With CONSULT-II>>GO TO 29.
Without CONSULT-II>>GO TO 30.

29. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

With CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time: RICH → LEAN → RICH

2 times: RICH → LEAN → RICH → LEAN → RICH

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 31.

30. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

Without CONSULT-II

1. Set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to [EC-70, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .
2. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 31.

31. DETECT MALFUNCTIONING PART

Check the following.

- Check fuel pressure regulator and repair or replace if necessary. Refer to [EC-51, "Fuel Pressure Check"](#) .
- Check mass air flow sensor and its circuit, and repair or replace if necessary. Refer to [EC-154](#) , [EC-161](#) and [EC-387](#) .
- Check injector and its circuit, and repair or replace if necessary. Refer to [EC-574](#) .
- Check engine coolant temperature sensor and its circuit, and repair or replace if necessary. Refer to [EC-172](#) and [EC-177](#) .

OK or NG

- OK >> GO TO 33.
 NG >> 1. Repair or replace.
 2. GO TO 32.

32. ERASE UNNECESSARY DTC

After this inspection, unnecessary DTC might be displayed.

Erase the stored memory in ECM and TCM. Refer to [EC-67, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) and [AT-38](#) .

>> GO TO 4.

33. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-68, "VIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

Accelerator Pedal Released Position Learning

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” wait at least 10 seconds.
4. Turn ignition switch “ON” and wait at least 2 seconds.
5. Turn ignition switch “OFF” wait at least 10 seconds.

Throttle Valve Closed Position Learning

DESCRIPTION

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

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch “ON”.
3. Turn ignition switch “OFF” wait at least 10 seconds.
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

Idle Air Volume Learning

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 12.9V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- PNP switch: ON
- Electric load switch: OFF
(Air conditioner, headlamp, rear window defogger)
On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
For A/T models with CONSULT-II, drive vehicle until “FLUID TEMP SE” in “DATA MONITOR” mode of “A/T” system indicates less than 0.9V.
For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes.

OPERATION PROCEDURE

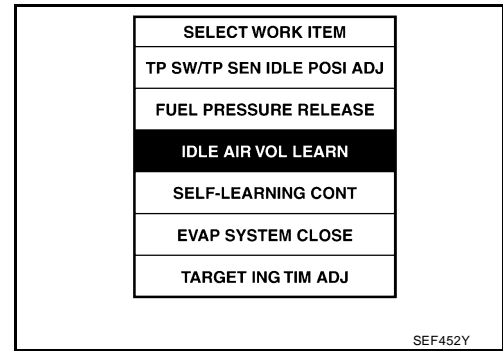
With CONSULT-II

1. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#).
2. Perform [EC-49, "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 “PRE-CONDITIONING” (previously mentioned) are in good order.

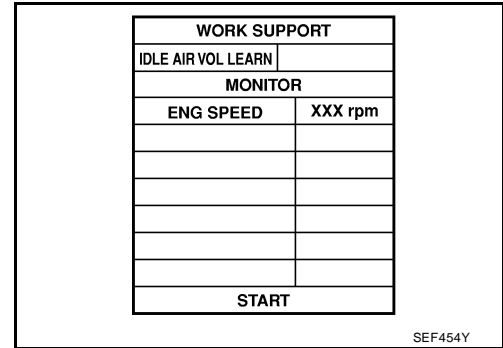
BASIC SERVICE PROCEDURE

[QR]

5. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.



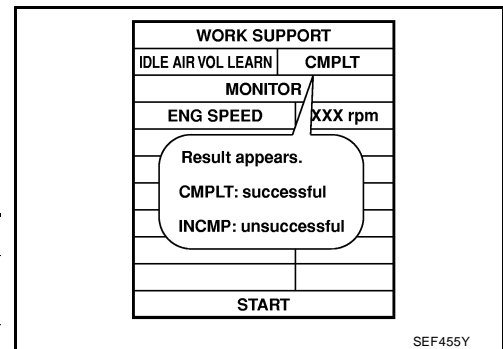
6. Touch "START" and wait 20 seconds.



7. Make sure that "CMPLT" is displayed on CONSULT-II screen. If "INCMP" is displayed, "Idle Air Volume Learning" will not be carried out successfully. In this case, find the cause of the problem by referring to the "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.

ITEM	SPECIFICATION
Idle speed	M/T: 700±50 rpm A/T: 700±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 15±5° BTDC A/T: 15±5° BTDC (in "P" or "N" position)

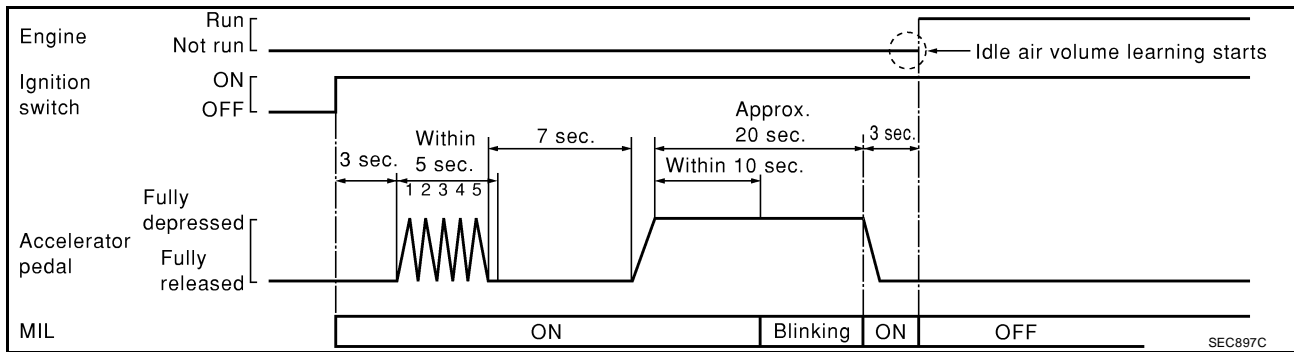


⊗ Without CONSULT-II

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-49, "Accelerator Pedal Released Position Learning"](#) .
 2. Perform [EC-49, "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 "PRE-CONDITIONING" (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 goes off.

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.

ITEM	SPECIFICATION
Idle speed	M/T: 700±50 rpm A/T: 700±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 15±5° BTDC A/T: 15±5° BTDC (in "P" or "N" position)

13. If idle speed and ignition timing are not within the specification, the result will be incomplete. In this case, find the cause of the problem 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 problem.
It is useful to perform [EC-126. "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#).
5. If any of the following conditions occur after the engine has started, eliminate the cause of the problem and perform "Idle air volume learning" all over again:
 - Engine stalls.
 - Erroneous idle.

Fuel Pressure Check

FUEL PRESSURE RELEASE

UBS0020C

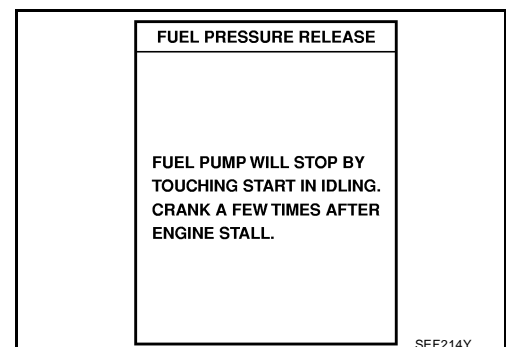
Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

NOTE:

Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because L31 models do not have fuel return system.

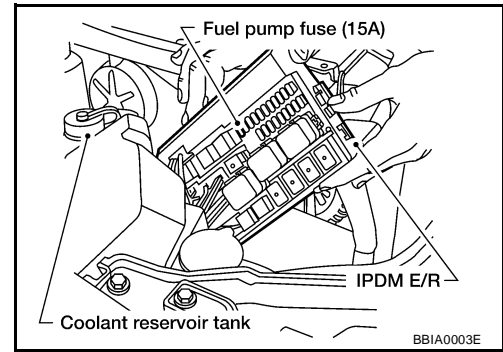
With CONSULT-II

1. Turn ignition switch "ON".
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
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-II**

1. Remove fuel pump fuse located in IPDM E/R.
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.



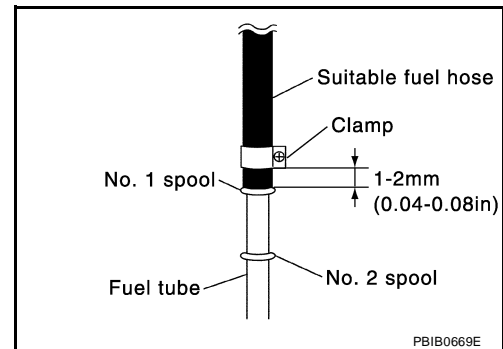
FUEL PRESSURE CHECK

CAUTION:

- 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 sealability 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 [EC-51, "FUEL PRESSURE RELEASE"](#).
2. Prepare fuel hose for fuel pressure check, and connect fuel pressure gauge.
 - 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-16, "INTAKE MANIFOLD"](#).
 - Do not twist or kink fuel hose because it is plastic hose.
 - Do not remove fuel hose from quick connector.
 - Keep the original fuel hose to be free from intrusion of dust or foreign substances with a suitable cover.

4. Install the fuel pressure gauge as shown in the figure.
 - 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 and No.1 spool.
 - 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.
 - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.
 - Use a torque driver to tighten clamps.



BASIC SERVICE PROCEDURE

[QR]

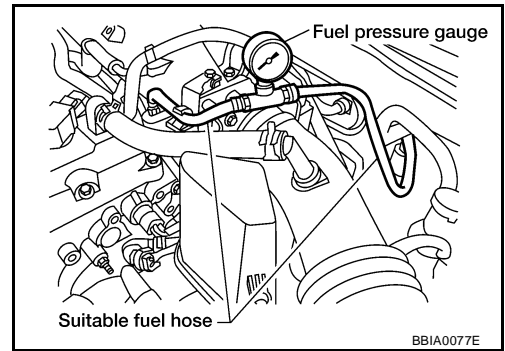
- Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).

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

- Make sure that clamp screw does not contact adjacent parts.
5. 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.
 6. Turn ignition switch "ON", and check for fuel leakage.
 7. Start engine and check for fuel leakage.
 8. 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 (3.7 kg/cm² , 51 psi)

9. If result is unsatisfactory, go to next step.
10. 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.



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ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

Introduction

UBS0020D

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

Emission-related diagnostic information	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979
Calibration ID	Mode 9 of SAE J1979

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	Test value
CONSULT-II	×	×	×	×	×	—
GST	×	×*1	×	—	×	×
ECM	×	×*2	—	—	—	—

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

*2: 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-82](#).)

Two Trip Detection Logic

UBS0020E

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				
Coolant overtemperature enrichment protection — DTC: P0217	—	×	—	—	×	—	—	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
Throttle control motor — DTC: P1128	—	×	—	—	×	—	—	—
Closed loop control — DTC: P1148	—	×	—	—	×	—	—	—
Fail-safe items (Refer to EC-82 .)	—	×	—	—	×	—	×	—
Except above	—	—	—	×	—	×	×	—

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR]

UBS002OF

Emission-related Diagnostic Information EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
CAN COMM CIRCUIT	U1000	1000*6	—	—	×	EC-138
CAN COMM CIRCUIT	U1001	1001*6	—	—	×	EC-138
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—	—	—	—
INT/V TIM CONT-B1	P0011	0011	—	—	×	EC-141
HO2S1 HTR (B1)	P0031	0031	×	×	×*5	EC-144
HO2S1 HTR (B1)	P0032	0032	×	×	×*5	EC-144
HO2S2 HTR (B1)	P0037	0037	×	×	×*5	EC-149
HO2S2 HTR (B1)	P0038	0038	×	×	×*5	EC-149
MAF SEN/CIRCUIT	P0101	0101	—	—	×	EC-154
MAF SEN/CIRCUIT*3	P0102	0102	—	—	—	EC-161
MAF SEN/CIRCUIT*3	P0103	0103	—	—	—	EC-161
IAT SEN/CIRCUIT	P0112	0112	—	—	×	EC-167
IAT SEN/CIRCUIT	P0113	0113	—	—	×	EC-167
ECT SEN/CIRCUIT*3	P0117	0117	—	—	—	EC-172
ECT SEN/CIRCUIT*3	P0118	0118	—	—	—	EC-172
ECT SENSOR	P0125	0125	—	—	×	EC-177
IAT SENSOR	P0127	0127	—	—	×	EC-180
THERMSTAT FNCTN	P0128	0128	—	—	×	EC-183
HO2S1 (B1)	P0132	0132	×	×	×*5	EC-185
HO2S1 (B1)	P0133	0133	×	×	×*5	EC-191
HO2S1 (B1)	P0134	0134	×	×	×*5	EC-200
HO2S2 (B1)	P0138	0138	×	×	×*5	EC-207
HO2S2 (B1)	P0139	0139	×	×	×*5	EC-213
FUEL SYS-LEAN-B1	P0171	0171	—	—	×	EC-220
FUEL SYS-RICH-B1	P0172	0172	—	—	×	EC-226
FTT SENSOR	P0181	0181	—	—	×	EC-232
FTT SEN/CIRCUIT	P0182	0182	—	—	×	EC-234
FTT SEN/CIRCUIT	P0183	0183	—	—	×	EC-234
ENG OVER TEMP	P0217	0217	—	—	×	EC-238
TP SENSOR*3	P0221	0221	—	—	—	EC-250
TP SEN 1/CIRC*3	P0222	0222	—	—	—	EC-257
TP SEN 1/CIRC*3	P0223	0223	—	—	—	EC-257
APP SENSOR*3	P0226	0226	—	—	—	EC-263
APP SEN 1/CIRC*3	P0227	0227	—	—	—	EC-269
APP SEN 1/CIRC*3	P0228	0228	—	—	—	EC-269
MULTI CYL MISFIRE	P0300	0300	—	—	×	EC-275

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR]

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
CYL 1 MISFIRE	P0301	0301	—	—	×	EC-275
CYL 2 MISFIRE	P0302	0302	—	—	×	EC-275
CYL 3 MISFIRE	P0303	0303	—	—	×	EC-275
CYL 4 MISFIRE	P0304	0304	—	—	×	EC-275
KNOCK SEN/CIRC-B1	P0327	0327	—	—	×	EC-280
KNOCK SEN/CIRC-B1	P0328	0328	—	—	×	EC-280
CKP SEN/CIRCUIT	P0335	0335	—	—	×	EC-284
CMP SEN/CIRC-B1	P0340	0340	—	—	×	EC-291
TW CATALYST SYS-B1	P0420	0420	×	×	×*5	EC-297
EVAP PURG FLOW/MON	P0441	0441	×	×	×*5	EC-301
EVAP SMALL LEAK	P0442	0442	×	×	×*5	EC-307
PURG VOLUME CONT/V	P0444	0444	—	—	×	EC-315
PURG VOLUME CONT/V	P0445	0445	—	—	×	EC-315
VENT CONTROL VALVE	P0447	0447	—	—	×	EC-321
EVAP SYS PRES SEN	P0452	0452	—	—	×	EC-328
EVAP SYS PRES SEN	P0453	0453	—	—	×	EC-334
EVAP GROSS LEAK	P0455	0455	—	×	×*5	EC-341
EVAP VERY SML LEAK	P0456	0456	×*4	×	×*5	EC-349
FUEL LEV SEN SLOSH	P0460	0460	—	—	×	EC-358
FUEL LEVEL SENSOR	P0461	0461	—	—	×	EC-363
FUEL LEVL SEN/CIRC	P0462	0462	—	—	×	EC-365
FUEL LEVL SEN/CIRC	P0463	0463	—	—	×	EC-365
VEH SPEED SEN/CIRC*6	P0500	0500	—	—	×	EC-370
ISC SYSTEM	P0506	0506	—	—	×	EC-372
ISC SYSTEM	P0507	0507	—	—	×	EC-374
ECM	P0605	0605	—	—	×	EC-376
MIL/CIRC	P0650	0650	—	—	×	EC-379
PNP SW/CIRC	P0705	0705	—	—	×	AT-103
ATF TEMP SEN/CIRC	P0710	0710	—	—	×	AT-109
VEH SPD SEN/CIR AT*6	P0720	0720	—	—	×	AT-115
ENGINE SPEED SIG	P0725	0725	—	—	×	AT-120
A/T 1ST GR FNCTN	P0731	0731	—	—	×	AT-124
A/T 2ND GR FNCTN	P0732	0732	—	—	×	AT-129
A/T 3RD GR FNCTN	P0733	0733	—	—	×	AT-134
A/T 4TH GR FNCTN	P0734	0734	—	—	×	AT-139
TCC SOLENOID/CIRC	P0740	0740	—	—	×	AT-146
A/T TCC S/V FNCTN	P0744	0744	—	—	×	AT-151
L/PRESS SOL/CIRC	P0745	0745	—	—	×	AT-159
SFT SOL A/CIRC	P0750	0750	—	—	×	AT-165
SFT SOL B/CIRC	P0755	0755	—	—	×	AT-170
ECM BACK UP/CIRC	P1065	1065	—	—	×	EC-383

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR]

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
MAF SENSOR*3	P1102	1102	—	—	—	EC-387
INT/V TIM V/CIR-B1	P1111	1111	—	—	×	EC-393
ETC ACTR*3	P1121	1121	—	—	—	EC-397
ETC FUNCTION/CIRC*3	P1122	1122	—	—	—	EC-399
ETC MOT PWR	P1124	1124	—	—	×	EC-406
ETC MOT PWR*3	P1126	1126	—	—	—	EC-406
ETC MOT	P1128	1128	—	—	—	EC-411
HO2S1 (B1)	P1143	1143	×	×	×*5	EC-416
HO2S1 (B1)	P1144	1144	×	×	×*5	EC-422
HO2S2 (B1)	P1146	1146	×	×	×*5	EC-428
HO2S2 (B1)	P1147	1147	×	×	×*5	EC-435
CLOSED LOOP-B1	P1148	1148	—	—	—	EC-442
ENG OVER TEMP	P1217	1217	—	—	×	EC-444
TP SEN 2/CIRC*3	P1223	1223	—	—	—	EC-455
TP SEN 2/CIRC*3	P1224	1224	—	—	—	EC-455
CTP LEARNING	P1225	1225	—	—	×	EC-461
CTP LEARNING	P1226	1226	—	—	×	EC-463
APP SEN 2/CIRC*3	P1227	1227	—	—	—	EC-465
APP SEN 2/CIRC*3	P1228	1228	—	—	—	EC-465
SENSOR POWER/CIRC*3	P1229	1229	—	—	—	EC-471
EVAP SMALL LEAK	P1442	1442	×	×	×*5	EC-475
PURG VOLUME CONT/V	P1444	1444	—	—	×	EC-477
VENT CONTROL VALVE	P1446	1446	—	—	×	EC-485
VENT CONTROL VALVE	P1448	1448	—	—	×	EC-491
EVAP VERY SML LEAK	P1456	1456	×*4	×	×*5	EC-498
FUEL LEVEL SEN/CIRC	P1464	1464	—	—	×	EC-507
VC/V BYPASS/V	P1490	1490	—	—	×	EC-510
VC CUT/V BYPASS/V	P1491	1491	—	—	×	EC-517
ASCD SW	P1564	1564	—	—	×	EC-526
ASCD BRAKE SW	P1572	1572	—	—	×	EC-533
ASCD VHL SPD SEN	P1574	1574	—	—	×	EC-543
TPV SEN/CIRC A/T	P1705	1705	—	—	×	AT-175
P-N POS SW/CIRCUIT	P1706	1706	—	—	×	EC-545
O/R CLTCH SOL/CIRC	P1760	1760	—	—	×	AT-180
BRAKE SW/CIRCUIT	P1805	1805	—	—	×	EC-549

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

*2: These numbers are prescribed by SAE J2012.

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

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

*5: These are not displayed with GST.

*6: When the fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.

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 [EC-67, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

For malfunctions in which 1st trip DTCs are displayed, refer to [EC-55, "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-II.

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

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in "Work Flow" procedure Step II, refer to [EC-78, "WORK FLOW"](#) . Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the problem. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

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

 **WITH CONSULT-II**

 **WITH GST**

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1148, P1706, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II 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, 1148, 1706, 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-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

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

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

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

DTC display	SELF DIAG RESULTS		1st trip DTC display	SELF DIAG RESULTS	
	DTC RESULTS			DTC RESULTS	
	MAF SEN/CIRCUIT [P0101]	0		MAF SEN/CIRCUIT [P0101]	1t

SEC745C

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, 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-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see [EC-110, "Freeze Frame Data and 1st Trip Freeze Frame Data"](#).

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 A/T related items)
3	1st trip freeze frame data	

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

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in [EC-55, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS"](#).

SYSTEM READINESS TEST (SRT) CODE

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

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

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

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

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

NOTE:

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

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

NOTE:

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

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR]

SRT Item

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

SRT item (CONSULT-II indication)	Performance Priority*1	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
EVAP SYSTEM	1	EVAP control system	P0442, P1442
	2	EVAP control system	P0456, P1456
	2	EVAP control system purge flow monitoring	P0441
HO2S	2	Heated oxygen sensor 1	P0132
		Heated oxygen sensor 1	P0133
		Heated oxygen sensor 1	P0134
		Heated oxygen sensor 1	P1143
		Heated oxygen sensor 1	P1144
		Heated oxygen sensor 2	P0138
		Heated oxygen sensor 2	P0139
		Heated oxygen sensor 2	P1146
		Heated oxygen sensor 2	P1147
HO2S HTR	2	Heated oxygen sensor 1 heater	P0031, P0032
		Heated oxygen sensor 2 heater	P0037, P0038

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

SRT Set Timing

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

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

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR]

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 on the next page.

A

EC

C

D

E

F

G

H

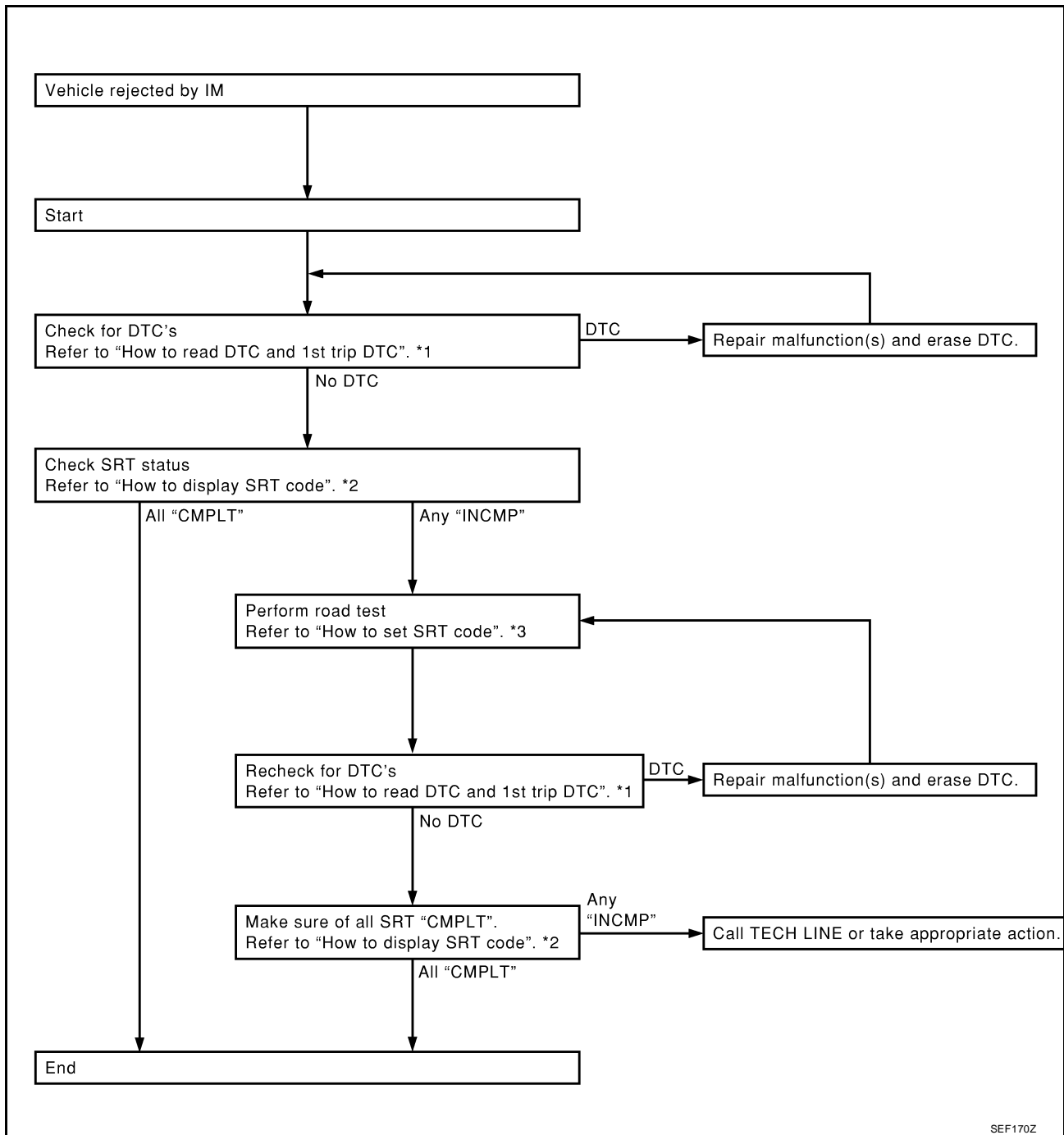
I

J

K

L

M



SEF170Z

*1 [EC-58](#)

*2 [EC-62](#)

*3 [EC-63](#)

How to Display SRT Code

WITH CONSULT-II

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

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

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

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

"CMPLT" means the self-diagnosis is complete and SRT is set.

WITH GST

Selecting Mode 1 with GST (Generic Scan Tool)

SRT STATUS	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	CMPLT

SEF949Z

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-II

Perform corresponding DTC Confirmation Procedure one by one based on "Performance Priority" in the table on [EC-60, "SRT Item"](#).

WITHOUT CONSULT-II

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

A

EC

C

D

E

F

G

H

I

J

K

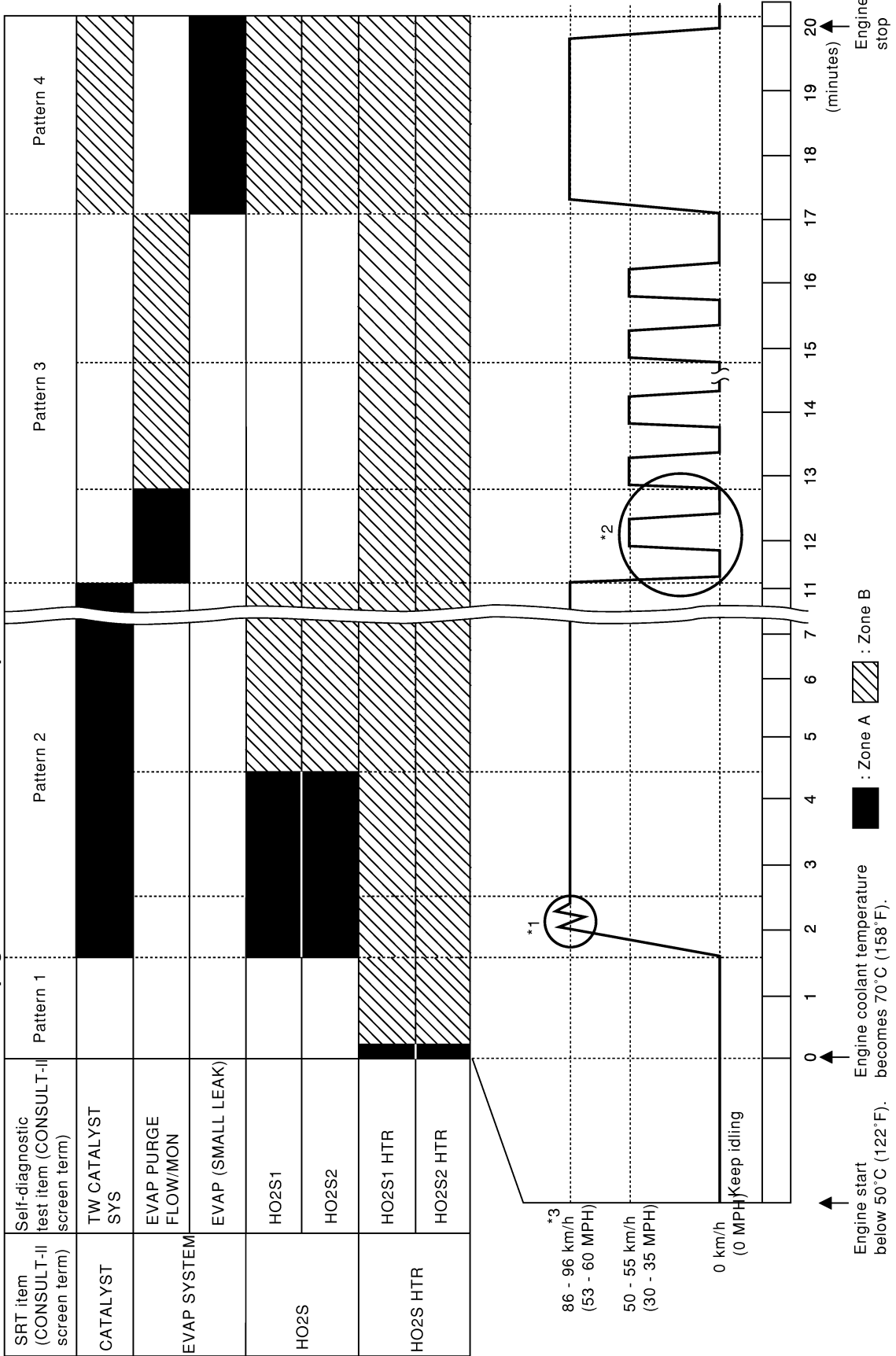
L

M

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



ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR]

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

*: Normal conditions refer to the following:

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

Pattern 1:

- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 93 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 93 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 70 and ground is less than 4.1V).**

Pattern 2:

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

Pattern 3:

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

Pattern 4:

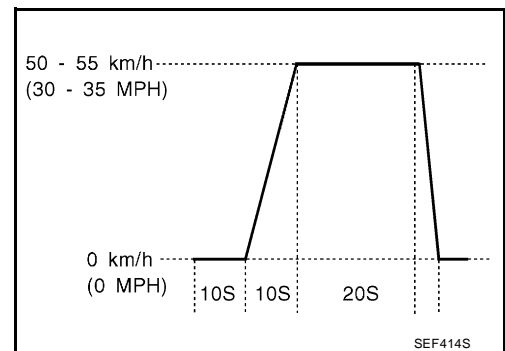
- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

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

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

1. Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
2. Repeat driving pattern shown at right at least 10 times.
- **During acceleration, hold the accelerator pedal as steady as possible.**

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



Suggested Transmission Gear Position for A/T Models

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

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.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR]

	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	24 (15)	24 (15)	24 (15)
2nd to 3rd	29 (18)	40 (25)	40 (25)
3rd to 4th	48 (30)	58 (36)	64 (40)
4th to 5th	62 (39)	64 (40)	75 (45)

Suggested Maximum Speed in Each Gear

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

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

Gear	km/h (MPH)
1st	48 (30)
2nd	88 (55)
3rd	—
4th	—
5th	—

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

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

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

Items for which these data (test value and test limit) are displayed are the same as SRT code items (30 test items).

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

×: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function	01H	01H	Max.	×
		02H	81H	Min.	×
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	×
	EVAP control system purge flow monitoring	06H	83H	Min.	×
	EVAP control system (Very small leak)	07H	03H	Max.	×
HO2S	Heated oxygen sensor 1	09H	04H	Max.	×
		0AH	84H	Min.	×
		0BH	04H	Max.	×
		0CH	04H	Max.	×
	Heated oxygen sensor 2	0DH	04H	Max.	×
		19H	86H	Min.	×
		1AH	86H	Min.	×
		1BH	06H	Max.	×
		1CH	06H	Max.	×

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
HO2S HTR	Heated oxygen sensor 1 heater	29H	08H	Max.	×
		2AH	88H	Min.	×
	Heated oxygen sensor 2 heater	2DH	0AH	Max.	×
		2EH	8AH	Min.	×

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

Ⓟ How to Erase DTC (With CONSULT-II)

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

If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).

NOTE:

If the DTC is not for A/T related items (see EC-15), skip steps 2 through 4.

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

How to erase DTC (With CONSULT-II)

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 10 seconds and then turn it “ON” (engine stopped) again.

SELECT SYSTEM
ENGINE
A/T

SELECT DIAG MODE
SELF-DIAG RESULTS
DATA MONITOR
DTC WORK SUPPORT
TCM PART NUMBER

SELF-DIAG RESULTS	
DTC RESULTS	TIME
SHIFT SOLENOID/V A	

2. Turn **CONSULT-II** “ON”, and touch “A/T”.

3. Touch “SELF-DIAG RESULTS”.

4. Touch “ERASE”. (The DTC in the TCM will be erased.)

SELECT SYSTEM
ENGINE
A/T

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
ACTIVE TEST
DTC & SRT CONFIRMATION
ECM PART NUMBER

SELF-DIAG RESULTS	
DTC RESULTS	TIME
SFT SOL A/CIRC [P0750]	0

5. Touch “ENGINE”.

6. Touch “SELF-DIAG RESULTS”.

7. Touch “ERASE”. (The DTC in the ECM will be erased.)

How to Erase DTC (With GST)

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

NOTE:

If the DTC is not for A/T related items (see [EC-15](#)), skip step 2.

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

How to Erase DTC (No Tools)

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once.
 2. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
 3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal. Refer to [EC-70, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .
- **If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.**
 - **The following data are cleared when the ECM memory is erased.**
 1. Diagnostic trouble codes
 2. 1st trip diagnostic trouble codes
 3. Freeze frame data
 4. 1st trip freeze frame data
 5. System readiness test (SRT) codes
 6. Test values
 7. Others

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

VIS (Nissan Vehicle Immobilizer System — NATS)

UBS0020G

- **If the security indicator lights up with the ignition switch in the "ON" position or "NATS MALFUNCTION" is displayed on "SELF-DIAG RESULTS" screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to [BL-116, "NVIS\(NISSAN Vehicle Immobilizer System-NATS\)"](#) .**
- **Confirm no self-diagnostic results of NVIS (NATS) is displayed before touching "ERASE" in "SELF-DIAG RESULTS" mode with CONSULT-II.**
- **When replacing ECM, initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card.**

SELF DIAG RESULTS	
DTC RESULTS	TIME
NATS MALFUNCTION [P1610]	0

SEF543X

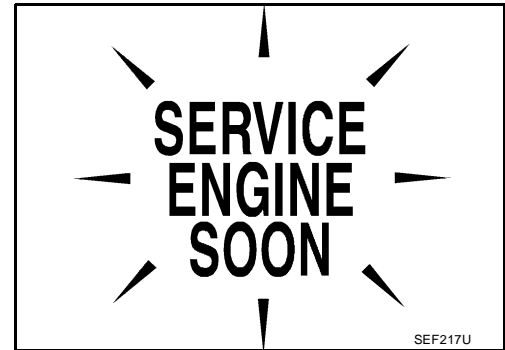
Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, IVIS/NVIS.

Malfunction Indicator Lamp (MIL)

DESCRIPTION







The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
If the MIL does not light up, refer to [DI-22, "WARNING LAMPS"](#), or see [EC-379](#).
2. When the engine is started, the MIL should go off.
If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following four functions.

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"> ● "Coolant overtemperature enrichment protection" ● "Misfire (Possible three way catalyst damage)" ● "Closed loop control" ● "Throttle control motor" ● Fail-safe mode
Mode II	Ignition switch in "ON" position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running 	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

MIL Flashing Without DTC

If the ECM is in Diagnostic Test Mode II, MIL may flash when engine is running. In this case, check ECM diagnostic test mode. [EC-70, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#).

How to switch the diagnostic test (function) modes, and details of the above functions are described later. [EC-70, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#).

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

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

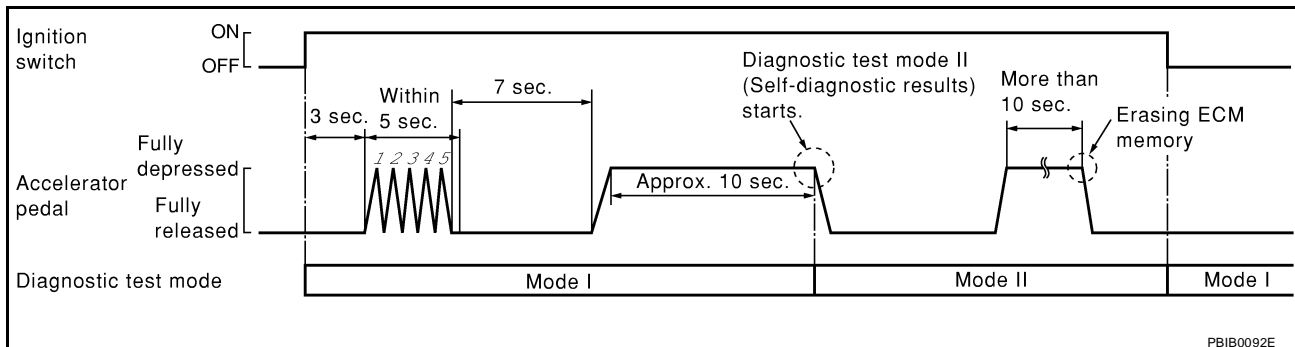
HOW TO SWITCH DIAGNOSTIC TEST MODE

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



How to Set Diagnostic Test Mode II (Heated Oxygen Sensor 1 Monitor)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-70, "How to Set Diagnostic Test Mode II \(Self-diagnostic Results\)"](#).
2. Start Engine.
ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).
ECM will start heated oxygen sensor 1 monitoring from the bank 1 sensor.

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

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-70, "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-22, "WARNING LAMPS"](#) or see [EC-379](#).

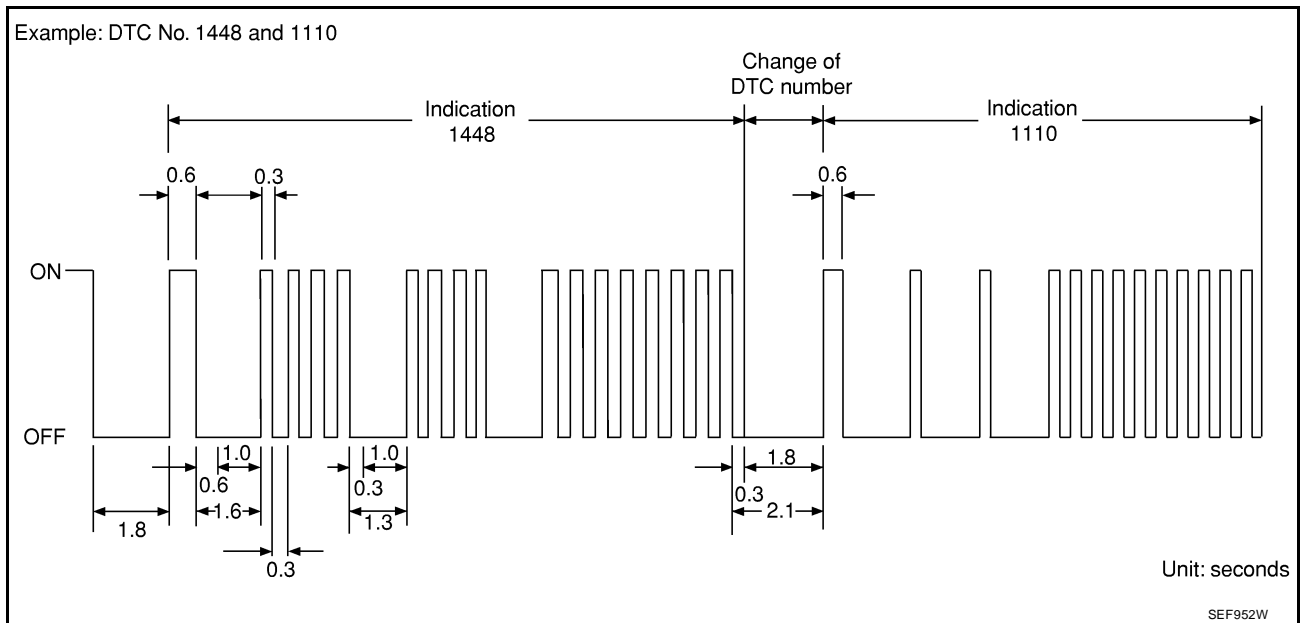
DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
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 unidentified codes can be identified by using the CONSULT-II 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 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-15, "INDEX FOR DTC"](#))

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 [EC-70, "How to Erase Diagnostic Test Mode II \(Self-diagnostic Results\)"](#) .

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

DIAGNOSTIC TEST MODE II — HEATED OXYGEN SENSOR 1 MONITOR

In this mode, the MIL displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MIL	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.

Next run engine at about 2,000 rpm for about 2 minutes under no-load conditions. Then make sure that the MIL comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no-load.

OBD System Operation Chart

UBS00201

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-54, "Two Trip Detection Logic"](#) .
- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT-II will count the number of times the vehicle is driven.
- 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)

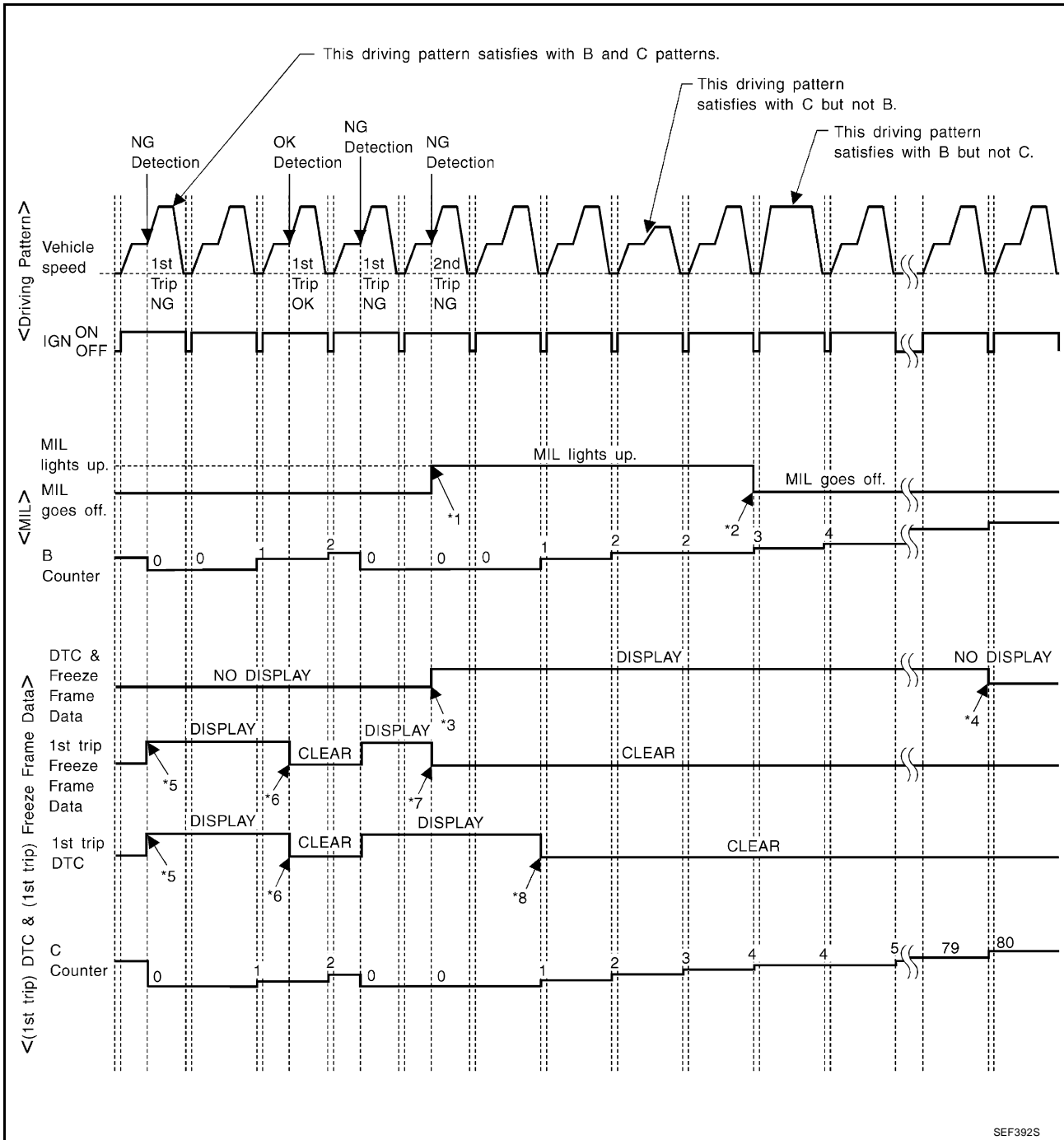
For details about patterns "B" and "C" under "Fuel Injection System" and "Misfire", see [EC-74](#) .

For details about patterns "A" and "B" under "Other", see [EC-76](#) .

*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"



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

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

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

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

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

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

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

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

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

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

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

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

<Driving Pattern C>

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:

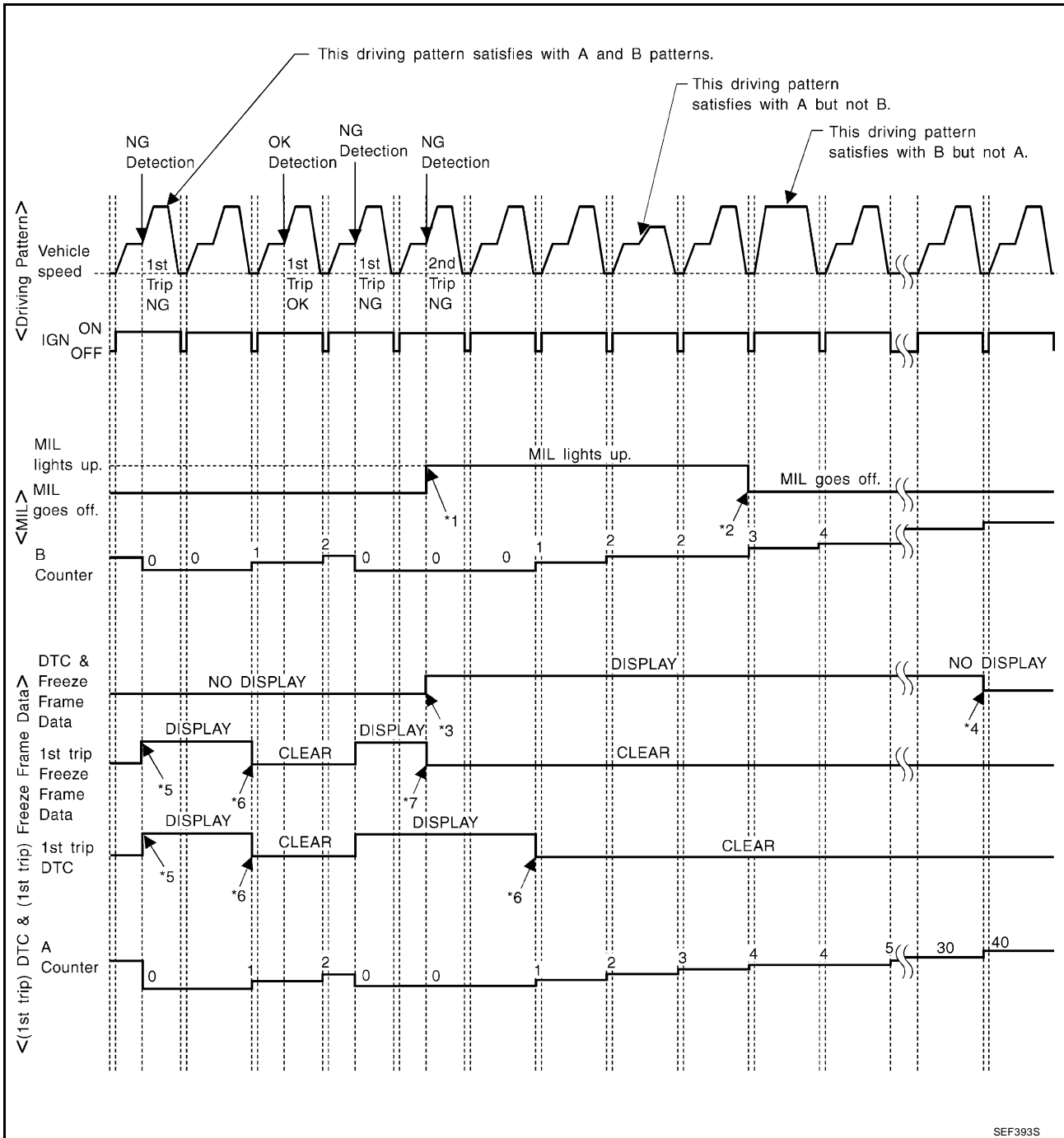
Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

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

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



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

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

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

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

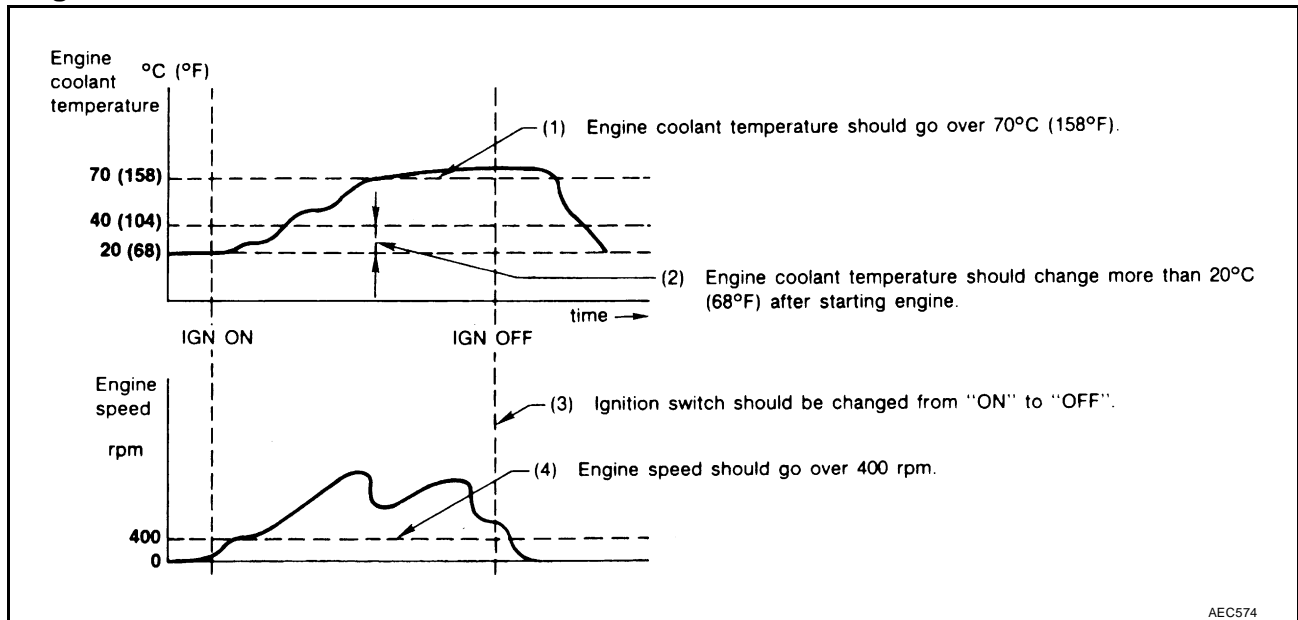
*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

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

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

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").

TROUBLE DIAGNOSIS

Trouble Diagnosis Introduction INTRODUCTION

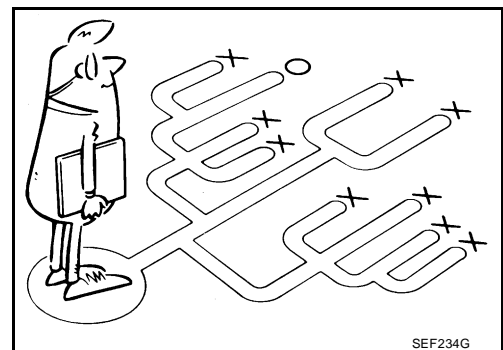
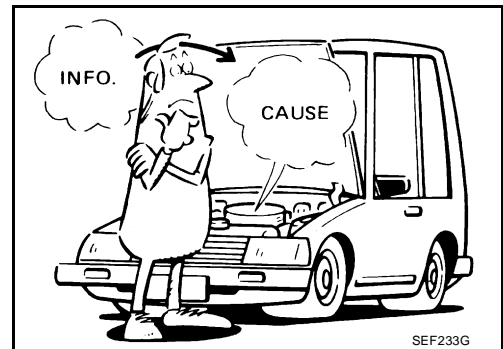
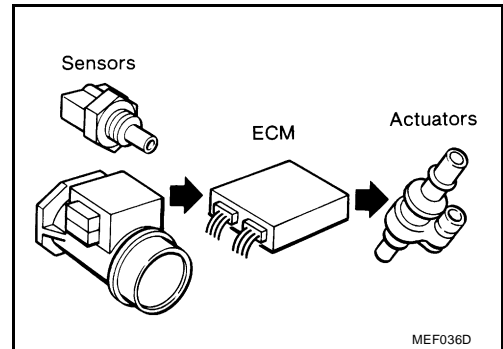
The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that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

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

A visual check only may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on [EC-78](#).

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example on [EC-81](#) should be used.

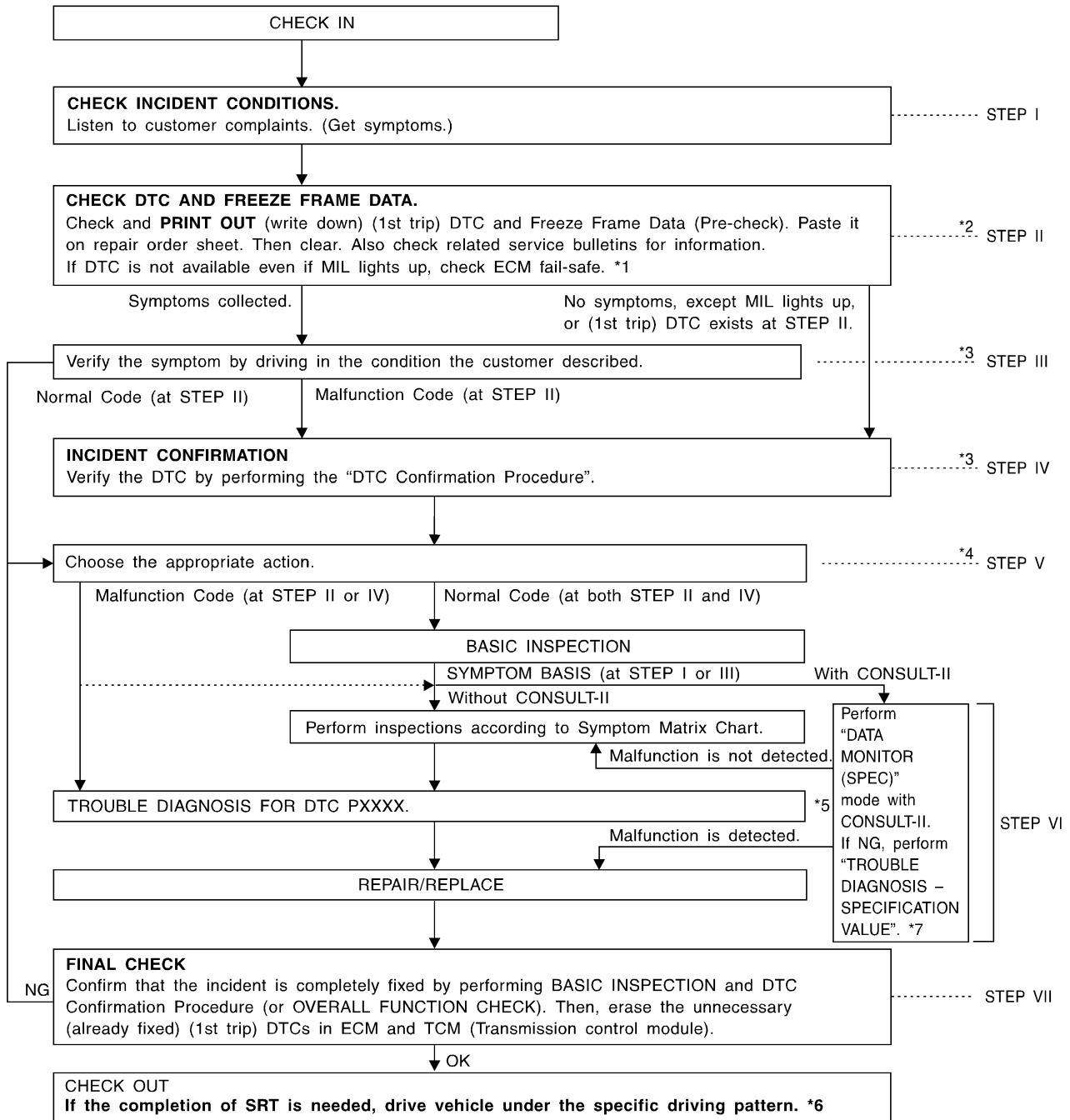
Start your diagnosis by looking for "conventional" problems first. This will help troubleshoot driveability problems on an electronically controlled engine vehicle.



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WORK FLOW

Flow Chart



SEF510ZF

*1 [EC-82](#)

*2 If time data of "SELF-DIAG RESULTS" is other than "0" or "[1t]", perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

*3 If the incident cannot be verified, perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

*4 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to [EC-131, "POWER SUPPLY CIRCUIT FOR ECM"](#).

*5 If malfunctioning part cannot be detected, perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

*6 [EC-64](#)

*7 [EC-126](#)

TROUBLE DIAGNOSIS

[QR]

Description for Work Flow

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", EC-80 .
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or GST) the (1st trip) DTC and the (1st trip) freeze frame data, then erase the DTC and the data. (Refer to EC-67 .) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. If the incident cannot be verified, perform EC-130. "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See EC-89 .) Also check related service bulletins for information.
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The "DIAGNOSTIC WORK SHEET" and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform EC-130. "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . If the malfunction code is detected, skip STEP IV and perform STEP V.
STEP IV	Try to detect the (1st trip) DTC by driving in (or performing) the "DTC Confirmation Procedure". Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or GST. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform EC-130. "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . In case the "DTC Confirmation Procedure" is not available, perform the "Overall Function Check" instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified "check" is an effective alternative. The "NG" result of the "Overall Function Check" is the same as the (1st trip) DTC detection.
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-84 .) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS – SPECIFICATION VALUE". (Refer to EC-126 .) (If malfunction is detected, proceed to "PERAIR/REPLACE".) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-89 .)
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-99 , EC-120 . The "Diagnostic Procedure" in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to "Circuit Inspection" in GI-25. "How to Perform Efficient Diagnosis for an Electrical Incident" . Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform EC-130. "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the "DTC Confirmation Procedure" and confirm the normal code [DTC No. P0000] is detected. If the incident is still detected in the final check, perform STEP VI by using a method different from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to EC-67. "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" and AT-38. "HOW TO ERASE DTC" .)

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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 a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

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

Some conditions may cause the 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

TROUBLE DIAGNOSIS

[QR]

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> ● U1000 U1001 CAN communication line ● P0101 P0102 P0103 P1102 Mass air flow sensor ● P0112 P0113 P0127 Intake air temperature sensor ● P0117 P0118 P0125 Engine coolant temperature sensor ● P0128 Thermostat function ● P0181 P0182 P0183 Fuel tank temperature sensor ● P0221 P0222 P0223 P1223 P1224 P1225 P1226 P1229 Throttle position sensor ● P0226 P0227 P0228 P1227 P1228 Accelerator pedal position sensor ● P0327 P0328 Knock sensor ● P0335 Crankshaft position sensor (POS) ● P0340 Camshaft position sensor (PHASE) ● P0460 P0461 P0462 P0463 P1464 Fuel level sensor ● P0500 Vehicle speed sensor ● P0605 ECM ● P1610-P1615 NATS ● P1706 Park/Neutral position (PNP) switch
2	<ul style="list-style-type: none"> ● P0031 P0032 Heated oxygen sensor 1 heater ● P0037 P0038 Heated oxygen sensor 2 heater ● P0132 P0133 P0134 P1143 P1144 Heated oxygen sensor 1 ● P0138 P0139 P1146 P1147 Heated oxygen sensor 2 ● P0217 Coolant overtemperature enrichment protection ● P0441 EVAP control system purge flow monitoring ● P0444 P0445 P1444 EVAP canister purge volume control solenoid valve ● P0447 P1446 P1448 EVAP canister vent control valve ● P0452 P0453 EVAP control system pressure sensor ● P0506 P0507 Idle speed control system ● P0650 MIL ● P0705-P0725, P0740-P0755, P1705 P1760 A/T related sensors and solenoid valves ● P1065 ECM power supply ● P1111 Intake valve timing control solenoid valve ● P1122 Electric throttle control function ● P1124 P1126 P1128 Electric throttle control actuator ● P1490 P1491 Vacuum cut valve bypass valve ● P1805 Brake switch
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/P1442 P0456/P1456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) ● P0455 EVAP control system (GROSS LEAK) ● P0731-P0734 A/T function ● P1121 Electric throttle control actuator ● P1148 Closed loop control ● P1217 Engine over temperature (OVERHEAT) ● P1564 ASCD steering switch ● P1572 ASCD brake switch ● P1574 ASCD vehicle speed sensor

Fail-safe Chart

UBS002OL

The ECM enters fail-safe mode, if any of the following malfunctions is detected. When the ECM enters the fail-safe mode, the MIL illuminates.

TROUBLE DIAGNOSIS

[QR]

DTC No.	Detected items	Engine operating condition in fail-safe mode								
P0102 P0103 P1102	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	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.								
		<table border="1"> <thead> <tr> <th>Condition</th> <th>Engine coolant temperature decided (CONSULT-II display)</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or Start</td> <td>40°C (104°F)</td> </tr> <tr> <td>More than approx. 4 minutes after ignition ON or Start</td> <td>80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td>40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table>	Condition	Engine coolant temperature decided (CONSULT-II display)	Just as ignition switch is turned ON or Start	40°C (104°F)	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
Condition	Engine coolant temperature decided (CONSULT-II display)									
Just as ignition switch is turned ON or Start	40°C (104°F)									
More than approx. 4 minutes after ignition ON or Start	80°C (176°F)									
Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)									
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.								
P0221 P0222 P0223 P1223 P1224	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.								
P0226 P0227 P0228 P1227 P1228	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.								
P1121	Electric throttle control actuator (ECM detect 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" position, and engine speed will not exceed 1,000 rpm or more.								
P1122	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.								
P1126	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.								
P1229	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.								

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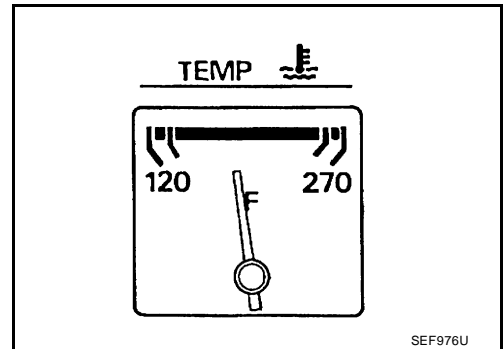
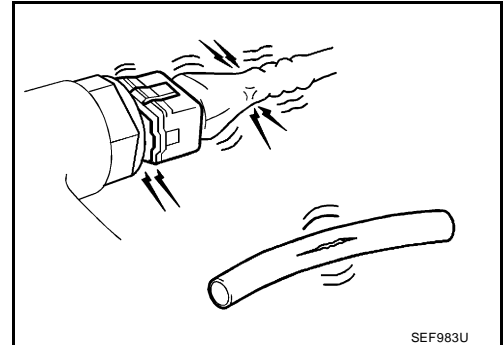
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Basic Inspection

1. INSPECTION START

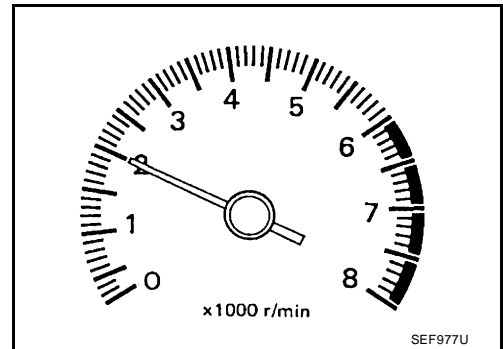
1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses for 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-II or GST.

OK or NG

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



2. REPAIR OR REPLACE

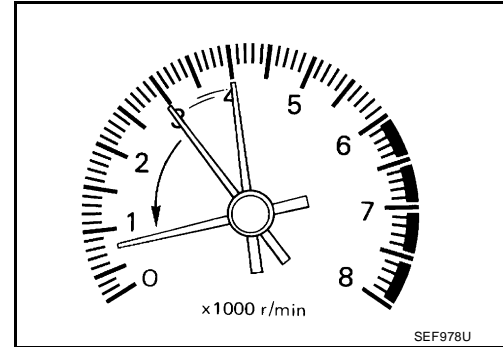
Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

>> GO TO 3.

3. CHECK TARGET IDLE SPEED

④ With CONSULT-II

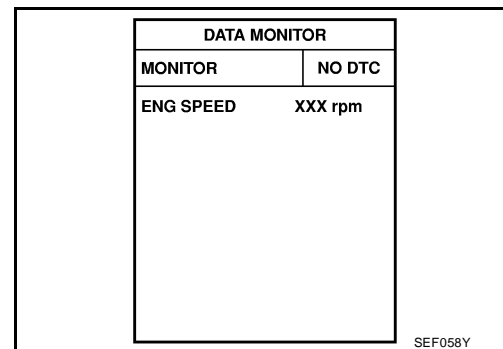
1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)



⊗ Without CONSULT-II

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

M/T: 700 ± 50 rpm

A/T: 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

1. Stop engine.
2. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

1. Stop engine.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#).

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-49, "Idle Air Volume Learning"](#) .

Which is the result CMPLT or INCMP

CMPLT or INCMP

CMPLT >> GO TO 7.

INCMP >> 1. Follow the construction of "Idle Air Volume Learning".
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 700 ± 50 rpm

A/T: 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 camshaft position sensor (PHASE) and circuit. Refer to [EC-291](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-284](#) .

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 a problem, but this is the rarely the case.)
2. Perform initialization of NATS system and registration of NATS ignition key IDs. Refer to [EC-68, "VIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.

M/T: $15 \pm 5^\circ$ BTDC

A/T: $15 \pm 5^\circ$ BTDC (in "P" or "N" position)

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

1. Stop engine.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#).

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-49, "Idle Air Volume Learning"](#).

**Which is the result CMPLT or
INCMP**

CMPLT or INCMP

CMPLT >> GO TO 14.

INCMP >> 1. Follow the construction of "Idle Air Volume Learning".

2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

Ⓜ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

Ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 700 ± 50 rpm

A/T: 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.

M/T: $15 \pm 5^\circ$ BTDC

A/T: $15 \pm 5^\circ$ BTDC (in "P" or "N" position)

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-45, "TIMING CHAIN"](#) .

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 camshaft position sensor (PHASE) and circuit. Refer to [EC-291](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-284](#) .

OK or NG

OK >> GO TO 18.

NG >> 1. Repair or replace.
2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is the rarely the case.)
2. Perform initialization of NATS system and registration of NATS ignition key IDs. Refer to [EC-68, "VIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

TROUBLE DIAGNOSIS

[QR]

UBS0020N

Symptom Matrix Chart 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-584
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-51
	Injector circuit	1	1	2	3	2		2	2			2			EC-574
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-614
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-626
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			EC-84
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-397 , EC-399 , EC-406 , EC-411
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-84
	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-131
Mass air flow sensor circuit		1	1	2	2	2		2	2			2			EC-154 , EC-161 , EC-387
Engine coolant temperature sensor circuit		1	1	2	2	2	3	2	2	3	1	2			EC-172 , EC-177
Throttle position sensor circuit			1	2		2	2	2	2	2		2			EC-250 , EC-257 , EC-455 , EC-461 , EC-463 , EC-471
Accelerator pedal position sensor circuit				3	2	1	2			2					EC-263 , EC-269 , EC-465
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			EC-185 , EC-191 , EC-200 , EC-416 , EC-422
Knock sensor circuit				2	2							3			EC-280
Crankshaft position sensor (POS) circuit		2	2												EC-284
Camshaft position sensor (PHASE) circuit		2	2												EC-291

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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	
Vehicle speed signal circuit		2	3		3						3			EC-370
Power steering oil pressure switch circuit		2				3	3	3	3					EC-591
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-376 , EC-383
Intake valve timing control solenoid valve circuit	3	3	2		1	3	2	2	3		3			EC-393
VIAS control solenoid valve circuit					1									EC-565
PNP switch circuit			3		3	3	3	3	3		3			EC-545
Start signal circuit	2													EC-580
Refrigerant pressure sensor circuit		2				3	3	3	3		4			EC-596
Electrical load signal circuit						3	3	3	3					EC-601
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	MTC-28

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

TROUBLE DIAGNOSIS

[QR]

SYSTEM — ENGINE MECHANICAL & OTHER

		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 tank	5	5												FL-8													
	Fuel piping			5	5	5		5	5			5				EC-1116, EM-29												
	Vapor lock			5													—											
	Valve deposit																—											
	Poor fuel (Heavy weight gasoline, Low octane)			5	5	5	5		5	5				5			—											
Air	Air duct	5	5	5	5	5	5	5	5	5	5	5	5	5	EM-14													
	Air cleaner														EM-14													
	Air leakage from air duct (Mass air flow sensor —electric throttle control actuator)														EM-14													
	Electric throttle control actuator														EM-16													
	Air leakage from intake manifold/Collector/Gasket														EM-16													
Cranking	Battery	1	1	1	1	1	1	1	1	1	1	1	1	1	SC-4													
	Generator circuit														SC-25													
	Starter circuit														3													SC-9
	Signal plate/Flywheel/Drive plate														6													EM-67
	PNP switch														4													MT-12 or AT-103
Engine	Cylinder head	5	5	5	5	5	5	5	5	5	5	5	5	5	5	EM-53												
	Cylinder head gasket															4	3											
	Cylinder block																											
	Piston																4											
	Piston ring																											
	Connecting rod															6	6	6	6		6	6		6				EM-67
	Bearing																											
	Crankshaft																											

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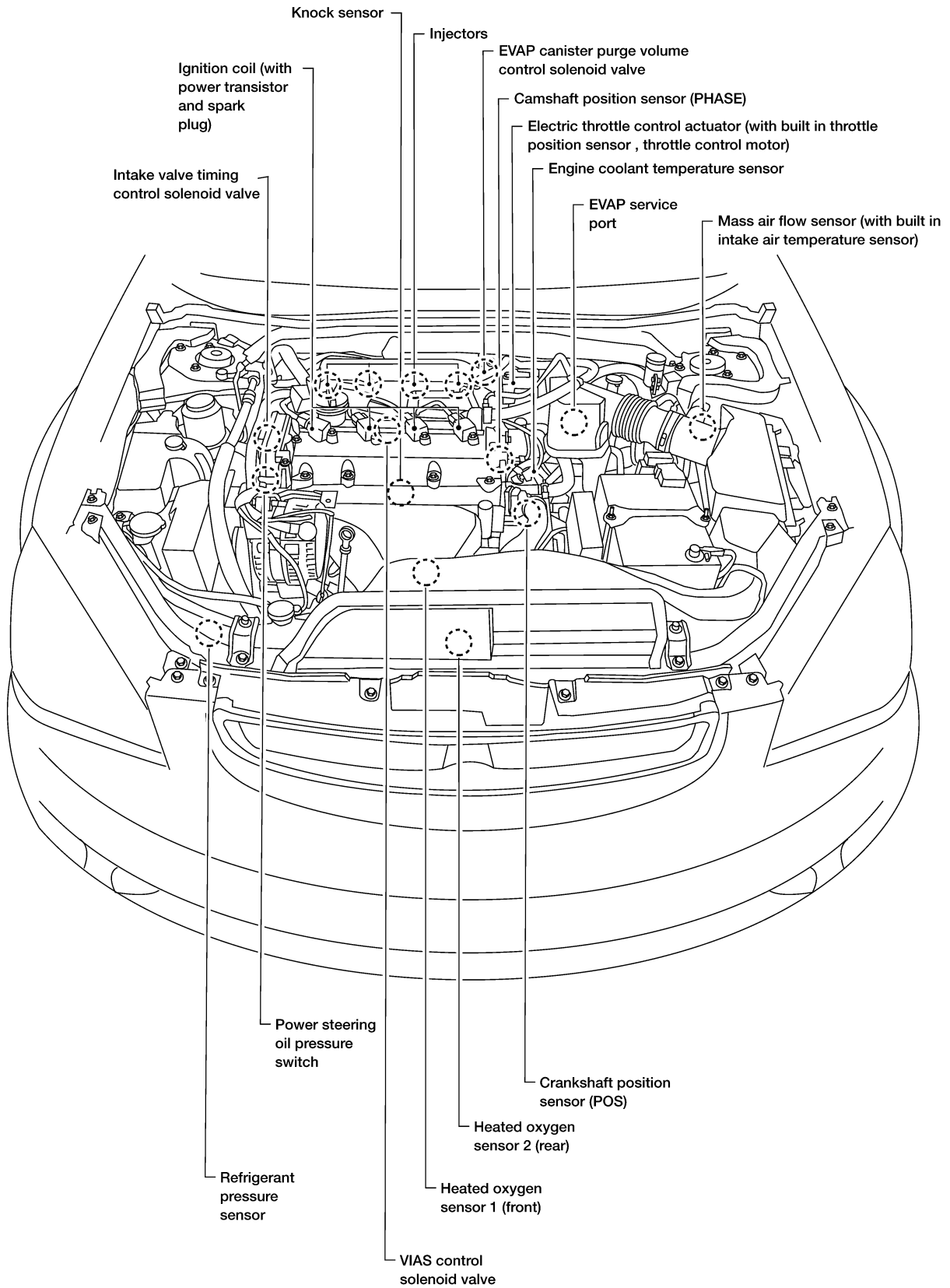
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		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER 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	
Valve mechanism	Timing chain														EM-45
	Camshaft														EM-34
	Intake valve timing control	5	5	5	5	5		5	5			5			EM-45
	Intake valve												3		EM-53
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			EM-21 , EX-3
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5	2		EM-23 , LU-8 , LU-9 , LU-4
	Oil level (Low)/Filthy oil														LU-6
Cooling	Radiator/Hose/Radiator filler cap														CO-12
	Thermostat									5					CO-20
	Water pump														CO-18
	Water gallery	5	5	5	5	5		5	5		2	5			CO-9
	Cooling fan									5					CO-12
	Coolant level (low)/Contaminated coolant														CO-10
NVIS (NISSAN Vehicle Immobilizer System — NATS)		1	1												EC-68 or BL-116

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

Engine Control Component Parts Location

UBS00200



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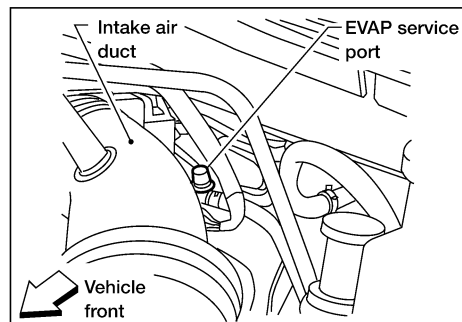
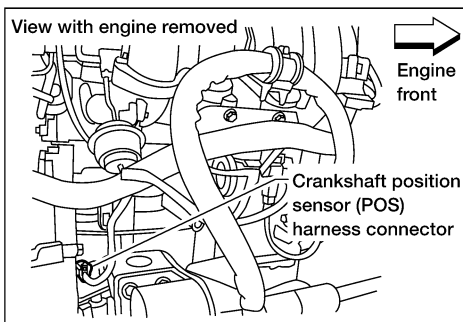
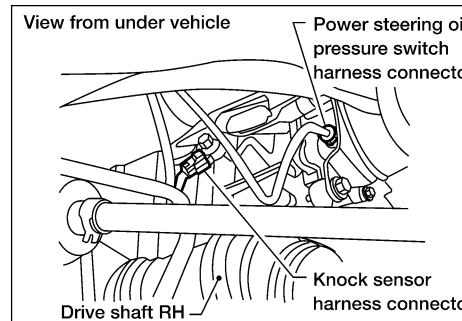
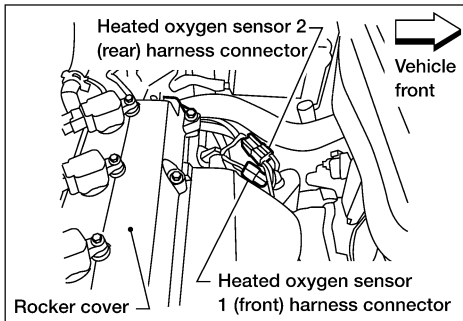
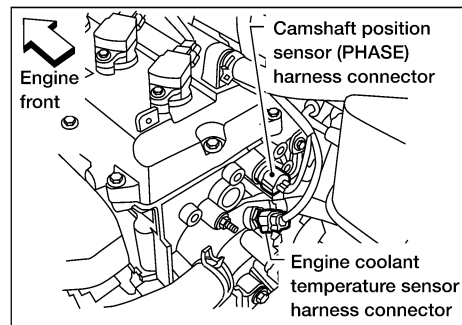
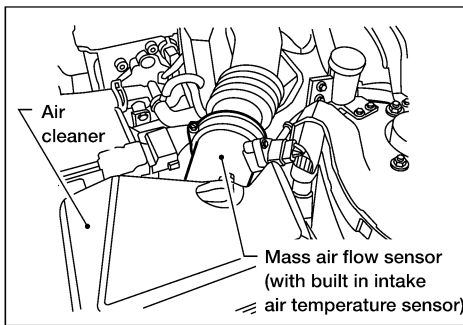
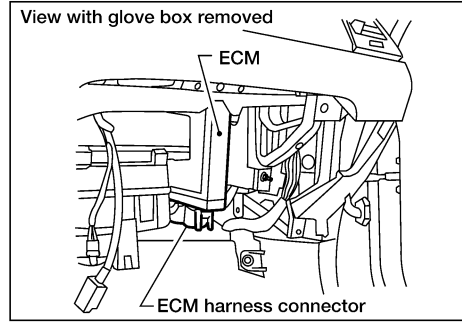
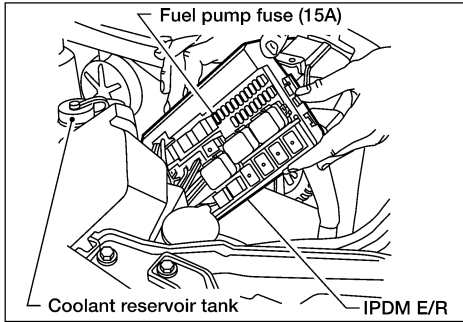
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TROUBLE DIAGNOSIS

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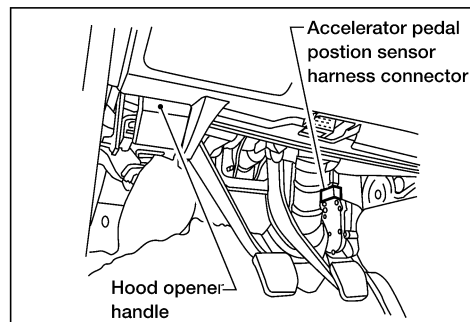
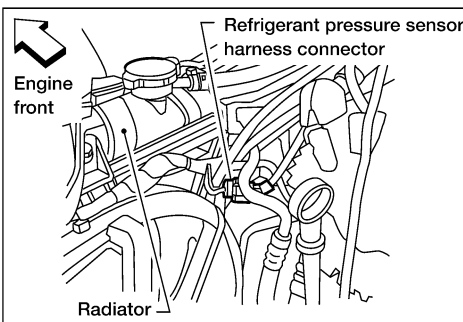
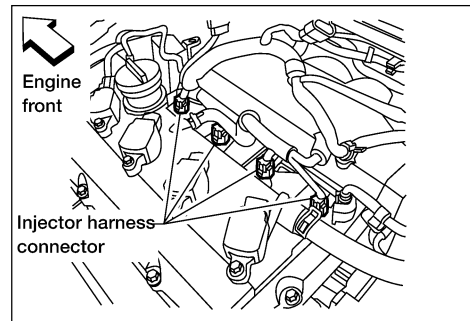
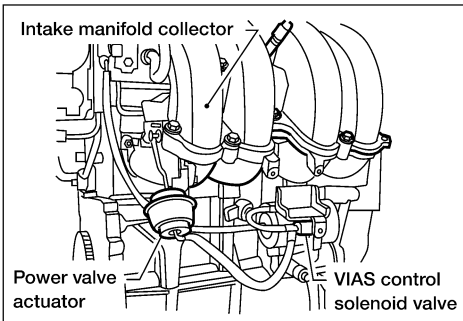
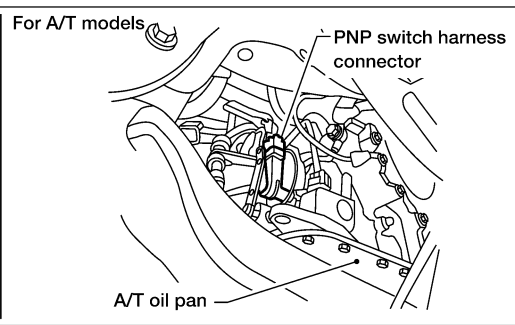
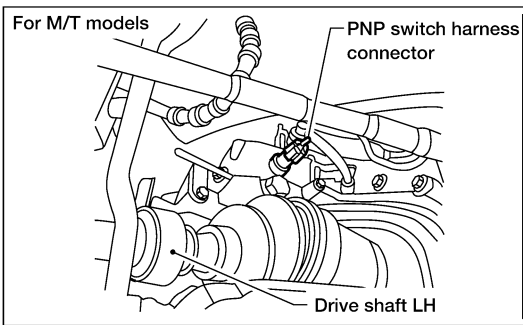
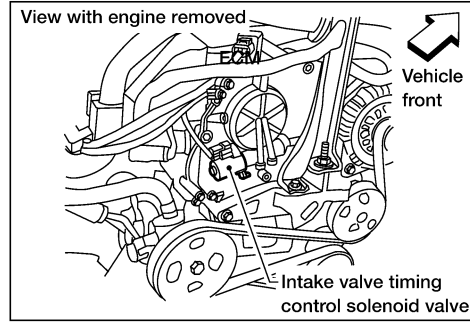
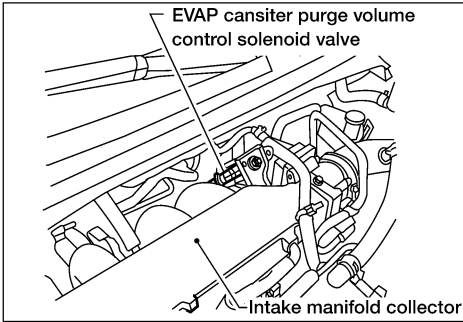
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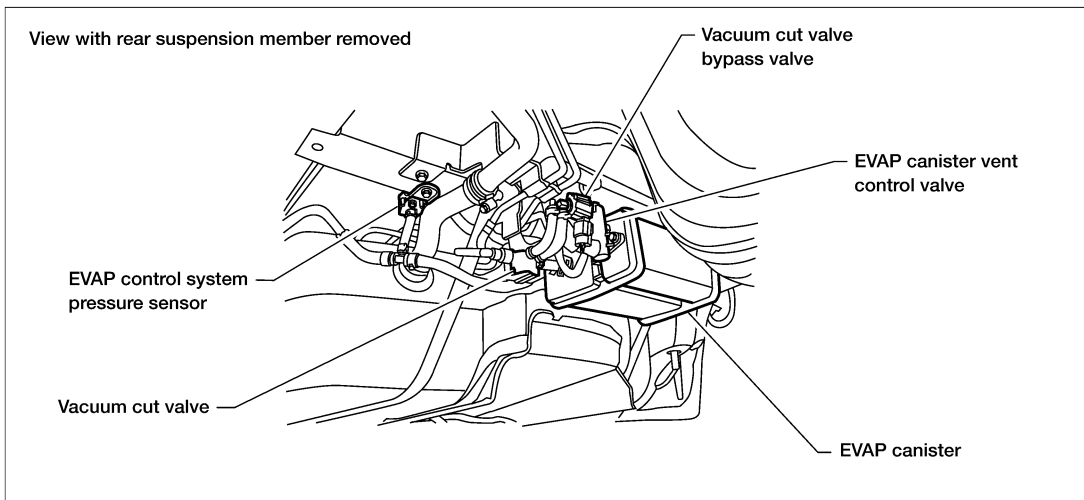
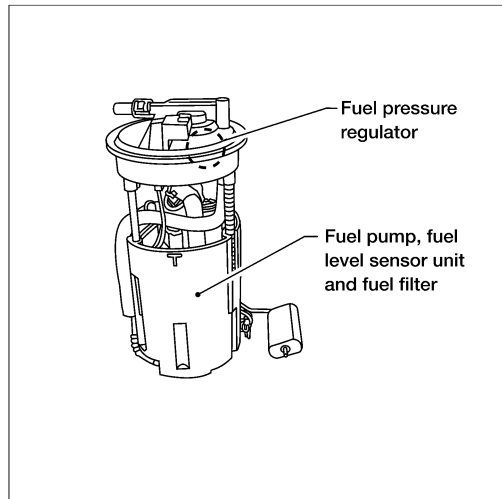
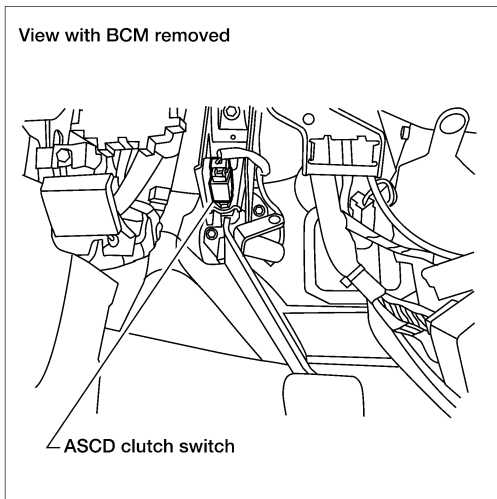
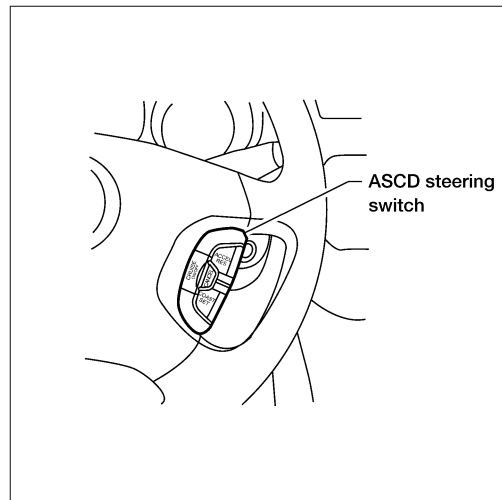
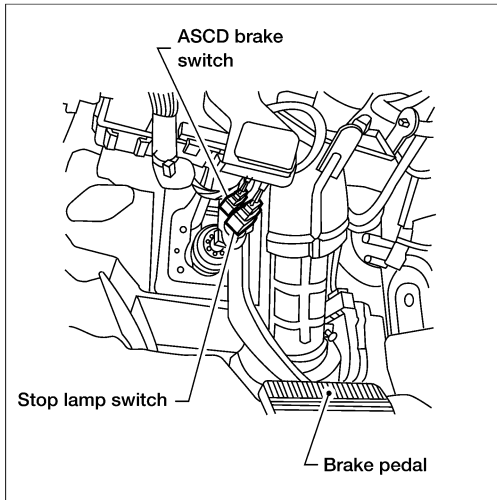
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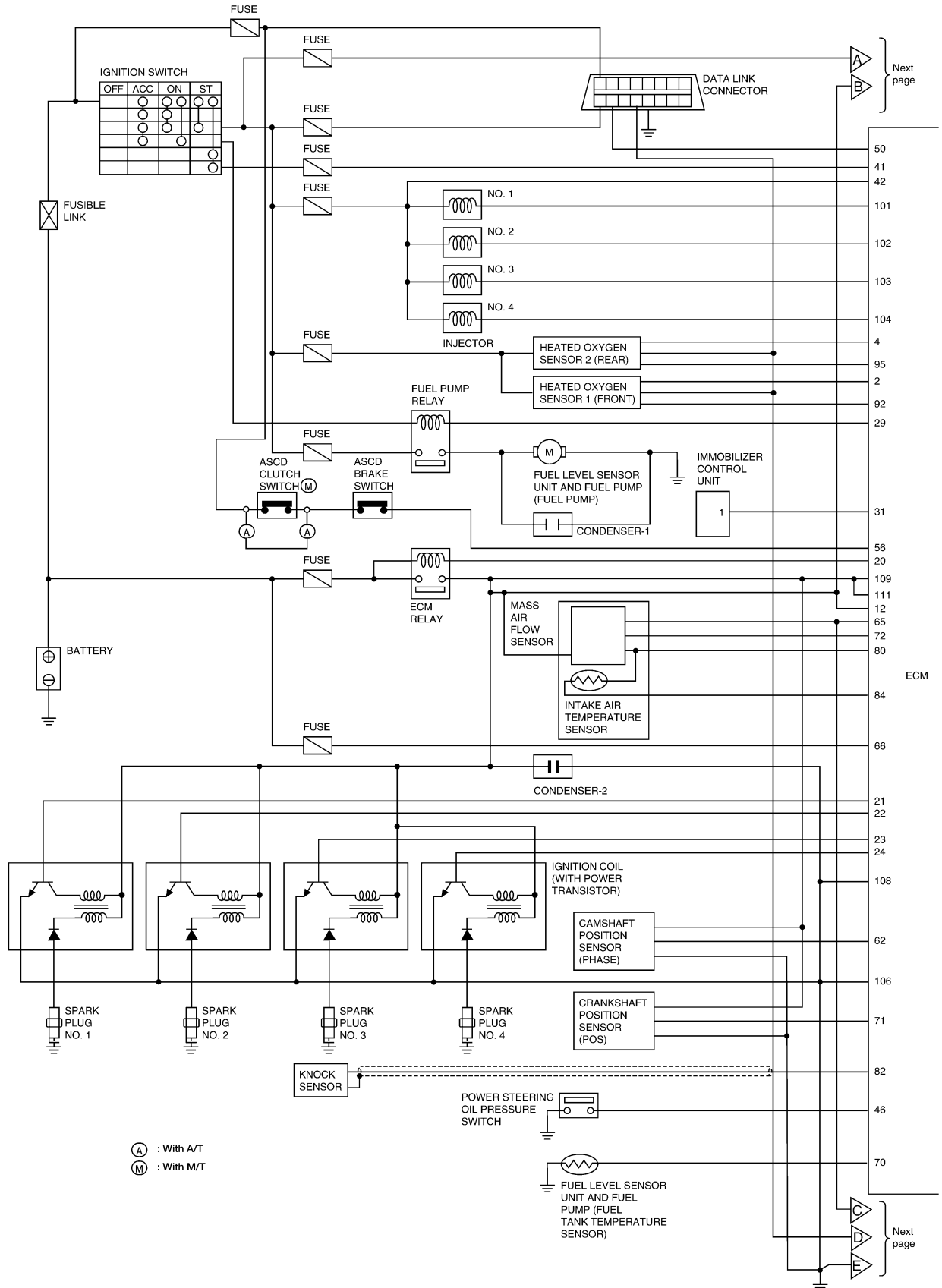


TROUBLE DIAGNOSIS

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Circuit Diagram

UBS0020P

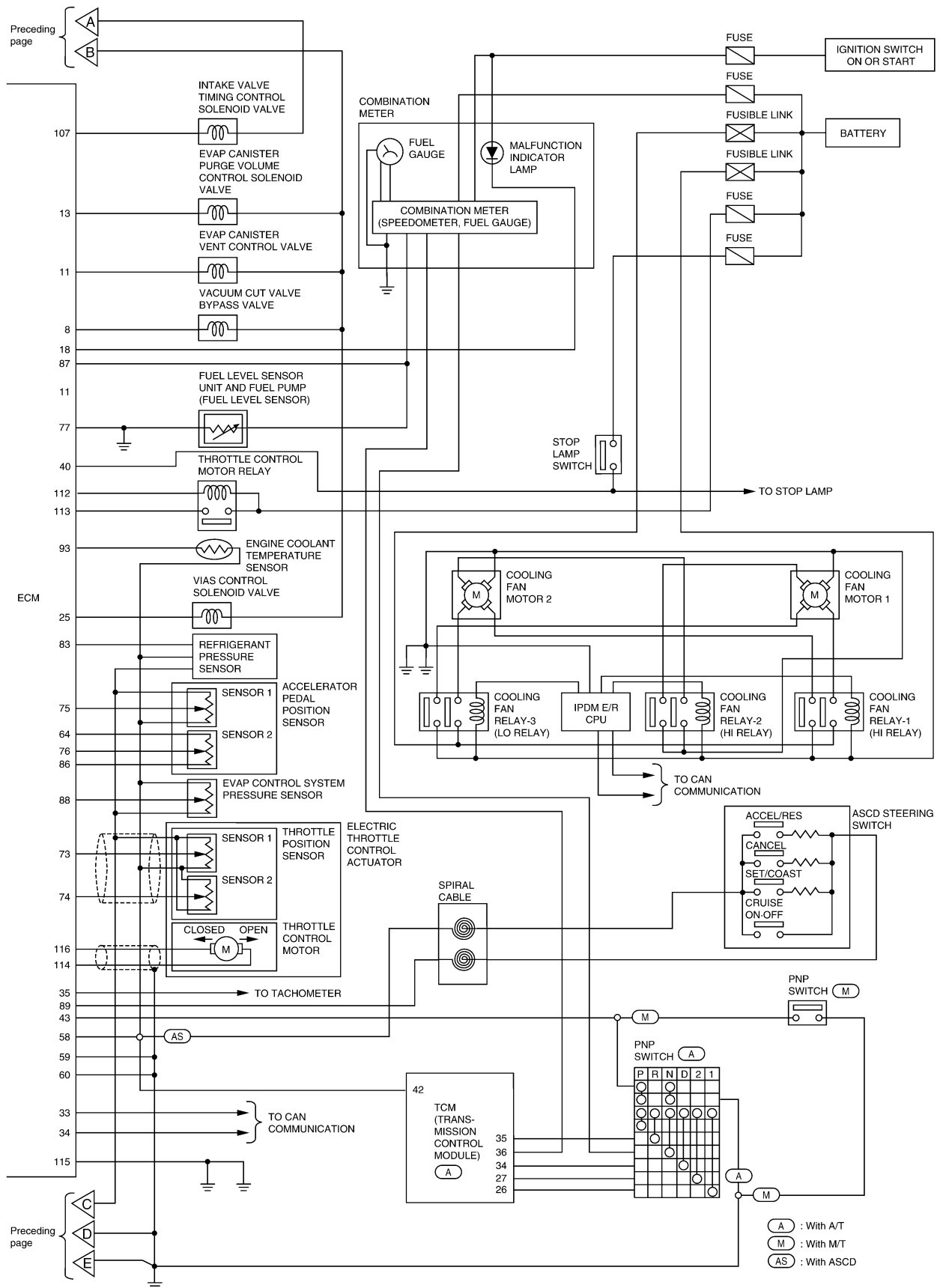


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TROUBLE DIAGNOSIS

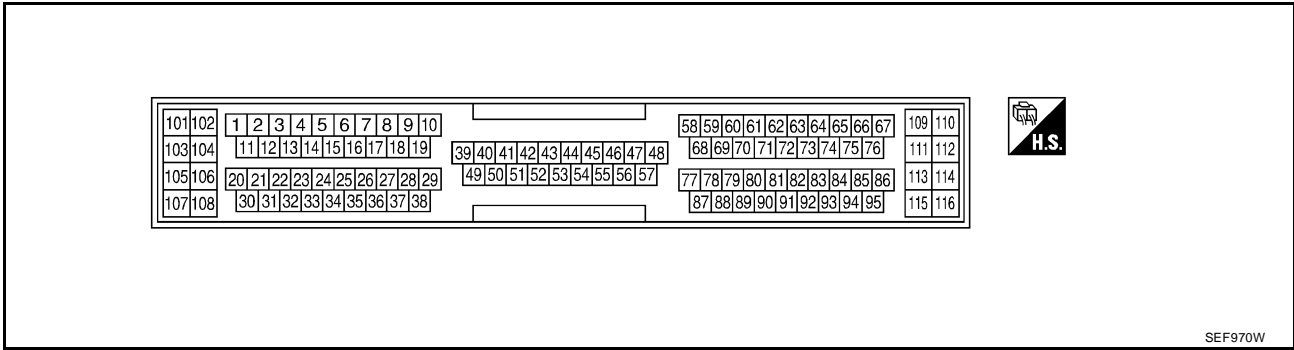
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ECM Harness Connector Terminal Layout

UBS00200

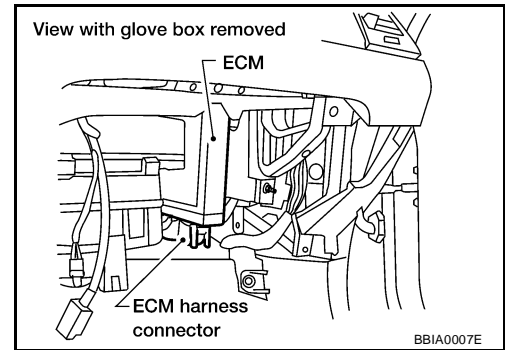


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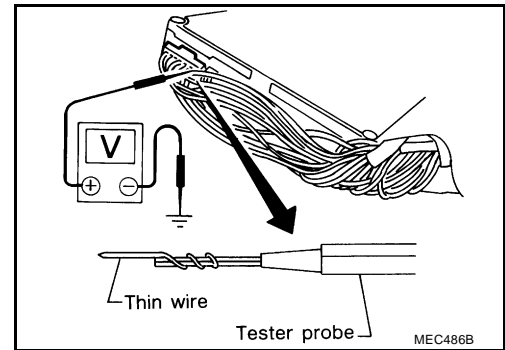
ECM Terminals and Reference Value

UBS0020R

1. ECM is located behind the glove box. For this inspection, remove glove box.
2. Remove ECM harness protector.



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



ECM INSPECTION TABLE

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

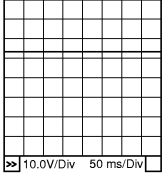
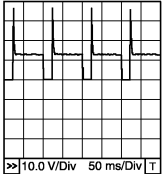
CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	OR/B	Heated oxygen sensor 1 heater	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition. ● Engine speed is below 3,600 rpm. 	Approximately 7.0V <small>FBIB0519E</small>
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)

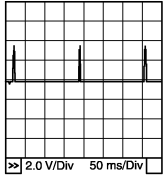
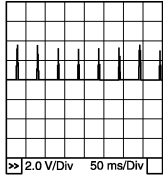
TROUBLE DIAGNOSIS

[QR]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	P/B	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more. 	0 - 1.0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Engine stopped [Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)
8	BR	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
11	OR	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
12	R	Counter current return	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
13	PU/R	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	BATTERY VOLTAGE (11 - 14V)★  <small>PBIB0050E</small>
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine) 	Approximately 10V★  <small>PBIB0520E</small>
18	LG/B	MIL	[Ignition switch "ON"]	0 - 1.0V
			[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	BATTERY VOLTAGE (11 - 14V)
20	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] <ul style="list-style-type: none"> ● For 3 seconds after turning ignition switch "OFF" 	0 - 1.0V
			[Ignition switch "OFF"] <ul style="list-style-type: none"> ● 3 seconds passed after turning ignition switch "OFF" 	BATTERY VOLTAGE (11 - 14V)

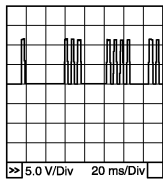
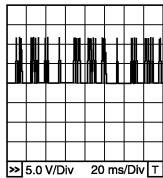
TROUBLE DIAGNOSIS

[QR]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
21 22 23 24	Y/R G/R L/R G/Y	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 3 Ignition signal No. 4	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	0 - 0.1V★  <small>PBIB0521E</small>	EC
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - 0.2V★  <small>PBIB0522E</small>	C
25	Y/G	VIAS control solenoid valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	BATTERY VOLTAGE (11 - 14V)	D
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 5,000 rpm 	0 - 1.0V	E
29	B/OR	Fuel pump relay	[Ignition switch "ON"] <ul style="list-style-type: none"> ● For 1 seconds after turning ignition switch "ON" 	0 - 1.0V	F
			[Engine is running] <ul style="list-style-type: none"> ● More than 1 seconds after turning ignition switch "ON". 	BATTERY VOLTAGE (11 - 14V)	G
33	L	CAN communication line	[Ignition switch "ON"]	Approximately 2.6 - 3.2V Output voltage varies with the communication status.	H
34	Y	CAN communication line	[Ignition switch "ON"]	Approximately 1.7 - 2.3V Output voltage varies with the communication status.	I
40	R/G	Stop lamp switch	[Engine is running] <ul style="list-style-type: none"> ● Brake pedal fully released 	Approximately 0V	J
			[Engine is running] <ul style="list-style-type: none"> ● Brake pedal depressed 	BATTERY VOLTAGE (11 - 14V)	K
41	BR/W	Start signal	[Ignition switch "ON"]	Approximately 0V	L
			[Ignition switch "START"]	9 - 14V	M
42	R	Ignition switch	[Ignition switch "OFF"]	0V	A
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)	D
43	G/R (A/T) G/W (M/T)	PNP switch	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "P" or "N" (A/T models), "Neutral" (M/T models). 	Approximately 0V	E
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Except the above gear position 	A/T models BATTERY VOLTAGE (11 - 14V) M/T models Approximately 5V	F

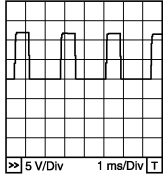
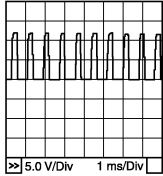
TROUBLE DIAGNOSIS

[QR]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
46	G	Power steering oil pressure switch	[Engine is running] ● Steering wheel is being turned	Approximately 0V
			[Engine is running] ● Steering wheel is not being turned	BATTERY VOLTAGE (11 - 14V)
50	OR	Data link connector	[Ignition switch "ON"] ● CONSULT-II or GST is disconnected.	Approximately 5V
56	G/B (A/T) G/R (M/T)	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
59 60 106 108	B B B B	ECM ground	[Engine is running] ● Idle speed	Engine ground
62	W	Camshaft position sensor (PHASE)	[Engine is running] ● Warm-up condition ● Idle speed	1.0 - 4.0V★  <small>PBIB0525E</small>
			[Engine is running] ● Engine speed is 2,000 rpm.	1.0 - 4.0V★  <small>PBIB0526E</small>
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
66	W/L	Power supply for ECM (Buck-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
70	P/L	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.

TROUBLE DIAGNOSIS

[QR]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
71	W	Crankshaft position sensor (POS)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 3V★ 	A
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 3V★ 	EC
72	W	Mass air flow sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	1.1 - 1.5V	C
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,500 rpm. 	1.6 - 2.0V	D
73	W	Throttle position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released 	More than 0.36V	E
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed 	Less than 4.75V	F
74	G	Throttle position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released 	Less than 4.75V	G
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed 	More than 0.36V	H
75	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully released 	0.41 - 0.71V	I
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	More than 4.2V	J
76	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully released 	0.21 - 0.36V	K
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	More than 2.1V	L
77	B/R	Fuel level sensor ground	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Approximately 0V	M

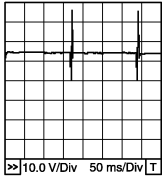
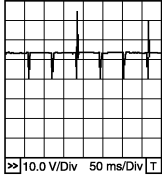
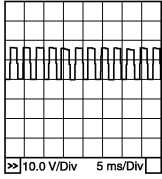
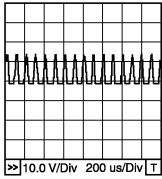
TROUBLE DIAGNOSIS

[QR]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
80	B	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
82	W	Knock sensor	[Engine is running] ● Idle speed	Approximately 2.5V
83	W	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch are "ON". (Compressor operates.)	1.0 - 4.0V
84	Y/G	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with intake air temperature.
86	G	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V
87	G/B	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
88	W	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 1.8 - 4.8V
89	G/Y	ASCD steering switch	[Ignition switch "ON"] ● ASCD steering switch is "OFF".	Approximately 4.0V
			[Ignition switch "ON"] ● CRUISE switch is "ON".	Approximately 0V
			[Ignition switch "ON"] ● CANCEL switch is "ON".	Approximately 1V
			[Ignition switch "ON"] ● SET/COAST switch is "ON".	Approximately 2V
			[Ignition switch "ON"] ● RESUME/ACCEL switch is "ON".	Approximately 3V
90	W	Accelerator pedal posi- tion sensor signal output	[Ignition switch "ON"] ● Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 4.2V
92	W	Heated oxygen sensor 1	[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodi- cally change)
93	Y	Engine coolant tempera- ture sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.
95	W	Heated oxygen sensor 2	[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V

TROUBLE DIAGNOSIS

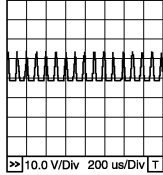
[QR]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101 102 103 104	R/B R/W R/Y R/L	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	BATTERY VOLTAGE (11 - 14V)★  <p style="text-align: right; font-size: small;">PBIB0529E</p>
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm 	BATTERY VOLTAGE (11 - 14V)★  <p style="text-align: right; font-size: small;">PBIB0530E</p>
107	G	Intake valve timing control solenoid valve	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm 	Approximately 9V★  <p style="text-align: right; font-size: small;">PBIB0532E</p>
109 111	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
112	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
113	R	Throttle control motor relay power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
114	Y	Throttle control motor (Open)	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is depressing 	0 - 14V★  <p style="text-align: right; font-size: small;">PBIB0533E</p>

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TROUBLE DIAGNOSIS

[QR]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
115	B	Throttle control motor ground	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Approximately 0V
116	BR	Throttle control motor (Close)	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is releasing 	0 - 14V★ 

PBIB0534E

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

CONSULT-II Function FUNCTION

UBS0020S

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

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

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

TROUBLE DIAGNOSIS

[QR]

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item		DIAGNOSTIC TEST MODE							
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS INPUT	Crankshaft position sensor (POS)		×	×	×	×			A
	Camshaft position sensor (PHASE)		×		×	×			B
	Mass air flow sensor		×		×	×			C
	Engine coolant temperature sensor		×	×	×	×	×		D
	Heated oxygen sensor 1		×		×	×		×	E
	Heated oxygen sensor 2		×		×	×		×	F
	Vehicle speed sensor		×	×	×	×			G
	Accelerator pedal position sensor		×		×	×			H
	Throttle position sensor		×		×	×			I
	Fuel tank temperature sensor		×		×	×	×		J
	EVAP control system pressure sensor		×		×	×			K
	Intake air temperature sensor		×		×	×			L
	Knock sensor		×						M
	Refrigerant pressure sensor				×	×			N
	Ignition switch (start signal)				×	×			O
	Closed throttle position switch (accelerator pedal position sensor signal)				×	×			P
	Air conditioner switch				×	×			Q
	Park/neutral position (PNP) switch		×		×	×			R
	Stop lamp switch		×		×	×			S
	Power steering oil pressure switch				×	×			T
Battery voltage				×	×			U	
Load signal				×	×			V	
Fuel level sensor		×		×	×			W	
ASCD steering switch		×		×	×			X	
ASCD brake switch		×		×	×			Y	

TROUBLE DIAGNOSIS

[QR]

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

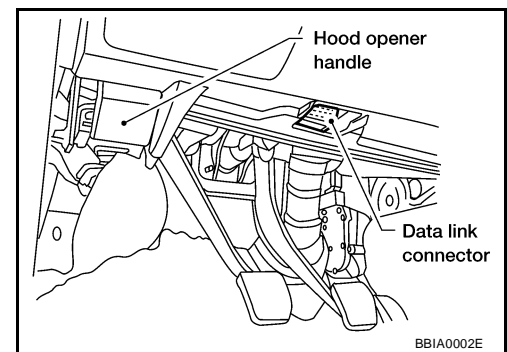
X: Applicable

*1: This item includes 1st trip DTCs.

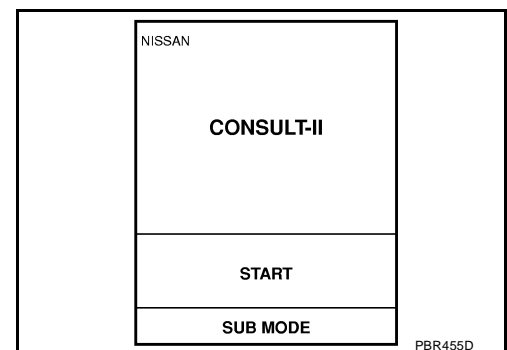
*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to [EC-59](#).

CONSULT-II INSPECTION PROCEDURE

1. Turn ignition switch OFF.
2. Connect "CONSULT-II" to data link connector, which is located under LH dash panel.
3. Turn ignition switch ON.



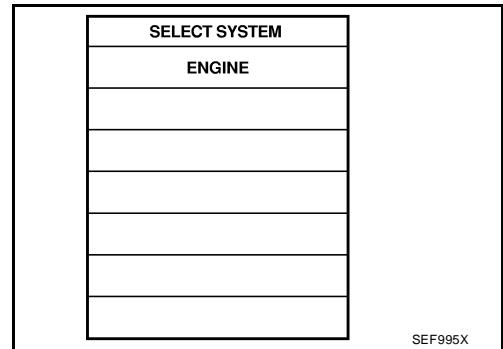
4. Touch "START".



TROUBLE DIAGNOSIS

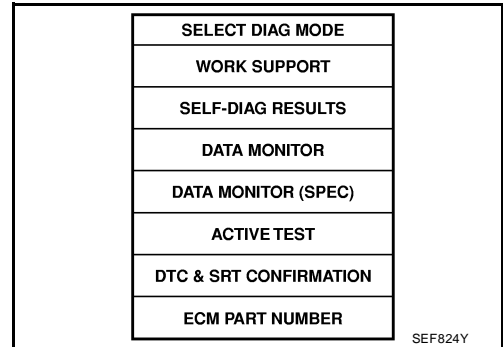
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5. Touch "ENGINE".



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

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



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	<p>OPEN THE VACUUM CUT VALVE BYPASS VALVE AND CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> 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-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</p>	When detecting EVAP vapor leak point of EVAP system

TROUBLE DIAGNOSIS

[QR]

WORK ITEM	CONDITION	USAGE
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 After adjustment, confirm target ignition timing with a timing light.

*: 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-15, "INDEX FOR DTC"](#) .)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*1	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-15, "INDEX FOR 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. "MODE 2": Open loop due to detected system malfunction "MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment) "MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control "MODE 5": 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 TRIM-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 TRIM-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.
VHCL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> ● The vehicle speed 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.

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

TROUBLE DIAGNOSIS

[QR]

DATA MONITOR MODE

Monitored Item

×: Applicable

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	CAN DIAG SUP- PORT MNTR	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.
B/FUEL SCHDL [msec]		×		<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. 	
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. 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.
HO2S1 (B1) [V]	×	×		<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 1 is displayed. 	
HO2S2 (B1) [V]	×	×		<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 is displayed. 	
HO2S1 MNTR (B1) [RICH/LEAN]	×	×		<ul style="list-style-type: none"> Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH ... means the mixture became "rich", and control is being affected toward a leaner mixture. LEAN ... means the mixture became "lean", and control is being affected toward a rich mixture. 	<ul style="list-style-type: none"> After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins. When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
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.
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. 	
ACCEL SEN 2 [V]	×				
THRTL SEN 1 [V]	×	×		<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 	
THRTL SEN 2 [V]	×				

TROUBLE DIAGNOSIS

[QR]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	CAN DIAG SUP- PORT MNTR	Description	Remarks
FUEL T/TEMP 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. 	
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. 	
ABSOL PRES/SE [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 [ON/OFF] condition from the starter signal. 	<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 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) switch signal. 	
PW/ST SIGNAL [ON/OFF]	×	×		<ul style="list-style-type: none"> [ON/OFF] condition of the power steering oil pressure switch as determined by the power steering oil pressure signal 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. 	
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. 	
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·m/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

[QR]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	CAN DIAG SUP- PORT MNTR	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. 	A EC C
INT/V TIM (B1) [°CA]				<ul style="list-style-type: none"> Indicates [°CA] of intake camshaft advanced angle. 	D
INT/V SOL (B1) [%]				<ul style="list-style-type: none"> The control condition of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. ON ... intake valve timing control is operating. OFF ... Intake valve timing control is not operating. 	E F
VIAS S/V [ON/OFF]				<ul style="list-style-type: none"> The control condition of the VIAS control solenoid valve (determined by ECM according to the input signals) is indicated. ON ... VIAS control solenoid valve is operating. OFF ... VIAS control solenoid valve is not operating. 	G H
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. 	I
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. 	J
VC/V BYPASS/V [ON/OFF]				<ul style="list-style-type: none"> The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signals) is indicated. ON ... Open OFF ... Closed 	K L
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 	M
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 	
HO2S1 HTR (B1) [ON/OFF]				<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals. 	

TROUBLE DIAGNOSIS

[QR]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	CAN DIAG SUP- PORT MNTR	Description	Remarks
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. 	
IDL A/V LEARN [YET/CMPLT/ INCMP]				<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. INCMP ... Idle air volume learning has not been performed successfully. 	
TRVL AFTER MIL [km] or [mile]				<ul style="list-style-type: none"> Distance traveled while MIL is activated. 	
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 CRUISE 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 ACCEL/RES switch signal. 	
SET SW [ON/OFF]				<ul style="list-style-type: none"> Indicates [ON/OFF] condition from COAST/SET switch signal. 	
BRAKE SW1 SW [ON/OFF]				<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ASCD brake switch signal, and ASCD clutch switch signal (M/T models). 	
BRAKE SW2 SW [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 A/T O/D according to the input signal from the TCM. 	
AT OD CANCEL [ON/OFF]				<ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D cancel signal sent from the TCM. 	

TROUBLE DIAGNOSIS

[QR]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	CAN DIAG SUP- PORT MNTR	Description	Remarks
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. 	
Voltage [V]				<ul style="list-style-type: none"> Voltage, frequency, duty cycle or pulse width measured by the probe. 	<ul style="list-style-type: none"> Only “#” is displayed if item is unable to be measured. Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency [msec], [Hz] or [%]					
DUTY-HI					
DUTY-LOW					
PLS WIDTH-HI					
PLS WIDTH-LOW					
CAN COMM [OK/NG]			×	<ul style="list-style-type: none"> Indicates the communication condition of CAN communication line. 	<ul style="list-style-type: none"> These items are not displayed in "SELECTION FROM MENU" mode.
CAN CIRC 1 [OK/UNKWN]			×		
CAN CIRC 2 [OK/UNKWN]			×		
CAN CIRC 3 [OK/UNKWN]			×		
CAN CIRC 4 [OK/UNKWN]			×		
CAN CIRC 5 [OK/UNKWN]			×		
CAN CIRC 6 [OK/UNKWN]			×		
CAN CIRC 7 [OK/UNKWN]			×		

NOTE:

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

DATA MONITOR (SPEC) MODE

Monitored Item

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	×		<ul style="list-style-type: none"> Indicates the engine speed computed from the signal of the crankshaft position sensor (POS). 	
MAS A/F SE-B1 [V]	×	×	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor specification is displayed. 	<ul style="list-style-type: none"> When engine is running specification range is indicated.
B/FUEL SCHDL [msec]			<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.
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 engine is running specification range is indicated. This data also includes the data for the air-fuel ratio learning control.

TROUBLE DIAGNOSIS

[QR]

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	JUDGEMENT	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-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> ● Harness and connectors ● Fuel injectors ● Heated oxygen 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-II. 	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 "N" ● Cut off each injector signal one at a time using CONSULT-II. 	Engine runs rough or dies.	<ul style="list-style-type: none"> ● Harness and connectors ● Compression ● Fuel injectors ● Power transistor ● Spark plugs ● Ignition coils
COOLING FAN	<ul style="list-style-type: none"> ● Ignition switch: ON ● Turn the cooling fan "ON" and "OFF" with CONSULT-II. 	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-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> ● Harness and connectors ● Engine coolant temperature sensor ● Fuel injectors
FUEL PUMP RELAY	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> ● Harness and connectors ● Fuel pump relay
VIAS SOL VALVE	<ul style="list-style-type: none"> ● Ignition switch: ON ● Turn solenoid valve "ON" and "OFF" with CONSULT-II and listen for operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connectors ● Solenoid valve
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-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> ● Harness and connectors ● Solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> ● Change the fuel tank temperature using CONSULT-II. 		
VENT CONTROL/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connectors ● Solenoid valve

TROUBLE DIAGNOSIS

[QR]

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
VC/V BYPASS/V	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> Harness and connectors Solenoid valve
V/T ASSIGN ANGLE	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change intake valve timing using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Intake valve timing control solenoid valve

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

For details, refer to [EC-59, "SYSTEM READINESS TEST \(SRT\) CODE"](#).

SRT Work Support Mode

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

DTC Work Support Mode

Test mode	Test item	Condition	Reference page
EVAP SYSTEM	PURGE FLOW P0441	Refer to corresponding trouble diagnosis for DTC.	EC-301
	EVAP SML LEAK P0442/P1442		EC-307, EC-475
	EVAP V/S SML LEAK P0456/P1456		EC-349, EC-498
	PURG VOL CN/V P1444		EC-477
	VC CUT/V BP/V P1491		EC-517
HO2S1	HO2S1 (B1) P0133		EC-191
	HO2S1 (B1) P0134		EC-200
	HO2S1 (B1) P1143		EC-416
	HO2S1 (B1) P1144		EC-422
HO2S2	HO2S2 (B1) P0139		EC-213
	HO2S2 (B1) P1146	EC-428	
	HO2S2 (B1) P1147	EC-435	

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

Description

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

1. "AUTO TRIG" (Automatic trigger):

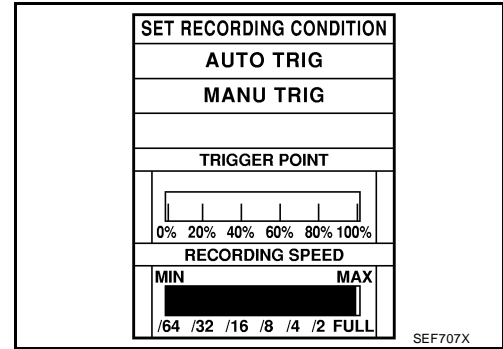
- The malfunction will be identified on the CONSULT-II screen in real time.
In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM.
At the moment a malfunction is detected by ECM, "MONITOR" in "DATA MONITOR" screen is changed to "Recording Data ... xx%" as shown at right, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, "REAL-TIME DIAG" screen is displayed. If "STOP" is touched on the screen during "Recording Data ... xx%", "REAL-TIME DIAG" screen is also displayed.
The recording time after the malfunction detection and the

DATA MONITOR	
Recording Data...11%	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
VHCL SPEED SE	XXX km/h

SEF705Y

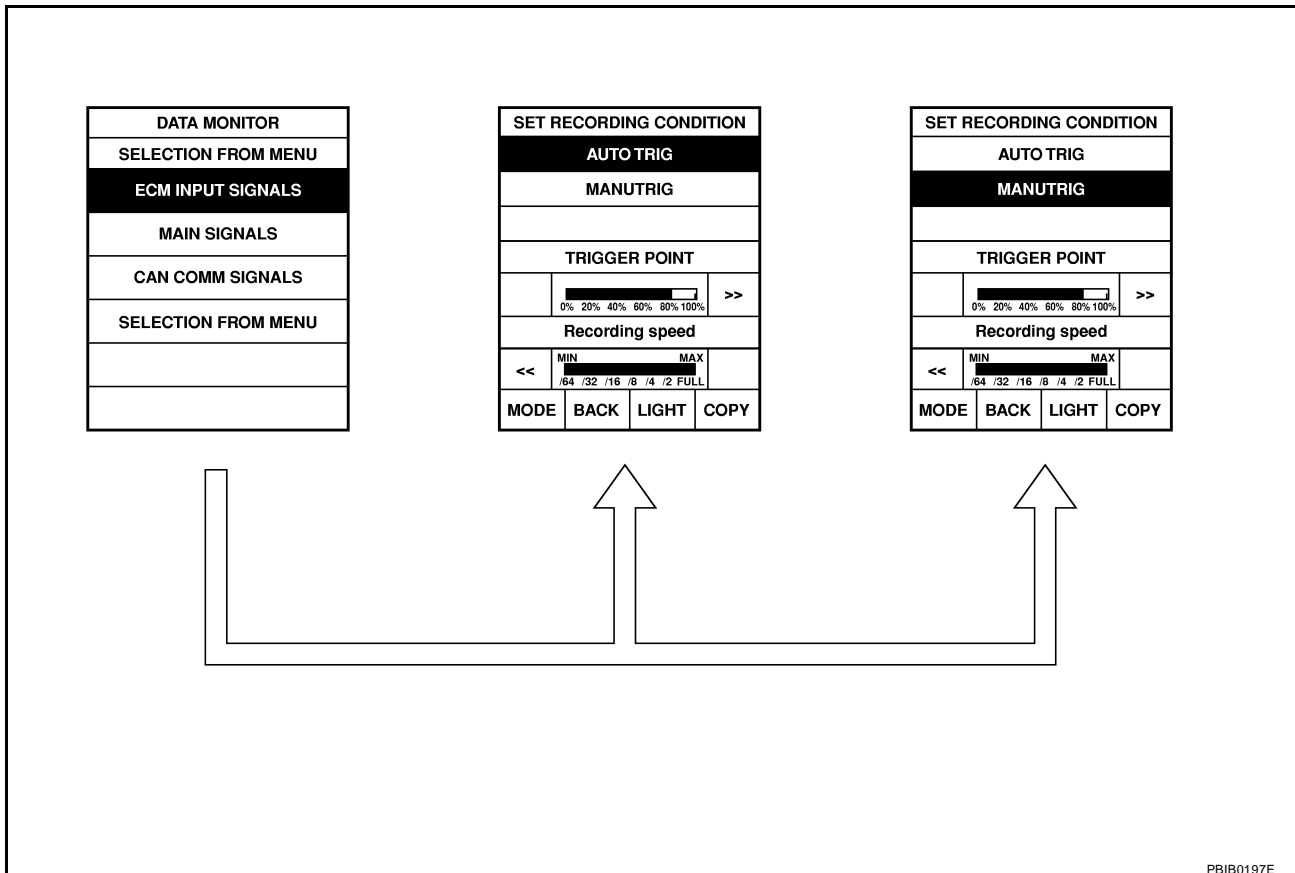
recording speed can be changed by “TRIGGER POINT” and “Recording Speed”. Refer to CONSULT-II OPERATION MANUAL.

2. “MANU TRIG” (Manual trigger):
 - DTC/1st trip DTC and malfunction item will not be displayed automatically on CONSULT-II screen even though a malfunction is detected by ECM.
DATA MONITOR can be performed continuously even though a malfunction is detected.



Operation

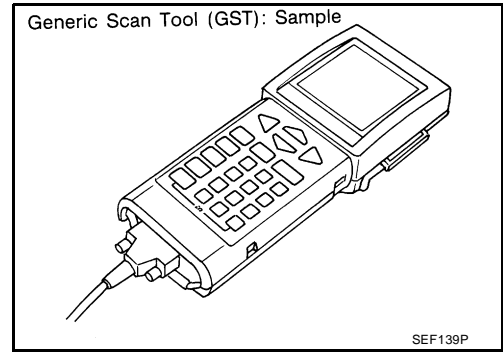
1. “AUTO TRIG”
 - While trying to detect the DTC/1st trip DTC by performing the “DTC Confirmation Procedure”, be sure to select to “DATA MONITOR (AUTO TRIG)” mode. You can confirm the malfunction at the moment it is detected.
 - While narrowing down the possible causes, CONSULT-II should be set in “DATA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



PBIB0197E

Generic Scan Tool (GST) Function DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained below. ISO9141 is used as the protocol. The name “GST” or “Generic Scan Tool” is used in this service manual.



FUNCTION

Diagnostic test mode		Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-59. "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA" .
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> ● Clear number of diagnostic trouble codes (MODE 1) ● Clear diagnostic trouble codes (MODE 3) ● Clear trouble code for freeze frame data (MODE 1) ● Clear freeze frame data (MODE 2) ● Reset status of system monitoring test (MODE 1) ● Clear on board monitoring test results (MODE 6 and 7)
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode can close EVAP system in ignition switch “ON” position (Engine stopped). When this mode is performed, the following parts can be opened or closed. <ul style="list-style-type: none"> ● EVAP canister vent control valve open ● Vacuum cut valve bypass valve closed In the following conditions, this mode 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
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

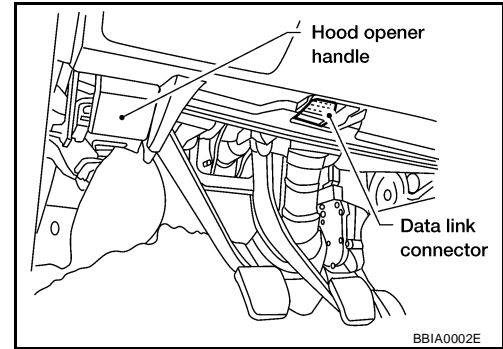
GST INSPECTION PROCEDURE

1. Turn ignition switch OFF.

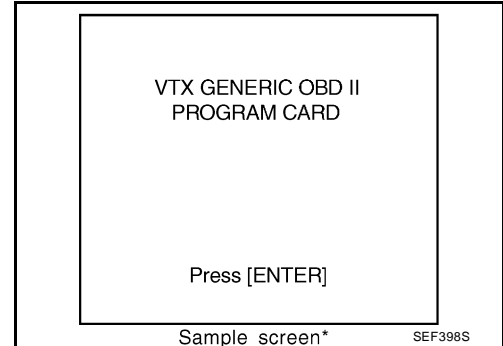
TROUBLE DIAGNOSIS

[QR]

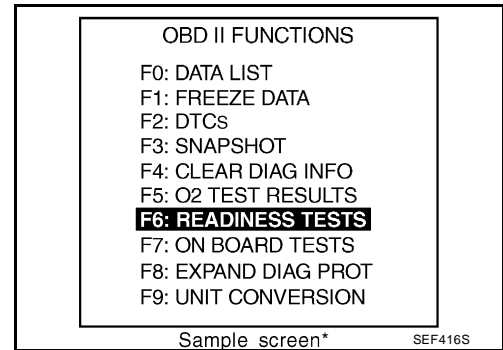
2. Connect "GST" to data link connector, which is located under LH dash panel near the fuse box cover.
3. Turn ignition switch ON.



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



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



CONSULT-II Reference Value in Data Monitor

UBS0020U

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	<ul style="list-style-type: none"> ● Tachometer: Connect ● Run engine and compare tachometer indication with the CONSULT-II value. 		Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load 	Idle	Approx. 1.1 - 1.5V
		2,500 rpm	Approx. 1.6 - 2.0V
B/FUEL SCHDL	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load 	Idle	2.5 - 3.5 msec
		2,000 rpm	2.5 - 3.5 msec
A/F ALPHA-B1	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm	54% - 155%

TROUBLE DIAGNOSIS

[QR]

MONITOR ITEM	CONDITION		SPECIFICATION
COOLAN TEMP/S	● Engine: After warming up		More than 70°C (158°F)
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 (B1)	● Engine: After warming up	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.
HO2S2 MNTR (B1)	● Engine: After warming up	Revving engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH
VEH SPEED SE	● Turn drive wheels and compare speedometer indication with the CONSULT-II value.		Almost the same speed as the CONSULT-II value
BATTERY VOLT	● Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN1	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
ACCEL SEN2		Accelerator pedal: Fully depressed	More than 4.2V
THRTL SEN1	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Fully released	More than 0.36V
THRTL SEN2		Accelerator pedal: Fully depressed	Less than 4.75V
EVAP SYS PRES	● Ignition switch: ON		Approx. 1.8 - 4.8V
ABSOL PRES/SE	● Ignition switch: ON		Approx. 4.4V
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	● Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T model) Neutral (M/T model)	ON
		Shift lever: Except above	OFF
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is in 2nd.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF
IGNITION SW	● Ignition switch: ON → OFF → ON		ON → OFF → ON
HEATER FAN SW	● Engine: After warming up, idle the engine	Heater fan is operating.	ON
		Heater fan is not operating	OFF
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec

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TROUBLE DIAGNOSIS

[QR]

MONITOR ITEM	CONDITION	SPECIFICATION	
IGN TIMING	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N 	Idle	10° - 20° BTDC
	<ul style="list-style-type: none"> ● Air conditioner switch: OFF ● No-load 	2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N 	Idle	10% - 35%
	<ul style="list-style-type: none"> ● Air conditioner switch: OFF ● No-load 	2,500 rpm	10% - 35%
MASS AIRFLOW	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N 	Idle	1.0 - 4.0 g-m/s
	<ul style="list-style-type: none"> ● Air conditioner switch: OFF ● No-load 	2,500 rpm	4.0 - 10.0 g-m/s
PURG VOL C/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N 	Idle	0%
	<ul style="list-style-type: none"> ● Air conditioner switch: OFF ● No-load 	2,000 rpm	20 - 30%
INT/V TIM (B1)	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N 	Idle	-5° - 5°C
	<ul style="list-style-type: none"> ● Air conditioner switch: OFF ● No-load 	2,000 rpm	Approx. 0° - 20°C
INT/V SOL (B1)	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N 	Idle	0% - 2%
	<ul style="list-style-type: none"> ● Air conditioner switch: OFF ● No-load 	2,000 rpm	Approx. 25% - 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
VIAS S/V	<ul style="list-style-type: none"> ● Engine: After warming up 	Idle	OFF
		More than 5,000 rpm	ON
FUEL PUMP RLY	<ul style="list-style-type: none"> ● For 1 seconds after turning ignition switch ON ● Engine running or cranking 		ON
	<ul style="list-style-type: none"> ● Except above conditions 		OFF
VC/V BYPAS S/V	<ul style="list-style-type: none"> ● Ignition switch: ON 		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 is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH
HO2S1 HTR (B1)	<ul style="list-style-type: none"> ● Engine: After warming up ● Engine speed: Below 3,600 rpm 		ON
	<ul style="list-style-type: none"> ● Engine speed: Above 3,600 rpm 		OFF
HO2S2 HTR (B1)	<ul style="list-style-type: none"> ● Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more] 		ON
	<ul style="list-style-type: none"> ● Engine speed: Above 3,600 rpm 		OFF

TROUBLE DIAGNOSIS

[QR]

MONITOR ITEM	CONDITION	SPECIFICATION
TRVL AFTER MIL	● Ignition switch: ON Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 mile)
AC PRESS SEN	● Ignition switch: ON (Engine stopped)	Approx. 0V
	● Engine: Idle ● Air conditioner switch: OFF	1.0 - 4.0V
VEH SPEED SE	● Turn drive wheels and compare speedometer indication with the CONSULT-II value.	Almost the same speed as the CONSULT-II value
SET VHCL SPD	● Engine: Running ASCD: Operating	The preset vehicle speed is displayed.
MAIN SW	● Ignition switch: ON	CRUISE switch: Depressed ON
		CRUISE switch: Released OFF
CANCEL SW	● Ignition switch: ON	CANCEL switch: Depressed ON
		CANCEL switch: Released OFF
RESUME/ACC SW	● Ignition switch: ON	ACCEL/RES switch: Depressed ON
		ACCEL/RES switch: Released OFF
SET SW	● Ignition switch: ON	COAST/SET switch: Depressed ON
		COAST/SET switch: Released OFF
BRAKE SW1	● Ignition switch: ON	Brake pedal: Fully released OFF
		Brake pedal: Slightly depressed ON
BRAKE SW2	● Ignition switch: ON	Brake pedal: Fully released OFF
		Brake pedal: Slightly depressed ON
CRUISE LAMP	● Ignition switch: ON	CRUISE lamp: Illuminated ON
		CRUISE lamp: Not illuminated OFF
SET LAMP	● Ignition switch: ON	SET lamp: Illuminated ON
		SET lamp: Not illuminated OFF
CAN COMM	● Ignition switch: ON	OK
CAN CIRC 1		OK
CAN CIRC 2		OK (A/T models) UNKW (M/T models)
CAN CIRC 3		UNKW
CAN CIRC 4		OK
CAN CIRC 5		UNKW
CAN CIRC 6		OK
CAN CIRC 7		OK

Major Sensor Reference Graph in Data Monitor Mode

UBS0020V

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

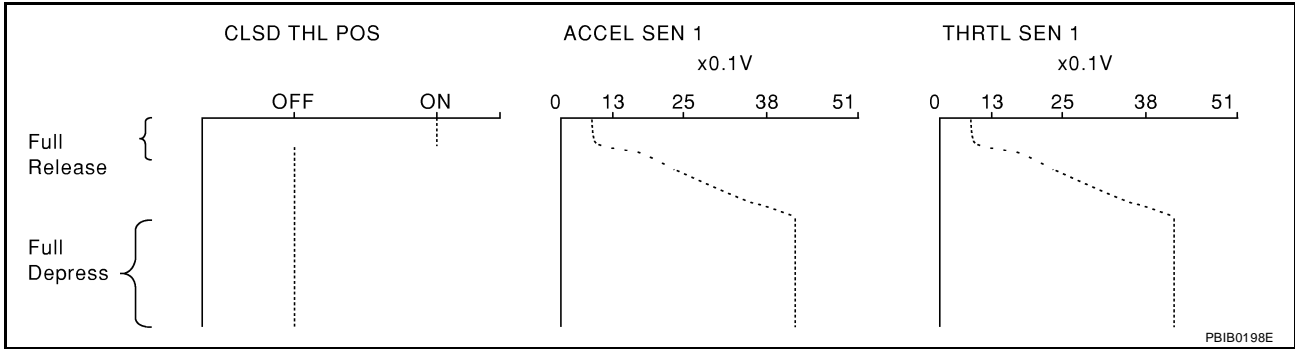
CLSD THL POS, ACCEL SEN 1, THRTL SEN 1

Below is the data for "CLSD THL POS", "ACCEL SEN 1" and "THRTL SEN 1" when depressing the accelerator pedal with the ignition switch "ON" and with selector lever in "D" position (A/T models) or with shift lever in "1st" position (M/T models).

TROUBLE DIAGNOSIS

[QR]

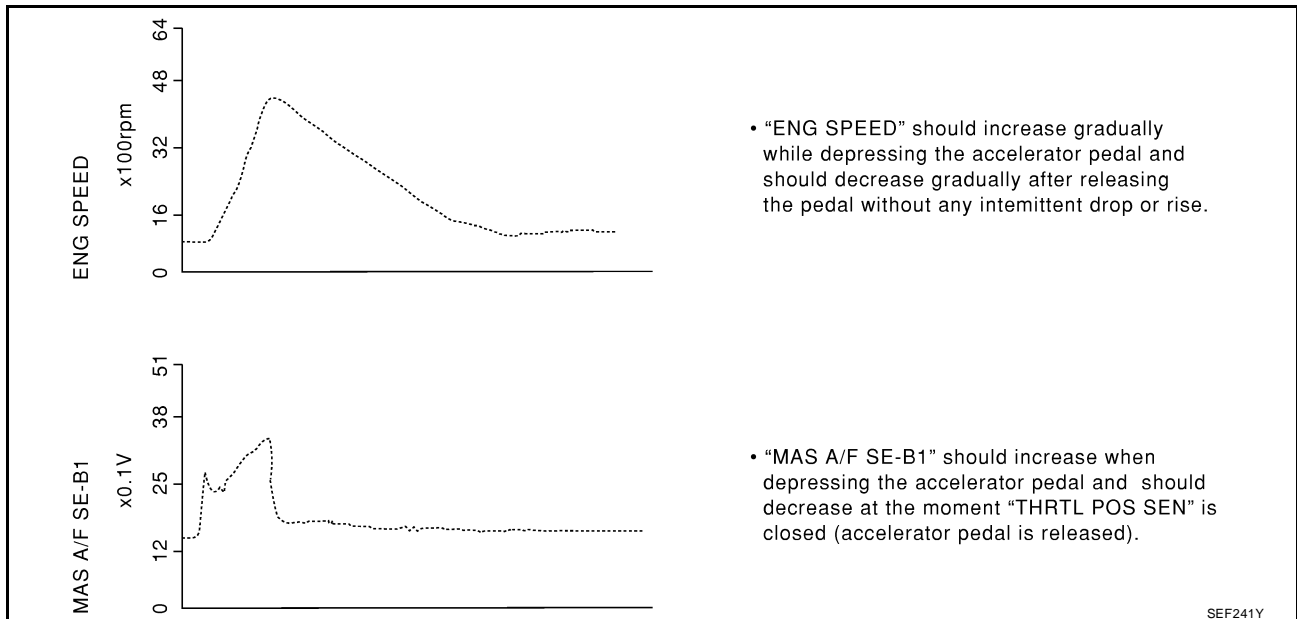
The signal of "ACCEL SEN 1" and "THRTL SEN 1" should rise gradually without any intermittent drop or rise after "CLSD THL POS" is changed from "ON" to "OFF".



ENG SPEED, MAS A/F SE-B1, THRTL SEN 1, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1

Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL SEN 1", "HO2S2 (B1)", "HO2S1 (B1)" and "INJ PULSE-B1" when revving engine quickly up to 4,800 rpm under no load after warming up engine sufficiently.

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



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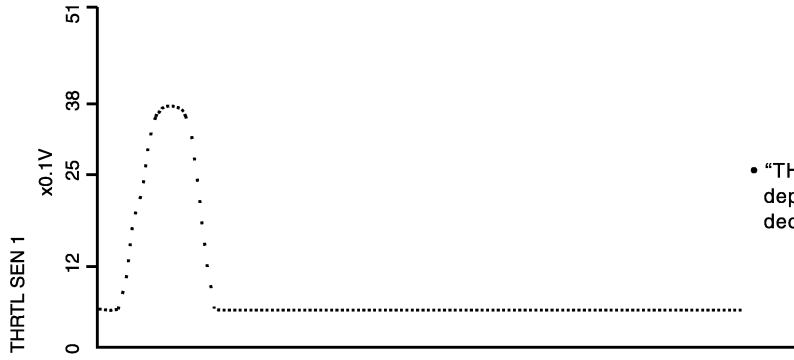
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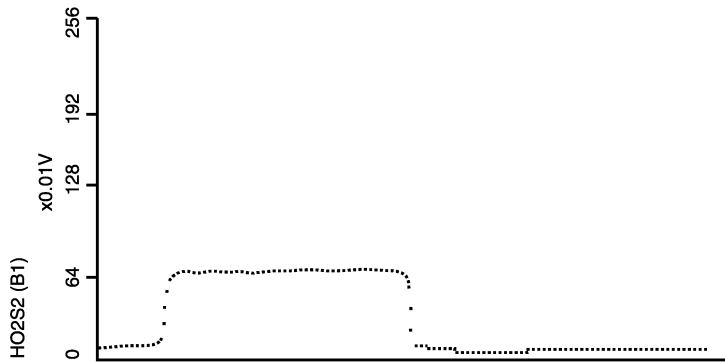
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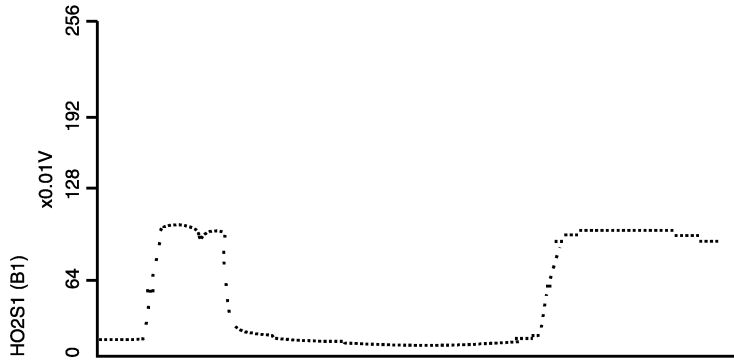
M



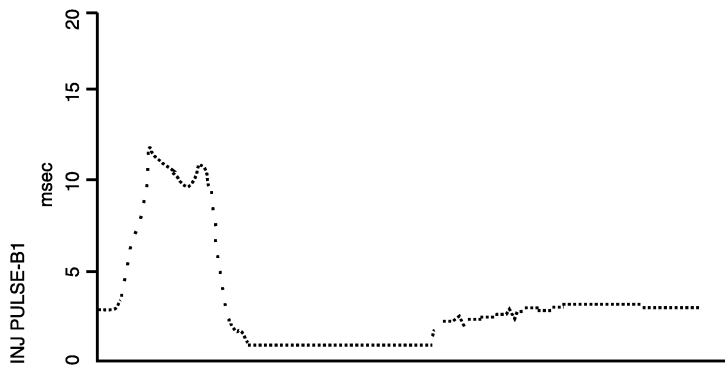
- "THRTL SEN 1" should increase while depressing the accelerator pedal and should decrease while releasing it.



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



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



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

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

PFP:00031

Description

UBS0020W

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

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

UBS0020X

- Vehicle driven distance: More than 5,000 km (3,017 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*1
- Electrical load: Not applied*2
- Engine speed: Idle

*1: For A/T models with CONSULT-II, after the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T fluid temperature sensor signal) indicates more than 60°C (140°F). For A/T models without CONSULT-II and M/T models, after the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.

*2: Rear window defogger switch, air conditioner switch, lighting switch are “OFF”. Steering wheel is straight ahead.

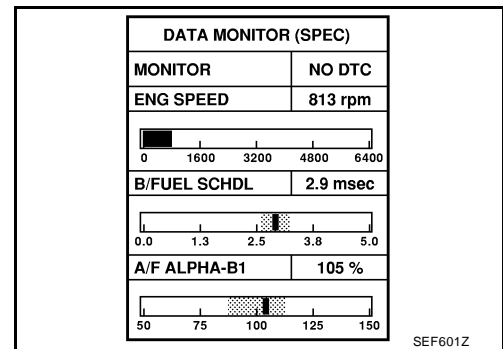
Inspection Procedure

UBS0020Y

NOTE:

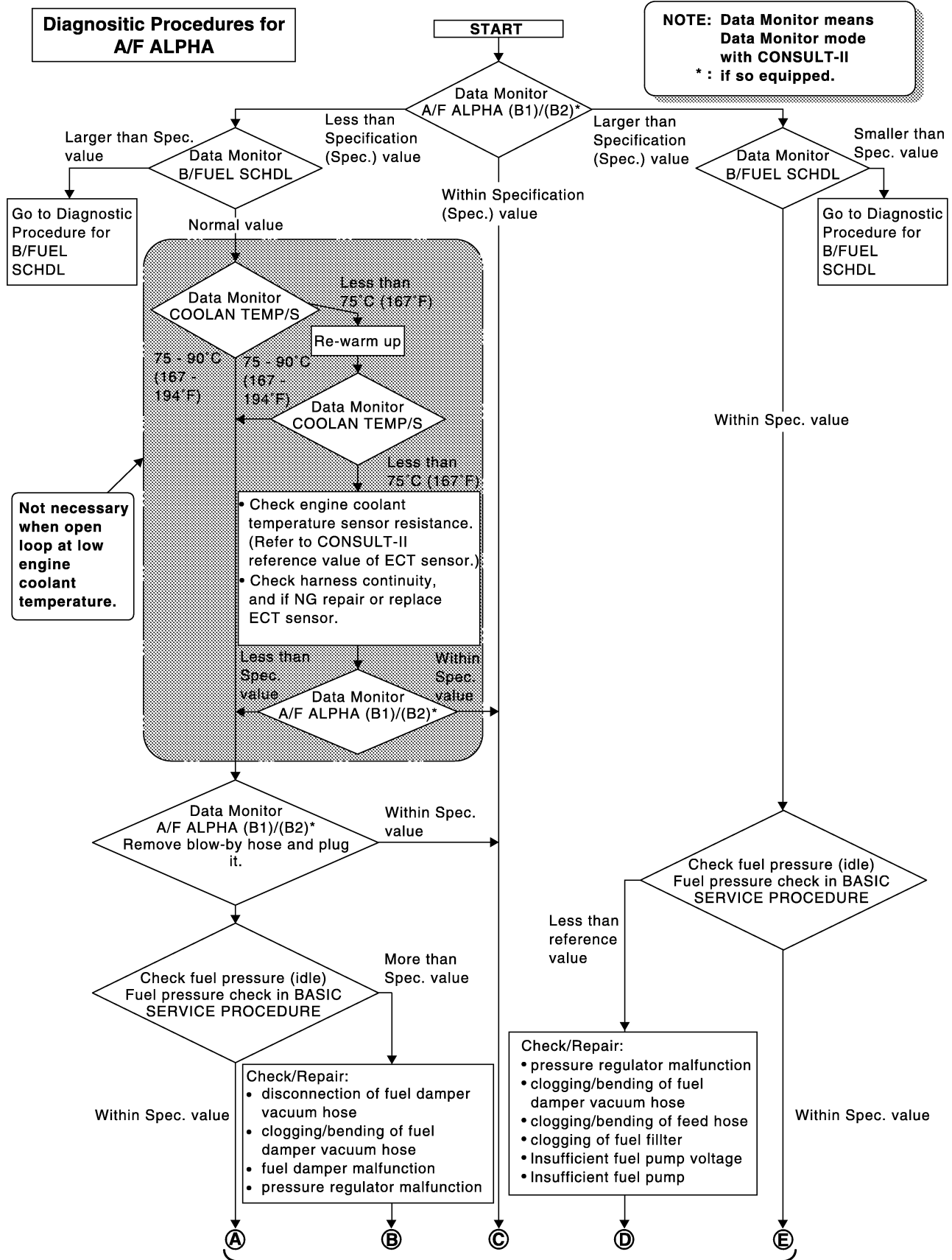
Perform “DATA MONITOR (SPEC)” mode in maximum scale display.

1. Perform [EC-84, "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 “DATA MONITOR (SPEC)” mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to [EC-127, "Diagnostic Procedure"](#) .



Diagnostic Procedure

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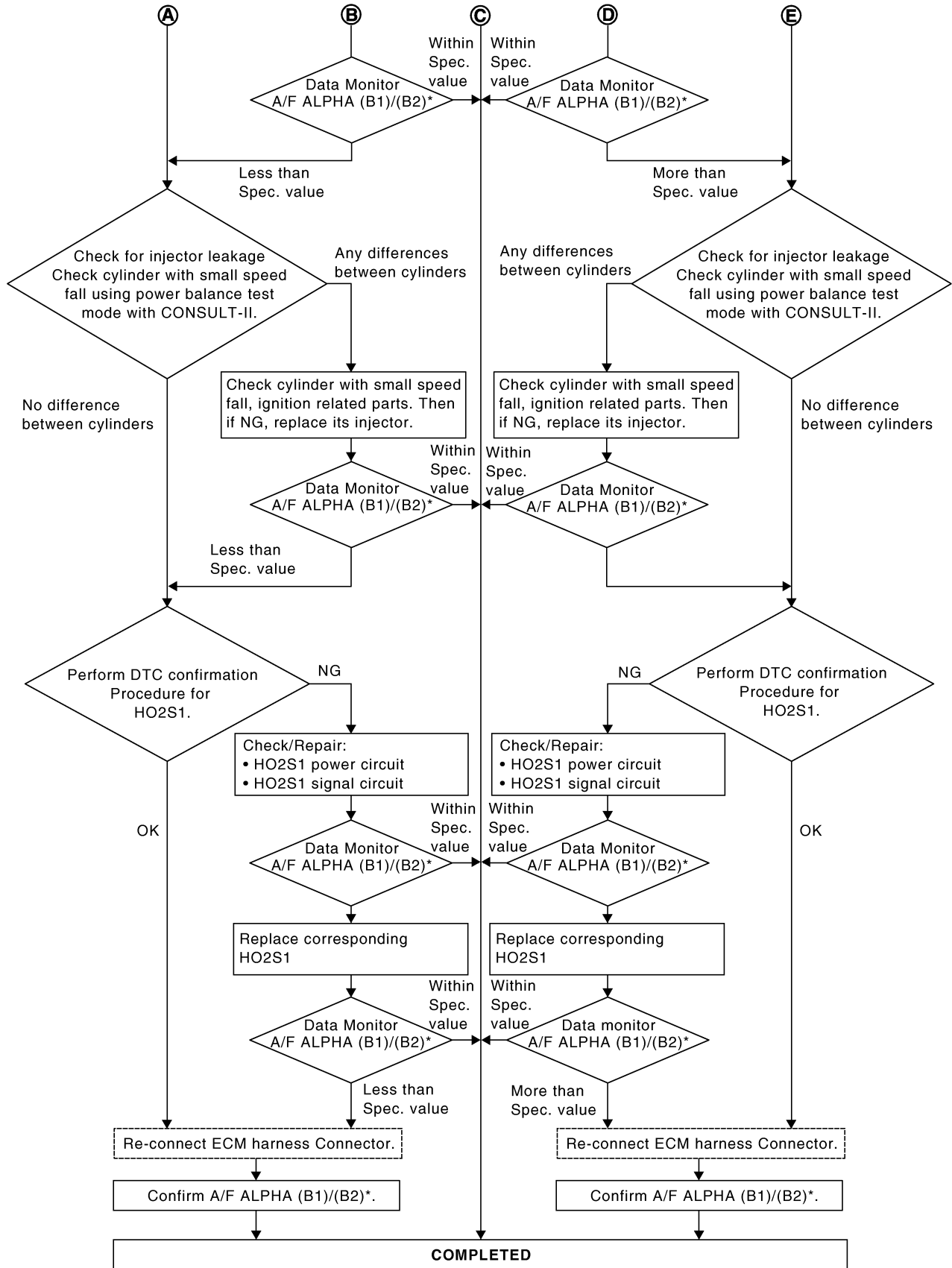


Not necessary when open loop at low engine coolant temperature.

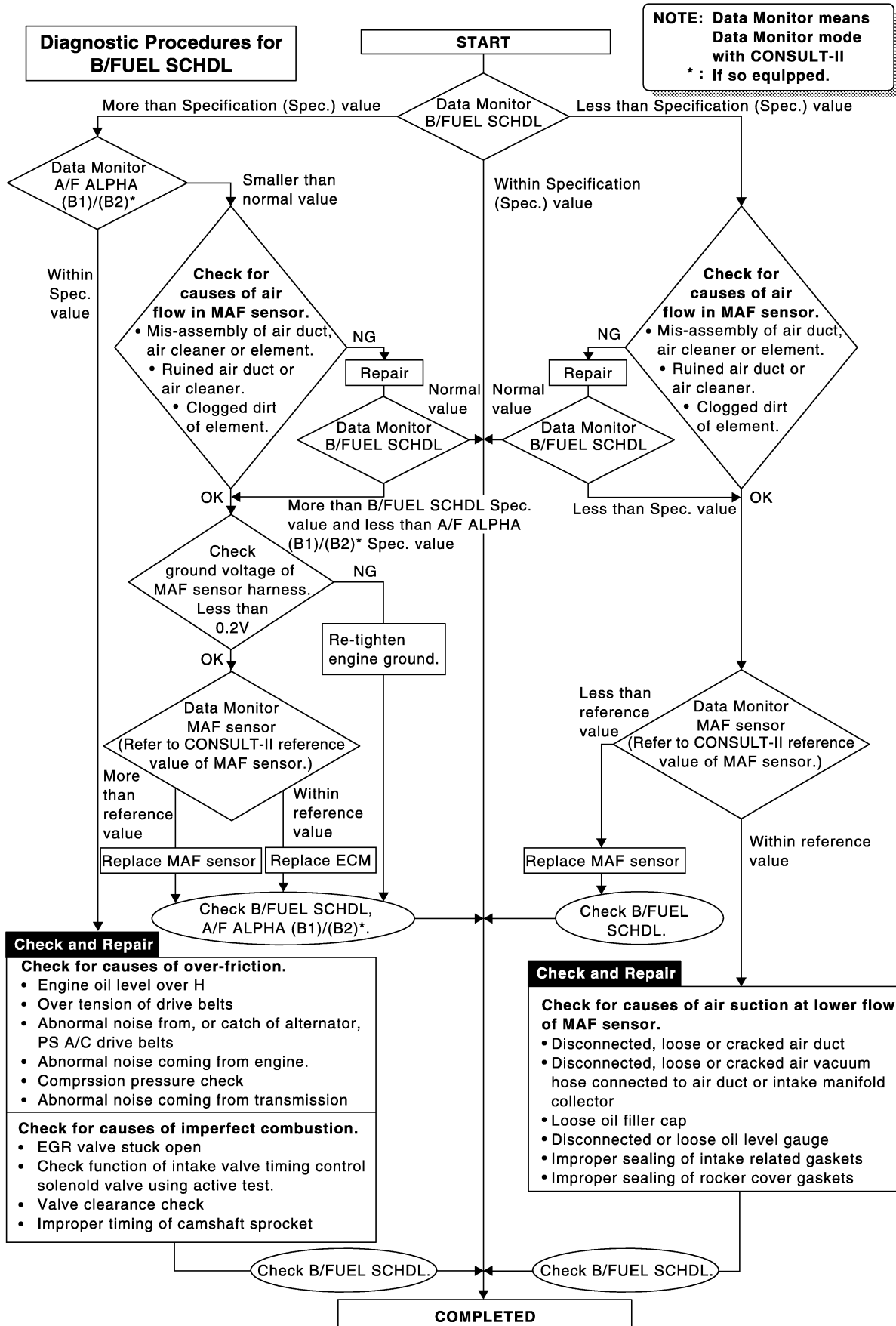
(Go to next page.)

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QR]



SEF768Z



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TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT**Description**

UBS002P0

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

Common I/I Report Situations

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

Diagnostic Procedure

UBS002P1

1. INSPECTION START

Erase (1st trip) DTCs. Refer to [EC-67, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).

>> GO TO 2.

2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.

Refer to [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "Incident Simulation Tests".

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3. SEARCH FOR ELECTRICAL INCIDENT

Perform [GI-25, "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-22, "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 CIRCUIT FOR ECM

[QR]

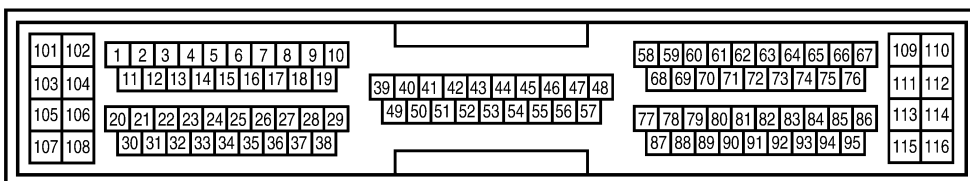
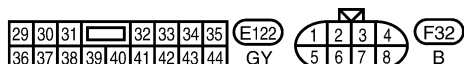
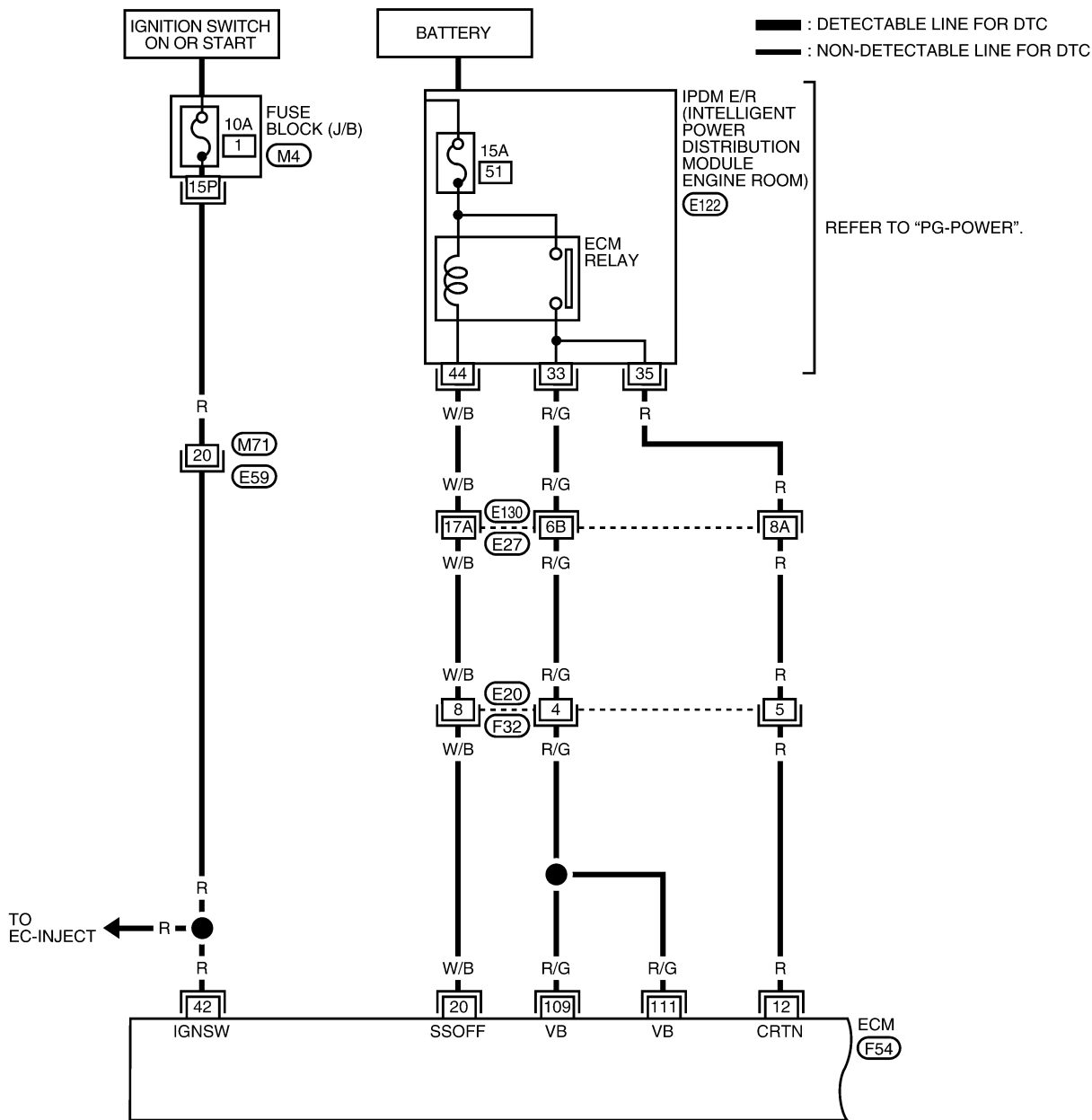
POWER SUPPLY CIRCUIT FOR ECM

PF2:24110

Wiring Diagram

UBS002P2

EC-MAIN-01



REFER TO THE FOLLOWING.

- E130 - SUPER MULTIPLE JUNCTION (SMJ)
- M4 - FUSE BLOCK - JUNCTION BOX (J/B)



BBWA0003E

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

POWER SUPPLY CIRCUIT FOR ECM

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12	R	Counter current return	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
20	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 3 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 3 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
42	R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
109 111	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

POWER SUPPLY CIRCUIT FOR ECM

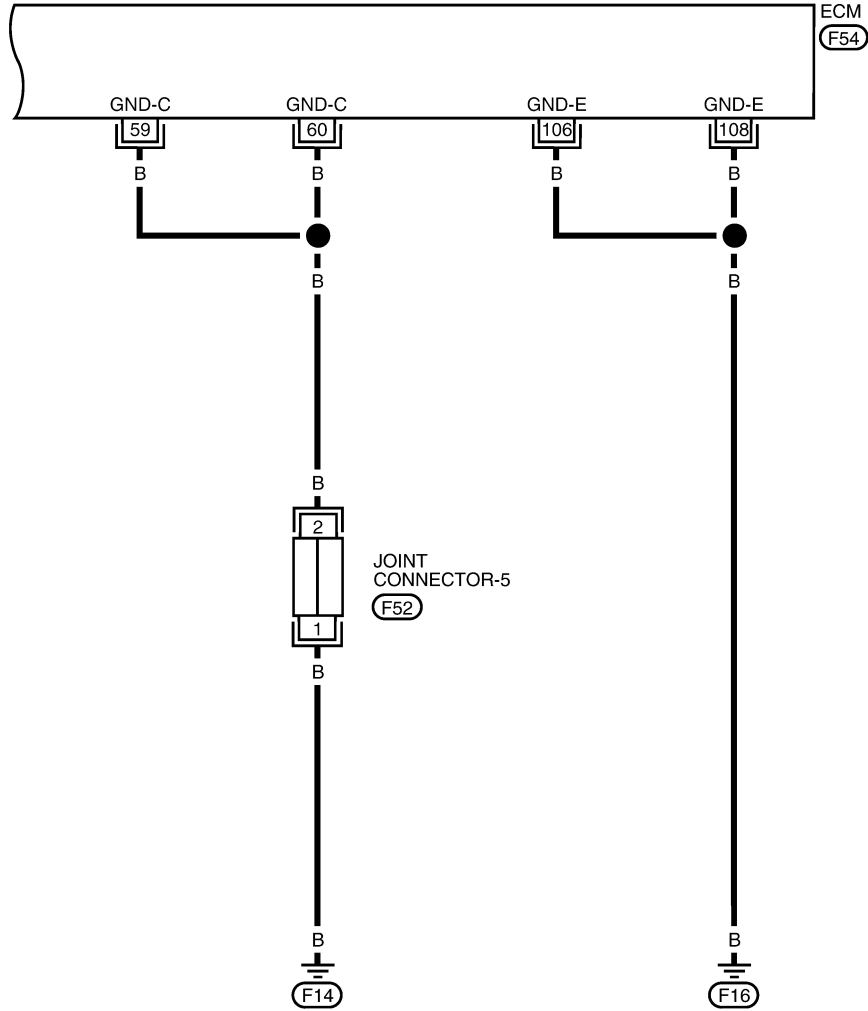
[QR]

EC-MAIN-02

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



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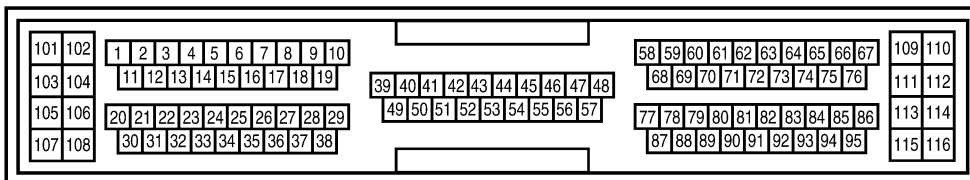
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REFER TO THE FOLLOWING.

(F52) -JOINT CONNECTOR (J/C)



BBWA0004E

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

POWER SUPPLY CIRCUIT FOR ECM

[QR]

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
59 60 106 108	B B B B	ECM ground	[Engine is running] ● Idle speed	Engine ground

Diagnostic Procedure

UBS002P3

1. INSPECTION START

Start engine.

Is engine running?

Yes or No

Yes >> GO TO 7.

No >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

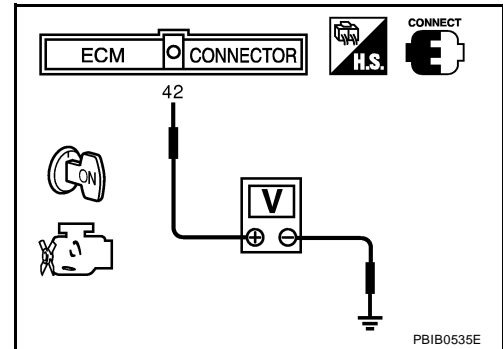
1. Turn ignition switch "OFF" and then "ON".
2. Check voltage between ECM terminal 42 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, F59
- Fuse block (J/B) connector M4
- 10A fuse
- Harness for open or short between ECM and fuse

>> Repair harness or connectors.

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

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 59, 60, 106, 108 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-5
- Harness for open or short between ECM and ground

>> Repair harness or connectors.

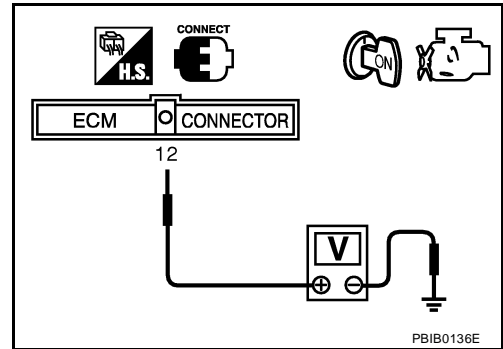
6. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connector.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminal 12 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> Go to [EC-554, "IGNITION SIGNAL"](#) .
- NG >> GO TO 7.



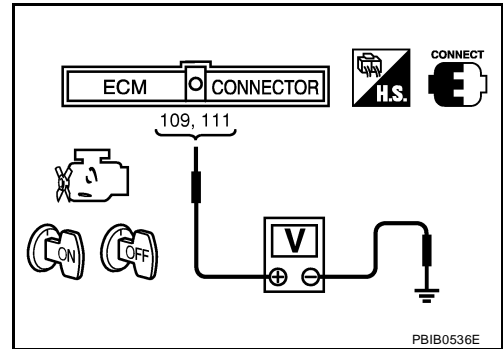
7. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Turn ignition switch "ON" and then "OFF".
2. Check voltage between ECM terminals 109, 111 and ground with CONSULT-II or tester.

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

OK or NG

- OK >> GO TO 8.
- NG (Battery voltage does not exist.)>>GO TO 10.
- NG (Battery voltage exists for more than a few seconds.)>>GO TO 18.



8. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector.
2. Check harness continuity between ECM terminal 12 and IPDM E/R terminal 35. 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 18.
- NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors E130, E27
- Harness or connectors E20, F32
- 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.

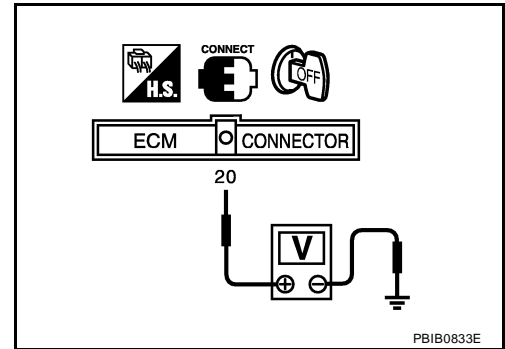
10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Turn ignition switch "OFF".
2. Check voltage between ECM terminal 20 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 11.
 NG >> GO TO 13.



11. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check harness continuity between ECM terminals 109, 111 and IPDM E/R terminal 33. 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 16.
 NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors E130, E27
- Harness or connectors E20, F32
- 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.

13. CHECK ECM POWER SUPPLY CIRCUIT-VII

1. Disconnect IPDM E/R harness connector.
2. Check harness continuity between ECM terminal 20 and IPDM E/R terminal 44.
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 15.
NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors E130, E27
- Harness or connectors E20, F32
- 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.

15. CHECK 15A FUSE

1. Disconnect 15A fuse from IPDM E/R.
2. Check 15A fuse.

OK or NG

- OK >> GO TO 18.
NG >> Replace 15A fuse.

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

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 59, 60, 106, 108 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 18.
NG >> GO TO 17.

17. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-5
- Harness for open or short between ECM and ground

>> Repair or replace.

18. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace IPDM E/R.
NG >> Repair open circuit or short to power in harness or connectors.

DTC U1000, U1001 CAN COMMUNICATION LINE

[QR]

DTC U1000, U1001 CAN COMMUNICATION LINE

PF2:23710

Description

UBS002P4

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

UBS002P5

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000 1000	CAN communication line	● ECM cannot communicate to other control unit.	● Harness or connectors (CAN communication line is open or shorted)
U1001 1001		● ECM cannot communicate for more than the specified time.	

DTC Confirmation Procedure

UBS002P6

1. Turn ignition switch "ON" and wait at least 3 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-140, "Diagnostic Procedure"](#) .




DTC U1000, U1001 CAN COMMUNICATION LINE

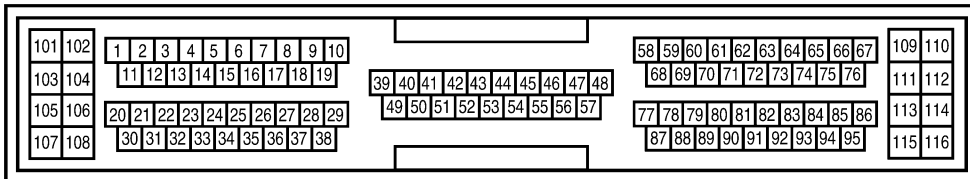
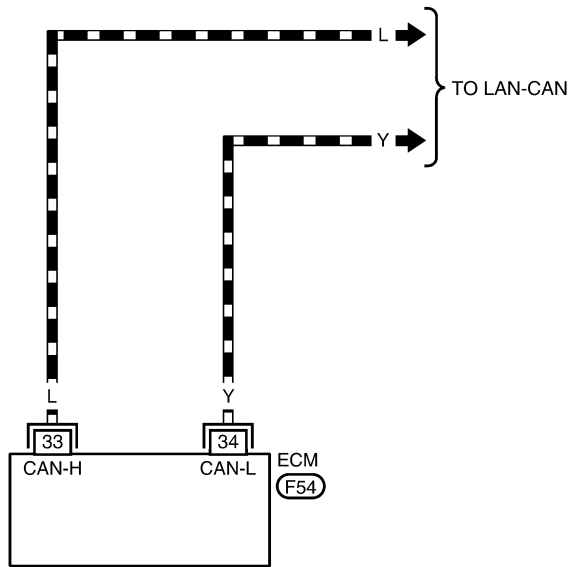
[QR]

Wiring Diagram

UBS002P7

EC-CAN-01

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



BBWA0005E

Diagnostic Procedure

1. INSPECTION START

1. Turn ignition switch ON.
2. Select "CAN DIAG SUPPORT MNTR" in "DATA MONITOR" mode with CONSULT-II.
3. Print out the CONSULT-II screen.

A/T models

OK data	NG data																																								
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M/T models

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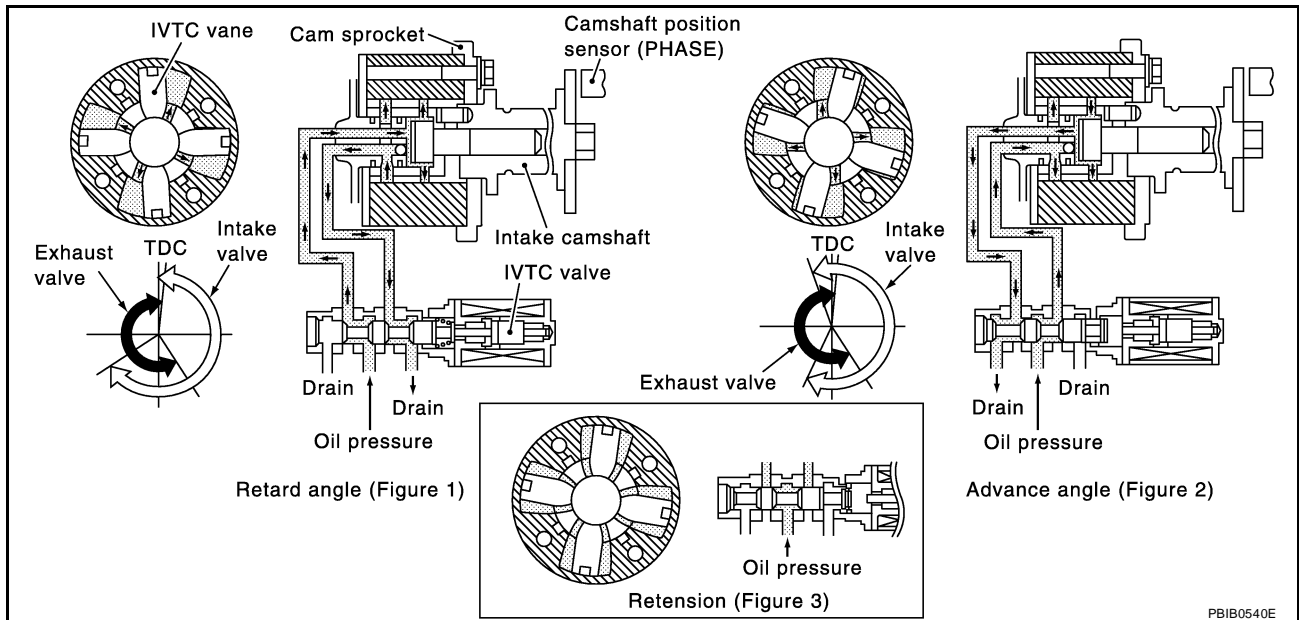
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>> Go to [LAN-27, "CAN SYSTEM \(FOR A/T MODELS\)"](#) or [LAN-43, "CAN SYSTEM \(FOR M/T MODELS\)"](#).

DTC P0011 IVT CONTROL

Description SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed sensor	Vehicle speed		



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-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V TIM (B1)	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load Idle	-5° - 5°CA
	2,000 rpm	Approx. 0° - 20°CA
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load Idle	0% - 2%
	2,000 rpm	Approx. 25% - 60%

On Board Diagnosis Logic

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) ● Accumulation of debris to the signal pick-up portion of the camshaft

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

CAUTION:

Always drive at a safe speed.

NOTE:

- If DTC P0011 is displayed with DTC P1111, first perform trouble diagnosis for "DTC P1111". See [EC-393](#).
- 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 10V and 16V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLANT TEMPS	70 - 105°C (158 - 221°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.)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

4. If 1st trip DTC is detected, go to [EC-142, "Diagnostic Procedure"](#)

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

1. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-289, "Component Inspection"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Replace crankshaft position sensor (POS).

2. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-295, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Replace camshaft position sensor (PHASE).

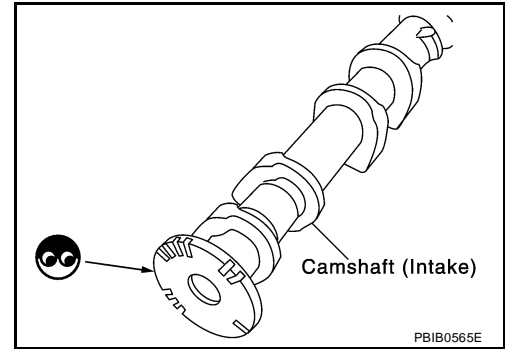
3. CHECK CAMSHAFT (INTAKE)

Check the following.

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

OK or NG

- OK >> GO TO 4.
- NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



4. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

For wiring diagram refer to CKP sensor (POS) [EC-286](#) and CMP sensor (PHASE) [EC-292](#) .

>> INSPECTION END

A
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DTC P0031, P0032 HO2S1 HEATER

[QR]

DTC P0031, P0032 HO2S1 HEATER

PF:22690

Description SYSTEM DESCRIPTION

UBS002PE

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Engine coolant temperature sensor	Engine coolant temperature		

The ECM performs ON/OFF duty control of the heated oxygen sensor 1 heater corresponding to the engine speed and engine coolant temperature. The duty percent varies with engine coolant temperature when engine is started.

OPERATION

Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

UBS002PF

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1)	<ul style="list-style-type: none"> Engine: After warming up Engine speed: Below 3,600 rpm 	ON
	<ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	OFF

On Board Diagnosis Logic

UBS002PG

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031	Heated oxygen sensor 1 heater control circuit low	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	<ul style="list-style-type: none"> Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.) Heater oxygen sensor 1 heater
P0032 0032	Heated oxygen sensor 1 heater control circuit high	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	<ul style="list-style-type: none"> Harness or connectors (The heated oxygen sensor 1 heater circuit is shorted.) Heater oxygen sensor 1 heater

DTC Confirmation Procedure

UBS002PH

NOTE:

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

TESTING CONDITION:

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

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.

DTC P0031, P0032 HO2S1 HEATER

[QR]

3. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
4. Start engine and run it for at least 6 seconds at idle speed.
5. If 1st trip DTC is detected, go to [EC-147, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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 run it for at least 6 seconds at idle speed.
 4. Turn ignition switch "OFF" and wait at least 10 seconds.
 5. Start engine and run it for at least 6 seconds at idle speed.
 6. Select "MODE 3" with GST.
 7. If DTC is detected, go to [EC-147, "Diagnostic Procedure"](#).
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

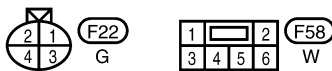
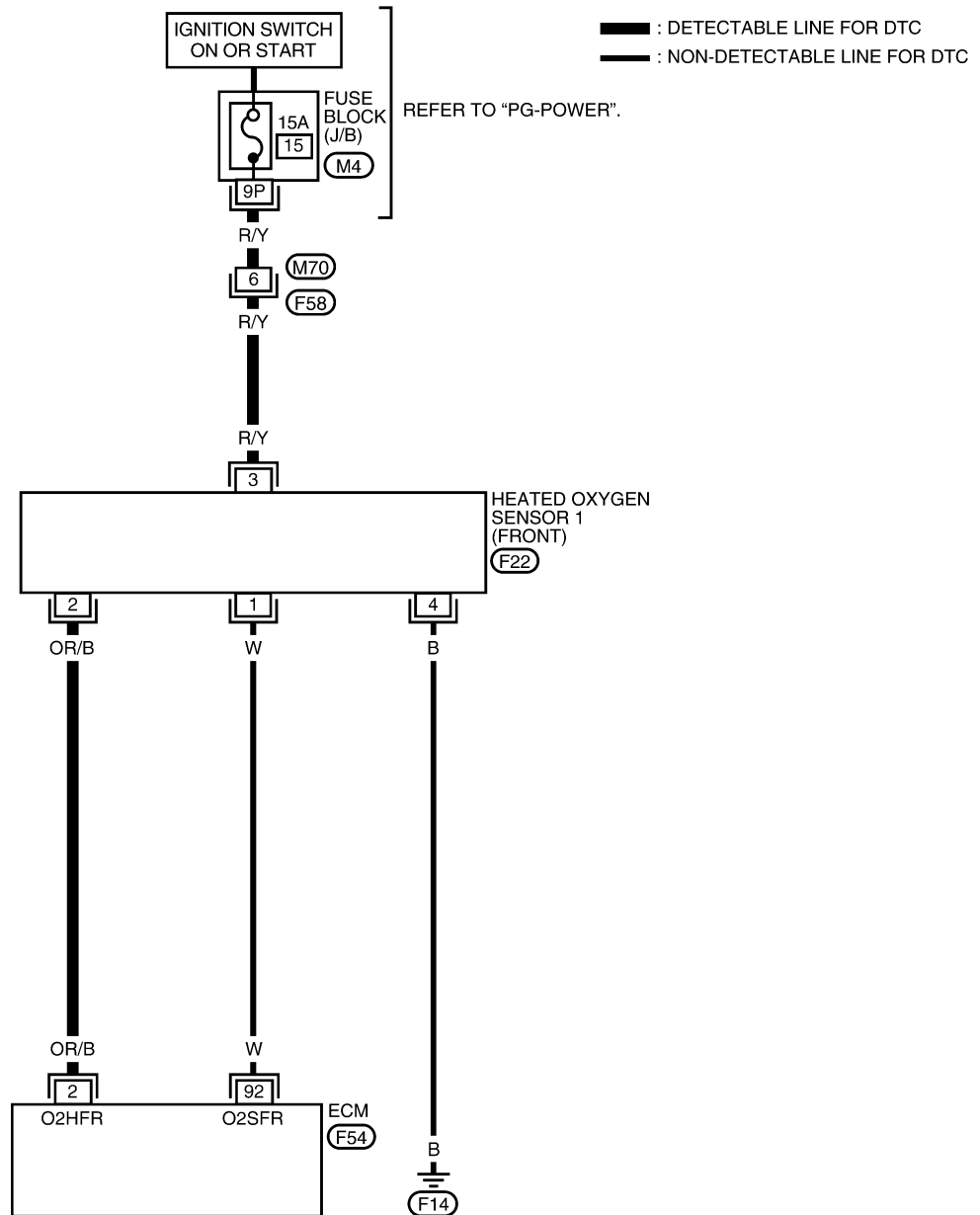
DTC P0031, P0032 HO2S1 HEATER

[QR]

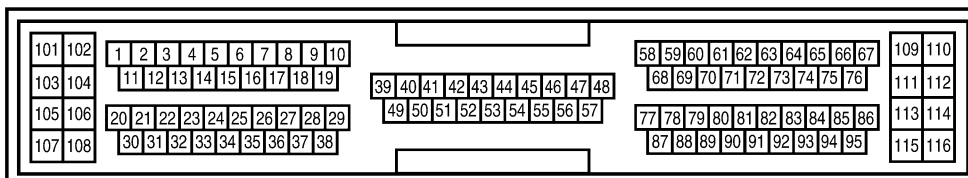
UBS002PI

Wiring Diagram

EC-HO2S1H-01



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0010E

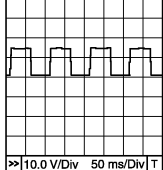
Specification data are reference values and are measured between each terminal and ground.

DTC P0031, P0032 HO2S1 HEATER

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	OR/B	Heated oxygen sensor 1 heater	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition. ● Engine speed is below 3,600 rpm. 	<p>Approximately 7.0V</p>  <p>PBIB0519E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm. 	<p>BATTERY VOLTAGE (11 - 14V)</p>

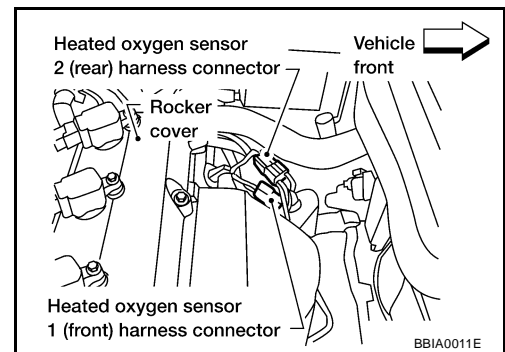
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS002PJ

1. CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Turn ignition switch "ON".

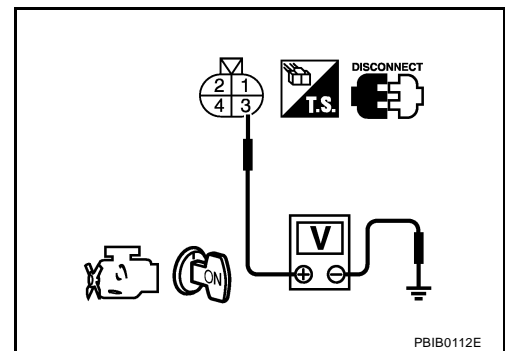


4. Check voltage between HO2S1 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M70, F58
- Fuse block (J/B) connector M4
- 15A fuse
- Harness for open or short between heated oxygen sensor 1 and fuse

>> Repair harness or connectors.

3. CHECK HO2S1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 2 and HO2S1 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 HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-148, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace heated oxygen sensor 1.

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 1 HEATER

UBS002PK

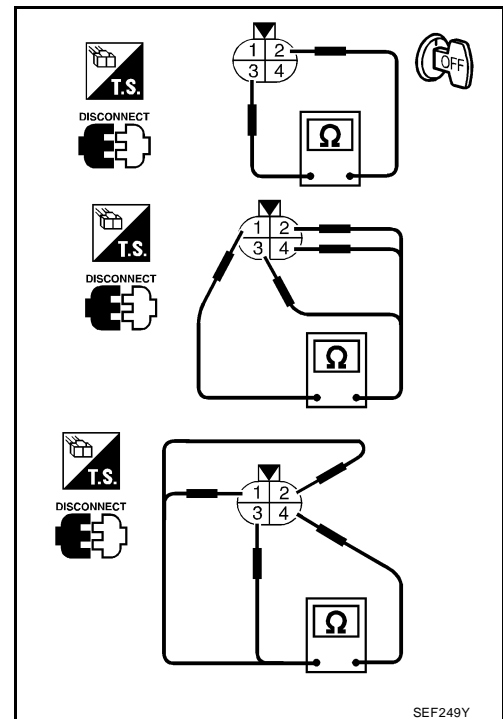
1. Check resistance between HO2S1 terminals as follows.

Terminal No.	Resistance
2 and 3	2.3 - 4.3 Ω at 25°C (77°F)
1 and 2, 3, 4	$\infty \Omega$ (Continuity should not exist)
4 and 1, 2, 3	

2. If NG, replace heated oxygen sensor 1.

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.



SEF249Y

Removal and Installation HEATED OXYGEN SENSOR 1

UBS002PL

Refer to [EM-21, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P0037, P0038 HO2S2 HEATER

[QR]

DTC P0037, P0038 HO2S2 HEATER

PF2:226A0

Description SYSTEM DESCRIPTION

UBS002PM

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)			

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

UBS002PN

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 driving for 2 minutes at a speed of 70 km/h (43 MPH) or more] 	ON
	<ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	OFF

On Board Diagnosis Logic

UBS002PO

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 1 heater.)	<ul style="list-style-type: none"> Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.) Heater oxygen sensor 1 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 1 heater.)	<ul style="list-style-type: none"> Harness or connectors (The heated oxygen sensor 1 heater circuit is shorted.) Heater oxygen sensor 1 heater

DTC Confirmation Procedure

UBS002PP

NOTE:

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

TESTING CONDITION:

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

④ WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine.
3. Drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.

DTC P0037, P0038 HO2S2 HEATER

[QR]

4. Stop vehicle and let engine idle for at least 6 seconds.
5. If 1st trip DTC is detected, go to [EC-152, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

1. Start engine.
 2. Drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
 3. Stop vehicle and let engine idle for at least 6 seconds.
 4. Turn ignition switch "OFF" and wait at least 10 seconds.
 5. Start engine.
 6. Drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
 7. Stop vehicle and let engine idle for at least 6 seconds.
 8. Select "MODE 3" with GST.
 9. If DTC is detected, go to [EC-152, "Diagnostic Procedure"](#).
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

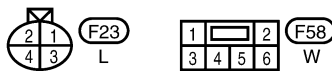
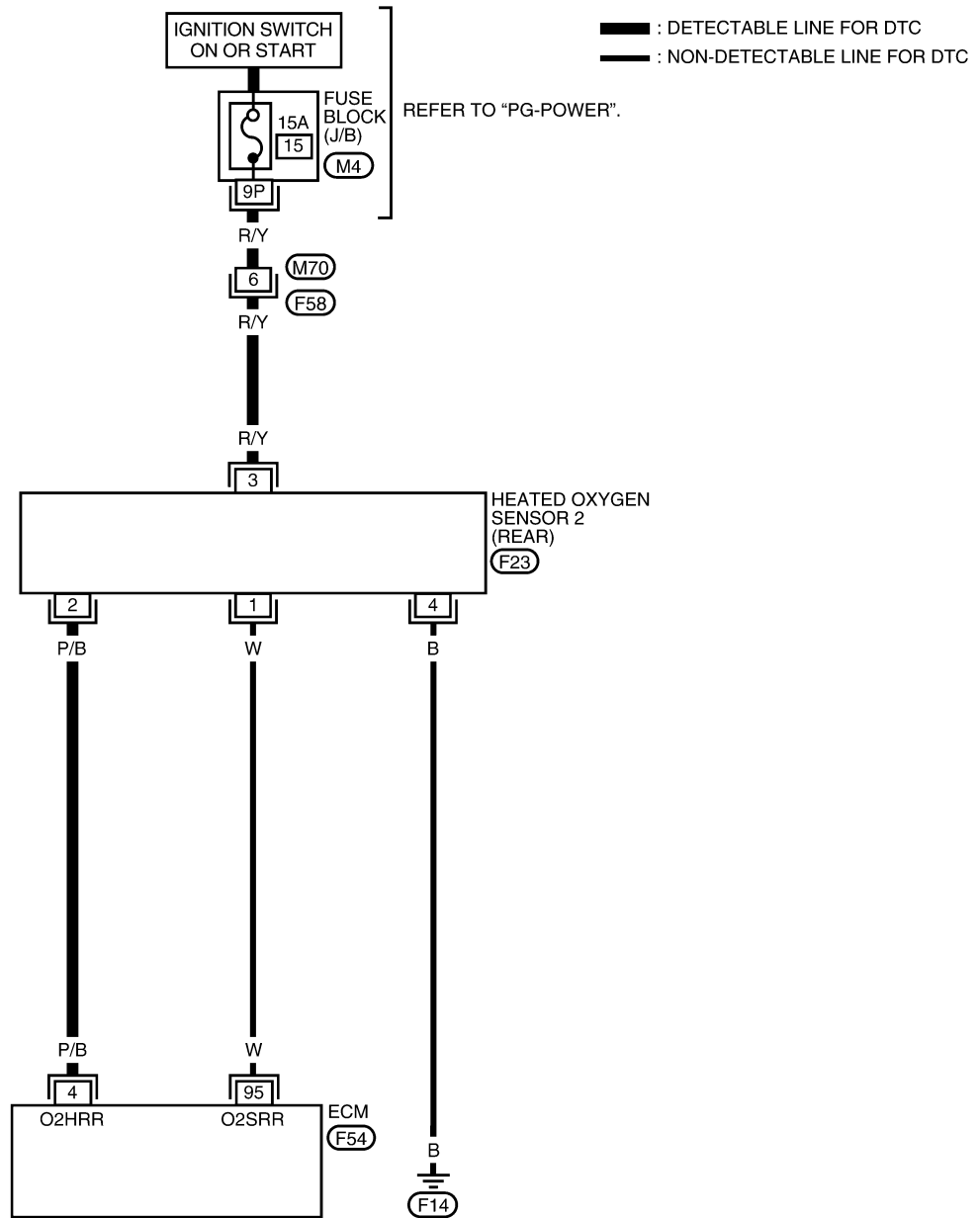
DTC P0037, P0038 HO2S2 HEATER

[QR]

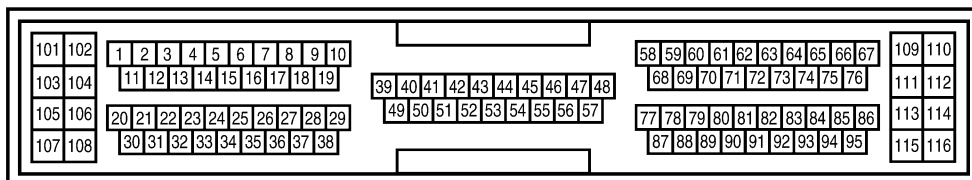
Wiring Diagram

UBS002PQ

EC-HO2S2H-01



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0012E

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

CAUTION:

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

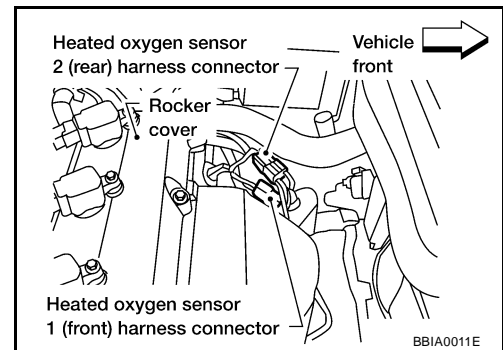
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	P/B	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more. 	0 - 1.0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Engine stopped [Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS002PR

1. CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Turn ignition switch "ON".

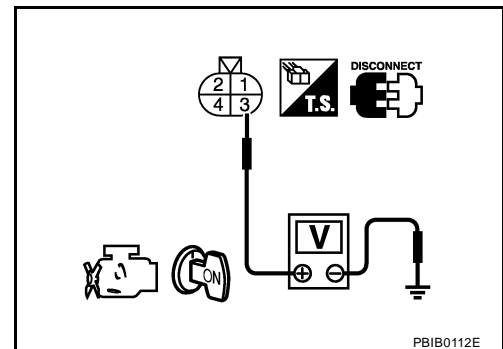


4. Check voltage between HO2S2 terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M70, F58
- Fuse block (J/B) connector M4
- 15A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair harness or connectors.

3. 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 4 and HO2S2 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 harness or connectors.

4. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-153, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace heated oxygen sensor 2.

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
HEATED OXYGEN SENSOR 2 HEATER**

UBS002PS

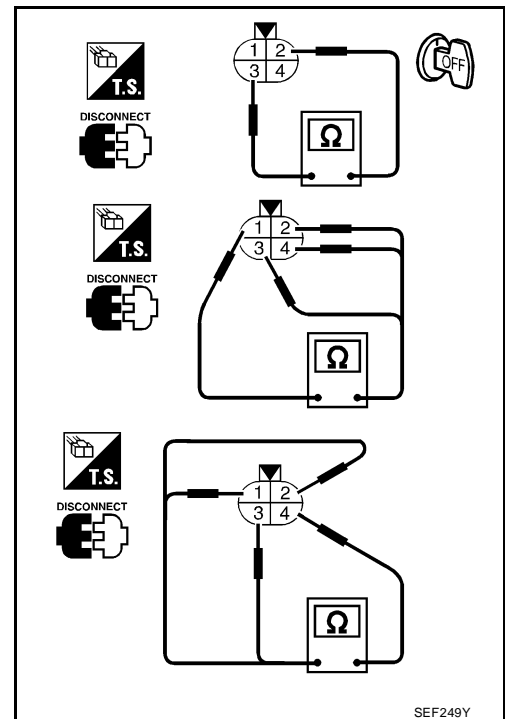
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
2 and 3	2.3 - 4.3 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.

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.



SEF249Y

**Removal and Installation
HEATED OXYGEN SENSOR 2**

UBS002PT

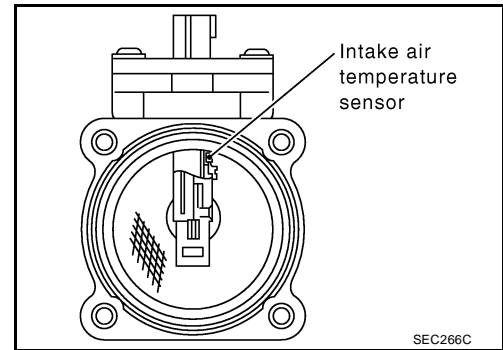
Refer to [EX-3, "EXHAUST SYSTEM \(QR25DE\)"](#) .

DTC P0101 MAF SENSOR

Component Description

UBS002PU

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

UBS002PV

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load 	Idle Approx. 1.1 - 1.5V
	2,500 rpm	Approx. 1.6 - 2.0V
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N ● 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: N ● 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

UBS002PW

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0101 0101	Mass air flow sensor circuit range/performance problem	A) A high voltage from the sensor is sent to ECM under light load driving condition.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor
		B) 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 ● Mass air flow sensor

DTC Confirmation Procedure

UBS002PX

Perform "PROCEDURE FOR MALFUNCTION A" first.

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

NOTE:

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

PROCEDURE FOR MALFUNCTION A

NOTE:

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

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and warm it up to normal operating temperature.
4. Run engine for at least 10 seconds at idle speed.
5. If 1st trip DTC is detected, go to [EC-158, "Diagnostic Procedure"](#)

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

SEF174Y

With GST

Follow the procedure "With CONSULT-II" above.

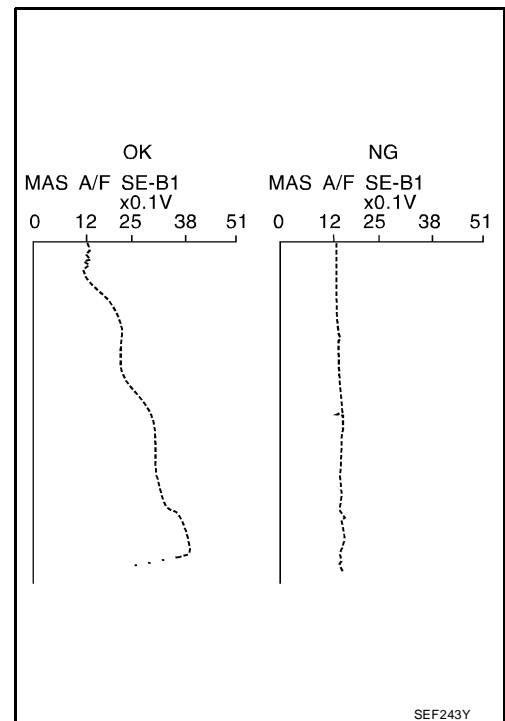
PROCEDURE FOR MALFUNCTION B

CAUTION:

Always drive vehicle at a safe speed.

With CONSULT-II

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
If engine cannot be started, go to [EC-158, "Diagnostic Procedure"](#) .
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
5. Increases engine speed to about 4,000 rpm.
6. Monitor the linear voltage rise in response to engine speed increases.
If NG, go to [EC-158, "Diagnostic Procedure"](#) .
If OK, go to following step.



A
EC
C
D
E
F
G
H
I
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K
L
M

DTC P0101 MAF SENSOR

[QR]

7. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL SEN 1	More than 3V
THRTL SEN 2	More than 3V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
THRTL SEN 1	XXX V
THRTL SEN 2	XXX V

PBIB0199E

8. If 1st trip DTC is detected, go to [EC-158, "Diagnostic Procedure"](#)

Overall Function Check PROCEDURE FOR MALFUNCTION B

UBS002PY

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

With GST

1. Start engine and warm it up to normal operating temperature.
2. Select "MODE 1" with GST.
3. Check the mass air flow sensor signal with "MODE 1".
4. Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.
5. If NG, go to [EC-158, "Diagnostic Procedure"](#) .

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

SEF534P

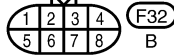
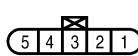
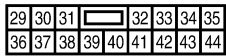
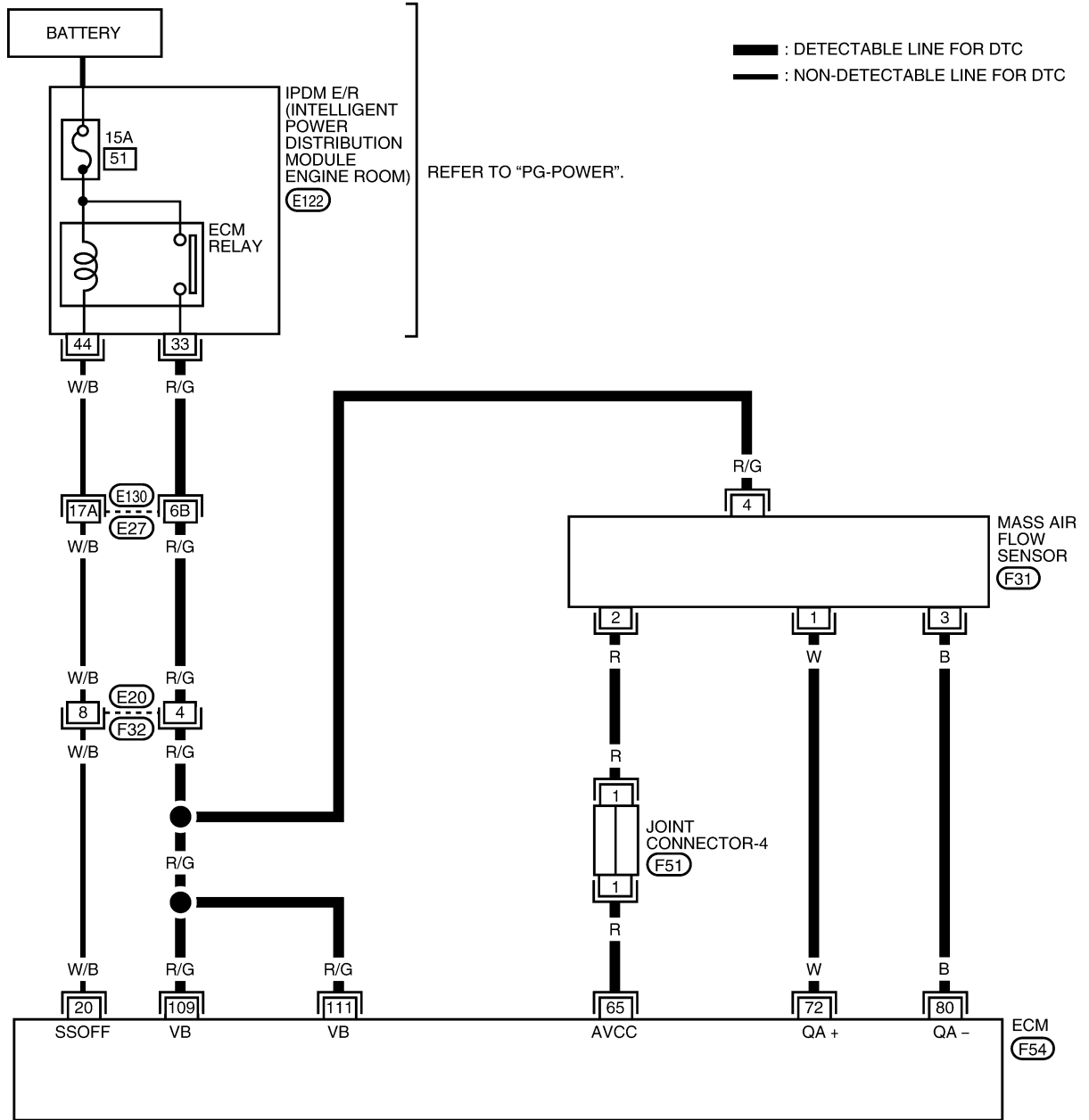
DTC P0101 MAF SENSOR

[QR]

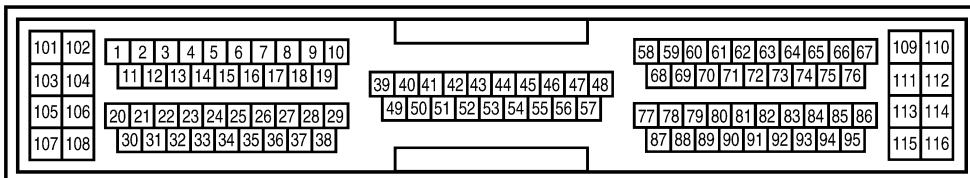
UBS002PZ

Wiring Diagram

EC-MAFS-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F51) - JOINT CONNECTOR (J/C)



BBWA0006E

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
72	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.6 - 2.0V
80	B	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

Diagnostic Procedure

UBS002Q0

1. INSPECTION START

Which malfunction (A or B) is duplicated?

A or B

- A >> GO TO 3.
- B >> GO TO 2.

2. CHECK INTAKE SYSTEM

Check the following for connection.

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

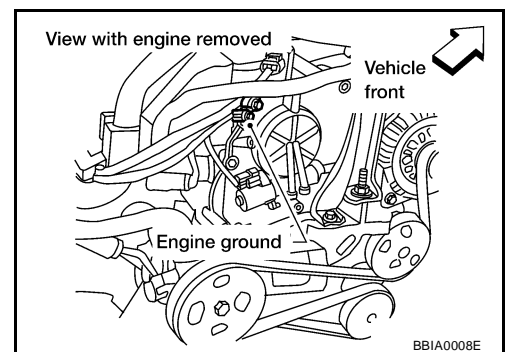
OK or NG

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

3. RETIGHTEN GROUND SCREWS

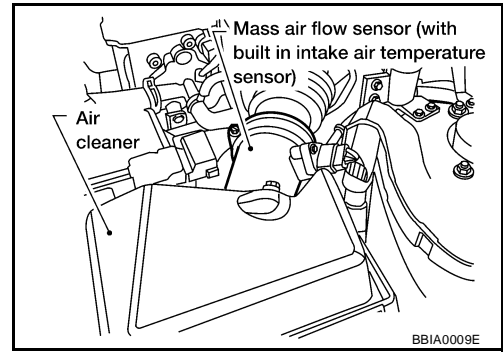
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

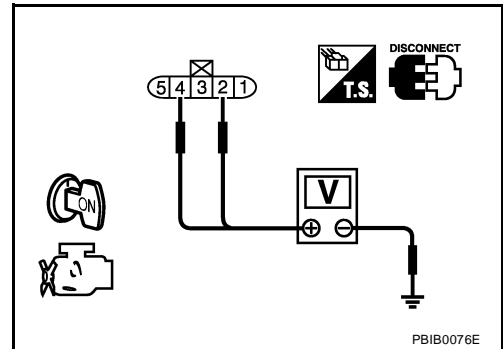


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

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



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Joint connector-4
- 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 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 80. 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 1 and ECM terminal 72.
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-160, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection MASS AIR FLOW SENSOR

UBS002Q1

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 72 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 2.0
Idle to about 4,000 rpm*	1.5 - 2.0 to Approx. 4.0

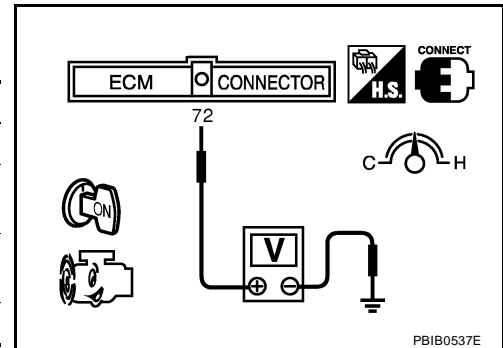
*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
 - a. Turn ignition switch "OFF".
 - b. Disconnect mass air flow sensor harness connector and reconnect it again.
 - c. Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.

Removal and Installation MASS AIR FLOW SENSOR

UBS002Q2

Refer to [EM-14, "AIR CLEANER AND AIR DUCT"](#) .



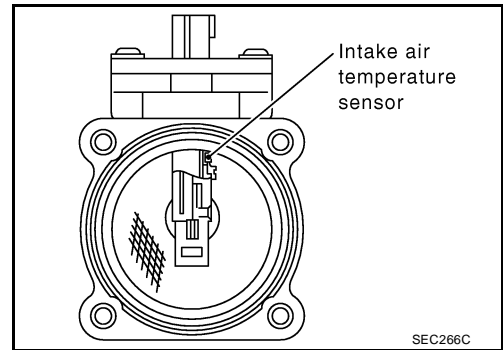
DTC P0102, P0103 MAF SENSOR

PFP:22680

Component Description

UBS002Q3

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

UBS002Q4

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load Idle	Approx. 1.1 - 1.5V
	2,500 rpm	Approx. 1.6 - 2.0V
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N ● 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: N ● 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

UBS002Q5

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 (The 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 (The 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

UBS002Q6

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

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait 5 seconds at most.
4. If DTC is detected, go to [EC-164, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR DTC P0103

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-164, "Diagnostic Procedure"](#) .
If DTC is not detected, go to next step.
5. Start engine and wait at least 5 seconds.
6. If DTC is detected, go to [EC-164, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

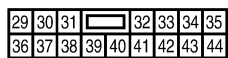
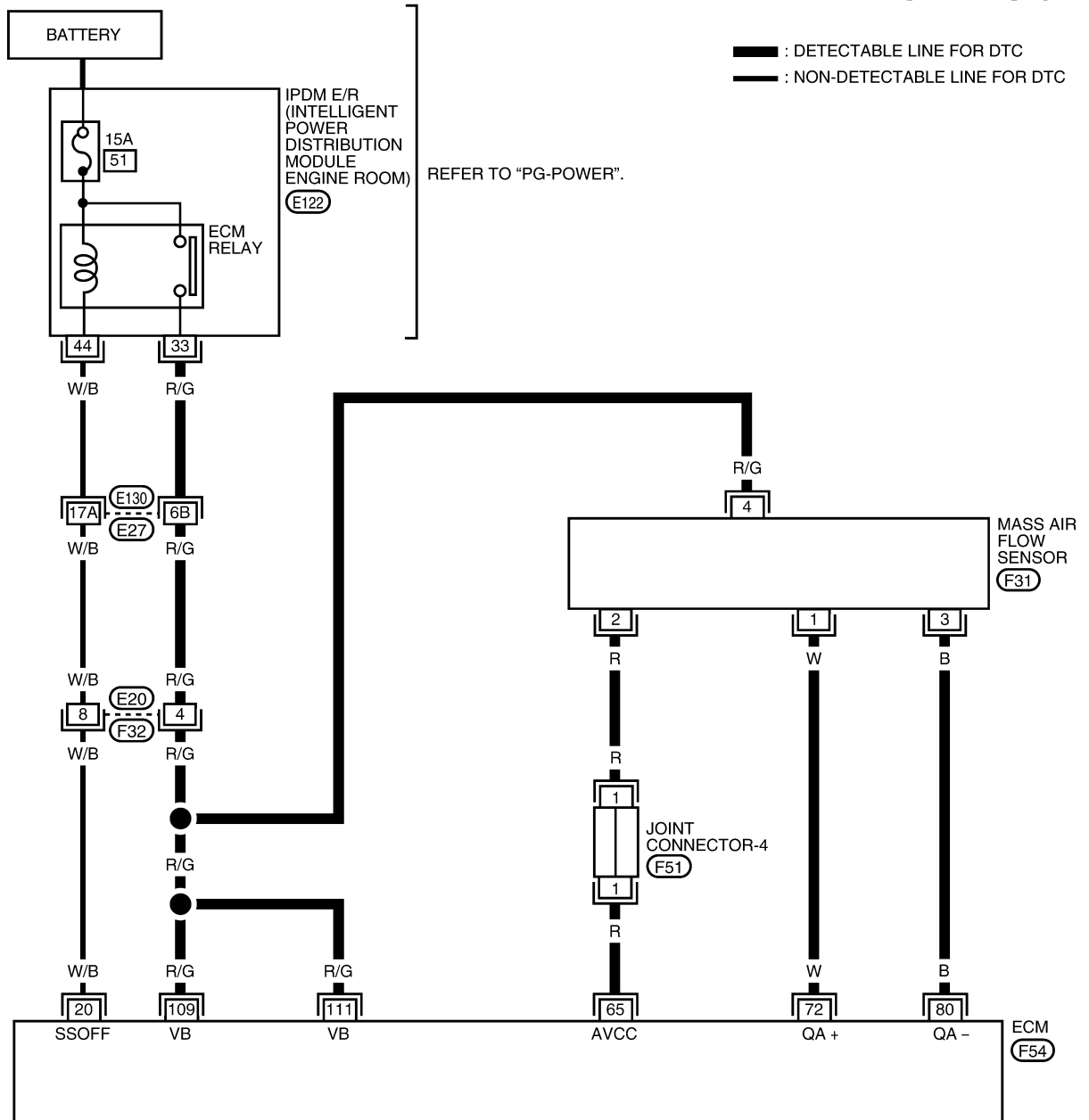
DTC P0102, P0103 MAF SENSOR

[QR]

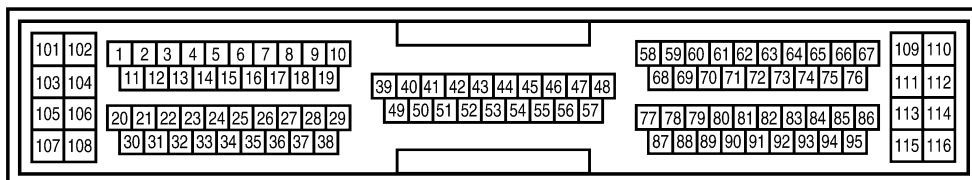
UBS002Q7

Wiring Diagram

EC-MAFS-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F51) - JOINT CONNECTOR (J/C)



BBWA0006E

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

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
72	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.6 - 2.0V
80	B	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

Diagnostic Procedure

UBS002Q8

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 to intake manifold

OK or NG

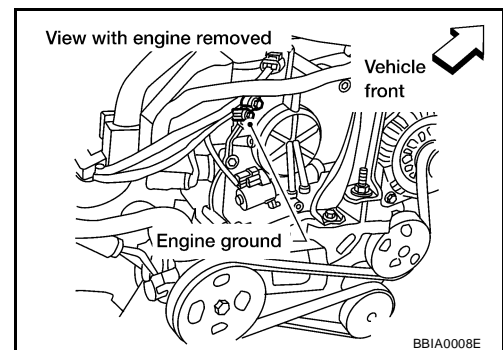
OK >> GO TO 3.

NG >> Reconnect the parts.

3. RETIGHTEN GROUND SCREWS

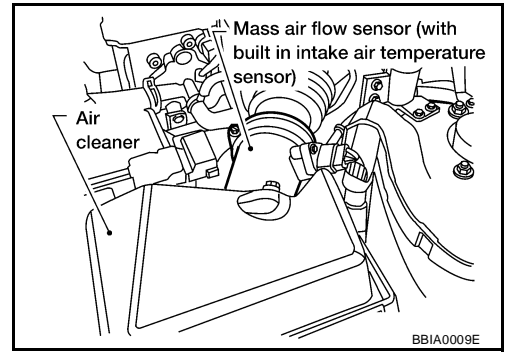
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

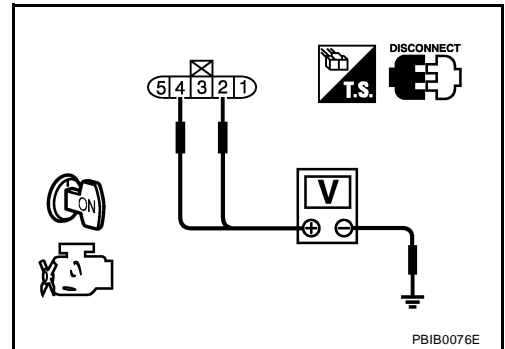


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

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



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Joint connector-4
- Harness for open or short between ECM relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

>> Repair 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 80. 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 1 and ECM terminal 72.
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-166, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection MASS AIR FLOW SENSOR

UBS002Q9

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 72 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 2.0
Idle to about 4,000 rpm*	1.5 - 2.0 to Approx. 4.0

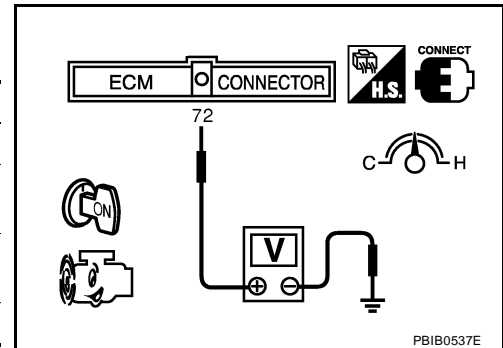
*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
 - a. Turn ignition switch "OFF".
 - b. Disconnect mass air flow sensor harness connector and reconnect it again.
 - c. Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.

Removal and Installation MASS AIR FLOW SENSOR

UBS002QA

Refer to [EM-14, "AIR CLEANER AND AIR DUCT"](#) .



DTC P0112, P0113 IAT SENSOR

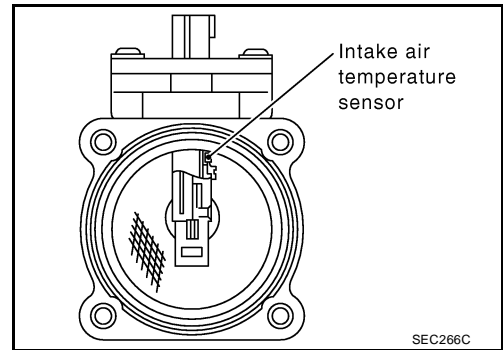
PFP:22630

Component Description

UBS002QB

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

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

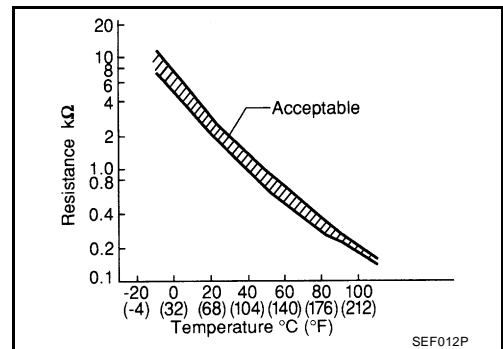


SEC266C

<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

*: These data are reference values and are measured between ECM terminal 84 (Intake air temperature sensor) and ground.



SEF012P

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

UBS002QC

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 (The sensor circuit is open or shorted.) ● Intake air temperature sensor
P0113 0113	Intake air temperature sensor circuit high input	An excessively low voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

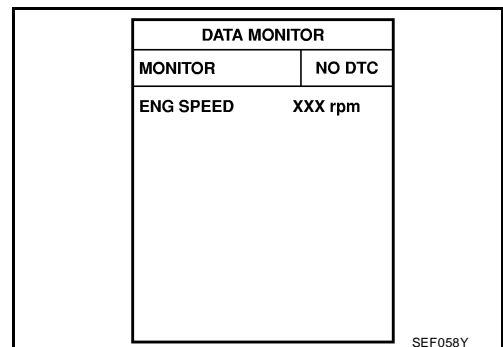
UBS002QD

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-170, "Diagnostic Procedure"](#)



SEF058Y

DTC P0112, P0113 IAT SENSOR

[QR]

 **WITH GST**

Follow the procedure "With CONSULT-II" above.

DTC P0112, P0113 IAT SENSOR

[QR]

Wiring Diagram

UBS0020E

EC-IATS-01

A

EC

C

D

E

F

G

H

I

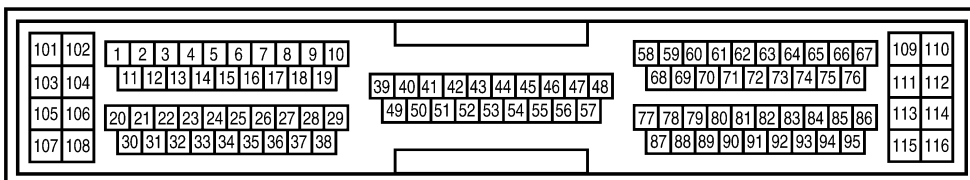
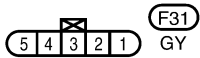
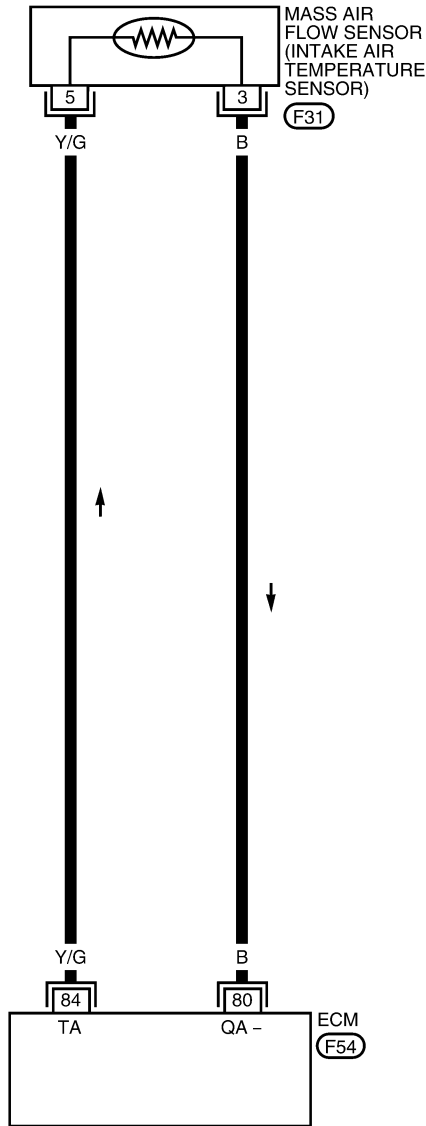
J

K

L

M

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

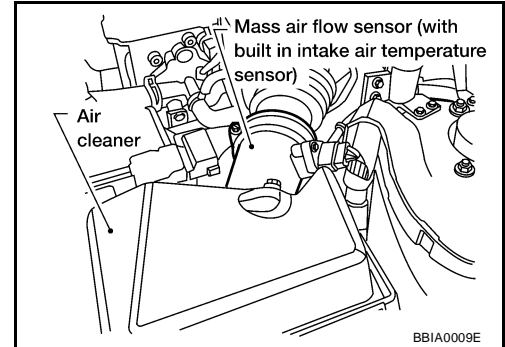


BBWA0007E

Diagnostic Procedure

1. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect mass air flow sensor (intake air temperature sensor is built-into) harness connector.
3. Turn ignition switch "ON".



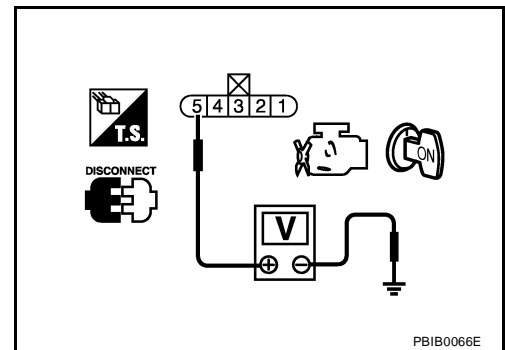
BBIA0009E

4. Check voltage between MAF sensor terminal 5 and ground.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 2.
 NG >> Repair harness or connectors.



PBIB0066E

2. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80. 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 harness or connectors.

3. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-171, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.
 NG >> Replace mass air flow sensor (with intake air temperature sensor).

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

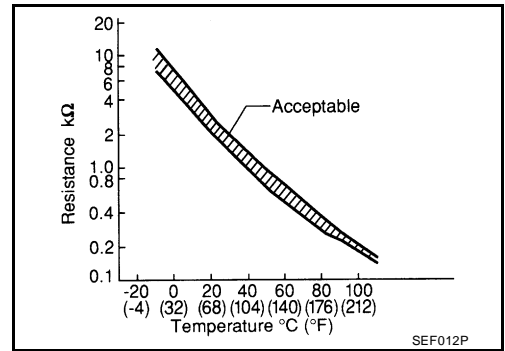
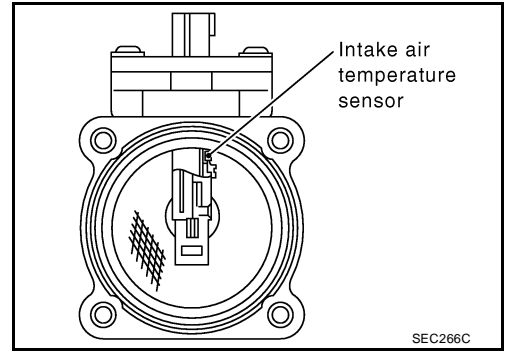
>> INSPECTION END

Component Inspection
INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between intake air temperature sensor terminals 3 and 5 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



Removal and Installation
MASS AIR FLOW SENSOR

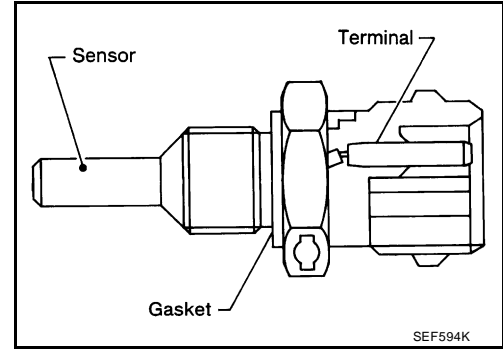
Refer to [EM-14, "AIR CLEANER AND AIR DUCT"](#) .

A
 EC
 C
 D
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 L
 M

DTC P0117, P0118 ECT SENSOR

Component Description

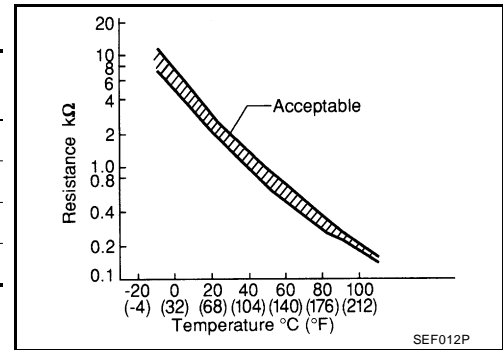
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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

*: These data are reference values and are measured between ECM terminal 93 (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

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

DTC P0117, P0118 ECT SENSOR

[QR]

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

UBS002QK

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-175, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0117, P0118 ECT SENSOR

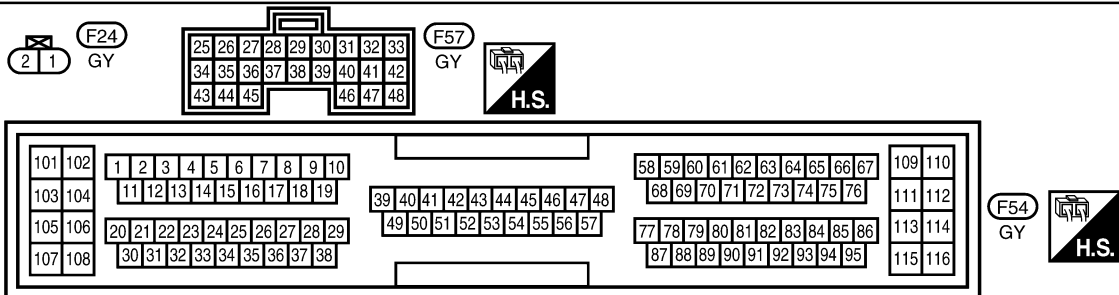
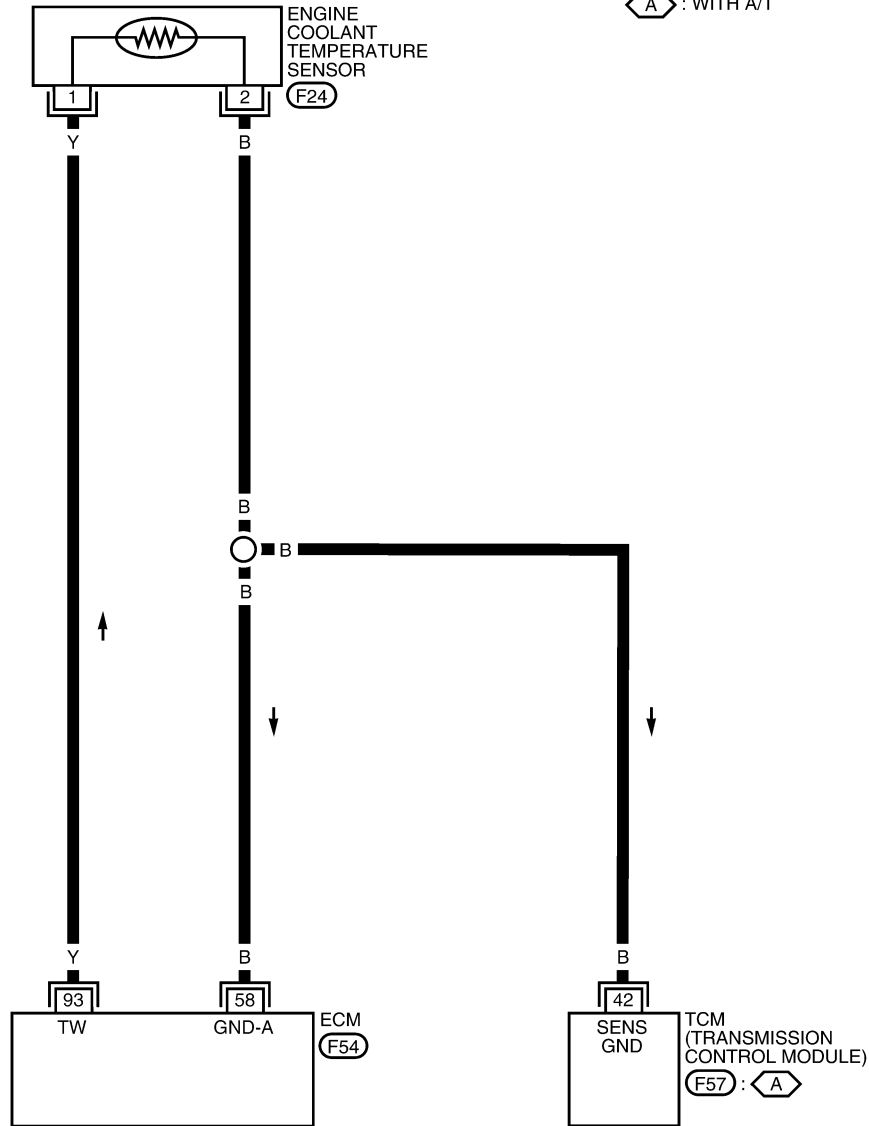
[QR]

Wiring Diagram

UBS002QL

EC-ECTS-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ⬡ : WITH A/T

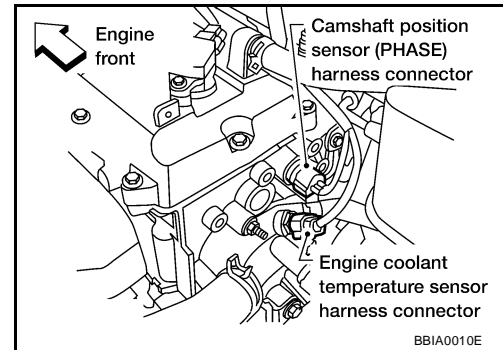


BBWA0008E

Diagnostic Procedure

1. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect engine coolant temperature (ECT) sensor harness connector.
3. Turn ignition switch "ON".

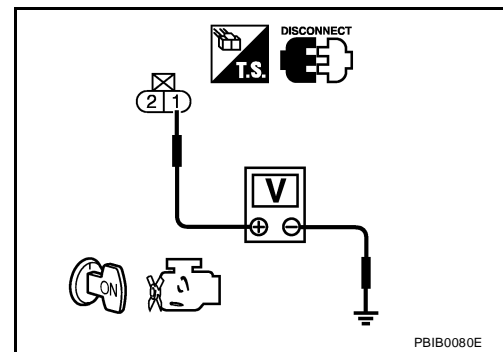


4. Check voltage between ECT sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 2.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



2. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ECT sensor terminal 2 and engine ground. 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 >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between engine coolant temperature sensor and ECM
- Harness for open or short between engine coolant temperature sensor and TCM

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

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-176. "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace engine coolant temperature sensor.

5. CHECK INTERMITTENT INCIDENT

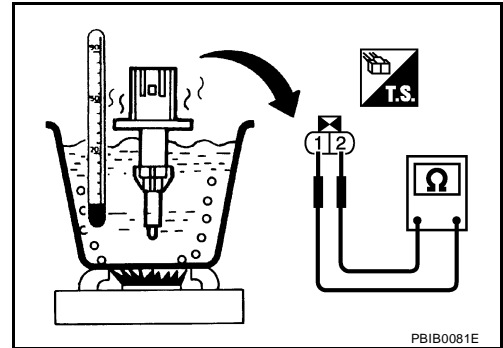
Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
ENGINE COOLANT TEMPERATURE SENSOR**

UBS002QN

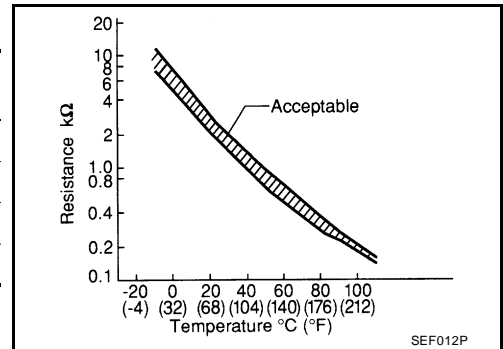
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<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

*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.



2. If NG, replace engine coolant temperature sensor.

**Removal and Installation
ENGINE COOLANT TEMPERATURE SENSOR**

UBS002QO

Refer to [CO-20, "THERMOSTAT AND THERMOSTAT HOUSING"](#) .

DTC P0125 ECT SENSOR

PFP:22630

Description

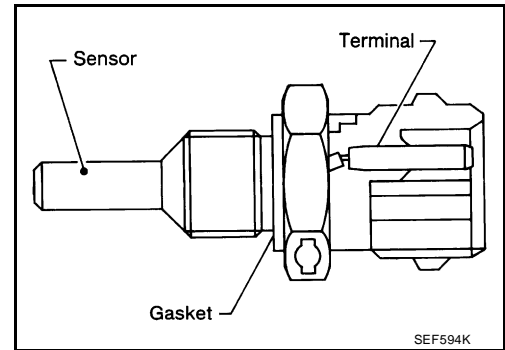
UBS002QP

NOTE:

If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-172](#).

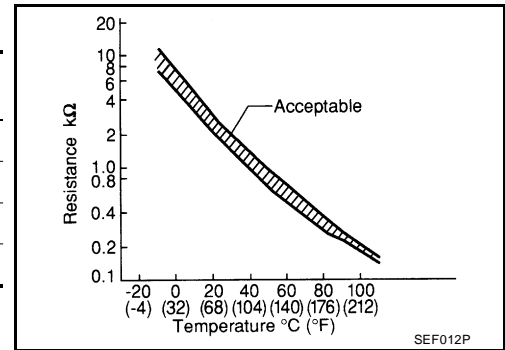
COMPONENT DESCRIPTION

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



*: These data are reference values and are measured between ECM terminal 93 (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

UBS002QQ

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

UBS002QR

CAUTION:

Be careful not to overheat engine.

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P0125 ECT SENSOR

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Check that "COOLAN TEMP/S" is above 10°C (50°F).
If it is above 10°C (50°F), the test result will be OK.
If it is below 10°C (50°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 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.
5. If 1st trip DTC is detected, go to [EC-178, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS002QS

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-178, "Component Inspection"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Replace engine coolant temperature sensor.

2. CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace thermostat. Refer to [CO-20, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

3. CHECK INTERMITTENT INCIDENT

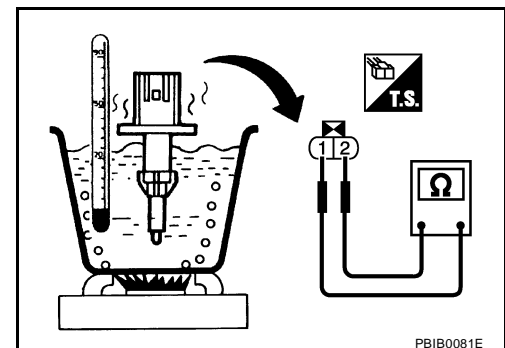
Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

UBS002QT

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



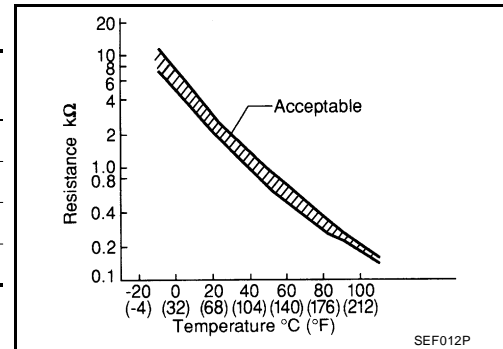
DTC P0125 ECT SENSOR

[QR]

<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

*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.



- If NG, replace engine coolant temperature sensor.

Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [CO-20, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

UBS002QU

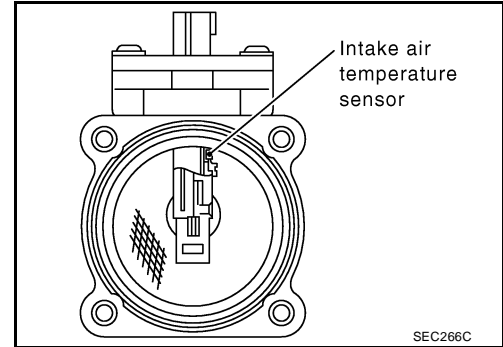
DTC P0127 IAT SENSOR

Component Description

UBS002QV

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

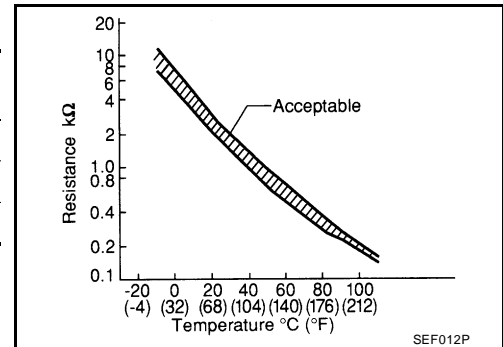
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

*: These data are reference values and are measured between ECM terminal 84 (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

UBS002QW

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 (The sensor circuit is open or shorted) ● Intake air temperature sensor

DTC Confirmation Procedure

UBS002QX

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.

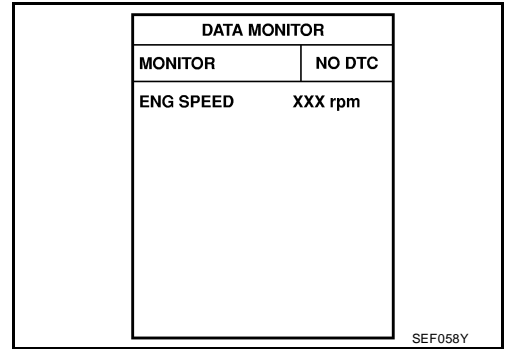
Ⓜ WITH CONSULT-II

1. Wait until engine coolant temperature is less than 90°C (194°F)
 - a. Turn ignition switch "ON".

DTC P0127 IAT SENSOR

[QR]

- b. Select "DATA MONITOR" mode with CONSULT-II.
- c. Check the engine coolant temperature.
- d. If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
 - Perform the following steps before engine coolant temperature is above 90°C (194°F).
2. Turn ignition switch "ON".
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. If 1st trip DTC is detected, go to [EC-181, "Diagnostic Procedure"](#).



WITH GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

UBS002QY

1. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-181, "Component Inspection"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Replace mass air flow sensor (with intake air temperature sensor).

2. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

Refer to [EC-169, "Wiring Diagram"](#).

>> INSPECTION END

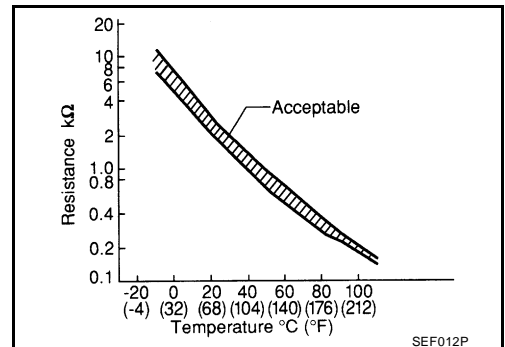
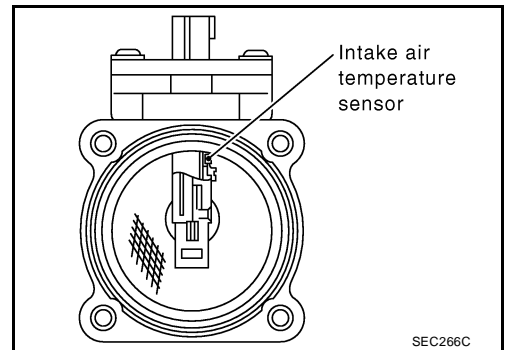
Component Inspection INTAKE AIR TEMPERATURE SENSOR

UBS002QZ

1. Check resistance between intake air temperature sensor terminals 3 and 5 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



Removal and Installation
MASS AIR FLOW SENSOR

Refer to [EM-14, "AIR CLEANER AND AIR DUCT"](#) .

DTC P0128 THERMOSTAT FUNCTION

PFP:21200

On Board Diagnosis Logic

UBS002R1

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 function ● Leakage from sealing portion of thermostat ● Engine coolant temperature sensor

DTC Confirmation Procedure

UBS002R2

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 60°C (140°F).

WITH CONSULT-II

1. Replace thermostat with new one. Refer to [CO-20, "THERMOSTAT AND THERMOSTAT HOUSING"](#) . Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2. Turn ignition switch “ON”.
3. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
4. Check that the “COOLAN TEMP/S” is above 60°C (140°F).
If it is below 60°C (140°F), go to following step.
If it is above 60°C (140°F), stop engine and cool down the engine to less than 60°C (140°F), then retry from step 1.
5. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)
---------------	-----------------------------

If 1st trip DTC is detected, go to [EC-183, "Diagnostic Procedure"](#)

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

SEF176Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

UBS002R3

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

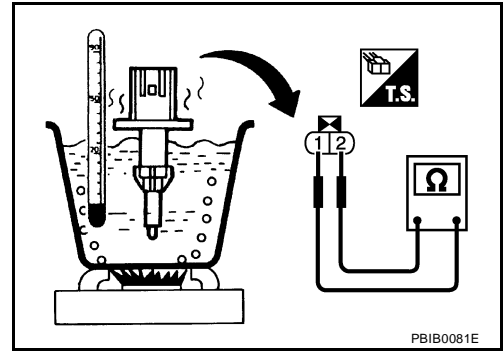
Refer to [EC-184, "Component Inspection"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace engine coolant temperature sensor.

Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

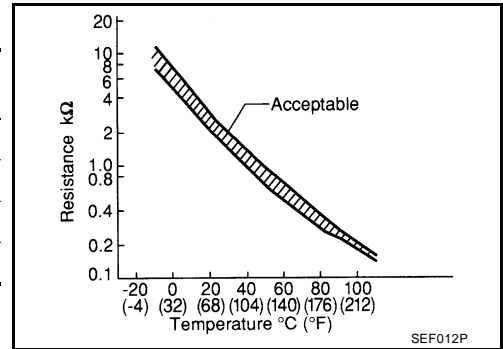
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature °C (°F)	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

*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.



2. If NG, replace engine coolant temperature sensor.

Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [CO-20, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

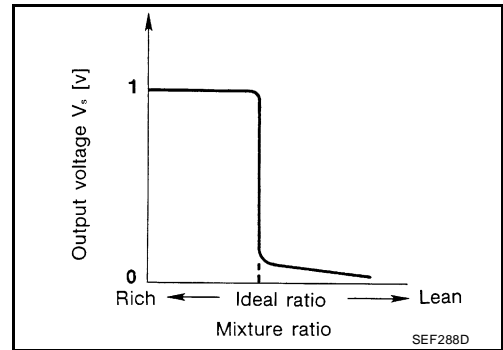
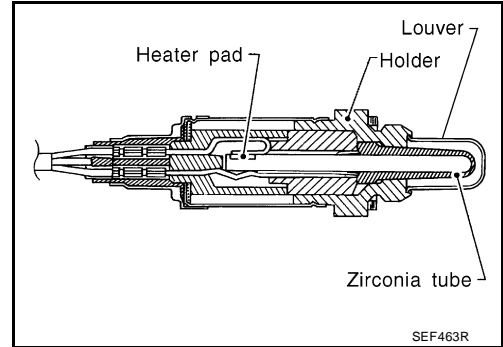
DTC P0132 HO2S1

PFP:22690

Component Description

UBS002R6

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



CONSULT-II Reference Value in Data Monitor Mode

UBS002R7

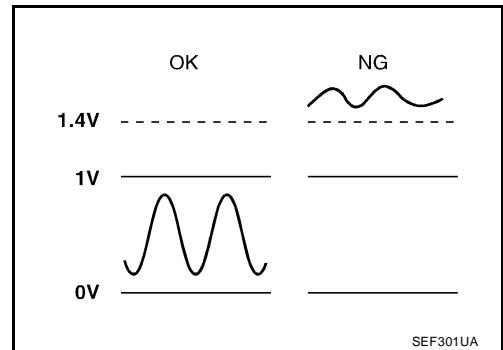
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS002R8

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 output is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0132 0132	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 1

DTC Confirmation Procedure

NOTE:

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

④ WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Restart engine and let it idle for 2 minutes.
6. If 1st trip DTC is detected, go to [EC-188, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANTEMP/S	XXX °C

SEF174Y

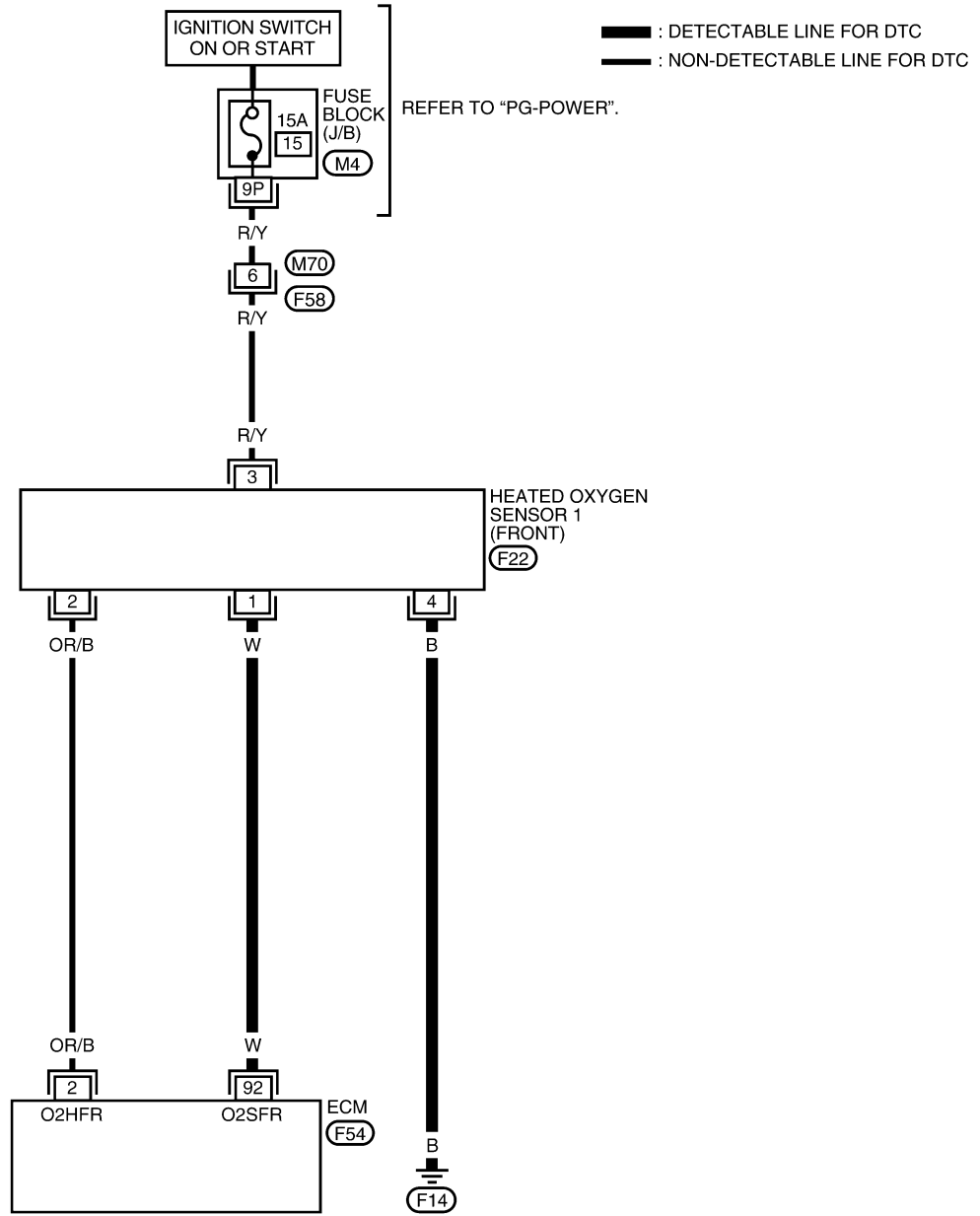
④ WITH GST

1. Start engine and warm it up to normal operating temperature.
 2. Turn ignition switch "OFF" and wait at least 10 seconds.
 3. Restart engine and let it idle for 2 minutes.
 4. Turn ignition switch "OFF" and wait at least 10 seconds.
 5. Restart engine and let it idle for 2 minutes.
 6. Select "MODE 3" with GST.
 7. If DTC is detected, go to [EC-188, "Diagnostic Procedure"](#) .
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

UBS002RA

EC-HO2S1-01



A

EC

C

D

E

F

G

H

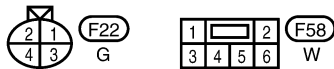
I

J

K

L

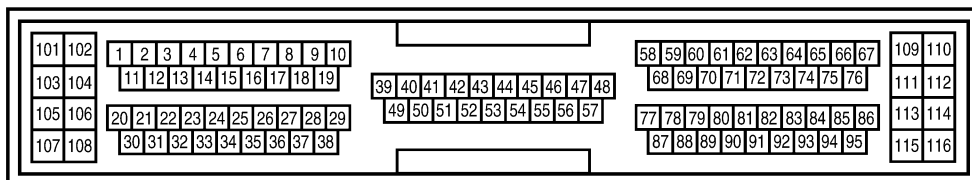
M



REFER TO THE FOLLOWING.

(M4) - FUSE BLOCK

- JUNCTION BOX (J/B)



BBWA0009E

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

CAUTION:

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

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	OR/B	Heated oxygen sensor 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V (Periodically change)

Diagnostic Procedure

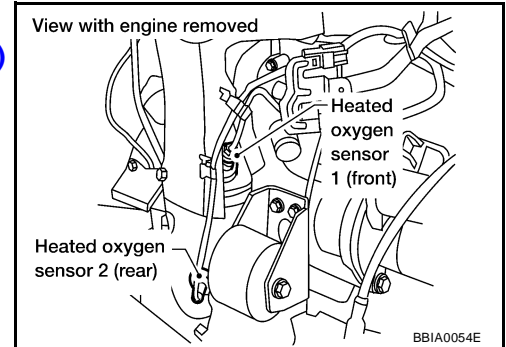
UBS002RB

1. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 40 - 50 N·m (4.1 - 5.1 kg·m, 30 - 37 ft·lb)

>> GO TO 2.



2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between HO2S1 terminal 4 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 3.

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

3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 and ground. Refer to Wiring Diagram.

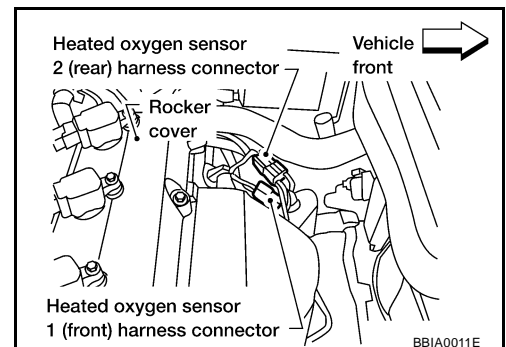
Continuity should not exist.

5. 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 HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.

Water should not exist.

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-189, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
HEATED OXYGEN SENSOR 1**

UBS002RC

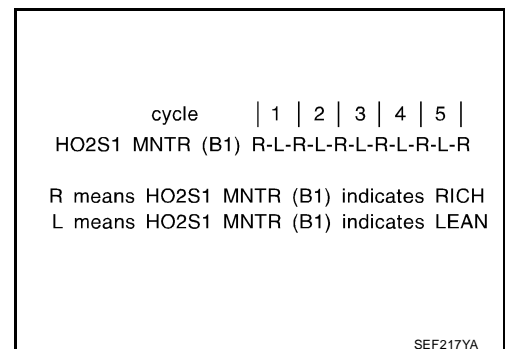
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

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

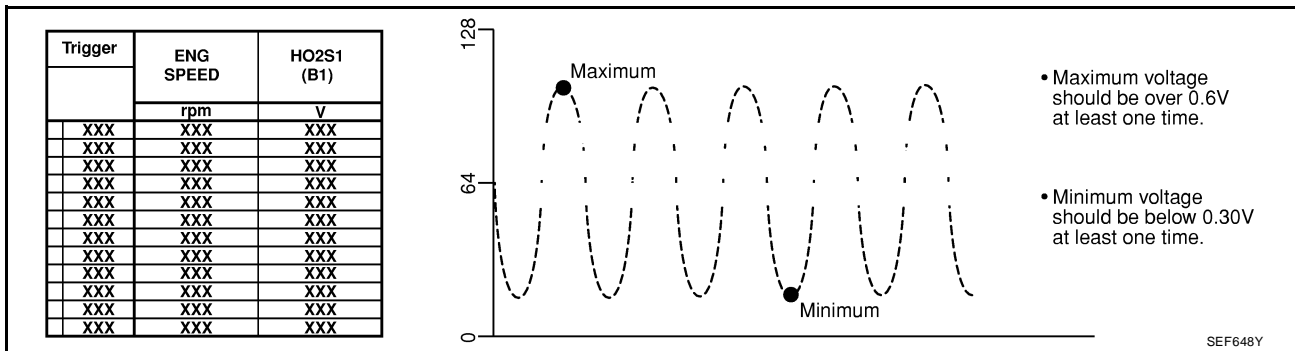
SEF646Y

6. Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
 - "HO2S1 (B1)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)" voltage never exceeds 1.0V.



DTC P0132 HO2S1

[QR]



CAUTION:

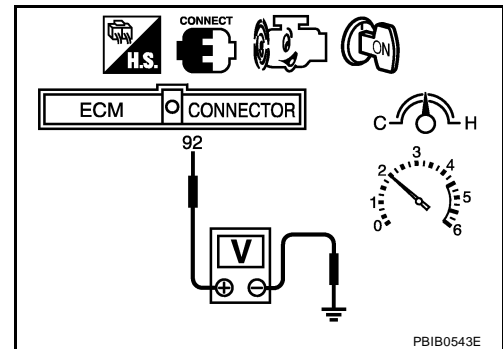
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved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

⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V



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.

Removal and Installation HEATED OXYGEN SENSOR 1

UBS002RD

Refer to [EM-21, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

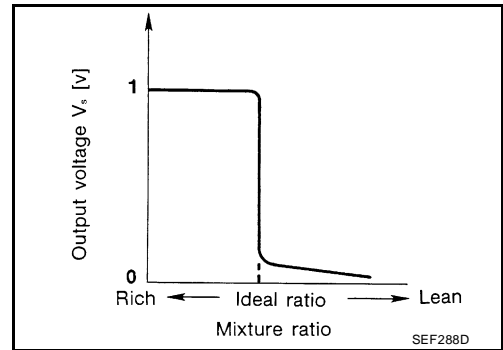
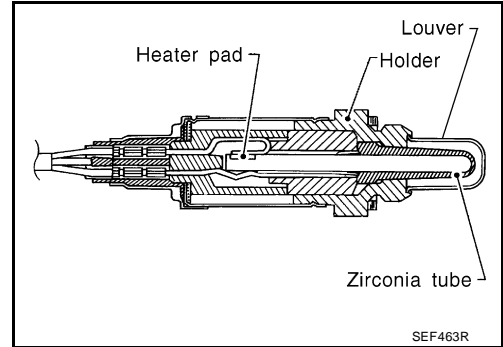
DTC P0133 HO2S1

PFP:22690

Component Description

UBS002RE

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



CONSULT-II Reference Value in Data Monitor Mode

UBS002RF

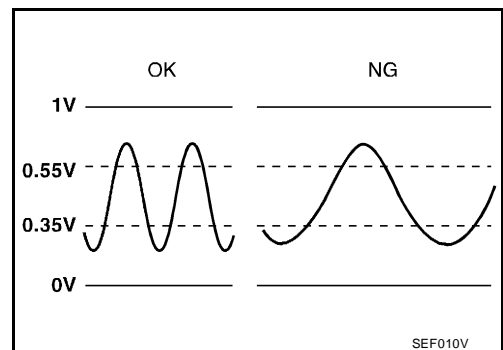
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS002RG

To judge the malfunction of heated oxygen sensor 1, this diagnosis measures response time of heated oxygen sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 temperature index. Judgment is based on whether the compensated time (heated oxygen sensor 1 cycling time index) is inordinately long or not.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0133 0133	Heated oxygen sensor 1 circuit slow response	The response of the voltage signal from the sensor takes more than the specified time.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Injectors ● Intake air leaks ● Exhaust gas leaks ● PCV valve ● Mass air flow sensor

DTC Confirmation Procedure

UBS002RH

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

HO2S1 (B1) P0133	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF338Z

6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 20 to 50 seconds.)

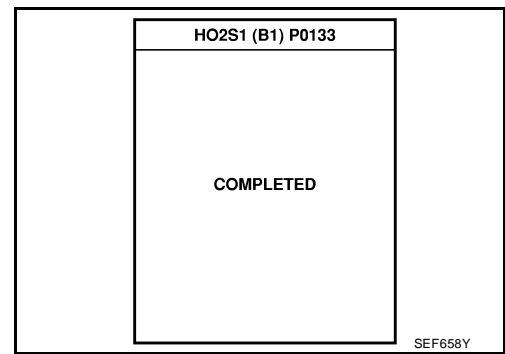
ENG SPEED	1,200 - 3,200 rpm
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	1.9 - 13.0 msec
Selector lever	Suitable position

HO2S1 (B1) P0133	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF339Z

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-195, "Diagnostic Procedure"](#).



UBS002R1

Overall Function Check

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

WITH GST

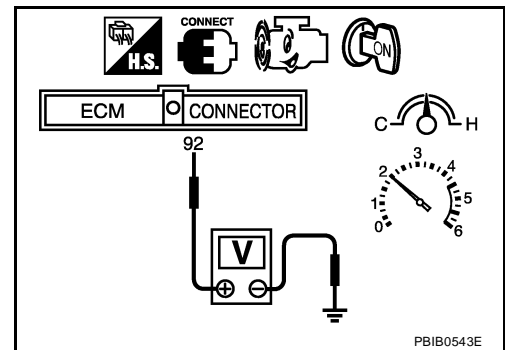
1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1(B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

times: → 0 - 0.3V

4. If NG, go to [EC-195, "Diagnostic Procedure"](#).

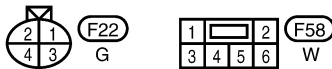
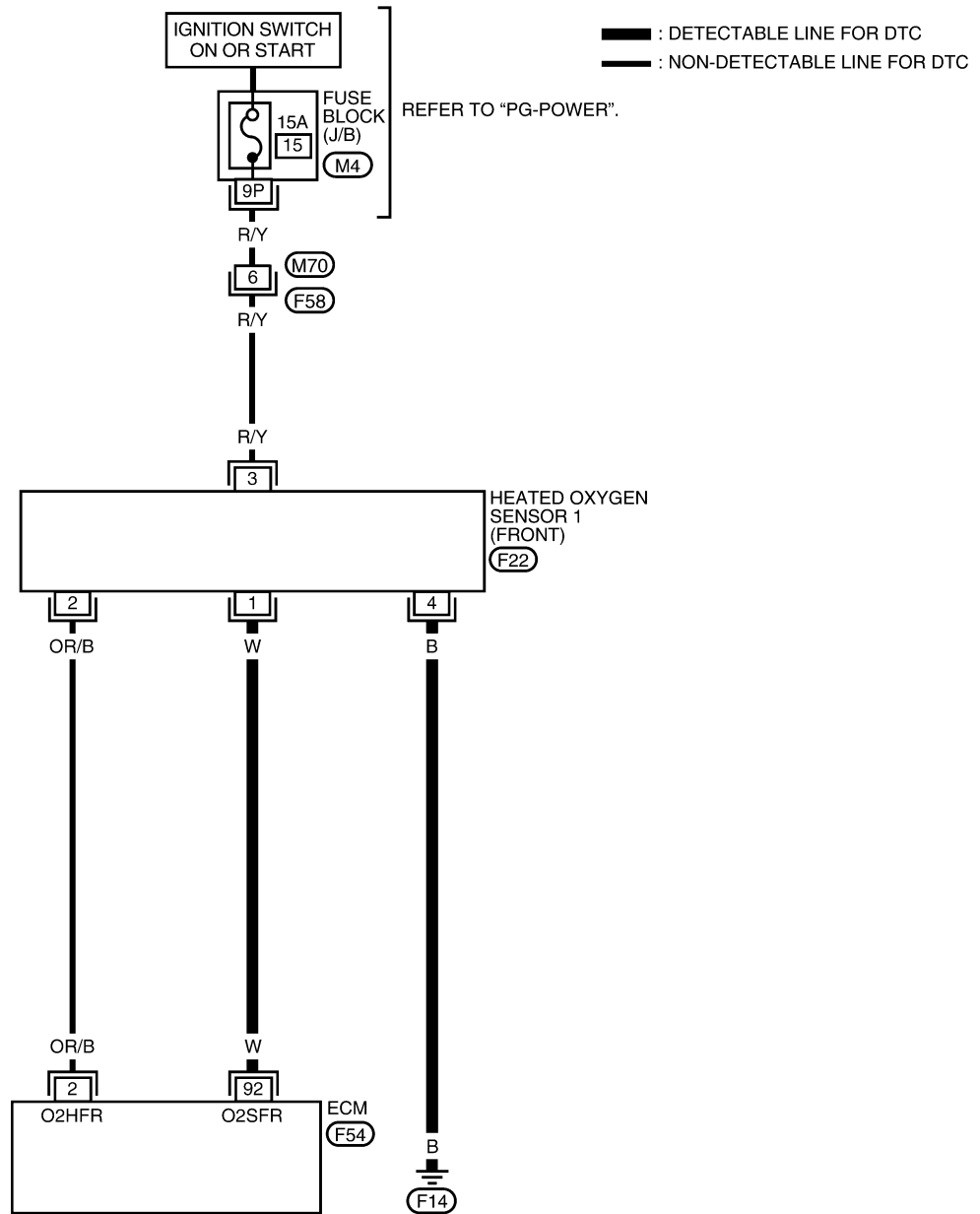


PBIB0543E

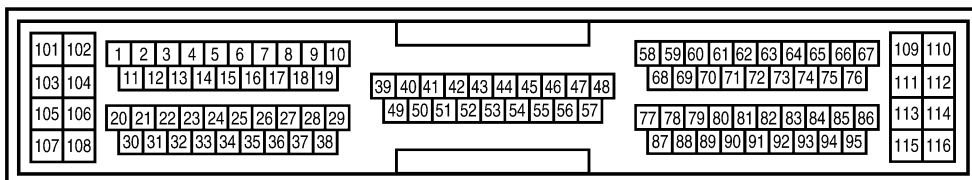
Wiring Diagram

UBS002RJ

EC-HO2S1-01



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0009E

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

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	W	Heated oxygen sensor 1	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V (Periodically change)

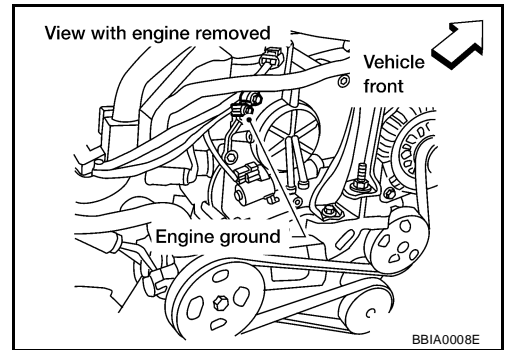
Diagnostic Procedure

UBS002RK

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

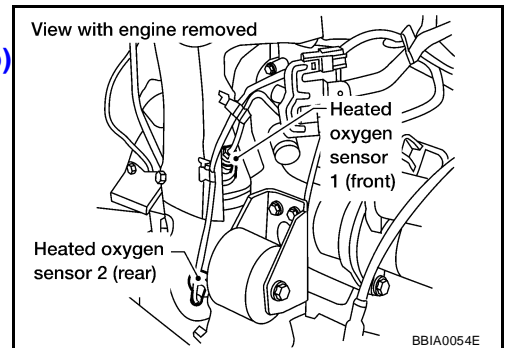


2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 40 - 50 N·m (4.1 - 5.1 kg·m, 30 - 37 ft·lb)

>> GO TO 3.

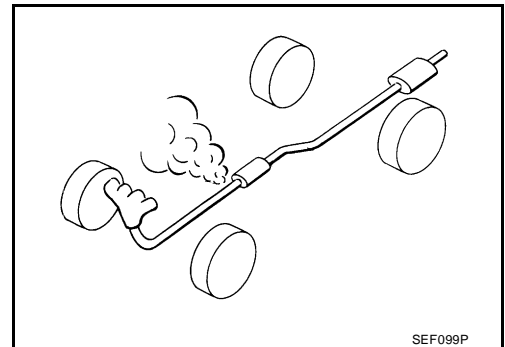


3. CHECK FOR EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air 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.

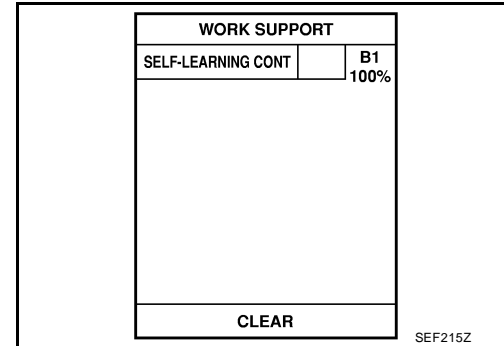
OK or NG

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

5. CLEAR THE SELF-LEARNING DATA

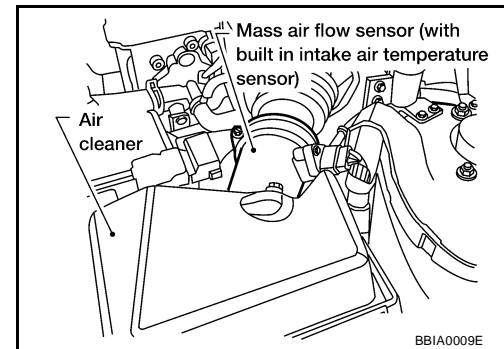
④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
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-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-67, "HOW TO ERASE 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 or DTC P0172 (Refer to [EC-220](#) or [EC-226](#)).
No >> GO TO 6.

6. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between HO2S1 terminal 4 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

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

7. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

4. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 and ground.
Refer to Wiring Diagram.

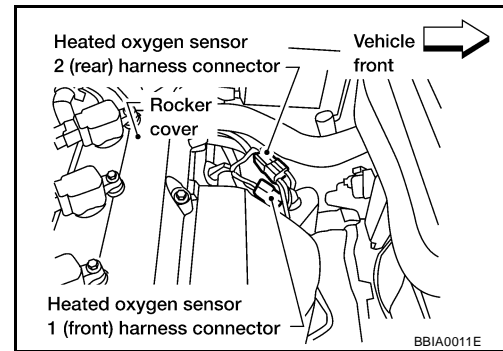
Continuity should not exist.

5. Also check harness for 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 HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-148, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace malfunctioning heated oxygen sensor 1.

9. CHECK MASS AIR FLOW SENSOR

Refer to [EC-160, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace mass air flow sensor.

10. CHECK PCV VALVE

Refer to [EC-626, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> Replace PCV valve.

11. CHECK HEATED OXYGEN SENSOR 1

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

OK or NG

OK >> GO TO 12.

NG >> Replace heated oxygen sensor 1.

12. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 1

☑ With CONSULT-II

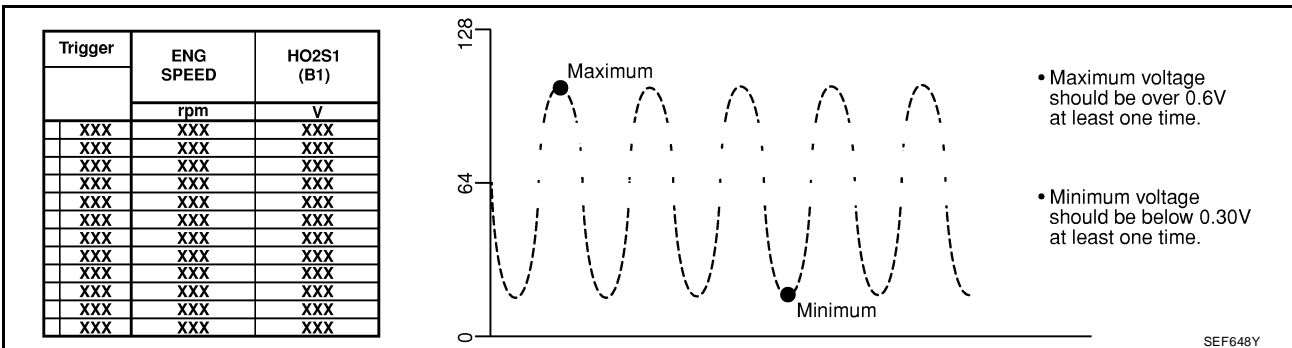
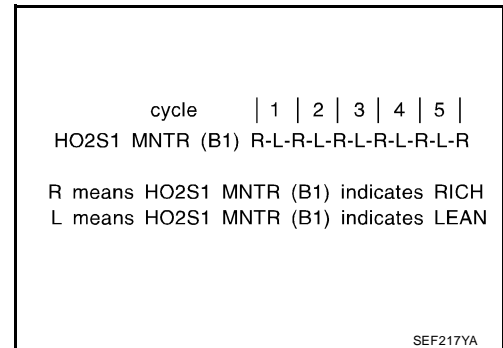
1. Start engine and warm it up to normal operating temperature.

2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

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

SEF646Y

6. Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
 - "HO2S1 (B1)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)" voltage never exceeds 1.0V.

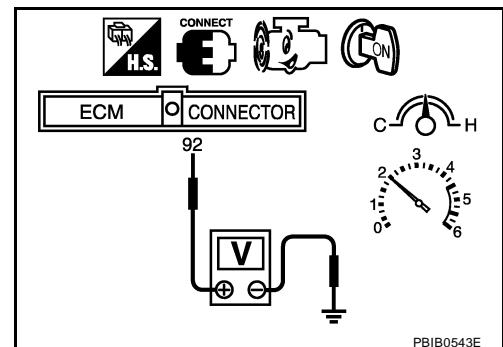


CAUTION:

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

⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
 2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
 3. Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is below 0.3V at least one time.
 - The voltage never exceeds 1.0V.
- 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V



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.

**Removal and Installation
HEATED OXYGEN SENSOR 1**

UBS002RM

Refer to [EM-21, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

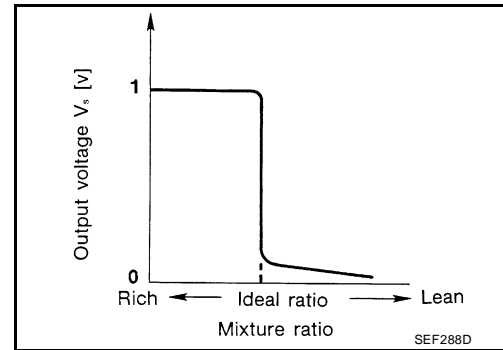
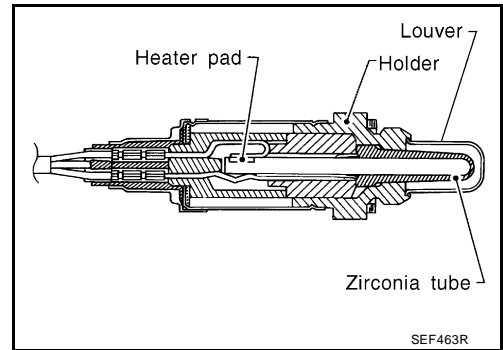
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DTC P0134 HO2S1

Component Description

UBS002RN

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



CONSULT-II Reference Value in Data Monitor Mode

UBS002RP

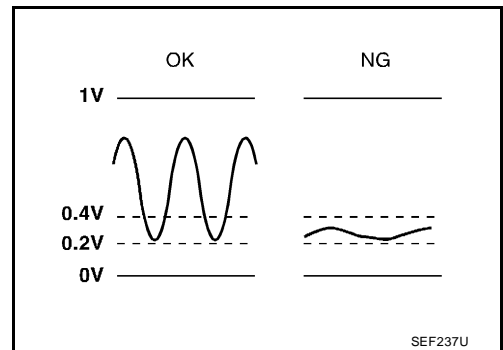
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS002RP

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



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit high no activity detected	The voltage from the sensor is constantly approx. 0.3V.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 1

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

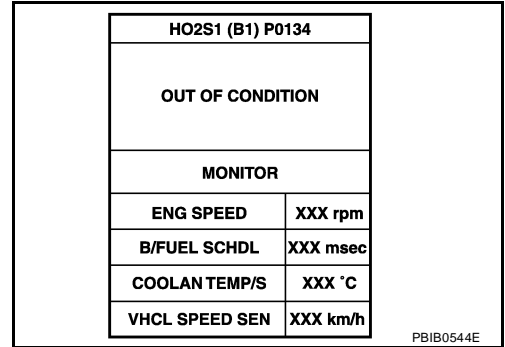
Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “HO2S1 (B1) P0134” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
3. Touch “START”.
4. Let it idle for at least 3 minutes.

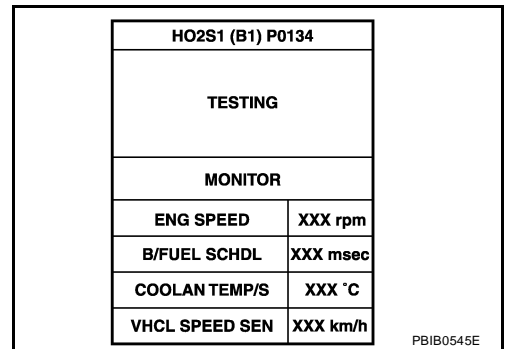
NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 4.



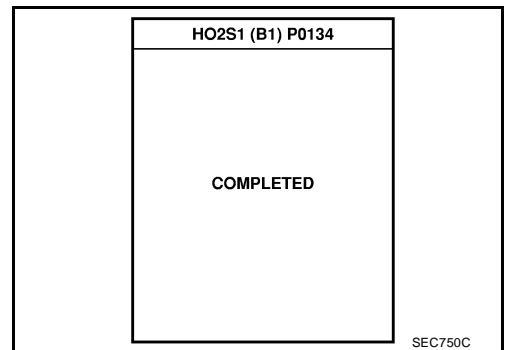
5. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 10 to 60 seconds.)

ENG SPEED	1,200 - 3,200 rpm
Vehicle speed	More than 64 km/h (40 MPH)
B/FUEL SCHDL	1.9 - 13.0 msec
Selector lever	Suitable position



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

6. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-204, "Diagnostic Procedure"](#).



Overall Function Check

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

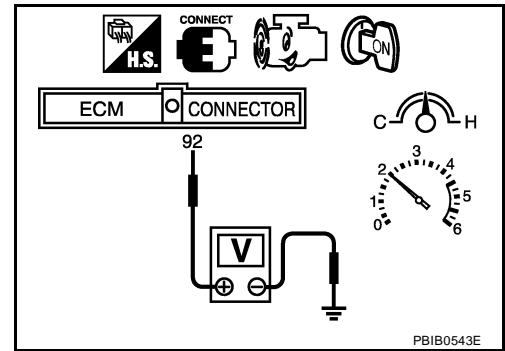
WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.

DTC P0134 HO2S1

[QR]

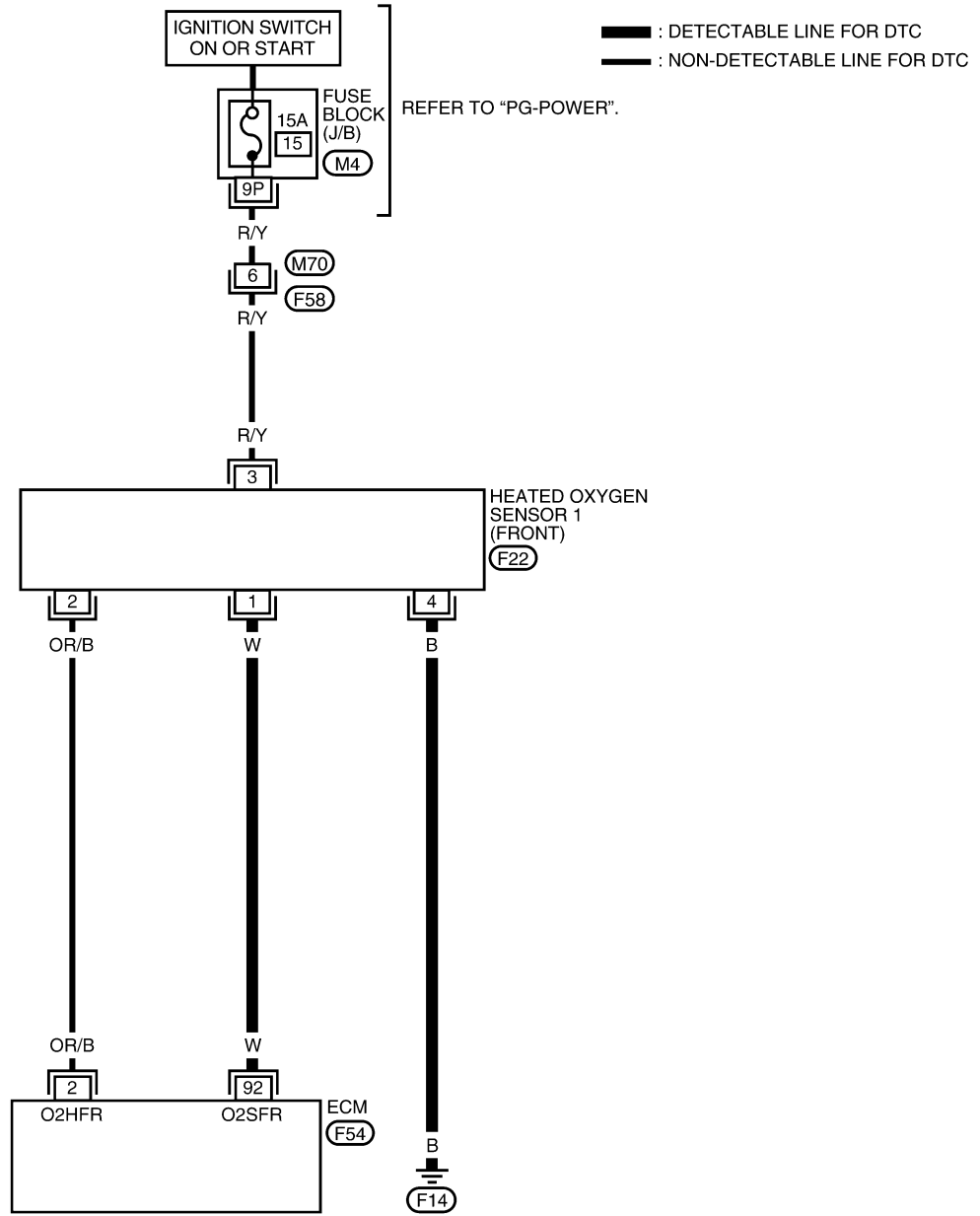
3. Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage does not remain in the range of 0.2 - 0.4V.
4. If NG, go to [EC-204, "Diagnostic Procedure"](#).



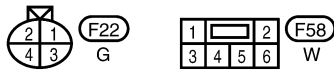
Wiring Diagram

UBS002RS

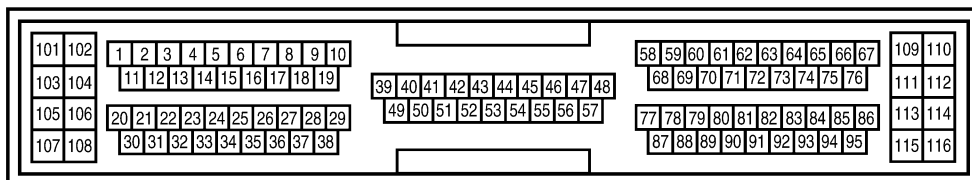
EC-HO2S1-01



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REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0009E

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

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	W	Heated oxygen sensor 1	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V (Periodically change)

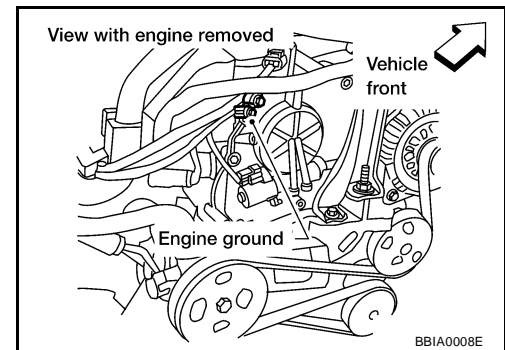
Diagnostic Procedure

UBS002RT

1. INSPECTION START

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

**2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Check harness continuity between HO2S1 terminal 4 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 3.
 NG >> Repair open circuit or short to power in harness or connectors.

3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 and ground. Refer to Wiring Diagram.

Continuity should not exist.

4. 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 HEATED OXYGEN SENSOR 1

Refer to [EC-205, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace heated oxygen sensor 1.

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
HEATED OXYGEN SENSOR 1**

UBS002RU

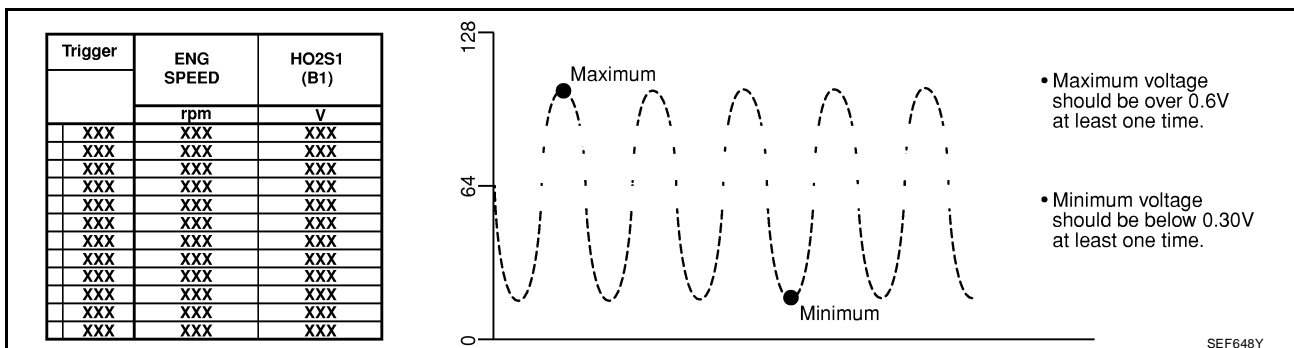
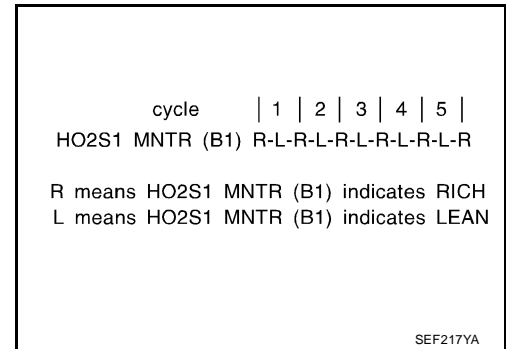
ⓐ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

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

SEF646Y

6. Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
5 times (cycles) are counted as shown at right.
 - "HO2S1 (B1)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)" voltage never exceeds 1.0V.



CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

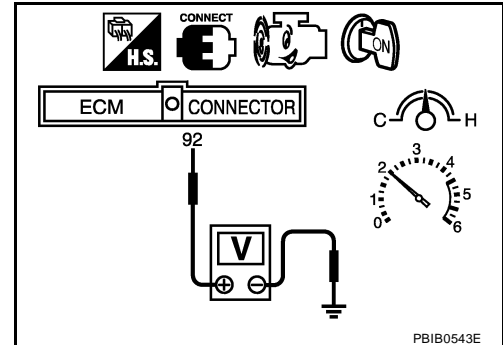
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

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.



Removal and Installation HEATED OXYGEN SENSOR 1

UBS002RV

Refer to [EM-21, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P0138 HO2S2

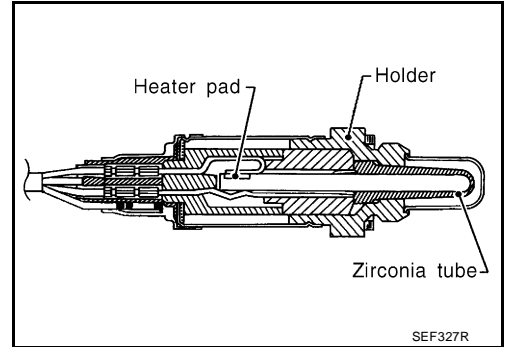
Component Description

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen 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 1V in richer conditions to 0V in leaner conditions.

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



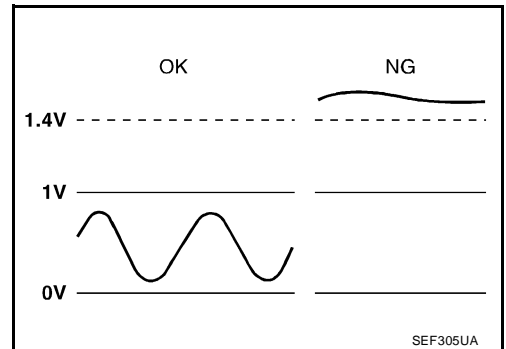
CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

On Board Diagnosis Logic

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138 0138	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2

DTC Confirmation Procedure

CAUTION:

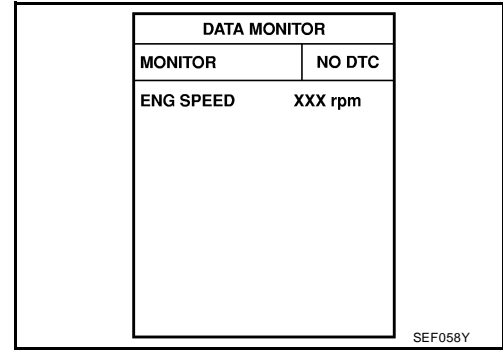
Always drive vehicle at a safe speed.

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
3. Stop vehicle with engine running.
4. Let engine idle for 1 minute.
5. If 1st trip DTC is detected, go to [EC-210, "Diagnostic Procedure"](#)



Overall Function Check

UBS002S0

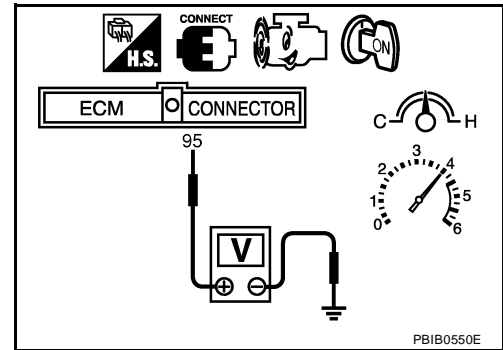
Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

CAUTION:

Always drive vehicle at a safe speed.

WITH GST

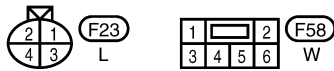
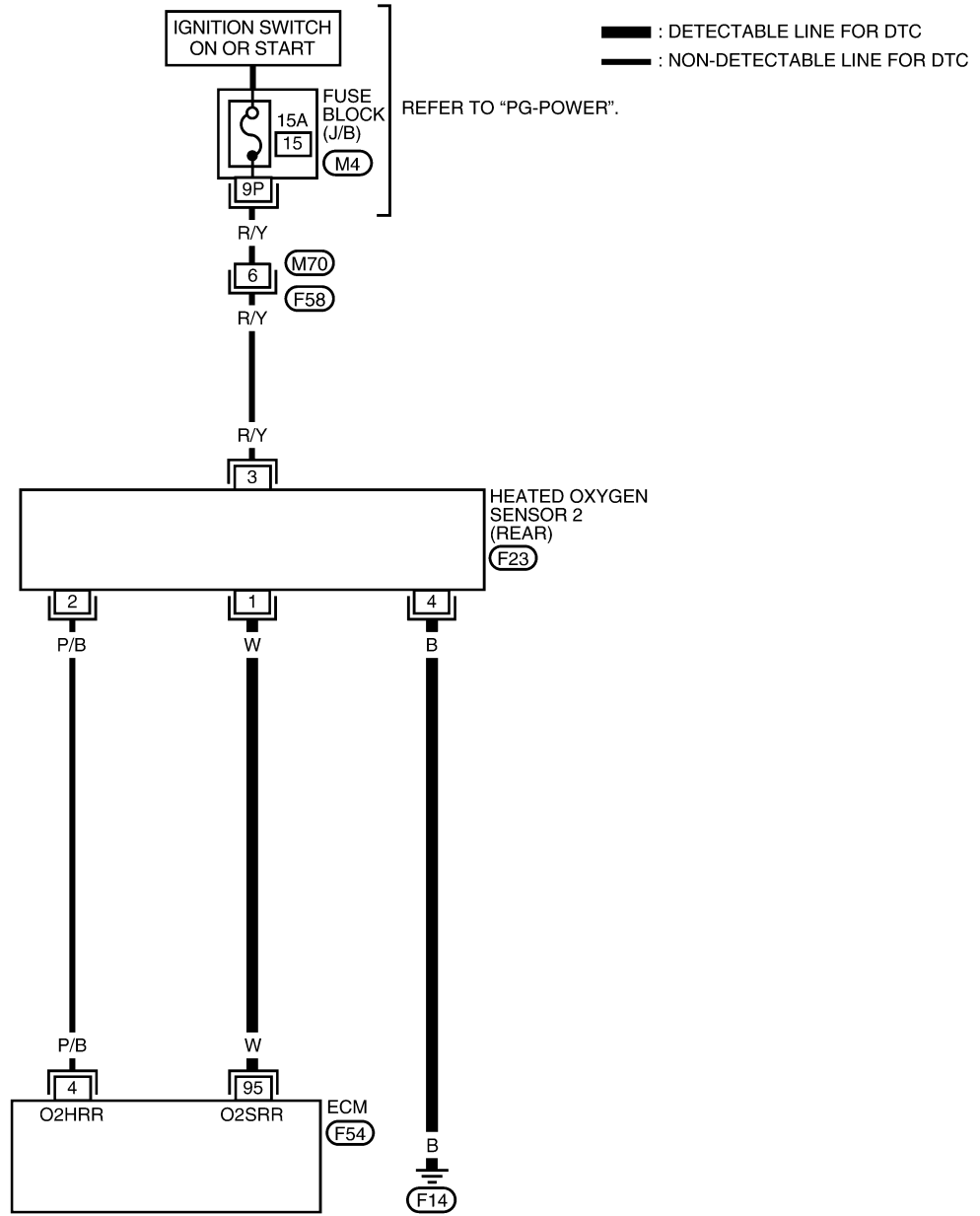
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 1.4V during this procedure.
5. If NG, go to [EC-210, "Diagnostic Procedure"](#) .



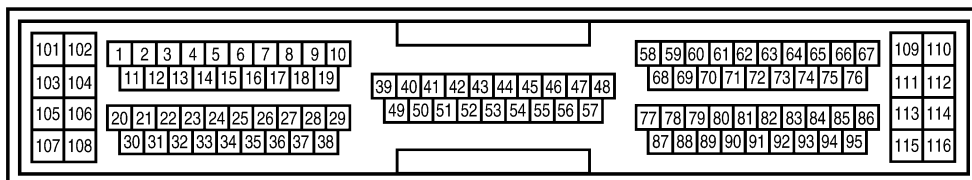
Wiring Diagram

UBS002S1

EC-HO2S2-01



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0011E

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

CAUTION:

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

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V

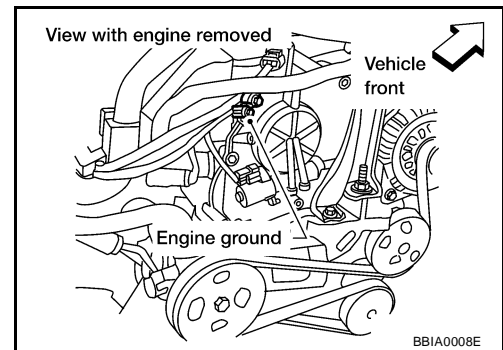
Diagnostic Procedure

UBS002S2

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram.

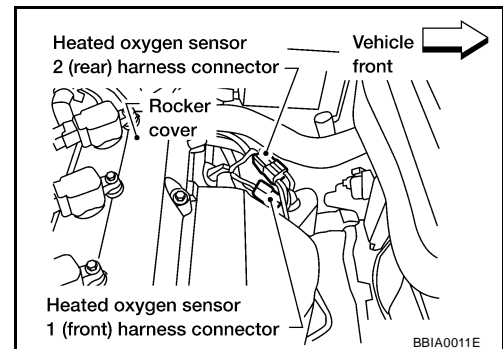
Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 3.

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



3. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Check harness continuity between ECM terminal 95 or HO2S2 terminal 1 and ground. Refer to Wiring Diagram.

Continuity should not 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 HARNESS CONNECTOR

Check HO2S2 harness connector for water.

Water should not exist.

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness connector.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-211, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 2

UBS002S3

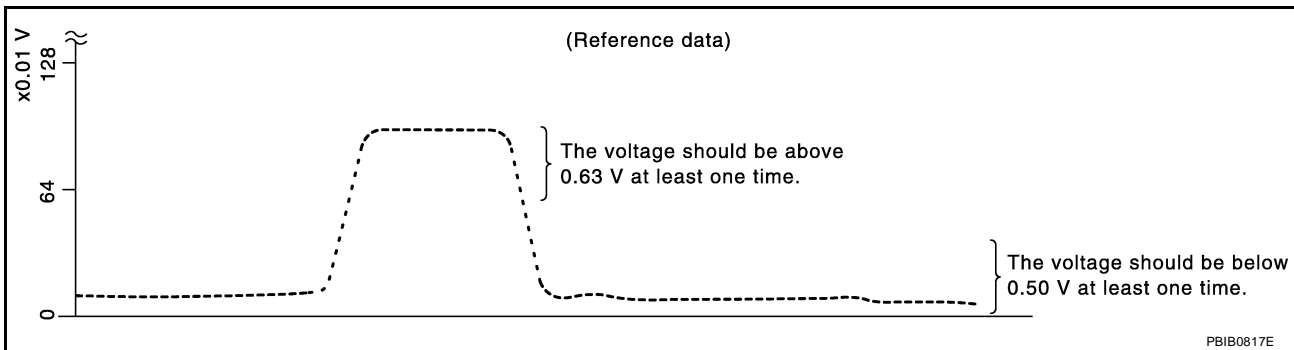
With CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

4. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)

The voltage should be above 0.63V at least once during this procedure.

If the voltage is above 0.63V at step 4, step 5 is not necessary.

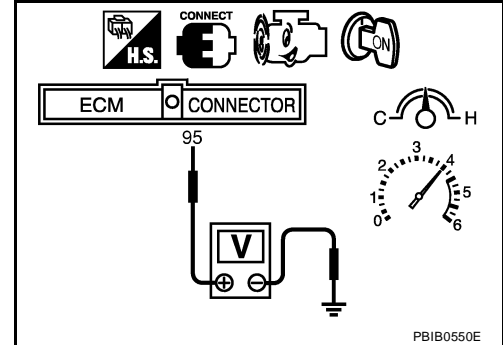
5. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).

The voltage should be below 0.50V at least once during this procedure.

6. If NG, replace heated oxygen sensor 2.

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.



Removal and Installation
HEATED OXYGEN SENSOR 2

UBS002S4

Refer to [EX-3, "EXHAUST SYSTEM \(QR25DE\)"](#) .

DTC P0139 HO2S2

Component Description

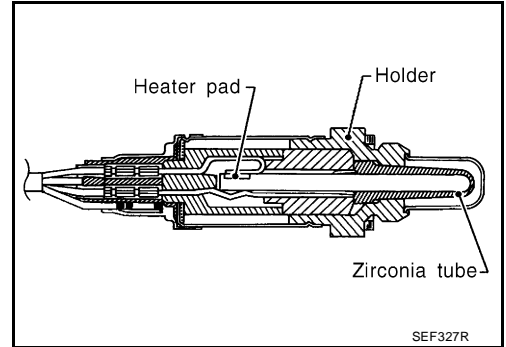
UBS002S5

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen 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 1V in richer conditions to 0V in leaner conditions.

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



CONSULT-II Reference Value in Data Monitor Mode

UBS002S6

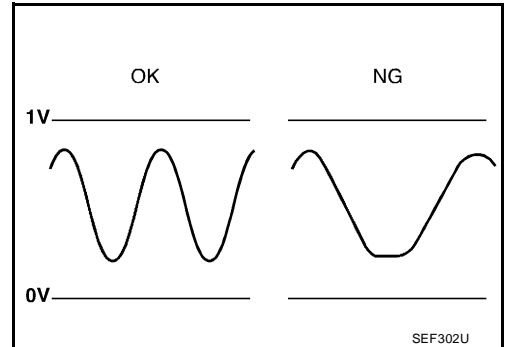
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

On Board Diagnosis Logic

UBS002S7

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst 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 the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors ● Intake air leaks

DTC Confirmation Procedure

UBS002S8

NOTE:

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

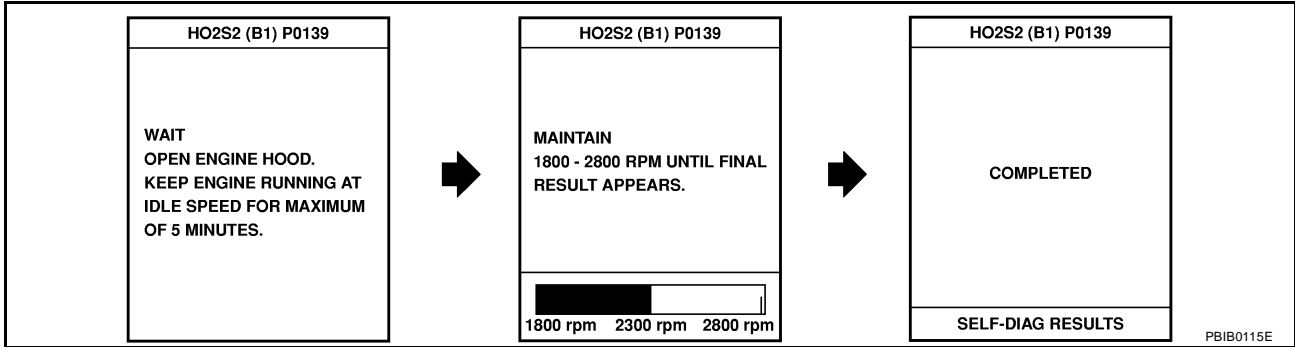
TESTING CONDITION:

Open engine hood before conducting following procedure.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.

5. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
6. Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7. Start engine and following the instruction of CONSULT-II.



8. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
 If "NG" is displayed, refer to [EC-216, "Diagnostic Procedure"](#) .
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
 - b. Turn ignition switch "ON".
 - c. Select "DATA MONITOR" mode with CONSULT-II.
 - d. Start engine.
 - e. Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

UBS002S9

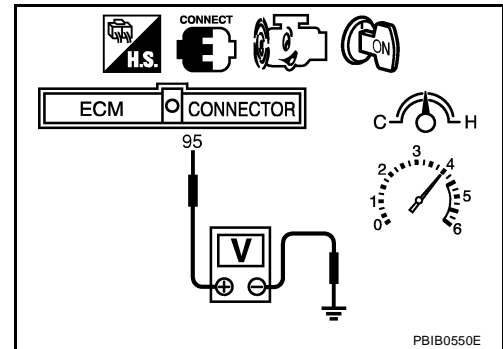
Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

CAUTION:

Always drive vehicle at a safe speed.

WITH GST

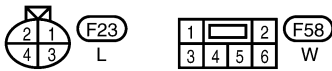
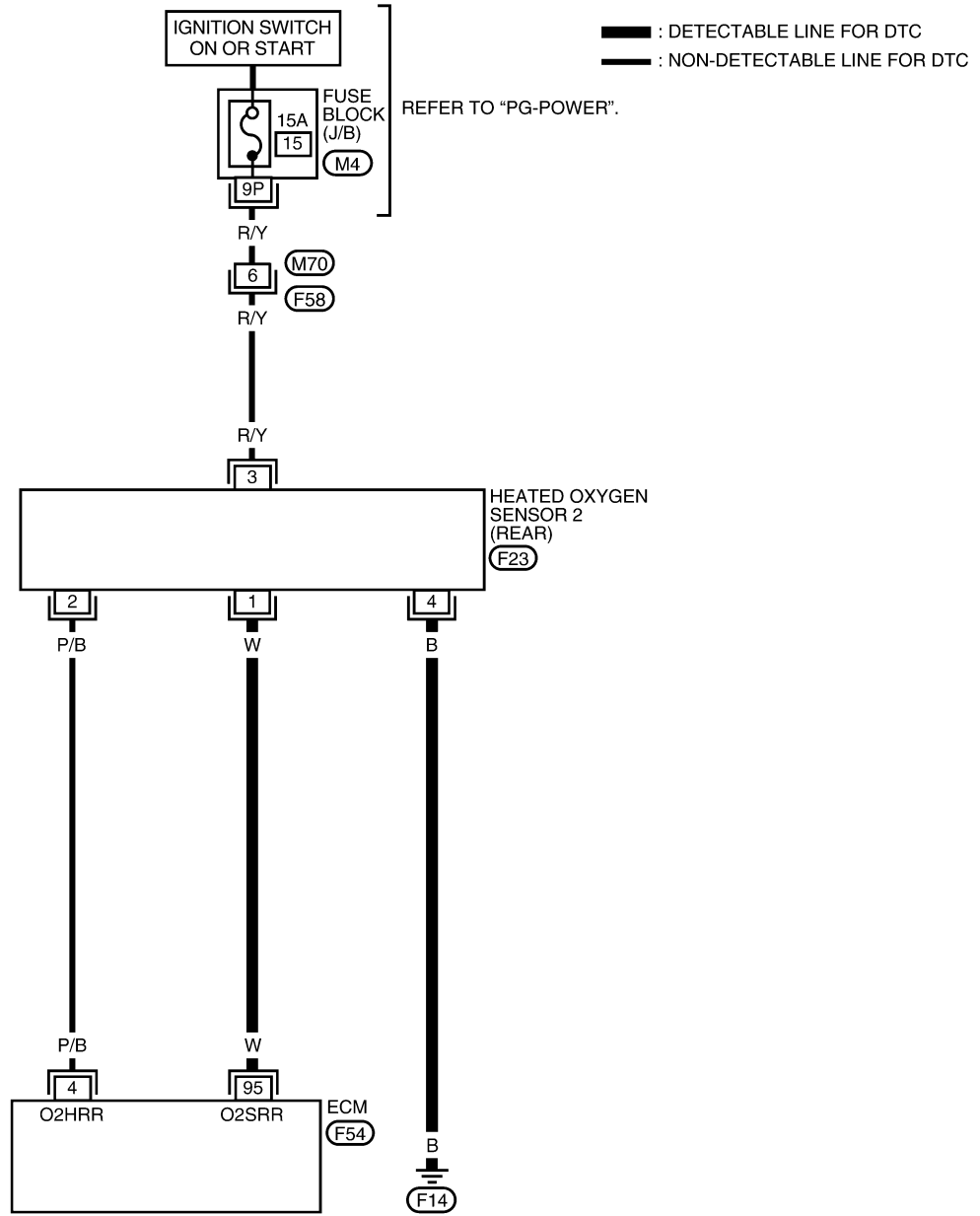
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should change at more than 0.06V for 1 second during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
5. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should change at more than 0.06V for 1 second during this procedure.
6. If NG, go to [EC-216, "Diagnostic Procedure"](#) .



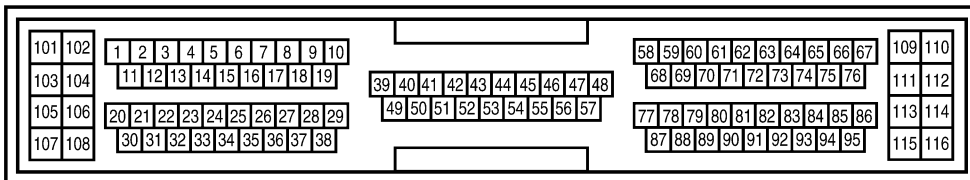
Wiring Diagram

EC-HO2S2-01

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REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



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

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Heated oxygen sensor 2	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V

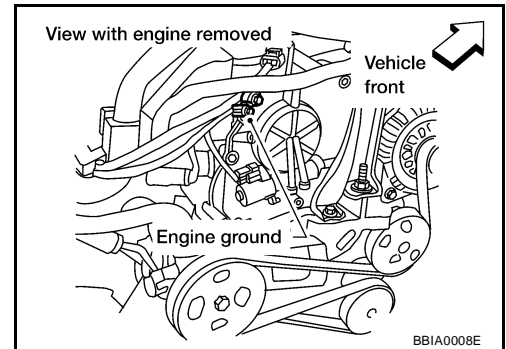
Diagnostic Procedure

UBS002SB

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

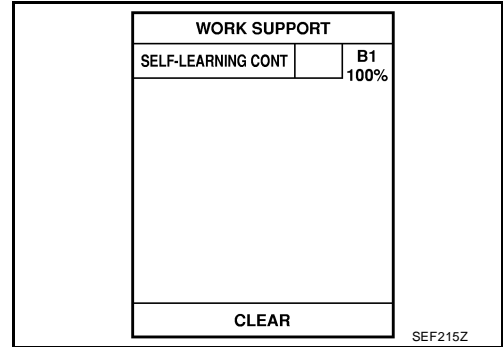
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

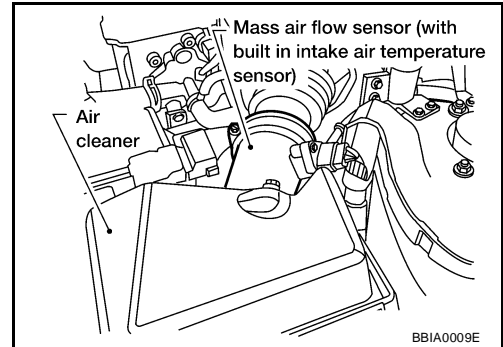
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
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-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-67, "HOW TO ERASE 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 or P0172. Refer to [EC-220](#) or [EC-226](#).
- No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

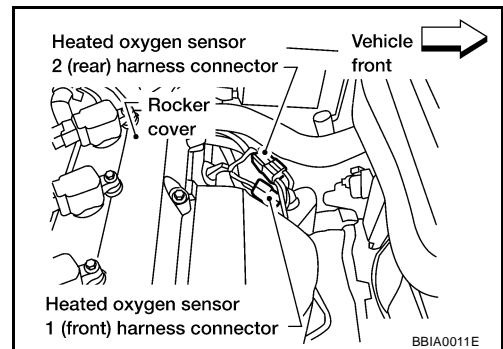
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check harness continuity between HO2S2 terminal 4 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to power in harness or connectors.



4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and HO2S2 terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

3. Check harness continuity between ECM terminal 95 or HO2S2 terminal 1 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

4. Also check harness for short to ground or 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-218, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
HEATED OXYGEN SENSOR 2**

UBS002SC

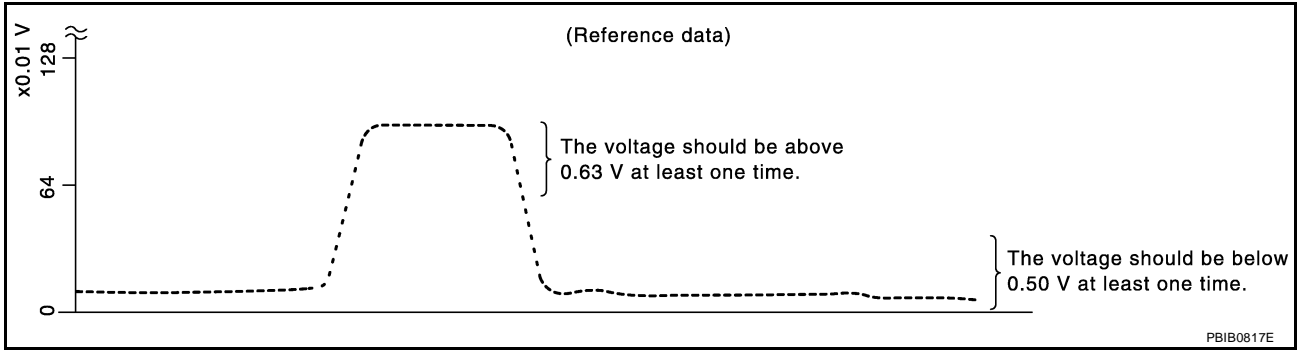
With CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

4. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

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

⊗ **Without CONSULT-II**

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)

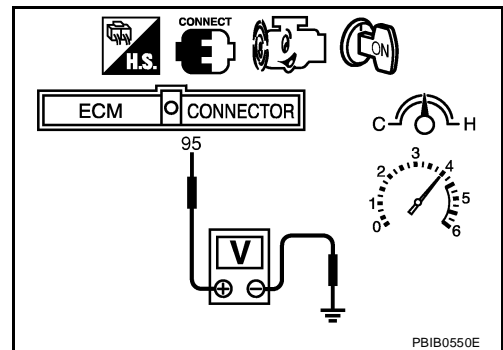
The voltage should be above 0.63V at least once during this procedure.

If the voltage is above 0.63V at step 4, step 5 is not necessary.

5. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).

The voltage should be below 0.50V at least once during this procedure.

6. If NG, replace heated oxygen sensor 2.



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.

Removal and Installation

HEATED OXYGEN SENSOR 2

Refer to [EX-3, "EXHAUST SYSTEM \(QR25DE\)"](#).

UBS002SD

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QR]

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

PF:16600

On Board Diagnosis Logic

UBS002SE

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1. 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 light up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

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 leaks Heated oxygen sensor 1 Injectors Exhaust gas leaks Incorrect fuel pressure Lack of fuel Mass air flow sensor Incorrect PCV hose connection

DTC Confirmation Procedure

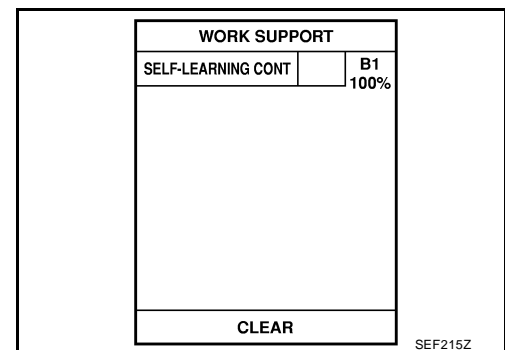
UBS002SF

NOTE:

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

WITH CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-223, "Diagnostic Procedure"](#).
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
- Crank engine while depressing accelerator pedal. If engine starts, go to [EC-223, "Diagnostic Procedure"](#). If engine does not start, check exhaust and intake air leak visually.



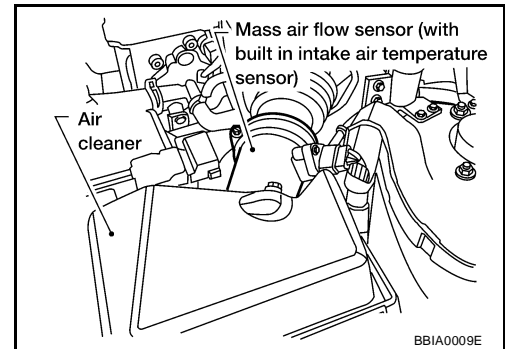
WITH GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QR]

3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 3" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select "MODE 7" with GST. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-223, "Diagnostic Procedure"](#).
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-223, "Diagnostic Procedure"](#). If engine does not start, check exhaust and intake air leak visually.



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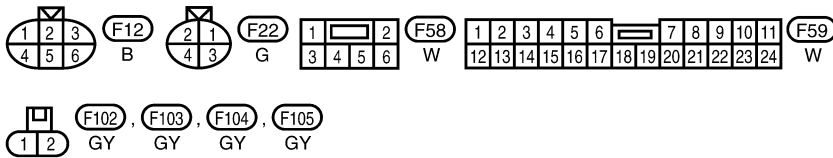
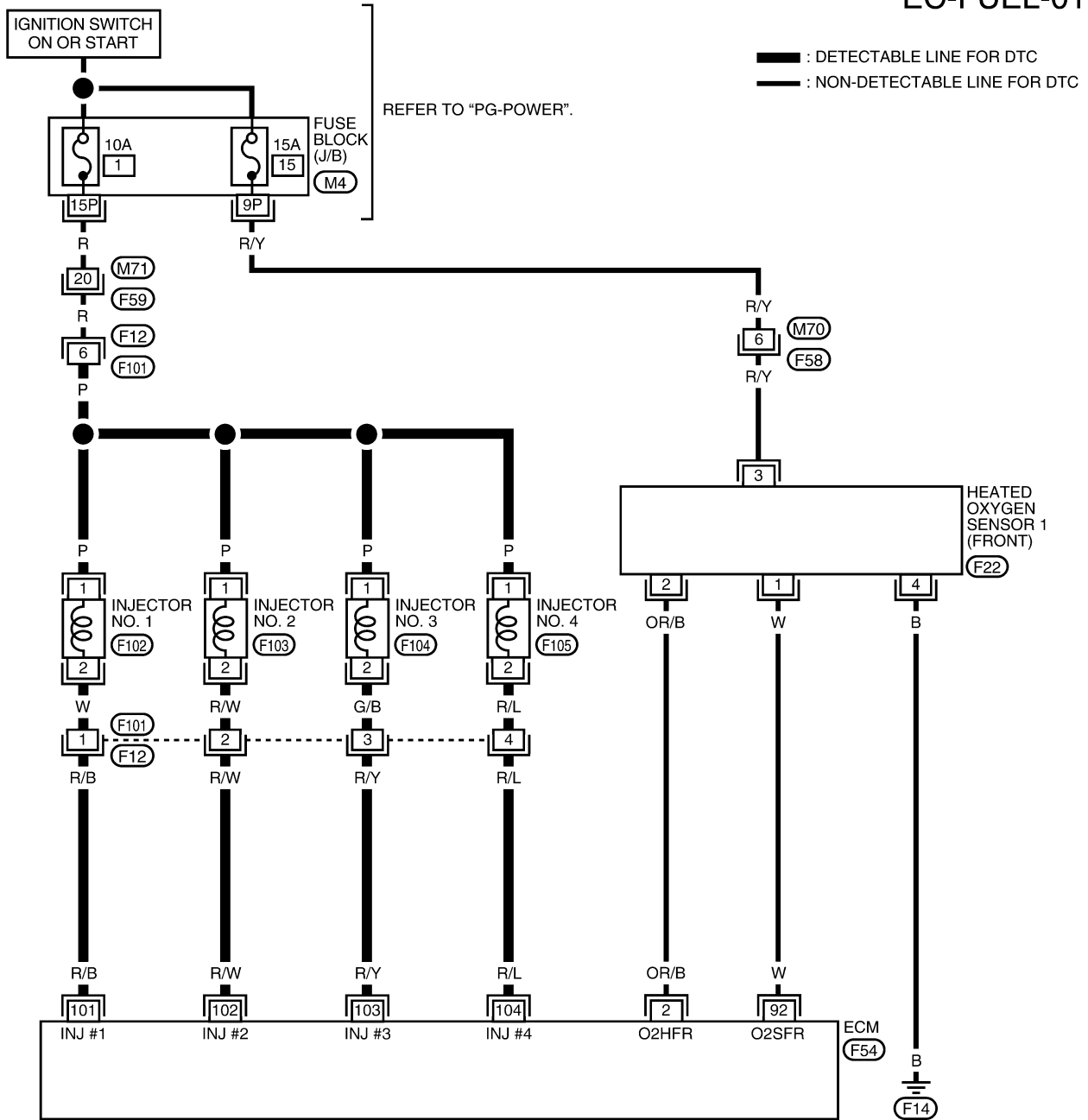
DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QR]

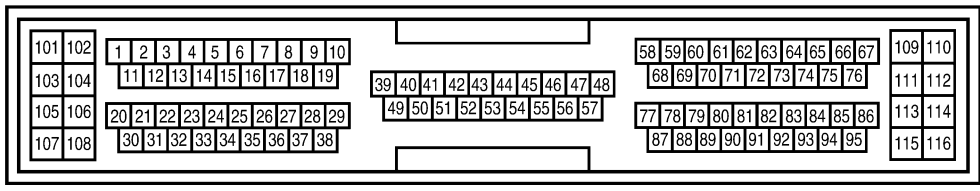
Wiring Diagram

UBS002SG

EC-FUEL-01



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0013E

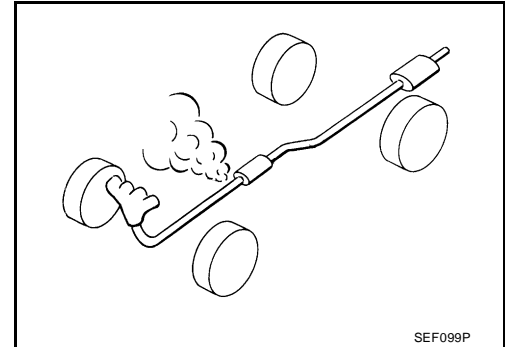
Diagnostic Procedure

1. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst.

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.
2. Check PCV hose connection.

OK or NG

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

3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect corresponding heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

5. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 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.

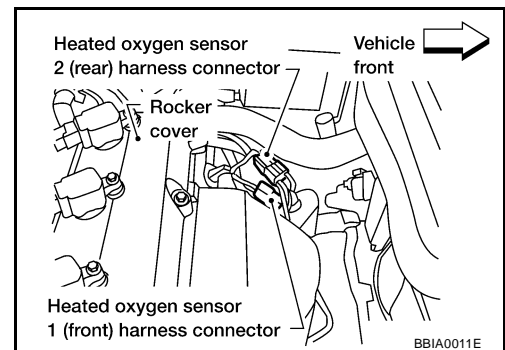
4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-51, "FUEL PRESSURE RELEASE"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-51, "Fuel Pressure Check"](#).

At idling: Approximately 350 kPa (3.7 kg/cm² , 51 psi)

OK or NG

- OK >> GO TO 5.
- NG >> Follow the construction of "FUEL PRESSURE CHECK".



5. CHECK MASS AIR FLOW SENSOR

 **With CONSULT-II**

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

1.0 - 4.0 g-m/sec: at idling
4.0 - 10 g-m/sec: at 2,500 rpm

 **With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

1.0 - 4.0 g-m/sec: at idling
4.0 - 10 g-m/sec: at 2,500 rpm

OK or NG

- OK >> GO TO 6.
 NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-161, "DTC P0102, P0103 MAF SENSOR"](#) .

6. CHECK FUNCTION OF INJECTORS

 **With CONSULT-II**

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

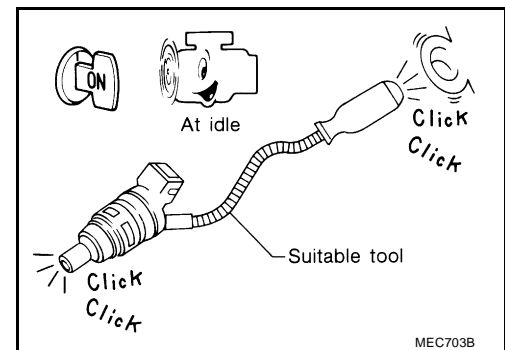
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

 **Without CONSULT-II**

1. Start engine.
2. Listen to each injector operating sound.

Clicking noise should be heard.



OK or NG

- OK >> GO TO 7.
 NG >> Perform trouble diagnosis for [EC-574, "INJECTOR CIRCUIT"](#) .

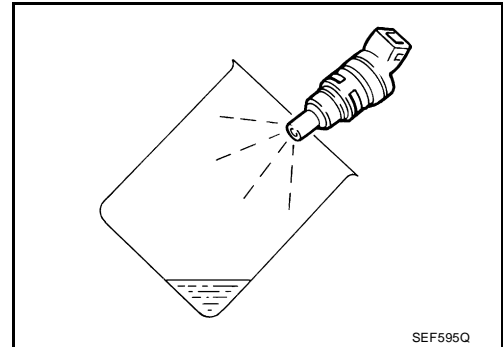
7. CHECK INJECTOR

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Disconnect injector harness connectors.
4. Remove injector gallery assembly. Refer to [EM-29, "FUEL INJECTOR AND FUEL TUBE"](#) .
Keep fuel hose and all injectors connected to injector gallery.
The injector harness connectors should remain connected.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each injector.
7. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.

Fuel should be sprayed evenly for each injector.

OK or NG

- OK >> GO TO 8.
NG >> Replace injectors from which fuel does not spray out.
Always replace O-ring with new ones.



8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

PFP:16600

On Board Diagnosis Logic

UBS002SI

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensors 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 light up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

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"> ● Heated oxygen sensor 1 ● Injectors ● Exhaust gas leaks ● Incorrect fuel pressure ● Mass air flow sensor

DTC Confirmation Procedure

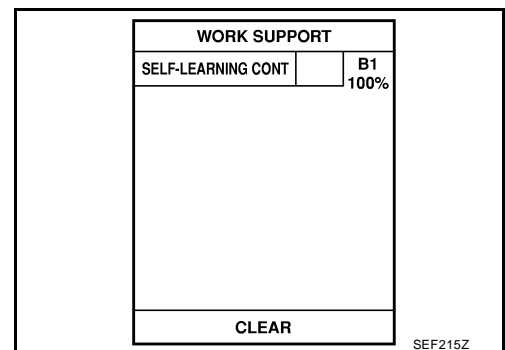
UBS002SJ

NOTE:

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

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
4. Clear the self-learning control coefficient by touching “CLEAR”.
5. Select “DATA MONITOR” mode with CONSULT-II.
6. Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-229, "Diagnostic Procedure"](#).
7. If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
8. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-229, "Diagnostic Procedure"](#). If engine does not start, remove ignition plugs and check for fouling, etc.



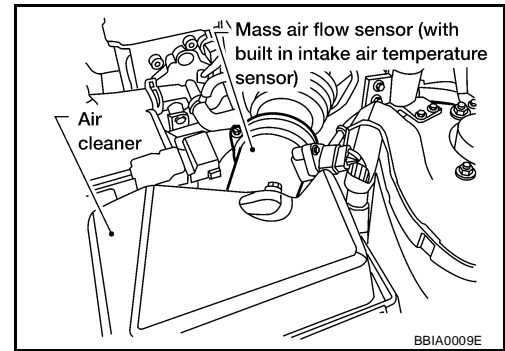
WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QR]

3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 3" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select "MODE 7" with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-229, "Diagnostic Procedure"](#).
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-229, "Diagnostic Procedure"](#). If engine does not start, check exhaust and intake air leak visually.



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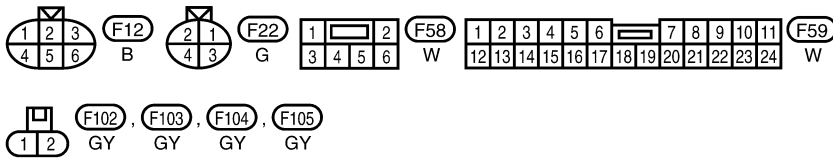
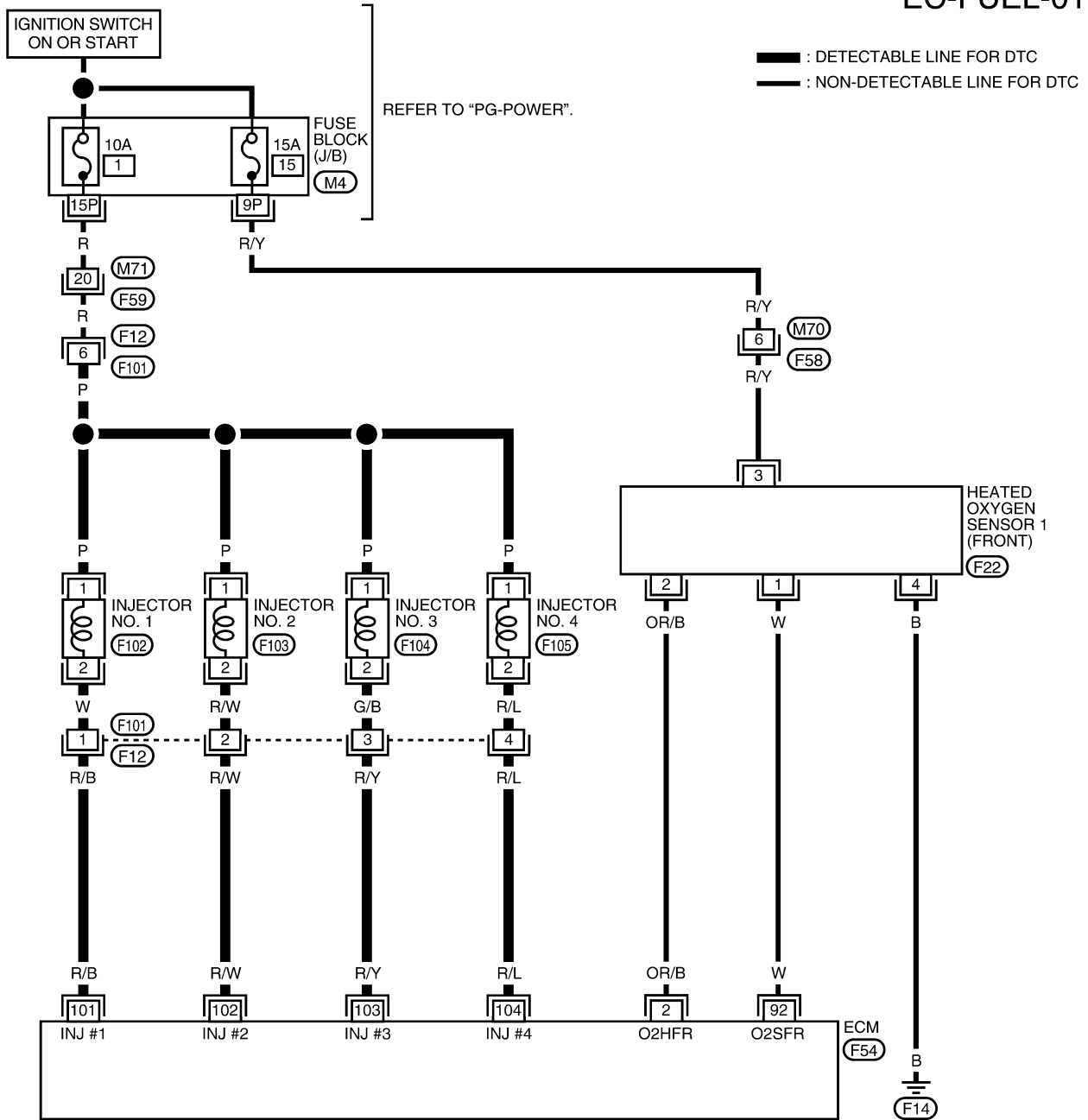
DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QR]

UBS002SK

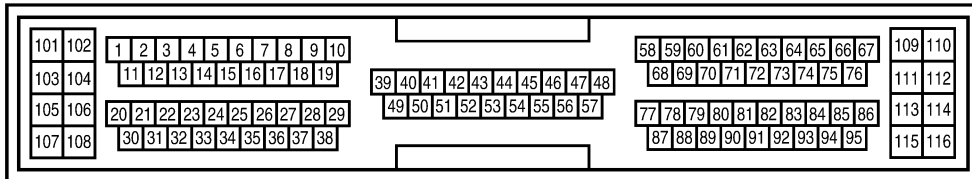
Wiring Diagram

EC-FUEL-01



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)



BBWA0013E

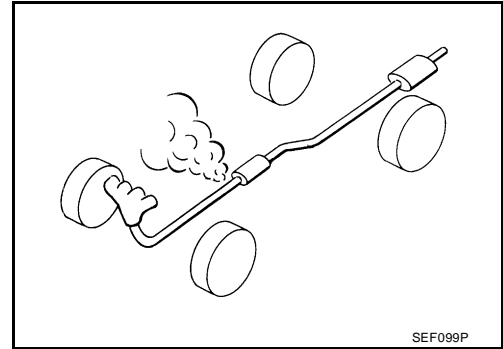
Diagnostic Procedure

1. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst.

OK or NG

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



2. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

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

3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect corresponding heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

5. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 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.

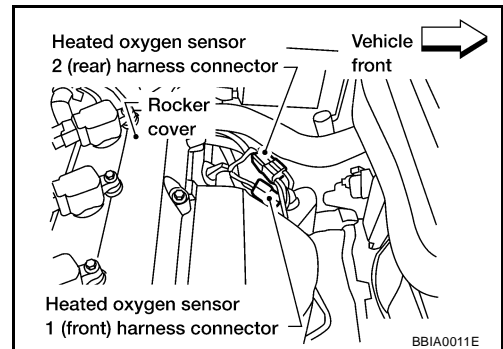
4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-51, "FUEL PRESSURE RELEASE"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-51, "Fuel Pressure Check"](#).

At idling: 350 kPa (3.7 kg/cm², 51 psi)

OK or NG

- OK >> GO TO 5.
- NG >> Follow the construction of "FUEL PRESSURE CHECK".



5. CHECK MASS AIR FLOW SENSOR

With CONSULT-II

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

1.0 - 4.0 g-m/sec: at idling
4.0 - 10 g-m/sec: at 2,500 rpm

With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

1.0 - 4.0 g-m/sec: at idling
4.0 - 10 g-m/sec: at 2,500 rpm

OK or NG

- OK >> GO TO 6.
 NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-161, "DTC P0102, P0103 MAF SENSOR"](#) .

6. CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

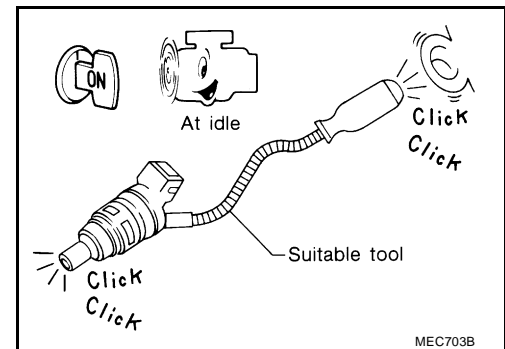
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.

Clicking noise should be heard.



OK or NG

- OK >> GO TO 7.
 NG >> Perform trouble diagnosis for [EC-574, "INJECTOR CIRCUIT"](#) .

7. CHECK INJECTOR

1. Remove injector assembly. Refer to [EM-29, "FUEL INJECTOR AND FUEL TUBE"](#) .
Keep fuel hose and all injectors connected to injector gallery.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect injector harness connectors.
The injector harness connectors should remain connected.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each injectors.
6. Crank engine for about 3 seconds.
Make sure fuel does not drip from injector.

OK or NG

OK (Does not drip.)>>GO TO 8.

NG (Drips.)>>Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

A

EC

C

D

E

F

G

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I

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K

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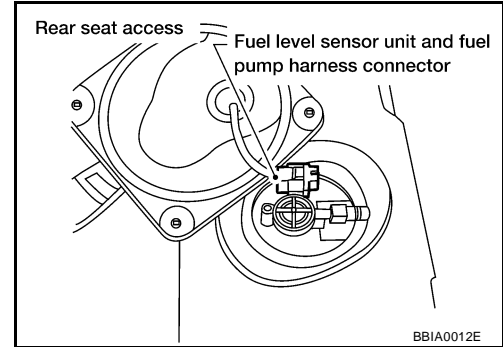
M

DTC P0181 FTT SENSOR

Component Description

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

UBS002SM



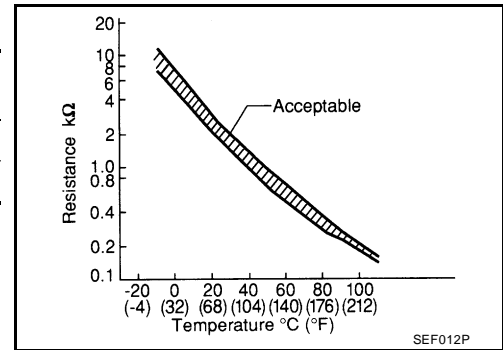
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: These data are reference values and are measured between ECM terminal 70 (Fuel tank temperature sensor) and ground.

CAUTION:

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



On Board Diagnosis Logic

UBS002SN

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 (The sensor circuit is open or shorted) ● Fuel tank temperature sensor

DTC Confirmation Procedure

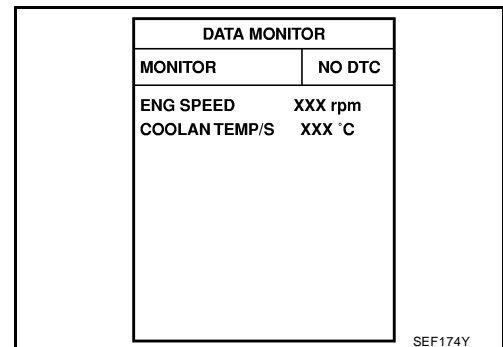
UBS002SO

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Check "COOLAN TEMP/S" value.
If "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.
If "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
4. Cool engine down until "COOLAN TEMP/S" signal is less than 60°C (140°F).
5. Wait at least 10 seconds.
6. If 1st trip DTC is detected, go to [EC-233, "Diagnostic Procedure"](#)



WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

1. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-233, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Replace fuel tank temperature sensor.

2. CHECK INTERMITTENT INCIDENT

Perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

Refer to [EC-235, "Wiring Diagram"](#) .

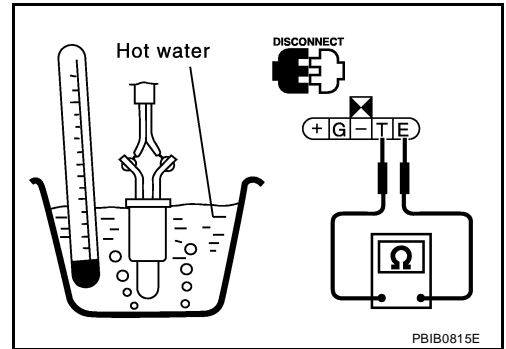
>> INSPECTION END

Component Inspection
FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals **T** and **E** by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace fuel level sensor unit.



Removal and Installation
FUEL TANK TEMPERATURE SENSOR

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

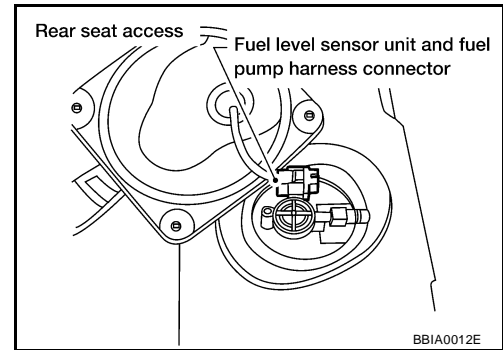
DTC P0182, P0183 FTT SENSOR

PFP:22630

Component Description

UBS002SS

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



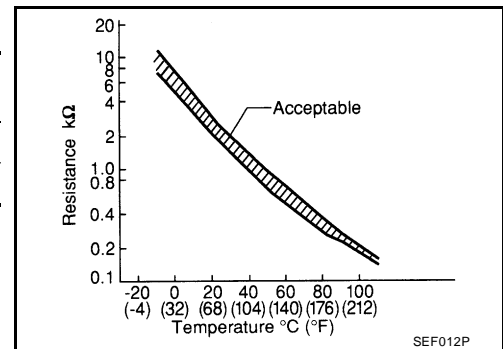
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: These data are reference values and are measured between ECM terminal 70 (Fuel tank temperature sensor) and ground.

CAUTION:

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



On Board Diagnosis Logic

UBS002ST

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 (The 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

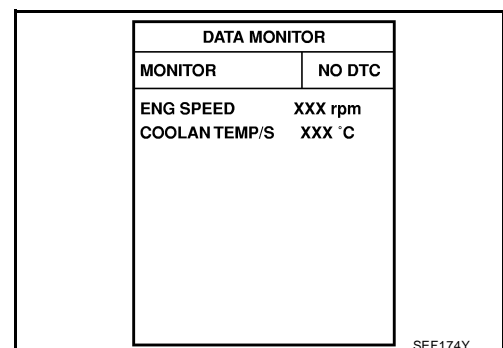
UBS002SU

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-236, "Diagnostic Procedure"](#)



WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0182, P0183 FTT SENSOR

[QR]

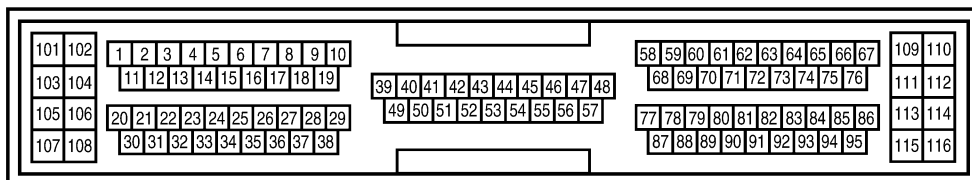
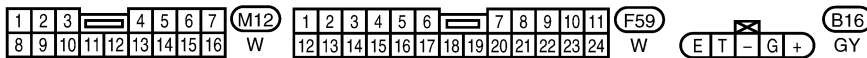
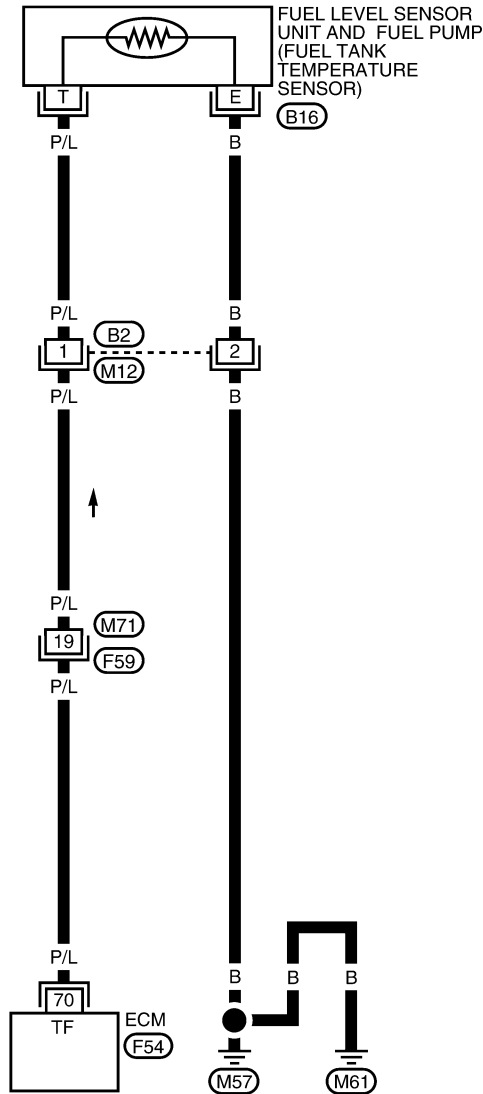
Wiring Diagram

UBS002SV

EC-FTTS-01

A
EC
C
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— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC

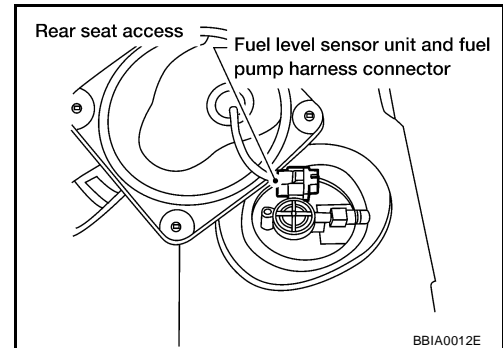


BBWA0014E

Diagnostic Procedure

1. CHECK POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

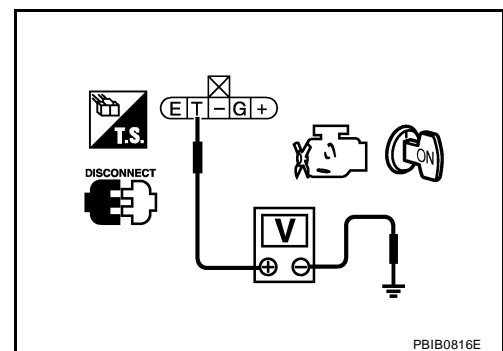


4. Check voltage between fuel level sensor unit and fuel pump terminal **T** and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M12
- Harness connectors M71, F59
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair harness or connector.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal **E** and body ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

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

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M12
- Harness for open or short between fuel level sensor unit and fuel pump and ground.

>> Repair harness or connector.

5. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-237, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace fuel tank temperature sensor.

6. CHECK INTERMITTENT INCIDENT

Perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

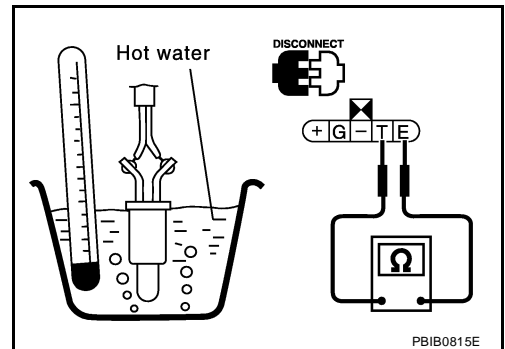
Component Inspection
FUEL TANK TEMPERATURE SENSOR

UBS002SX

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals **T** and **E** by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace fuel level sensor unit.



UBS002SY

Removal and Installation
FUEL TANK TEMPERATURE SENSOR

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR]

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

PF0:00019

UBS002SZ

System Description

NOTE:

If DTC P0217 is displayed with DTC U1000 ,U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-138, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#) .

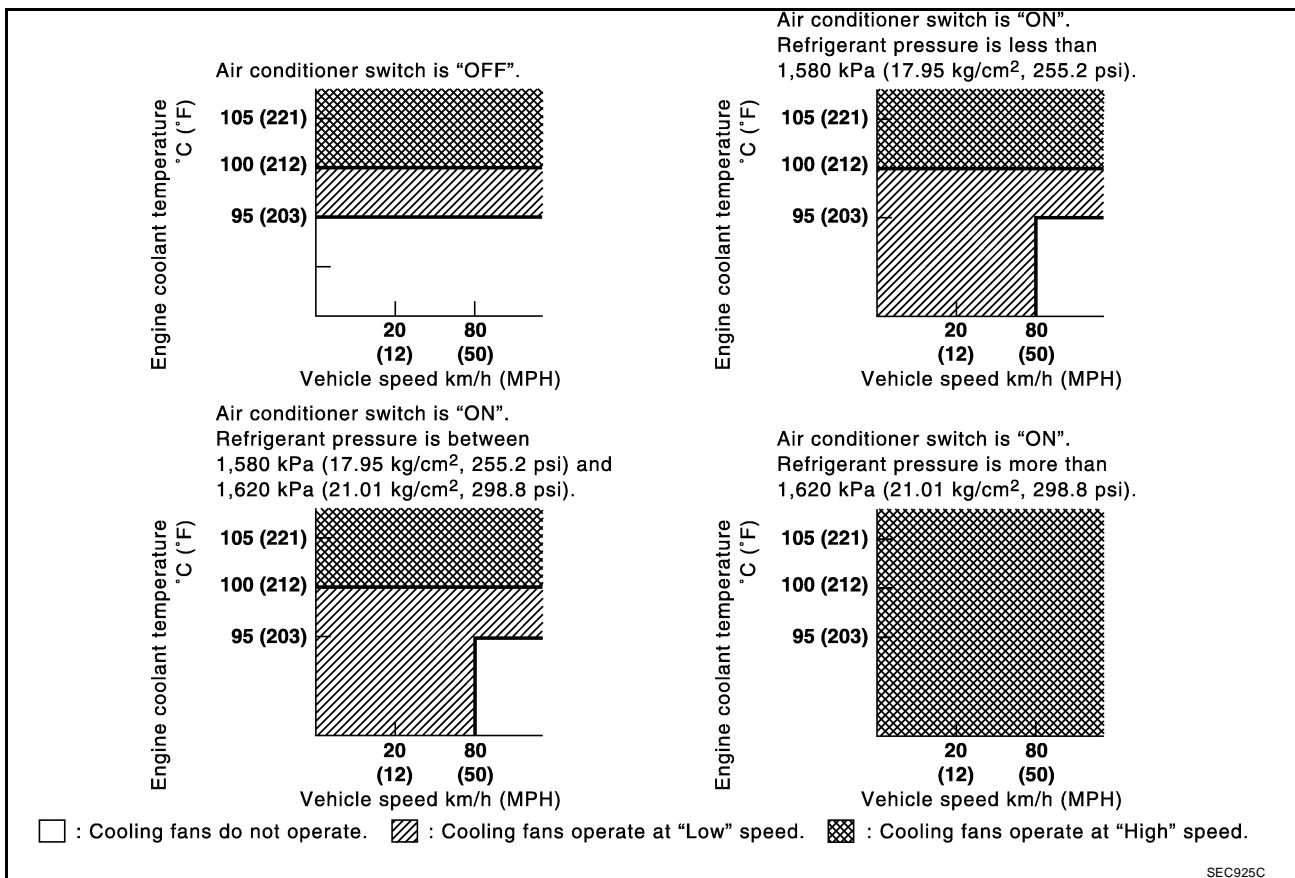
COOLING FAN CONTROL

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed*	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal*		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

*: These signals are 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]. The ECM controls cooling fan relays through CAN communication line.

OPERATION



CONSULT-II Reference Value in Data Monitor Mode

UBS002T0

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF
		Air conditioner switch: ON (Compressor operates.)
		OFF
		ON

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR]

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine ● Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH

On Board Diagnosis Logic

UBS002T1

This diagnosis checks whether the engine coolant temperature is extraordinary high, even when the load is not heavy.

When malfunction is detected, the malfunction indicator lamp (MIL) will light up even in the first trip.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0217 0217	Engine coolant over temperature condition	Engine coolant temperature is excessively high under normal engine speed.	<ul style="list-style-type: none"> ● Harness or connectors (The cooling fan circuit is open or shorted) ● Cooling fan ● Thermostat ● Improper ignition timing ● Engine coolant temperature sensor ● Blocked radiator ● Blocked front end (Improper fitting of nose mask) ● Crushed vehicle frontal area (Vehicle frontal is collided but not repaired) ● Blocked air passage by improper installation of front fog lamp or fog lamps ● Improper mixture ratio of coolant ● Damaged bumper <p>For more information, refer to EC-248, "Main 12 Causes of Overheating".</p>

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [MA-14, "Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [LU-7, "Changing Engine Oil"](#).

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-13, "ANTI-FREEZE COOLANT MIXTURE RATIO"](#).
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

Overall Function Check

UBS002T2

Use this procedure to check the overall function of the coolant overtemperature enrichment protection check, a DTC might not be confirmed.

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high-pressure fluid escaping from the radiator.

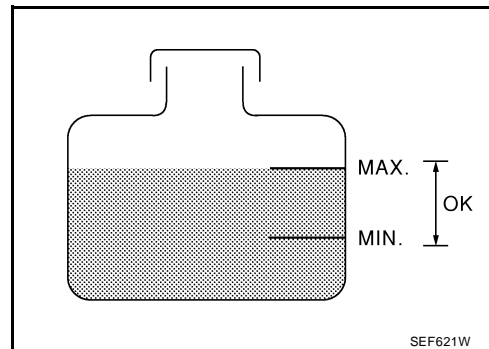
Wrap a thick cloth around the cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

WITH CONSULT-II

1. Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator.

Allow engine to cool before checking coolant level and mixture ratio.

- If the coolant level in the reservoir and/or radiator is below the proper range, go to [EC-243, "Diagnostic Procedure"](#).
- If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure [MA-14, "Changing Engine Coolant"](#).



- a. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to [MA-13, "ANTI-FREEZE COOLANT MIXTURE RATIO"](#).
- b. After refilling coolant, run engine to ensure that no water-flow noise is emitted.
- c. After checking or replacing coolant, go to step 3 below.
2. Ask the customer if engine coolant has been added. If it has been added, go to [EC-243, "Diagnostic Procedure"](#). After repair, go to the next step.
3. Start engine and let it idle.
4. Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to [MTC-28, "TROUBLE DIAGNOSIS"](#). After repair, go to the next step.
5. Perform "ENG COOLANT TEMP" in "ACTIVE TEST" mode with CONSULT-II at idle.
 - a. Set "ENG COOLANT TEMP" to 95°C (203°F) and make sure that cooling fan operates at low speed. If NG, go to [EC-243, "Diagnostic Procedure"](#).
 - b. Set "ENG COOLANT TEMP" to 100°C (212°F) and make sure that cooling fan operates at high speed. If NG, go to [EC-243, "Diagnostic Procedure"](#). After repair, go to the next step.
6. Check for blocked coolant passage.
 - a. Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows. If NG, go to [EC-243, "Diagnostic Procedure"](#). After repair, go to the next step. **Be extremely careful not to touch any moving or adjacent parts.**
7. Check for blocked radiator air passage.
 - a. When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.
 - b. Check the front end for clogging caused by insects or debris.
 - c. Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front. If NG, take appropriate action and then go to the next step.
8. Check function of ECT sensor. Refer to [EC-176, "Component Inspection"](#). If NG, replace ECT sensor and go to the next step.
9. Check ignition timing. Refer to [EC-84, "Basic Inspection"](#). Make sure that ignition timing is 15°±5° at idle. If NG, refer to [EC-84, "Basic Inspection"](#), and then recheck.

WITH GST

1. Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator. **Allow engine to cool before checking coolant level and mixture ratio.**
 - If the coolant level in the reservoir and/or radiator is below the proper range, and go to [EC-243, "Diagnostic Procedure"](#).
 - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure [MA-14, "Changing Engine Coolant"](#).
- a. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to [MA-13, "ANTI-FREEZE COOLANT MIXTURE RATIO"](#).
- b. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR]

- c. After checking or replacing coolant, go to step 3 below.
2. Ask the customer if engine coolant has been added. If it has been added, go to [EC-243, "Diagnostic Procedure"](#) . After repair, go to the next step. A
3. Start engine and let it idle.
4. Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to [MTC-28, "TROUBLE DIAGNOSIS"](#) . After repair, go to the next step. EC
5. Turn ignition switch "OFF".
6. Disconnect engine coolant temperature sensor harness connector. C
7. Connect 150Ω resistor to engine coolant temperature sensor.
8. Start engine and make sure that cooling fan operates. D
Be careful not to overheat engine.
If NG, go to [EC-243, "Diagnostic Procedure"](#) . After repair, go to the next step.
9. Check for blocked coolant passage. E
 - a. Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows.
If NG, go to [EC-243, "Diagnostic Procedure"](#) . After repair, go to the next step.
Be extremely careful not to touch any moving or adjacent parts. F
10. Check for blocked radiator air passage. G
 - a. When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.
 - b. Check the front end for clogging caused by insects or debris.
 - c. Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front.
If NG, take appropriate action and then go to the next step. H
11. Check function of ECT sensor. I
Refer to [EC-176, "Component Inspection"](#) .
If NG, replace ECT sensor and go to the next step.
12. Check ignition timing. Refer to [EC-84, "Basic Inspection"](#) . J
Make sure that ignition timing is $15^{\circ}\pm 5^{\circ}$ at idle.
If NG, refer to [EC-84, "Basic Inspection"](#) , and then recheck. K

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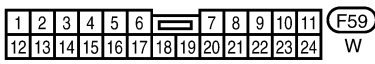
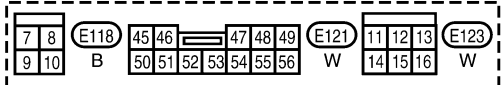
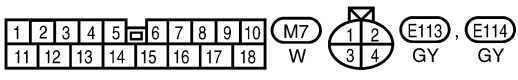
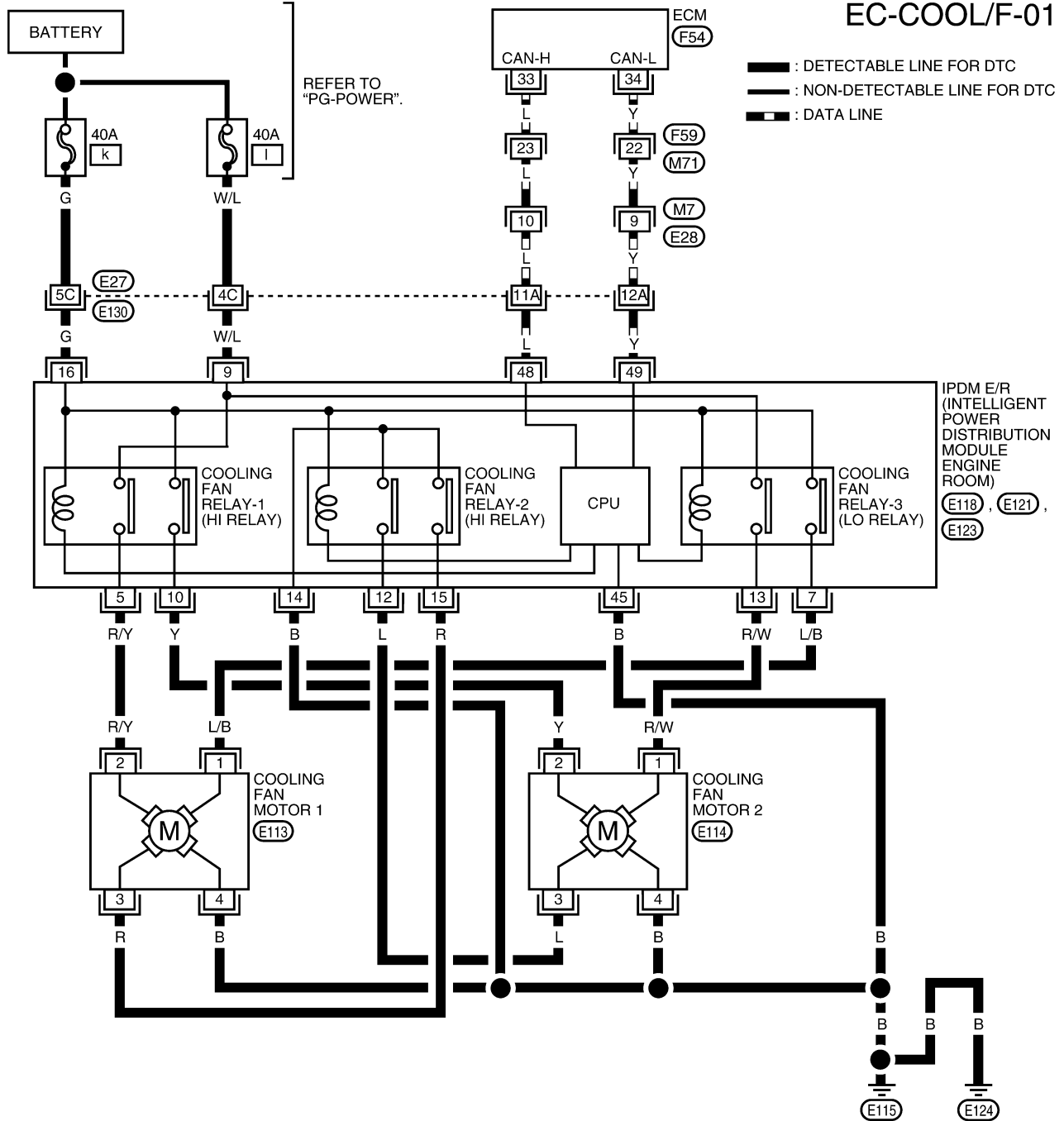
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR]

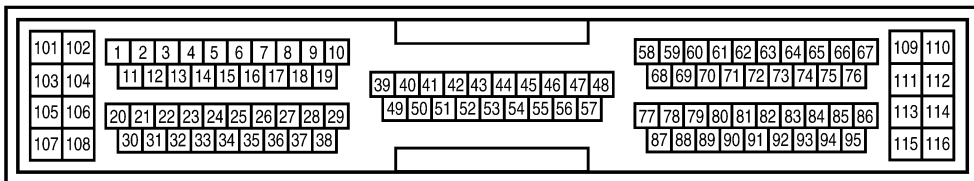
UBS002T3

Wiring Diagram

EC-COOL/F-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBI A0225E

Diagnostic Procedure

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.

2. CHECK COOLING FAN LOW SPEED OPERATION

With CONSULT-II

1. Start engine and let it idle.
2. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II and touch "LOW" on the CONSULT-II screen.
3. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

- OK >> GO TO 3.
- NG >> Check cooling fan low speed control circuit. (Go to [EC-246, "PROCEDURE A"](#) .)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

3. CHECK COOLING FAN HIGH SPEED OPERATION

With CONSULT-II

1. Touch "HIGH" on the CONSULT-II screen.
2. Make sure that cooling fans-1 and -2 operate at higher speed than low speed.

OK or NG

- OK >> GO TO 6.
- NG >> Check cooling fan high speed control circuit. (Go to [EC-248, "PROCEDURE B"](#) .)

ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

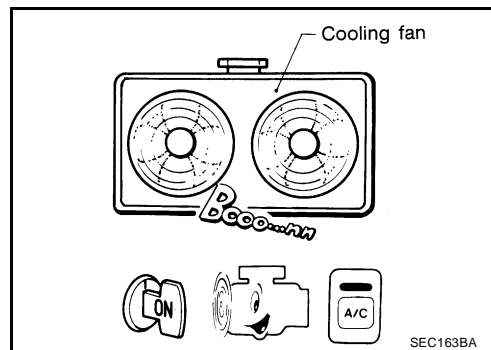
4. CHECK COOLING FAN LOW SPEED OPERATION

Without CONSULT-II

1. Start engine and let it idle.
2. Turn air conditioner switch "ON".
3. Turn blower fan switch "ON".
4. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

- OK >> GO TO 5.
- NG >> Check cooling fan low speed control circuit. (Go to [EC-246, "PROCEDURE A"](#) .)



5. CHECK COOLING FAN HIGH SPEED OPERATION

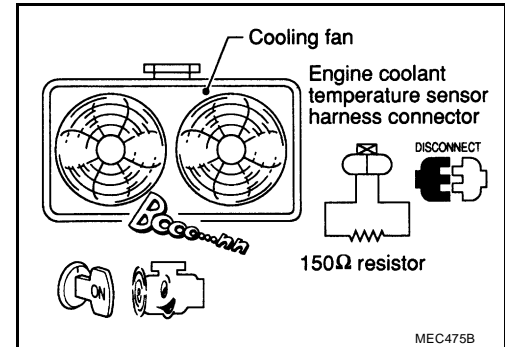
⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Turn air conditioner switch and blower fan switch "OFF".
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fans-1 and -2 operate at higher speed than low speed.

OK or NG

OK >> GO TO 6.

NG >> Check cooling fan high speed control circuit. (Go to [EC-248, "PROCEDURE B"](#).)



6. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

Testing pressure: 157 kPa (1.6 kg/cm² , 23 psi)

CAUTION:

Higher than the specified pressure may cause radiator damage. Pressure should not drop.

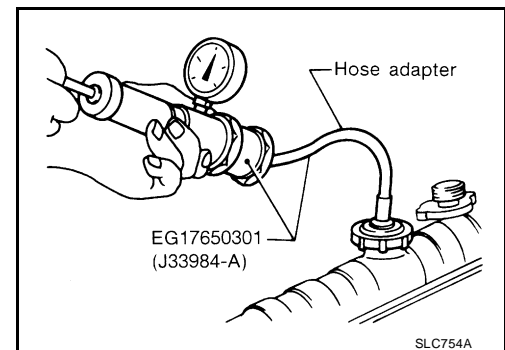
OK or NG

OK >> GO TO 7.

NG >> Check the following for leak.

- Hose
- Radiator
- Water pump

Refer to [CO-18, "WATER PUMP"](#) .



7. CHECK RADIATOR CAP

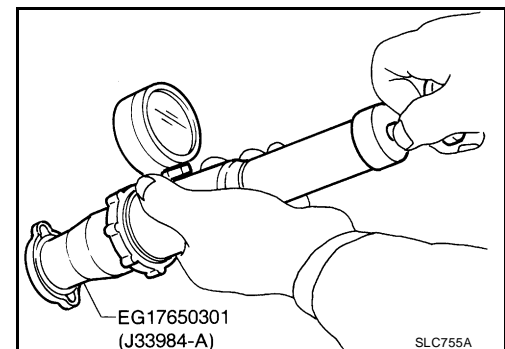
Apply pressure to cap with a tester.

**Radiator cap relief pressure: 59 - 98 kPa
(0.6 - 1.0 kg/cm² , 9 - 14 psi)**

OK or NG

OK >> GO TO 8.

NG >> Replace radiator cap.



8. CHECK THERMOSTAT

1. Check valve seating condition at normal room temperatures.
It should seat tightly.
2. Check valve opening temperature and valve lift.

Valve opening temperature: 82°C (180°F) [standard]

**Valve lift: More than 8 mm/95°C
(0.31 in/203°F)**

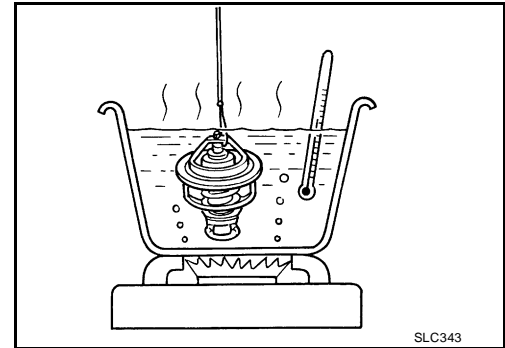
3. Check if valve is closed at 5°C (9°F) below valve opening temperature.

For details, refer to [CO-20, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

OK or NG

OK >> GO TO 9.

NG >> Replace thermostat.



9. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-176, "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> Replace engine coolant temperature sensor.

10. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to [EC-248, "Main 12 Causes of Overheating"](#).

>> **INSPECTION END**

PROCEDURE A

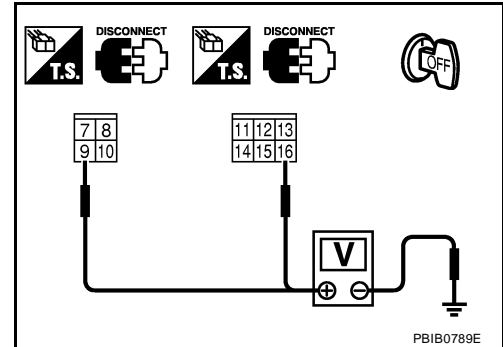
1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect IPDM E/R harness connectors E118 and E123.
3. Check voltage between IPDM E/R terminals 9, 16 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- 40A fusible links
- Harness connectors E27, E130
- 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 MOTORS CIRCUIT

1. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
2. Check harness continuity between cooling fan motor-1 terminal 1 and IPDM E/R terminal 7, cooling fan motor-1 terminal 4 and body ground. Refer to wiring diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.
4. Check harness continuity between cooling fan motor-2 terminal 1 and IPDM E/R terminal 13, cooling fan motor-2 terminal 4 and body ground. Refer to wiring diagram.

Continuity should exist.

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

OK or NG

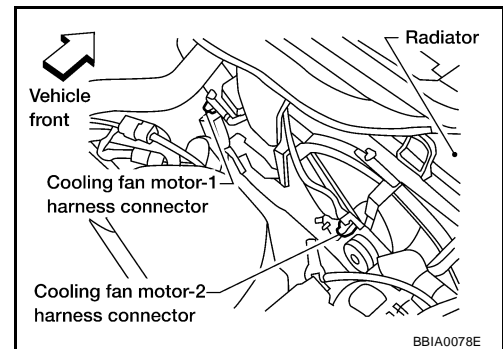
- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK COOLING FAN MOTORS

Refer to [EC-249, "COOLING FAN MOTORS-1 AND -2"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace cooling fan motors.



5. CHECK INTERMITTENT INCIDENT

Perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .
- NG >> Repair or replace harness or connector.

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PROCEDURE B

1. CHECK COOLING FAN MOTORS CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between the following; cooling fan motor-1 terminal 2 and IPDM E/R terminal 5, cooling fan motor-1 terminal 3 and IPDM E/R terminal 15, IPDM E/R terminal 14 and body ground. Refer to wiring diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.
5. Check harness continuity between the following; cooling fan motor-2 terminal 2 and IPDM E/R terminal 10, cooling fan motor-2 terminal 3 and IPDM E/R terminal 12, IPDM E/R terminal 14 and body ground. Refer to wiring diagram.

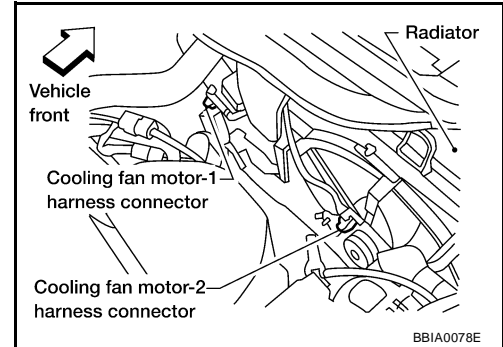
Continuity should exist.

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

OK or NG

OK >> GO TO 2.

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



2. CHECK COOLING FAN MOTORS

Refer to [EC-249, "Component Inspection"](#) .

OK or NG

OK >> GO TO 3.

NG >> Replace cooling fan motors.

3. CHECK INTERMITTENT INCIDENT

Perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .

NG >> Repair or replace harness connectors.

Main 12 Causes of Overheating

UBS00275

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 	50 - 50% coolant mixture	See MA-13, "ANTI-FREEZE COOLANT MIXTURE RATIO" .
	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 MA-14, "Changing Engine Coolant" .
	4	<ul style="list-style-type: none"> ● Radiator cap 	<ul style="list-style-type: none"> ● Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See CO-11, "CHECKING RADIATOR CAP" .

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

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Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*2	5	● Coolant leaks	● Visual	No leaks	See CO-10, "CHECKING COOLING SYSTEM FOR LEAKS" .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See CO-20, "THERMOSTAT AND THERMOSTAT HOUSING" , and CO-12, "RADIATOR" .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P0217 (EC-238) .
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	See MA-14, "Changing Engine Coolant" .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See CO-10, "CHECKING RESERVOIR LEVEL" .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-53, "CYLINDER HEAD" .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See EM-53, "CYLINDER HEAD" .

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to [CO-7, "OVERHEATING CAUSE ANALYSIS"](#) .

Component Inspection COOLING FAN MOTORS-1 AND -2

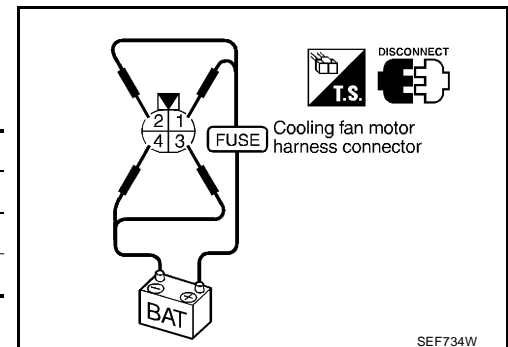
UBS002T6

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
	High	1, 2	3, 4

Cooling fan motor should operate.

If NG, replace cooling fan motor.



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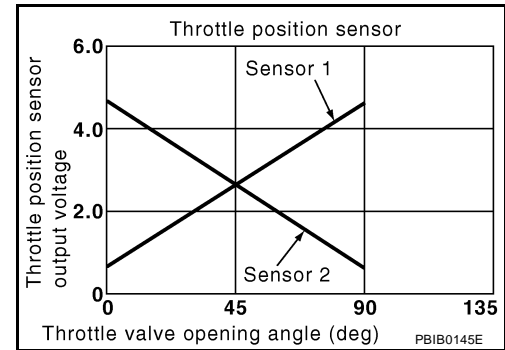
DTC P0221 TP SENSOR

Component Description

UBS002T7

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 the 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-II Reference Value in Data Monitor Mode

UBS002T8

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL SEN1 THRTL SEN2	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) 	Accelerator pedal: Fully released
	<ul style="list-style-type: none"> Shift lever: D (A/T model) 1st (M/T model) 	Accelerator pedal: Fully depressed
		More than 0.36V
		Less than 4.75V

On Board Diagnosis Logic

UBS002T9

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0221 0221	Throttle position sensor circuit range/performance problem	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 (The 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS002TA

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P0221 TP SENSOR

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-253, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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 **WITH GST**

Follow the procedure "WITH CONSULT-II" above.

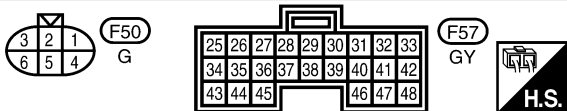
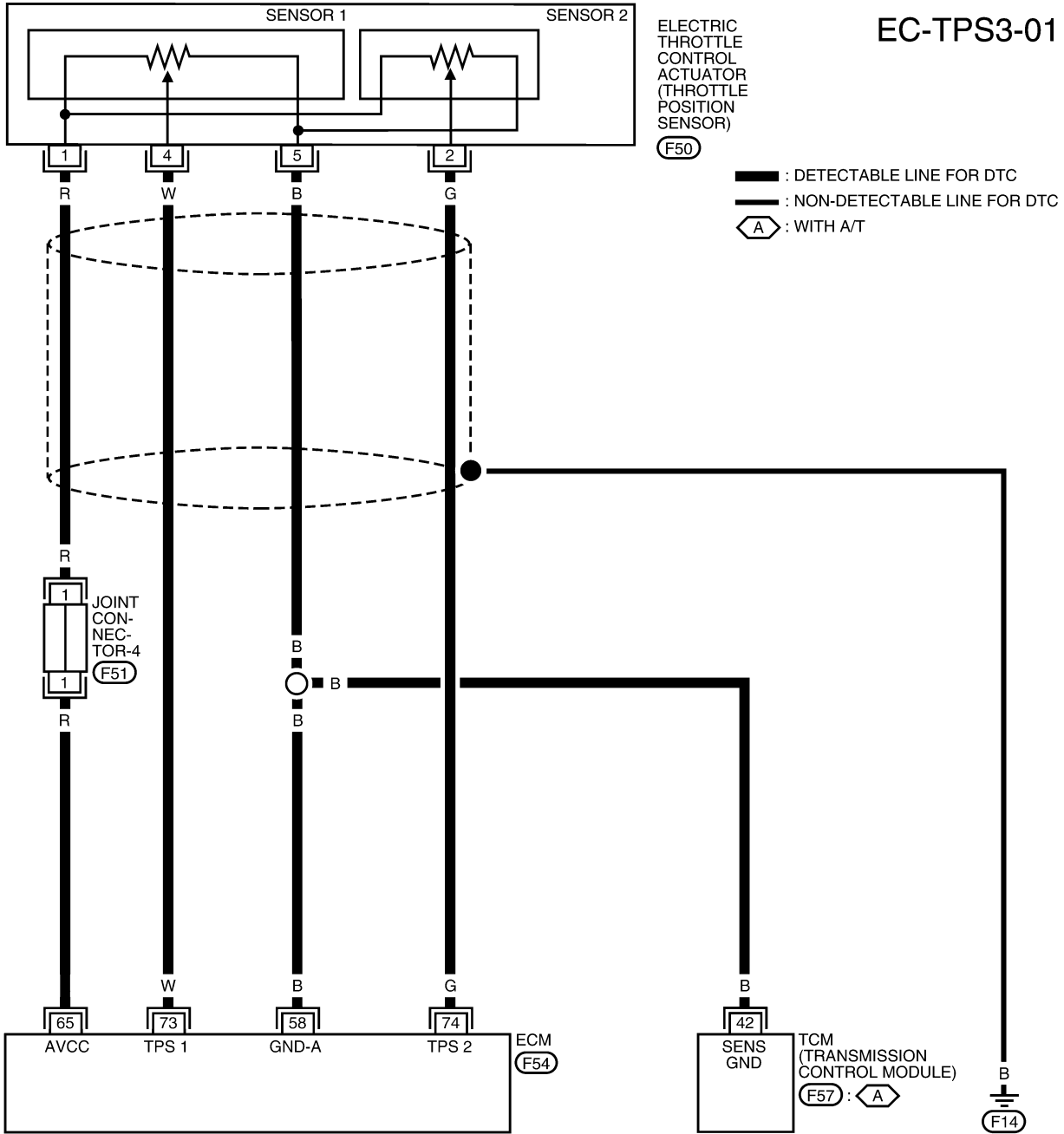
DTC P0221 TP SENSOR

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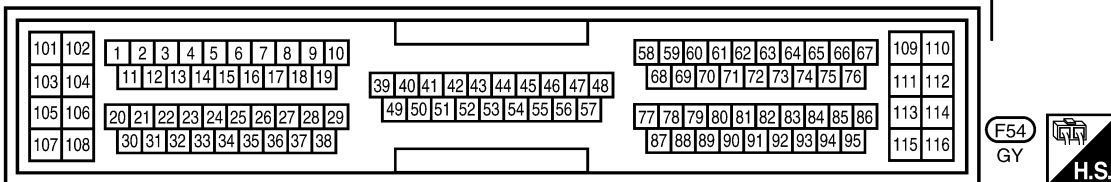
UBS002TB

Wiring Diagram

EC-TPS3-01



REFER TO THE FOLLOWING.
 (F51) - JOINT CONNECTOR (J/C)



BBWA0189E

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

DTC P0221 TP SENSOR

[QR]

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
73	W	Throttle position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released 	More than 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed 	Less than 4.75V
74	G	Throttle position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released 	Less than 4.75V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed 	More than 0.36V

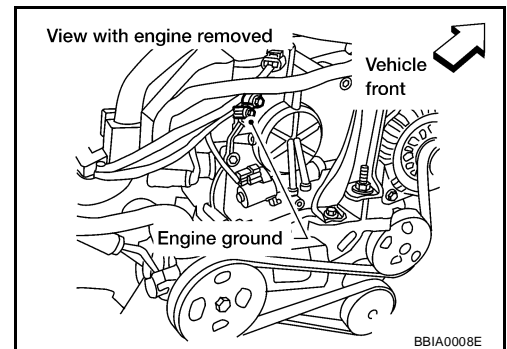
Diagnostic Procedure

UBS0027C

1. RETIGHTEN GROUND SCREWS

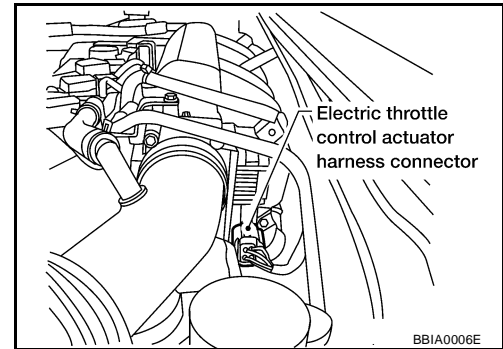
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

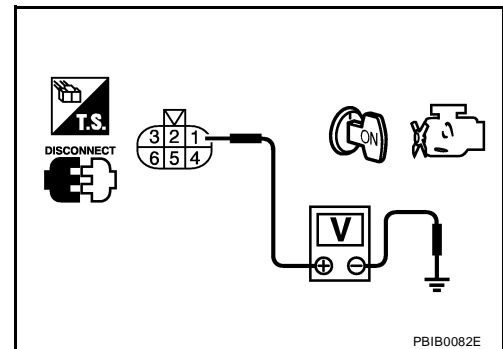


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-4
- Harness for open or short between electric throttle control actuator and ECM

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

4. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between electric throttle control actuator and ECM
- Harness for open or short between electric throttle control actuator and TCM

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

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

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 73 and electric throttle control actuator terminal 4, ECM terminal 74 and electric throttle control actuator 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 7.

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

7. CHECK THROTTLE POSITION SENSOR

Refer to [EC-255, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.

8. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

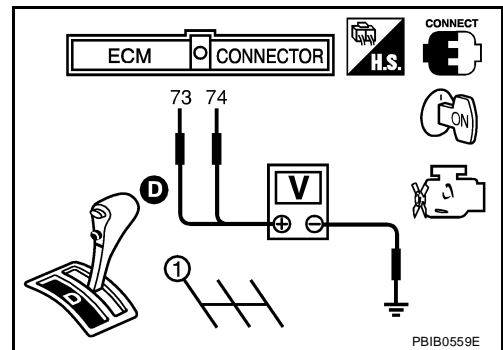
**Component Inspection
THROTTLE POSITION SENSOR**

UBS002TD

1. Reconnect all harness connectors disconnected.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 73 (TP sensor 1), 74 (TP sensor 2) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
74 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-49, "Idle Air Volume Learning"](#) .



PBIB0559E

Remove and Installation
ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-16, "INTAKE MANIFOLD"](#) .

DTC P0222, P0223 TP SENSOR

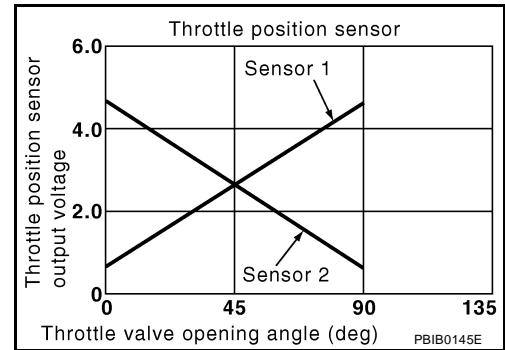
PFP:16119

Component Description

UBS002TF

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 the 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-II Reference Value in Data Monitor Mode

UBS002TG

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL SEN1	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released 	More than 0.36V
	<ul style="list-style-type: none"> Shift lever: D (A/T model) / 1st (M/T model) Accelerator pedal: Fully depressed 	Less than 4.75V

On Board Diagnosis Logic

UBS002TH

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 (The TP sensor 1 circuit is open or shorted.) Electric throttle control actuator (TP sensor 1)
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 in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS002TI

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P0222, P0223 TP SENSOR

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-260, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

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WITH GST

Follow the procedure "WITH CONSULT-II" above.

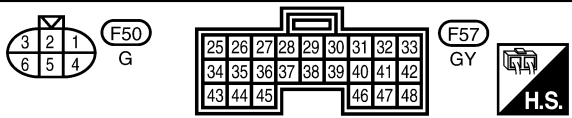
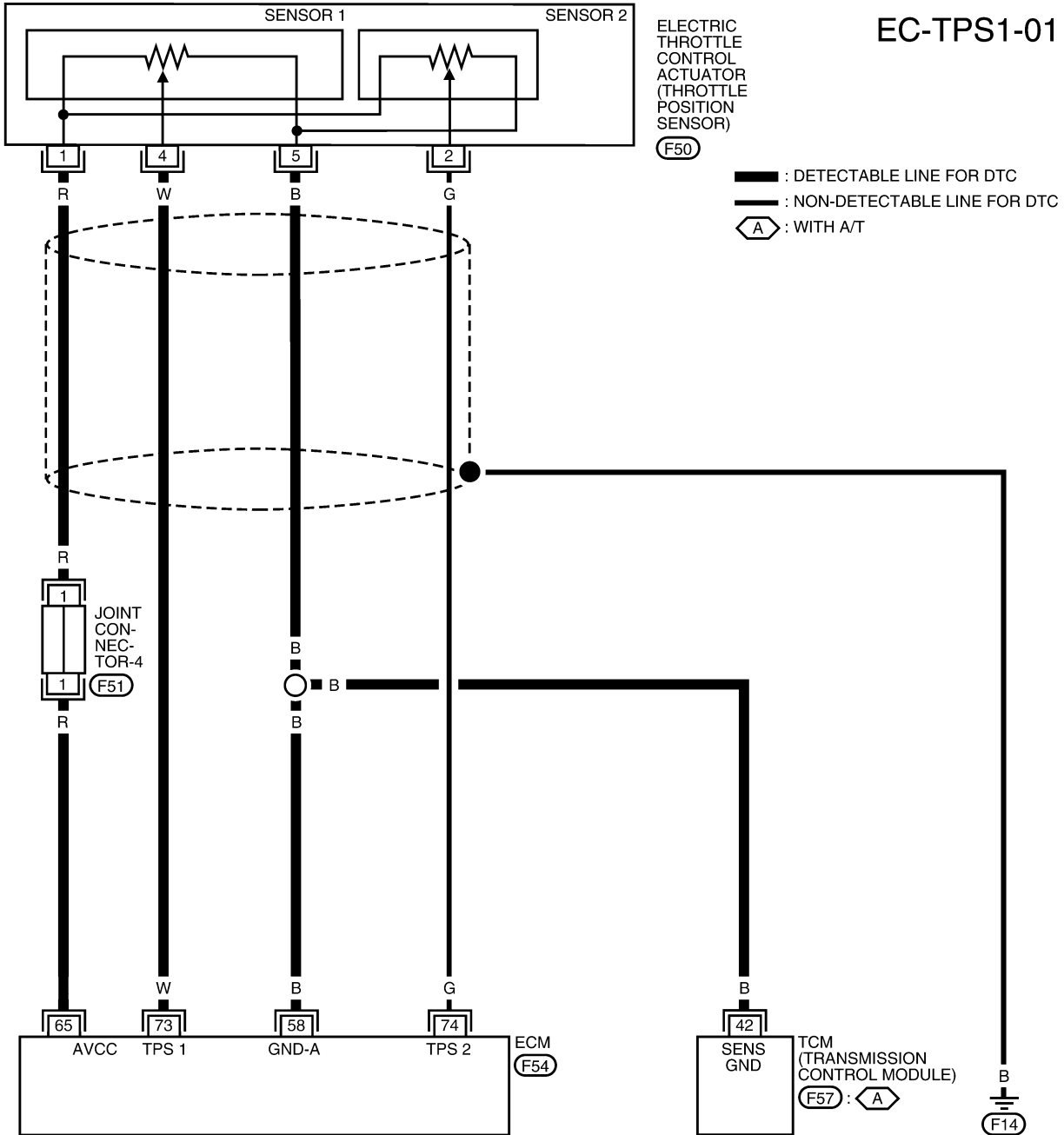
DTC P0222, P0223 TP SENSOR

[QR]

UBS002TJ

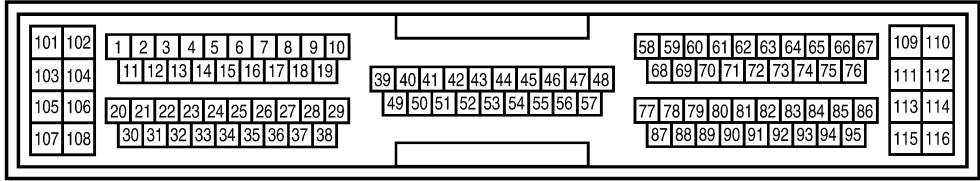
Wiring Diagram

EC-TPS1-01



REFER TO THE FOLLOWING.

(F51) - JOINT CONNECTOR (J/C)



BBWA0024E

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

DTC P0222, P0223 TP SENSOR

[QR]

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)
58	B	Sensors' ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
73	W	Throttle position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released 	More than 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed 	Less than 4.75V
74	G	Throttle position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released 	Less than 4.75V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed 	More than 0.36V

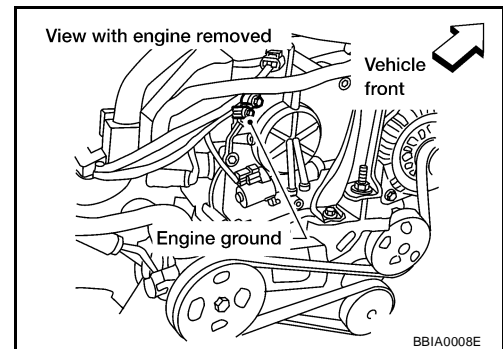
Diagnostic Procedure

UBS002TK

1. RETIGHTEN GROUND SCREWS

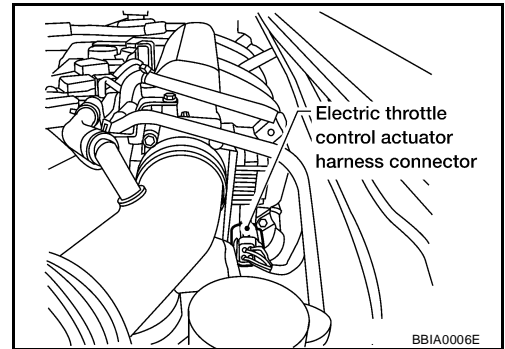
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

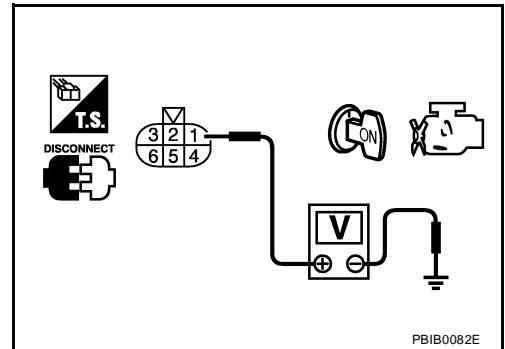


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-4
- Harness for open or short between electric throttle control actuator and ECM

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

4. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between electric throttle control actuator and ECM
- Harness for open or short between electric throttle control actuator and TCM

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

6. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 73 and electric throttle control actuator terminal 4. 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 7.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK THROTTLE POSITION SENSOR

Refer to [EC-262, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

8. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

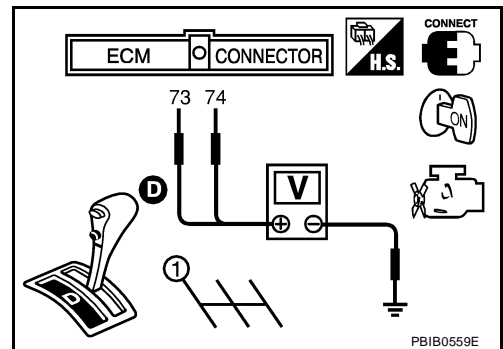
**Component Inspection
THROTTLE POSITION SENSOR**

UBS002TL

1. Reconnect all harness connectors disconnected.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 73 (TP sensor 1), 74 (TP sensor 2) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
74 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-49, "Idle Air Volume Learning"](#) .



**Remove and Installation
ELECTRIC THROTTLE CONTROL ACTUATOR**

UBS002TM

Refer to [EM-16, "INTAKE MANIFOLD"](#) .

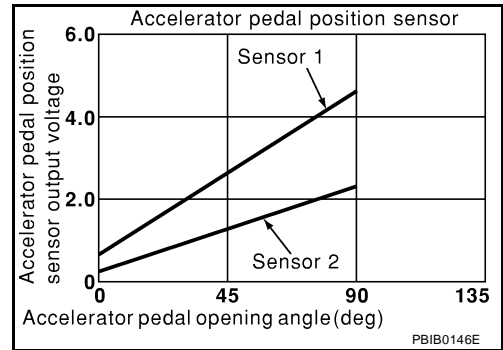
DTC P0226 APP SENSOR

Component Description

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-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1 ACCEL SEN2	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
CLSD THL POS	● Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0226 0226	Accelerator pedal position sensor circuit range/performance problem	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 (The APP sensor 1 and 2 circuit is open or shorted.) ● Accelerator pedal position sensor 1 and 2

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch “ON”.

DTC P0226 APP SENSOR

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-266, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0226 APP SENSOR

[QR]

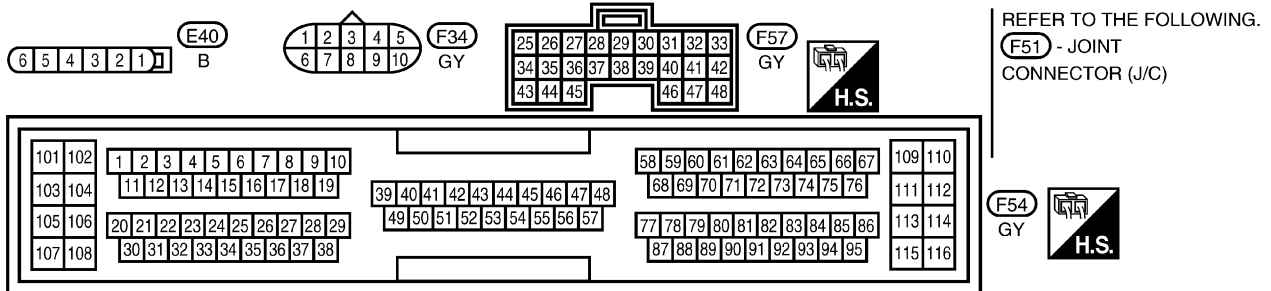
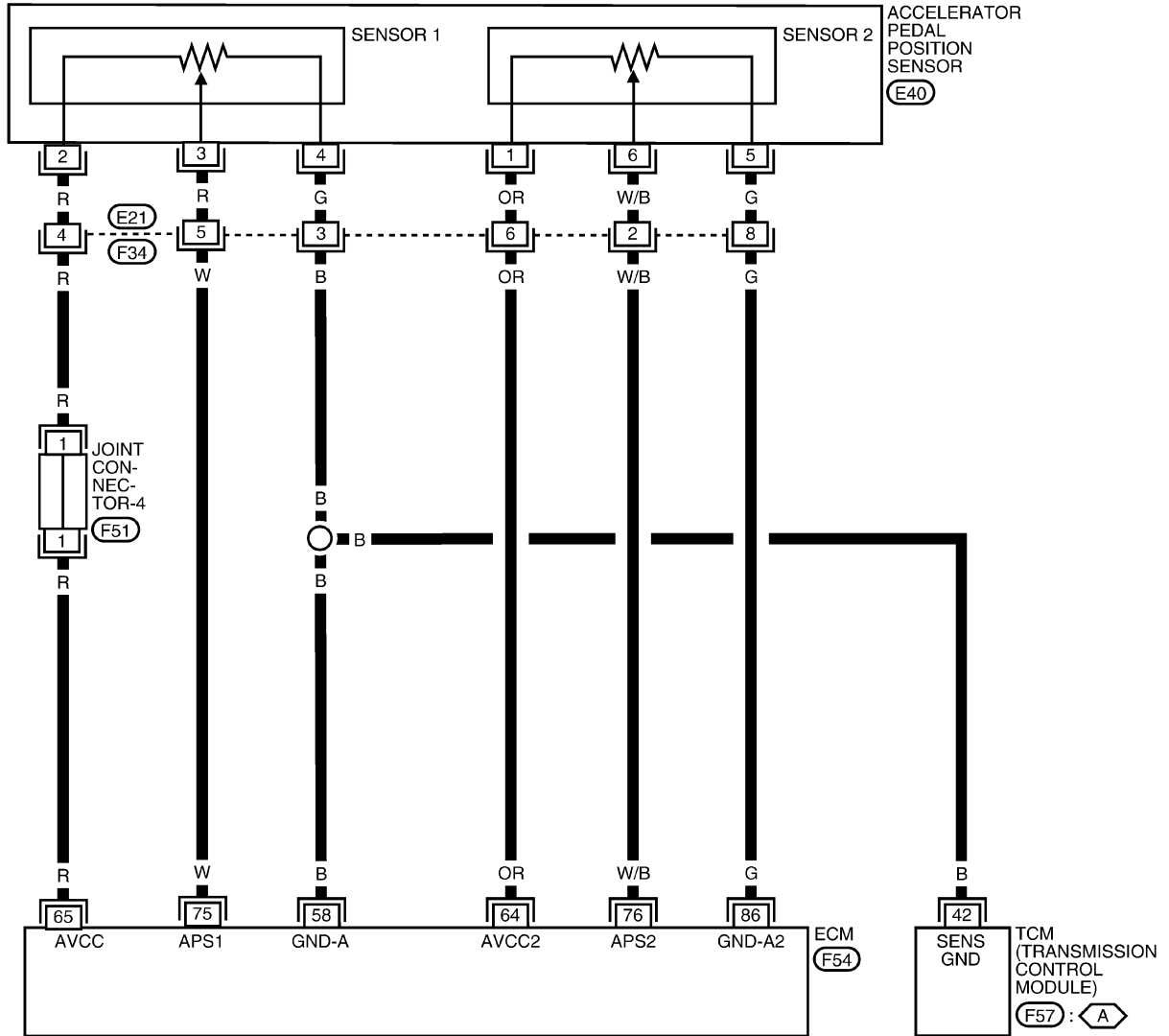
UBS002TR

Wiring Diagram

EC-APPS3-01

A
EC
C
D
E
F
G
H
I
J
K
L
M

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC
A : WITH A/T



BBWA0561E

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

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
75	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully released 	0.41 - 0.71V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	More than 4.2V
76	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully released 	0.21 - 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	More than 2.1V
86	G	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V

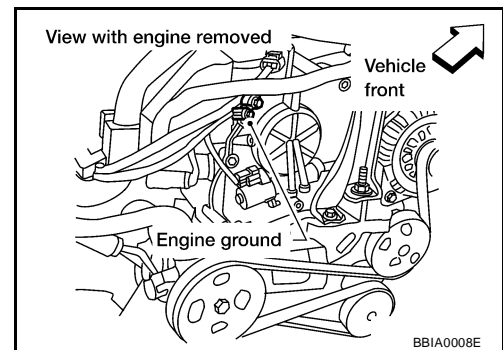
Diagnostic Procedure

UBS0027S

1. RETIGHTEN GROUND SCREWS

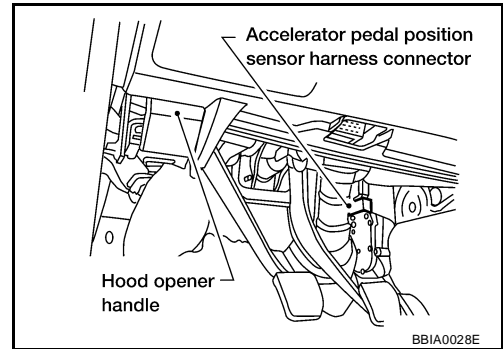
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

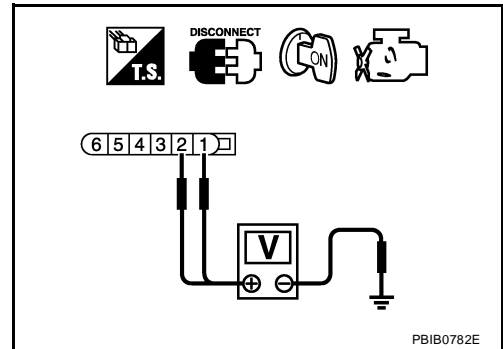


3. Check voltage between APP sensor terminals 1, 2 and ground with CONSULT-II or tester.

APP sensor terminal	Voltage (V)
1	Approximately 2.5
2	Approximately 5

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Joint connector-4
- Harness for open or short between ECM and accelerator pedal position sensor

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

4. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminal 4, 5 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor
- Harness for open or short between TCM and accelerator pedal position sensor

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

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

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 75 and APP sensor terminal 3, ECM terminal 76 and APP sensor terminal 6.
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 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

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

8. CHECK APP SENSOR

Refer to [EC-274, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-131, "POWER SUPPLY CIRCUIT FOR ECM"](#) .

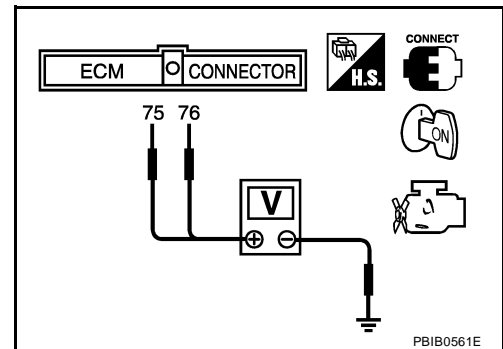
>> INSPECTION END

Component Inspection ACCELERATOR PEDAL POSITION SENSOR

UBS002TT

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 75 (APP sensor 1 signal), 76 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
75 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 4.2V
76 (Accelerator pedal position sensor 2)	Fully released	0.21 - 0.36V
	Fully depressed	More than 2.1V



4. If NG, replace accelerator pedal assembly.

Remove and Installation ACCELERATOR PEDAL

UBS002TU

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

DTC P0227, P0228 APP SENSOR

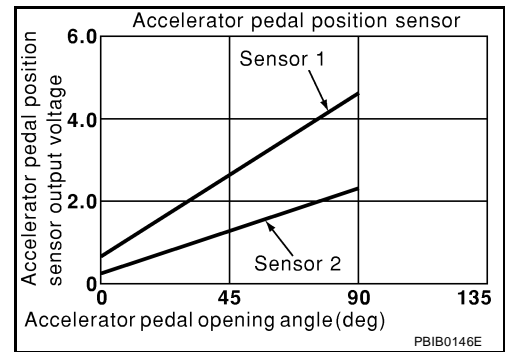
Component Description

UBS002TV

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-II Reference Value in Data Monitor Mode

UBS002TW

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
CLSD THL POS	● Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

UBS002TX

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0227 0227	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 (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P0228 0228	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, the ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS002TY

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

Ⓟ WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P0227, P0228 APP SENSOR

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-272, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0227, P0228 APP SENSOR

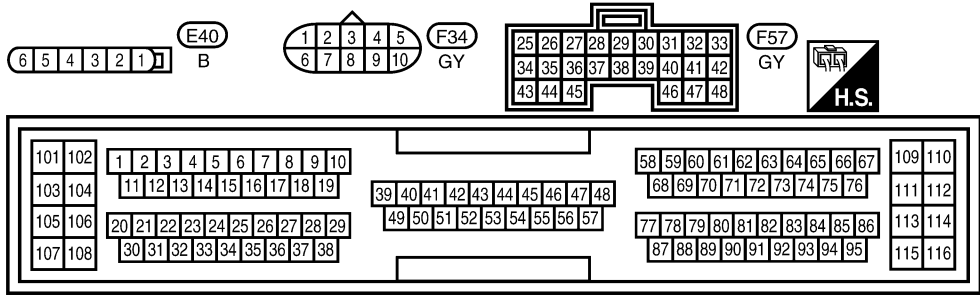
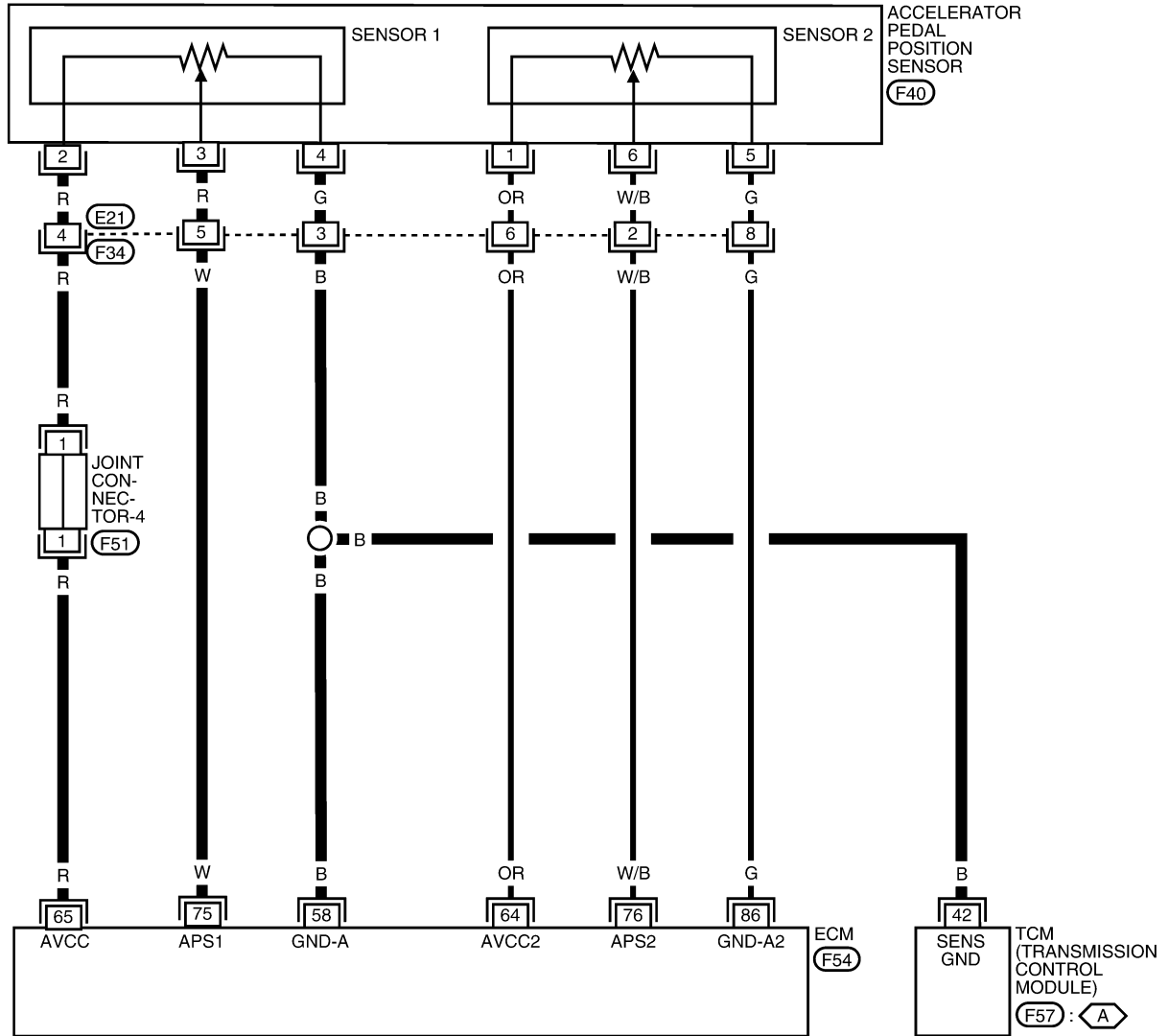
[QR]

UBS002TZ

Wiring Diagram

EC-APPS1-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ⬡** : WITH A/T



REFER TO THE FOLLOWING.

(F51) - JOINT CONNECTOR (J/C)

(F54) GY

BBWA0045E

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

DTC P0227, P0228 APP SENSOR

[QR]

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
75	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully released 	0.41 - 0.71V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	More than 4.2V
76	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully released 	0.21 - 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	More than 2.1V
86	G	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V

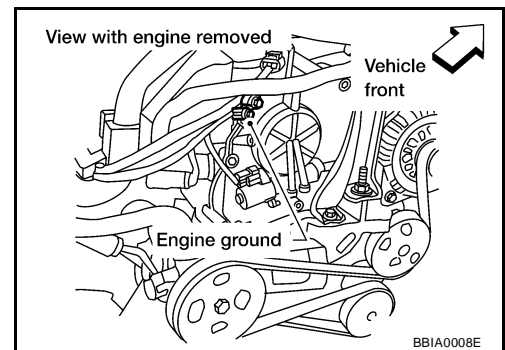
Diagnostic Procedure

UBS002U0

1. RETIGHTEN GROUND SCREWS

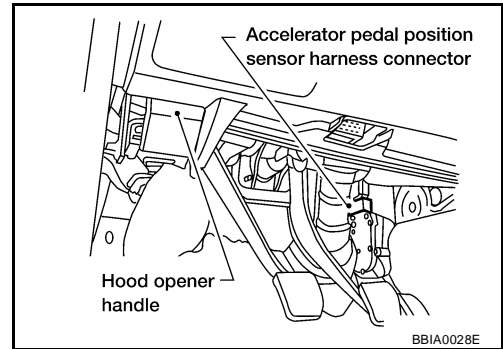
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

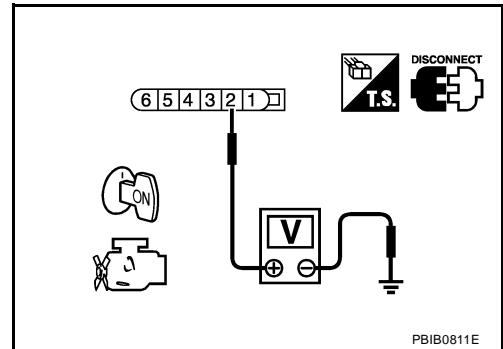


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Joint connector-4
- Harness for open or short between ECM and accelerator pedal position sensor

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

4. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminal 4 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor
- Harness for open or short between TCM and accelerator pedal position sensor

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

6. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 75 and APP sensor terminal 3.
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 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

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

8. CHECK APP SENSOR

Refer to [EC-274, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

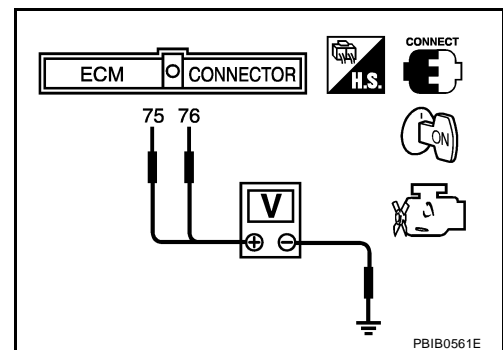
Component Inspection ACCELERATOR PEDAL POSITION SENSOR

UBS002U1

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 75 (APP sensor 1 signal), 76 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
75 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 4.2V
76 (Accelerator pedal position sensor 2)	Fully released	0.21 - 0.36V
	Fully depressed	More than 2.1V

4. If NG, replace accelerator pedal assembly.



UBS002U2

Removal and Installation ACCELERATOR PEDAL

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

[QR]

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

PFP:00000

On Board Diagnosis Logic

UBS002U3

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 first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.
 When a misfire condition occurs, the ECM monitors the CKP sensor (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 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
P0301 0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	<ul style="list-style-type: none"> ● Incorrect fuel pressure ● The injector circuit is open or shorted
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	<ul style="list-style-type: none"> ● Fuel injectors ● Intake air leak
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	<ul style="list-style-type: none"> ● The ignition signal circuit is open or shorted
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	<ul style="list-style-type: none"> ● Lack of fuel ● Drive plate or flywheel ● Heated oxygen sensor 1

DTC Confirmation Procedure

UBS002U4

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-II

- Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

[QR]

4. Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.
Hold the accelerator pedal as steady as possible.
NOTE:
Refer to the freeze frame data for the test driving conditions.
5. If 1st trip DTC is detected, go to [EC-276, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS002U5

1. CHECK FOR INTAKE AIR LEAK

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.

OK or NG

- OK >> GO TO 2.
- NG >> Discover air leak location and repair.

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 it.

3. PERFORM POWER BALANCE TEST

With CONSULT-II

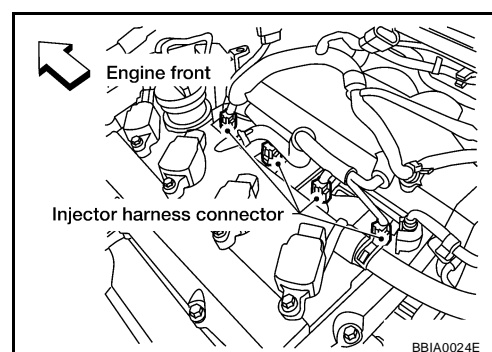
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

Without CONSULT-II

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



Yes or No

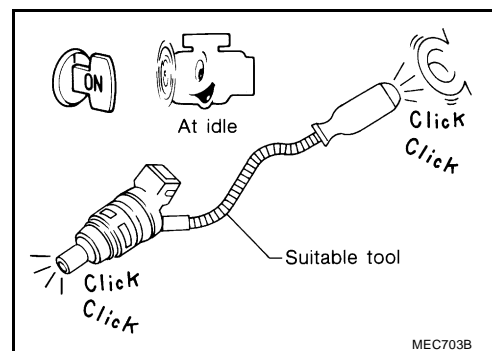
- Yes >> GO TO 4.
 No >> GO TO 7.

4. CHECK INJECTOR

Does each injector make an operating sound at idle?

Yes or No

- Yes >> GO TO 5.
 No >> Check injector(s) and circuit(s). Refer to [EC-574](#), "[INJECTOR CIRCUIT](#)".

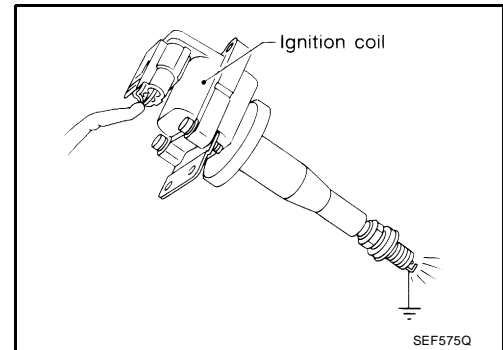


5. CHECK IGNITION SPARK

1. Disconnect ignition coil assembly from rocker cover.
2. Connect a known good spark plug to the ignition coil assembly.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

OK or NG

- OK >> GO TO 6.
NG >> Check ignition coil, power transistor and their circuits.
Refer to [EC-554, "IGNITION SIGNAL"](#) .

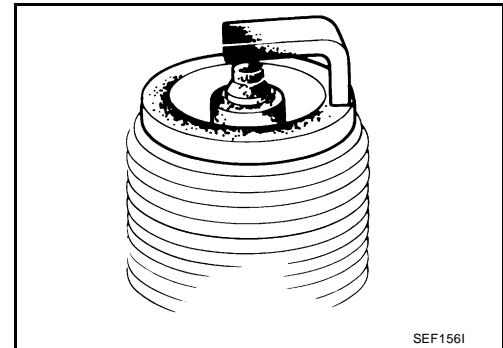


6. CHECK SPARK PLUGS

Remove the spark plugs and check for fouling, etc.

OK or NG

- OK >> GO TO 7.
NG >> Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to [MA-19, "Changing Spark Plugs \(Platinum - Tipped Type\)"](#) .



7. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-53, "CHECKING COMPRESSION PRESSURE"](#) .

Standard:	1,190 kPa (12.1 kg/cm² , 172 psi)/250 rpm
Minimum:	990 kPa (10.1 kg/cm² , 144 psi)/250 rpm
Difference between each cylinder:	98 kPa (1.0 kg/cm² , 14 psi)/250 rpm

OK or NG

- OK >> GO TO 8.
NG >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

8. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to [EC-51, "FUEL PRESSURE RELEASE"](#) .
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-51, "Fuel Pressure Check"](#) .

At idle: Approx. 350 kPa (3.7 kg/cm² , 51 psi)

OK or NG

- OK >> GO TO 9.
NG >> Follow the construction of "FUEL PRESSURE CHECK".

9. CHECK IGNITION TIMING

Check the following items. Refer to [EC-84, "Basic Inspection"](#) .

Items	Specifications	
Target idle speed	A/T	700 ± 50 rpm (in "P" or "N" position)
	M/T	700 ± 50 rpm
Ignition timing	A/T	15 ± 5° BTDC (in "P" or "N" position)
	M/T	15 ± 5° BTDC

OK or NG

OK >> GO TO 10.

NG >> Follow the "Basic Inspection".

10. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-189, "Component Inspection"](#) .

OK or NG

OK >> GO TO 12.

NG >> GO TO 11.

11. CHECK MASS AIR FLOW SENSOR

 **With CONSULT-II**

Check mass air flow sensor signal in "DATA MONITOR" mode with CONSULT-II.

1.4 - 4.0 g-m/sec: at idling

4.0 - 10.0 g-m/sec: at 2,500 rpm

 **With GST**

Check mass air flow sensor signal in MODE 1 with GST.

1.4 - 4.0 g-m/sec: at idling

4.0 - 10.0 g-m/sec: at 2,500 rpm

OK or NG

OK >> GO TO 12.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-161, "DTC P0102, P0103 MAF SENSOR"](#) .

12. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in [EC-89, "Symptom Matrix Chart"](#) .

OK or NG

OK >> GO TO 13.

NG >> Repair or replace.

13. 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-67, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

>> GO TO 14.

14. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

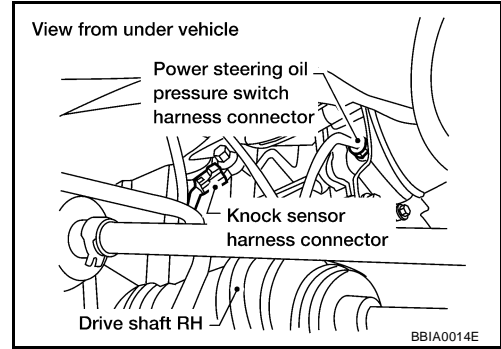
>> INSPECTION END

DTC P0327, P0328 KS

UBS002U6

Component Description

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



UBS002U7

On Board Diagnosis Logic

The MIL will not light for knock sensor malfunction.

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 (The 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

UBS002U8

NOTE:

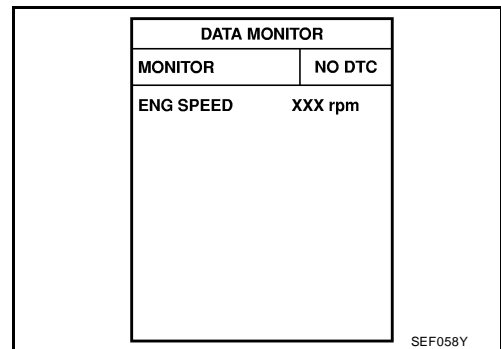
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-282, "Diagnostic Procedure"](#)



WITH GST

Follow the procedure "WITH CONSULT-II" above.

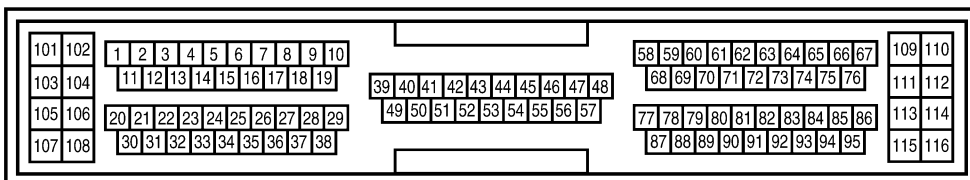
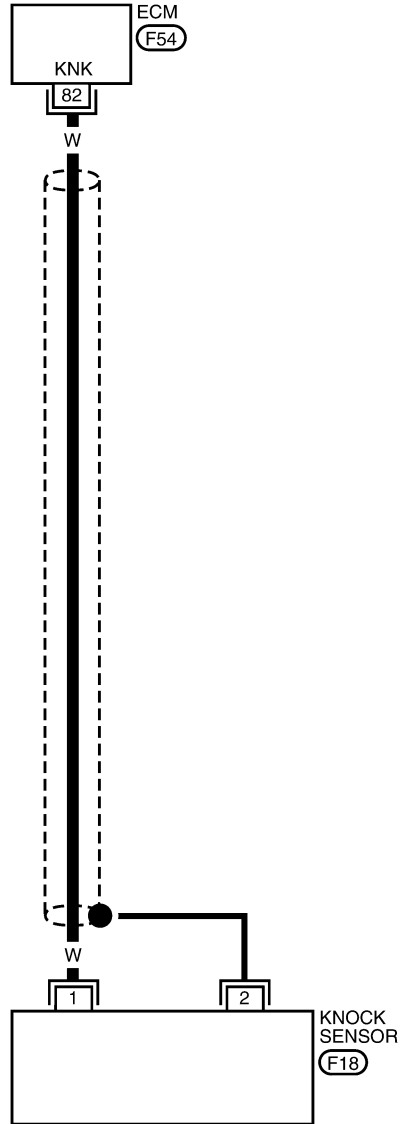
Wiring Diagram

UBS002U9

EC-KS-01

A
EC
C
D
E
F
G
H
I
J
K
L
M

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



BBWA0016E

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

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	W	Knock sensor	[Engine is running] ● Idle speed	Approximately 2.5V

Diagnostic Procedure

UBS002UA

1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 82 and engine ground. Refer to Wiring Diagram.

NOTE:

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 530 - 590kΩ [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

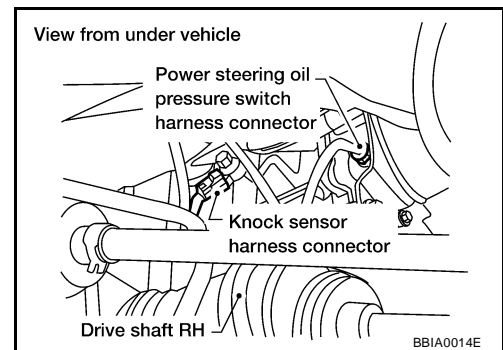
1. Disconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 82 and knock sensor terminal 1. Refer to Wiring Diagram.

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-283, "Component Inspection"](#) .

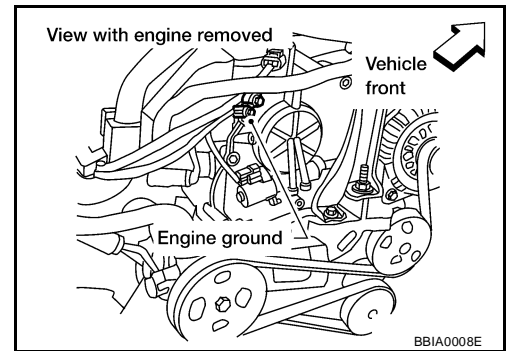
OK or NG

- OK >> GO TO 5.
- NG >> Replace knock sensor.

4. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

>> GO TO 5.



5. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

Component Inspection KNOCK SENSOR

UBS002UB

Check resistance between knock sensor terminal 1 and ground.

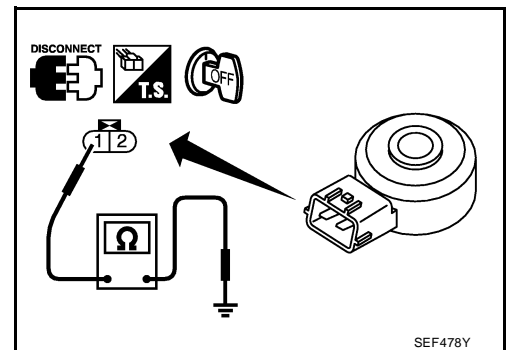
NOTE:

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.



UBS002UC

Removal and Installation KNOCK SENSOR

Refer to [EM-67, "CYLINDER BLOCK"](#).

DTC P0335 CKP SENSOR (POS)

PFP:23731

Component Description

UBS002UD

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.

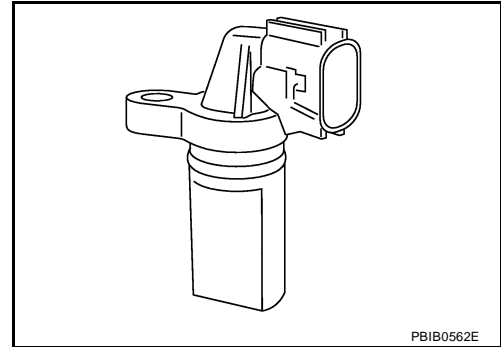
The sensor consists of a permanent magnet and Hall IC.

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



PBIB0562E

CONSULT-II Reference Value in Data Monitor Mode

UBS002UE

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED-	<ul style="list-style-type: none"> ● Tachometer: Connect ● Run engine and compare tachometer indication with the CONSULT-II value. 	Almost the same speed as the CONSULT-II value.

On Board Diagnosis Logic

UBS002UF

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 (The sensor circuit is open or shorted) ● Crankshaft position sensor (POS) ● Signal plate

DTC Confirmation Procedure

UBS002UG

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

④ WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-287, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC P0335 CKP SENSOR (POS)

[QR]



WITH GST

Follow the procedure "WITH CONSULT-II" above.

A

EC

C

D

E

F

G

H

I

J

K

L

M

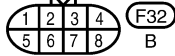
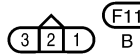
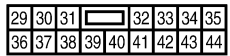
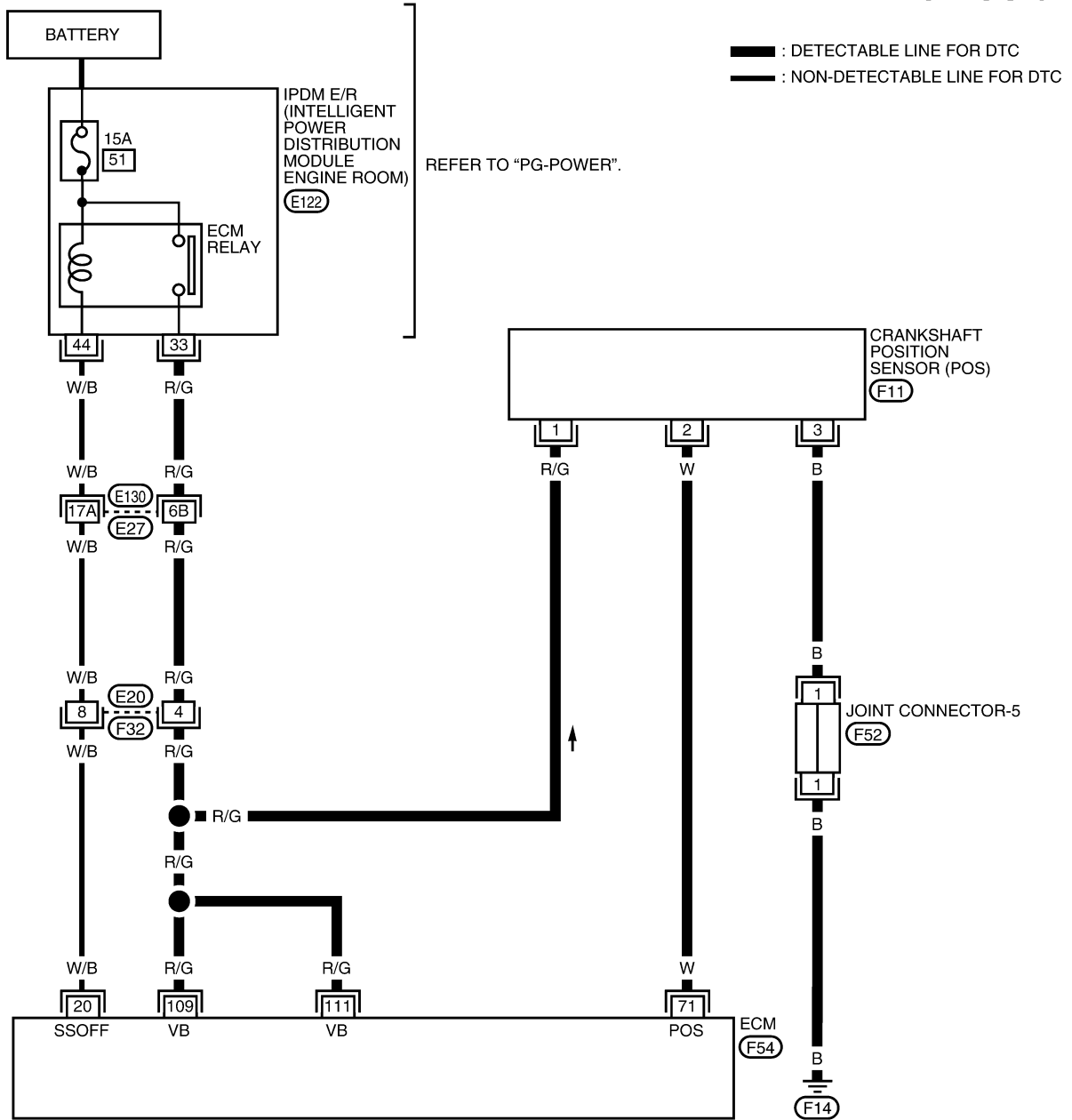
DTC P0335 CKP SENSOR (POS)

[QR]

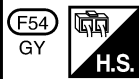
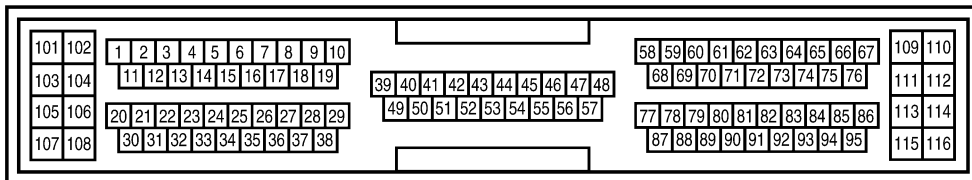
UBS002UH

Wiring Diagram

EC-POS-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F52) - JOINT CONNECTOR (J/C)



BBWA0017E

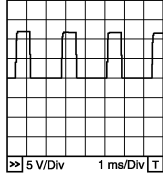
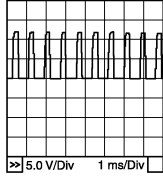
Specification data are reference values and are measured between each terminal and ground.

DTC P0335 CKP SENSOR (POS)

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
71	W	Crankshaft position sensor (POS)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>Approximately 3V★</p>  <p>PBIB0527E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	<p>Approximately 3V★</p>  <p>PBIB0528E</p>

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

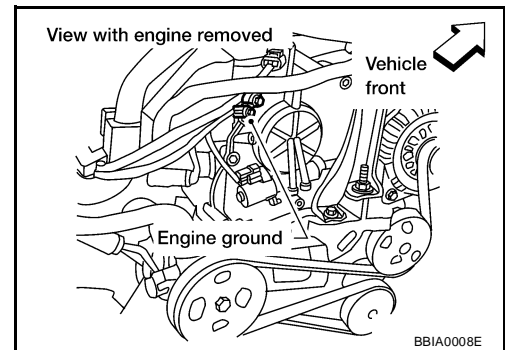
Diagnostic Procedure

UBS002UI

1. RETIGHTEN GROUND SCREWS

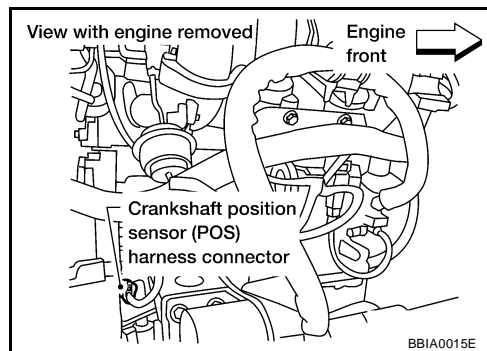
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch "ON".



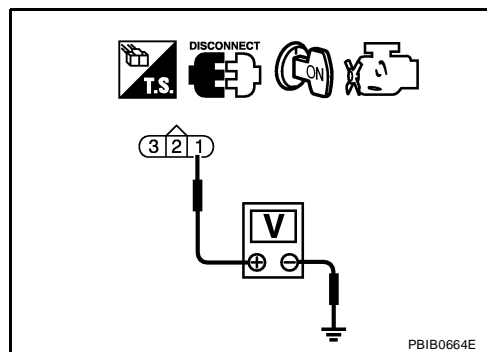
3. Check voltage between CKP sensor (POS) terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

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 E130, E27
- Harness connectors E20, F32
- Harness for open or short between crankshaft position sensor (POS) and ECM
- Harness for open or short between crankshaft position sensor (POS) and IPDM E/R

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

4. CHECK CKP (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between CKP sensor (POS) terminal 3 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for and short to power.

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-5
- Harness for open or short between crankshaft position sensor (POS) and engine ground

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

6. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 71 and CKP sensor (POS) 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 7.

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

7. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-289, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace crankshaft position sensor (POS).

8. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 9.

NG >> Replace the signal plate.

9. CHECK INTERMITTENT INCIDENT

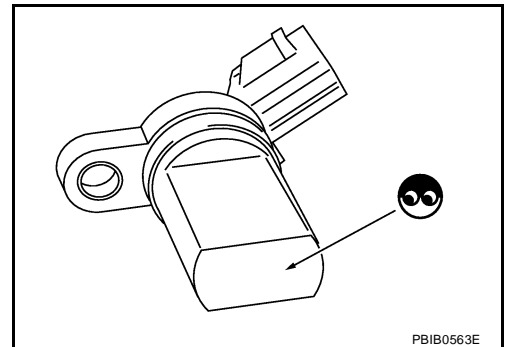
Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
CRANKSHAFT POSITION SENSOR (POS)**

UBS002UJ

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.



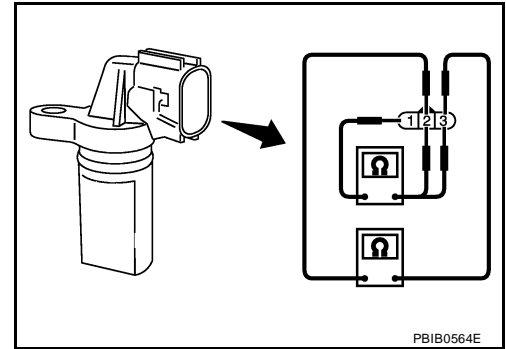
DTC P0335 CKP SENSOR (POS)

[QR]

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).



UBS002UK

Removal and Installation CRANKSHAFT POSITION SENSOR (POS)

Refer to [EM-67, "CYLINDER BLOCK"](#) .

DTC P0340 CMP SENSOR (PHASE)

Component Description

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

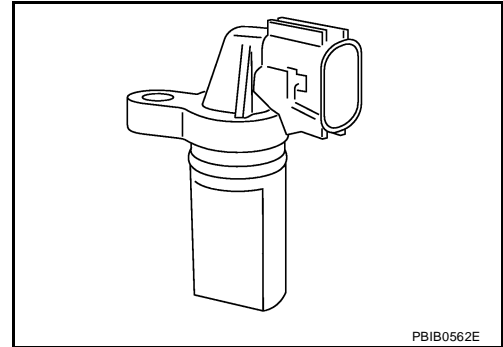
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

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

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.



On Board Diagnosis Logic

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 (The sensor circuit is open or shorted) ● Camshaft position sensor (PHASE) ● Camshaft (Intake) ● Starter motor (Refer to SC-9.) ● Starting system circuit (Refer to SC-9.) ● Dead (Weak) battery

DTC Confirmation Procedure

NOTE:

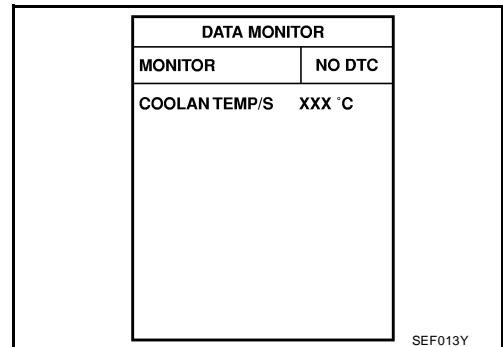
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
4. If 1st trip DTC is detected, go to [EC-293, "Diagnostic Procedure"](#).
If 1st trip DTC is not detected, go to next step.
5. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
6. If 1st trip DTC is detected, go to [EC-293, "Diagnostic Procedure"](#).



WITH GST

Follow the procedure "WITH CONSULT-II" above.

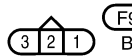
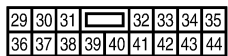
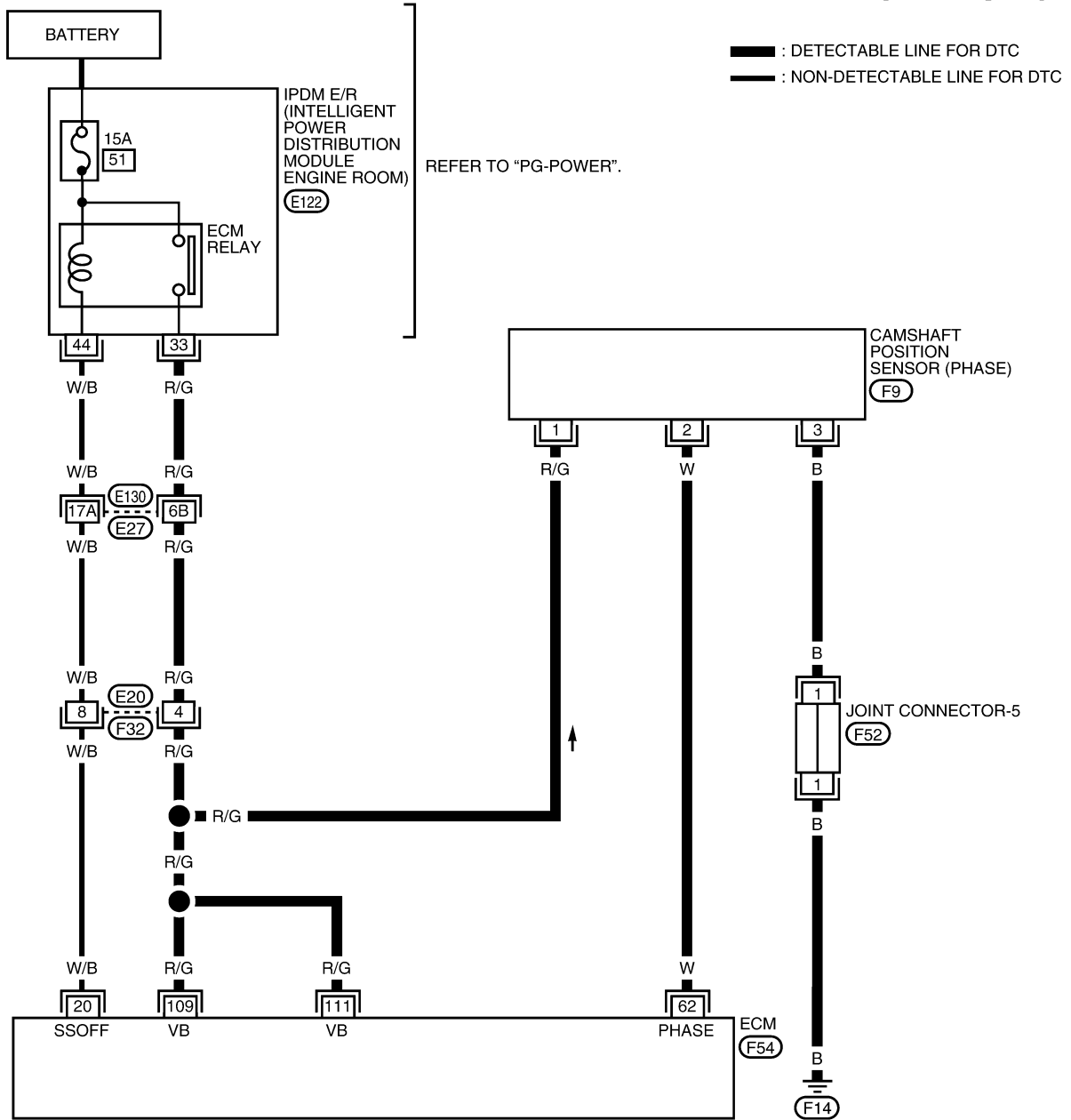
DTC P0340 CMP SENSOR (PHASE)

[QR]

UBS002UO

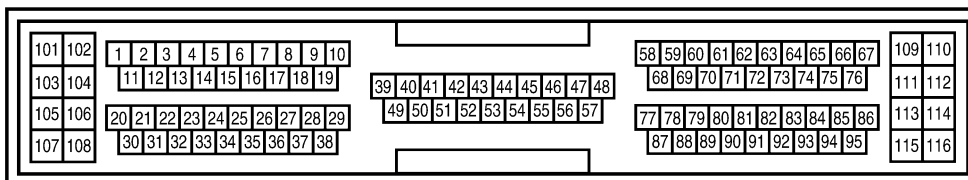
Wiring Diagram

EC-PHASE-01



REFER TO THE FOLLOWING.

- (E130) - SUPER MULTIPLE JUNCTION (SMJ)
- (F52) - JOINT CONNECTOR (J/C)



BBWA0018E

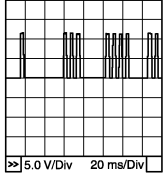
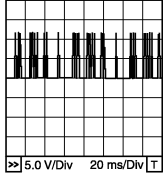
Specification data are reference values and are measured between each terminal and ground.

DTC P0340 CMP SENSOR (PHASE)

[QR]

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62	W	Camshaft position sensor (PHASE)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>1.0 - 4.0V★</p>  <p>PBIB0525E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm. 	<p>1.0 - 4.0V★</p>  <p>PBIB0526E</p>

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

Diagnostic Procedure

UBS002UP

1. CHECK STARTING SYSTEM

Turn ignition switch to "START" position.

Does the engine turn over?

Does the starter motor operate?

Yes or No

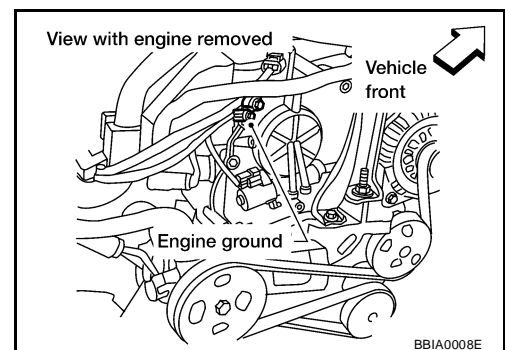
Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-9, "STARTING SYSTEM"](#) .)

2. RETIGHTEN GROUND SCREWS

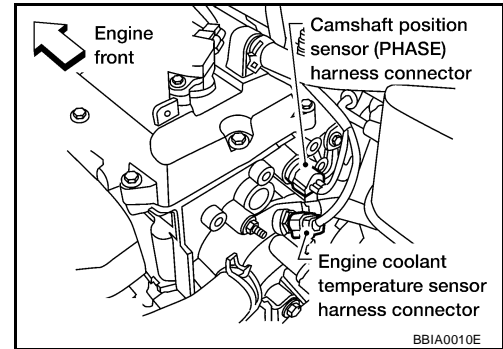
1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws.

>> GO TO 3.



3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch "ON".



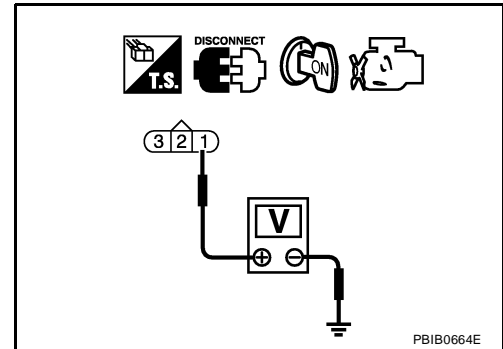
3. Check voltage between CMP sensor (PHASE) terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

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 E130, E27
- Harness connectors E20, F32
- Harness for open or short between camshaft position sensor (PHASE) and ECM
- Harness for open or short between camshaft position sensor (PHASE) and IPDM E/R

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

5. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between CMP sensor (PHASE) terminal 3 and engine ground.

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.

- Joint connector-5
- Harness for open or short between camshaft position sensor (PHASE) and engine ground

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

7. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 62 and CMP sensor (PHASE) terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground or 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 CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-295, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace camshaft position sensor (PHASE).

9. CHECK CAMSHAFT (INTAKE)

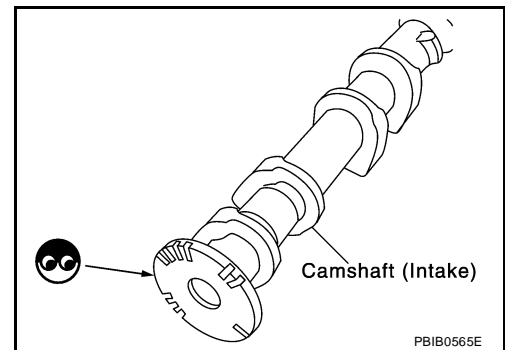
Check the following.

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

OK or NG

OK >> GO TO 10.

NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



10. CHECK INTERMITTENT INCIDENT

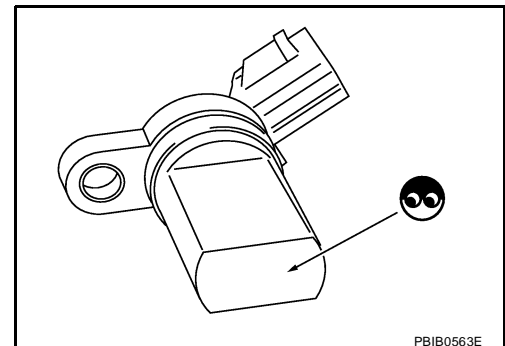
Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
CAMSHAFT POSITION SENSOR (PHASE)**

UBS002UQ

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.

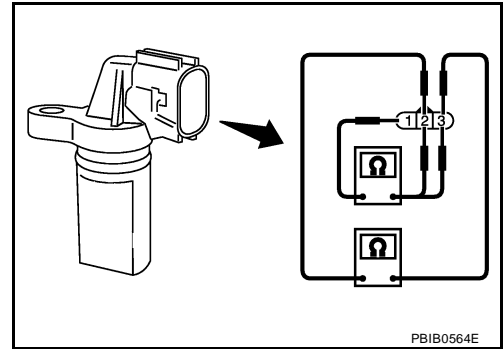


DTC P0340 CMP SENSOR (PHASE)

[QR]

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 (-)	



Removal and Installation CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EM-34, "CAMSHAFT"](#) .

UBS002UR

DTC P0420 THREE WAY CATALYST FUNCTION

[QR]

DTC P0420 THREE WAY CATALYST FUNCTION

PFP:20905

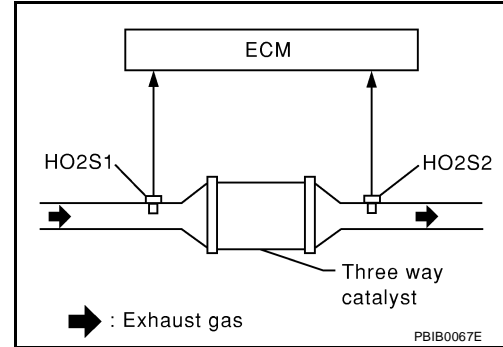
On Board Diagnosis Logic

UBS002US

The ECM monitors the switching frequency ratio of heated oxygen sensors 1 and 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 heated oxygen sensors 1 and 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 injectors Fuel injector leaks Spark plug Improper ignition timing

DTC Confirmation Procedure

UBS002UT

NOTE:

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

WITH CONSULT-II

TESTING CONDITION:

- Open engine hood before conducting the following procedure.
 - Do not hold engine speed for more than the specified minutes below.
- Turn ignition switch "ON".
 - Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
 - Start engine.
 - Rev engine up to 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 "COMPLT", go to step 7
 - Wait 5 seconds at idle.

SRT WORK SUPPORT	
CATALYST	INCMP
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0822E

DTC P0420 THREE WAY CATALYST FUNCTION

[QR]

- 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.

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0823E

- Select "SELF-DIAG RESULTS" mode with CONSULT-II.
- Confirm that the 1st trip DTC is not detected.
If the 1st trip DTC is detected, go to [EC-299, "Diagnostic Procedure"](#).

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF535Z

Overall Function Check

UBS002UU

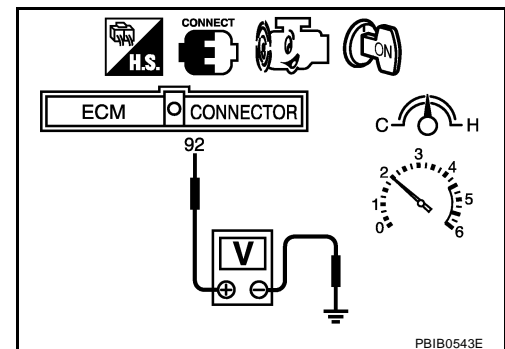
Use this procedure to check the overall function of the three way catalyst (Manifold). During this check, a 1st trip DTC might not be confirmed.

CAUTION:

Always drive vehicle at a safe speed.

WITH GST

- Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- Stop vehicle with engine running.
- Set voltmeters probes between ECM terminal 92 [HO2S1 signal] and engine ground, and ECM terminal 95 [HO2S2 signal] and engine ground.
- Keep engine speed at 2,000 rpm constant under no load.



- Make sure that the voltage switching frequency (high & low) between ECM terminal 95 and engine ground is very less than that of ECM terminal 92 and engine ground.

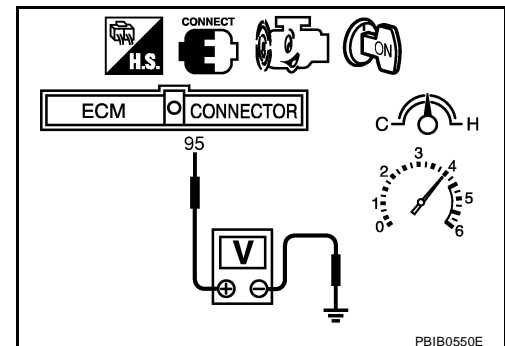
Switching frequency ratio = A/B

A: Heated oxygen sensor 2 voltage switching frequency

B: Heated oxygen sensor 1 voltage switching frequency

This ratio should be less than 0.75.

If the ratio is greater than above, it means three way catalyst does not operate properly. Go to [EC-299, "Diagnostic Procedure"](#).



NOTE:

If the voltage at terminal 92 does not switch periodically more than 5 times within 10 seconds at step 5, perform trouble diagnosis for "DTC P0133" first. (See [EC-191](#).)

Diagnostic Procedure

1. CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

OK or NG

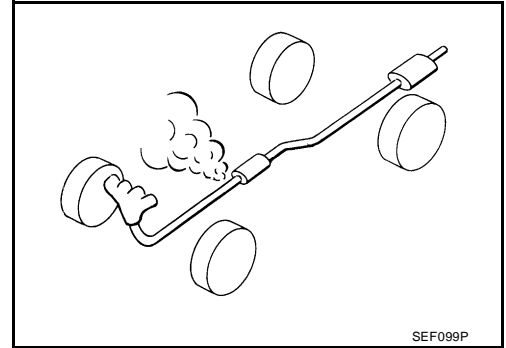
- OK >> GO TO 2.
- NG >> Repair or replace.

2. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air 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-84, "Basic Inspection"](#) .

Items	Specifications	
Ignition timing	A/T	$15^{\circ} \pm 5^{\circ}$ BTDC (in "P" or "N" position)
	M/T	$15^{\circ} \pm 5^{\circ}$ BTDC
Target idle speed	A/T	700 ± 50 rpm (in "P" or "N" position)
	M/T	700 ± 50 rpm

OK or NG

- OK >> GO TO 5.
- NG >> Follow the "Basic Inspection".

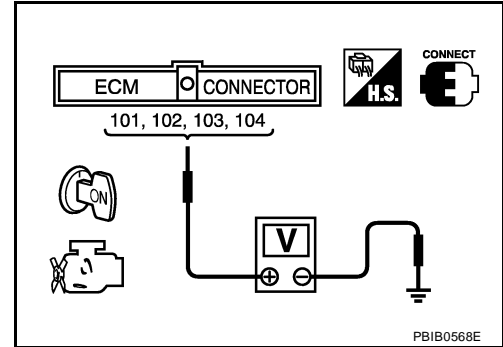
5. CHECK INJECTORS

1. Refer to Wiring Diagram for Injectors, [EC-575](#) .
2. Stop engine and then turn ignition switch "ON".
3. Check voltage between ECM terminals 101, 102, 103, 104 and ground with CONSULT-II or tester.

Battery voltage should exist.

OK or NG

- OK >> GO TO 6.
 NG >> Perform [EC-576, "Diagnostic Procedure"](#) .

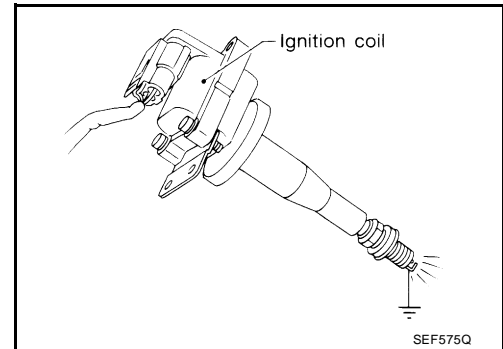


6. CHECK IGNITION SPARK

1. Turn ignition switch "OFF".
2. Disconnect ignition coil assembly from rocker cover.
3. Connect a known good spark plug to the ignition coil assembly.
4. Place end of spark plug against a suitable ground and crank engine.
5. Check for spark.

OK or NG

- OK >> GO TO 7.
 NG >> Check ignition coil with power transistor and their circuit.
 Refer to [EC-554, "IGNITION SIGNAL"](#) .



7. CHECK INJECTOR

1. Turn ignition switch "OFF".
2. Remove injector assembly.
 Refer to [EM-29, "FUEL INJECTOR AND FUEL TUBE"](#) .
 Keep fuel hose and all injectors connected to injector gallery.
3. Disconnect all ignition coil harness connectors.
4. Turn ignition switch "ON".
 Make sure fuel does not drip from injector.

OK or NG

- OK (Does not drip.)>>GO TO 8.
 NG (Drips.)>>Replace the injector(s) from which fuel is dripping.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

- Trouble is fixed.>>**INSPECTION END**
 Trouble is not fixed.>>Replace three way catalyst (Manifold).

DTC P0441 EVAP CONTROL SYSTEM

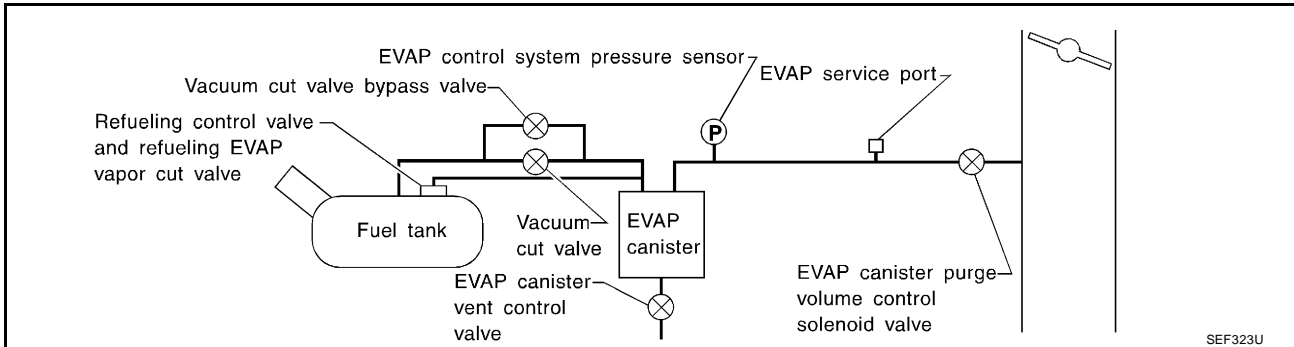
PF:14950

System Description

UBS002UW

NOTE:

If DTC P0441 is displayed with P0226, P0227, P0228, P1227 or P1228, perform trouble diagnosis for displayed 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

UBS002UX

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault is determined.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441 0441	EVAP control system incorrect purge flow	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

DTC Confirmation Procedure

UBS002UY

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 0°C (32°F) or more.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

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

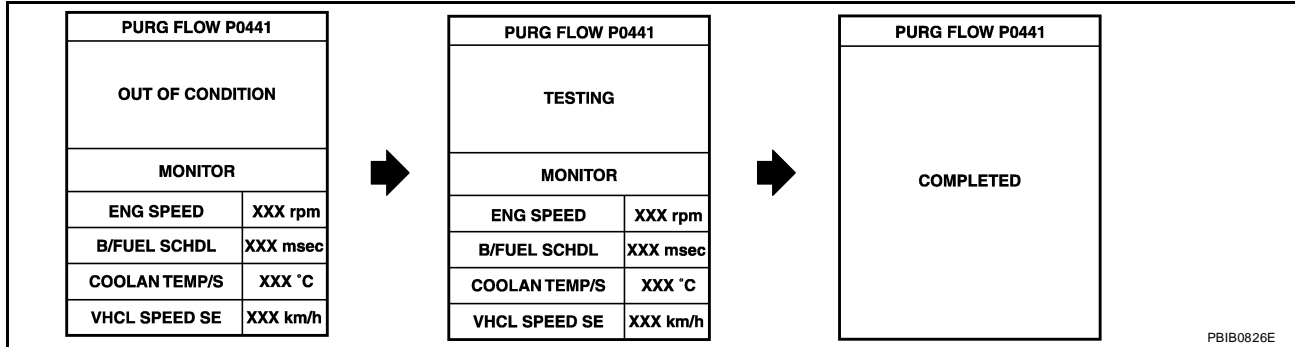
DTC P0441 EVAP CONTROL SYSTEM

[QR]

5. Touch "START".
If "COMPLETED" is displayed, go to step 7.
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 10.0 msec
Engine coolant temperature	70 - 100°C (158 - 212°F)

If "TESTING" is not changed for a long time, retry from step 2.



7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-303, "Diagnostic Procedure"](#).

Overall Function Check

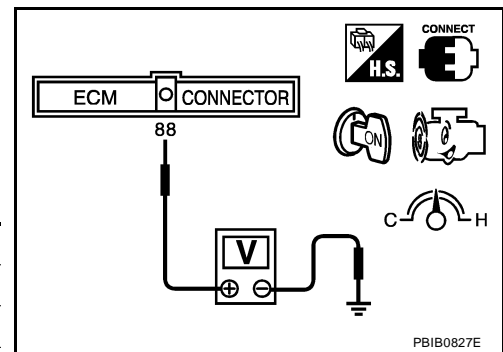
UBS002UZ

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 (TCS switch "OFF") and warm it up to normal operating temperature.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM terminals 88 (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
Steering wheel	Fully turned
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than "P", "N" or "R"



8. Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
9. If NG, go to [EC-303, "Diagnostic Procedure"](#).

Diagnostic Procedure

1. CHECK EVAP CANISTER

1. Turn ignition switch "OFF".
2. Check EVAP canister for cracks.

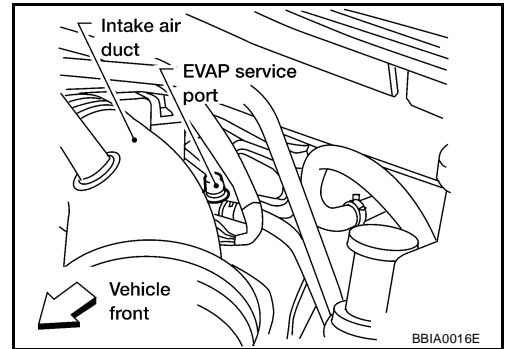
OK or NG

- OK (With CONSULT-II)>>GO TO 2.
- OK (Without CONSULT-II)>>GO TO 3.
- NG >> Replace EVAP canister.

2. CHECK PURGE FLOW

Ⓜ With CONSULT-II

1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.
2. Start engine and let it idle.



3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
4. Rev engine up to 2,000 rpm.
5. Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

PURG VOL CONT/V	Vacuum
100.0%	Should exist.
0.0%	Should not exist.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

3. CHECK PURGE FLOW

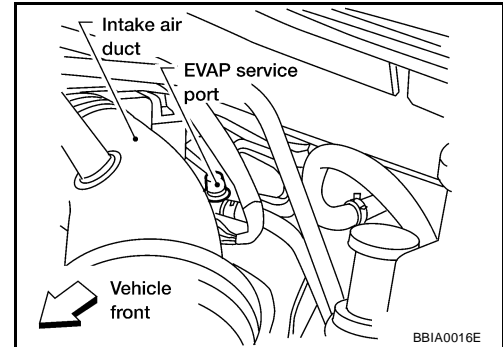
Without CONSULT-II

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.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum gauge indication when revving engine up to 2,000 rpm.

Vacuum should exist.

6. Release the accelerator pedal fully and let idle.

Vacuum should not exist.



OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.

4. CHECK EVAP PURGE LINE

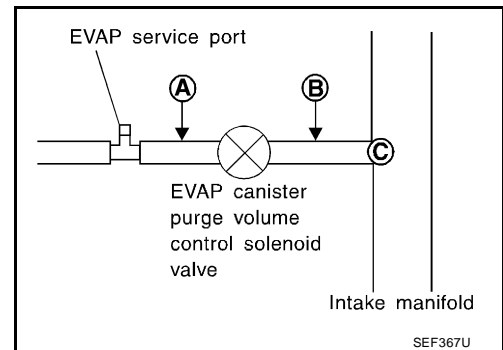
1. Turn ignition switch "OFF".
2. Check EVAP purge line for improper connection or disconnection. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK (With CONSULT-II)>>GO TO 5.
- OK (Without CONSULT-II)>>GO TO 6.
- NG >> Repair it.

5. CHECK EVAP PURGE HOSE AND PURGE PORT

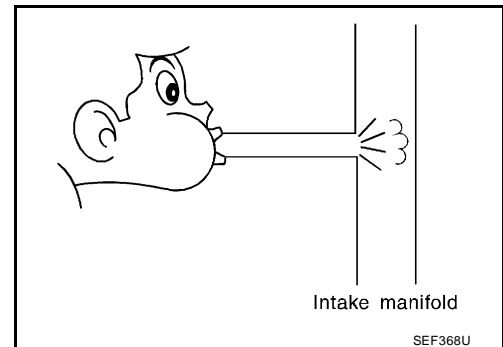
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



3. Check that air flows freely.

OK or NG

- OK >> GO TO 6.
- NG >> Repair or clean hoses and/or purge port.



6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

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

OK or NG

- OK >> GO TO 8.
NG >> Replace EVAP canister purge volume control solenoid valve.

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

1. Turn ignition switch "OFF".
2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 9.
NG >> Repair it.

9. 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 10.
NG >> Replace EVAP control system pressure sensor.

10. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to "DTC Confirmation Procedure" for DTC P0452 ([EC-328](#)) and P0453 ([EC-334](#)).

OK or NG

- OK >> GO TO 11.
NG >> Replace EVAP control system pressure sensor.

11. 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 12.
NG >> Clean the rubber tube using an air blower.

12. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-326, "Component Inspection"](#) .

OK or NG

OK >> GO TO 13.

NG >> Replace EVAP canister vent control valve.

13. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

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-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0442 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

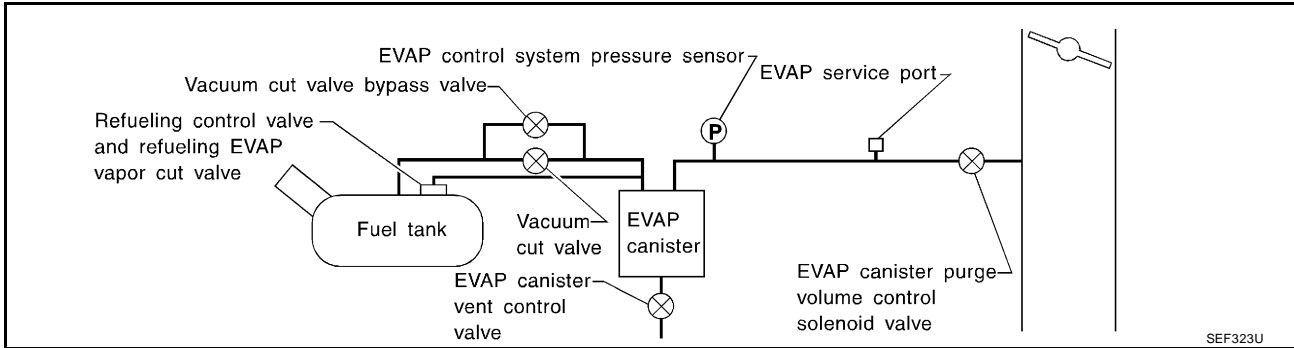
NOTE:

If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-491.)

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions.

The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



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 ● Blocked or bent rubber tube to EVAP control system pressure sensor ● Loose or disconnected rubber tube ● EVAP canister vent control valve and the circuit ● EVAP canister purge volume control solenoid valve and the circuit ● Fuel tank temperature sensor ● O-ring of EVAP canister vent control valve is missing or damaged ● Water separator ● EVAP canister is saturated with water ● EVAP control system pressure sensor ● Fuel level sensor and the circuit ● Refueling control valve ● ORVR system leaks

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

UBS002V2

NOTE:

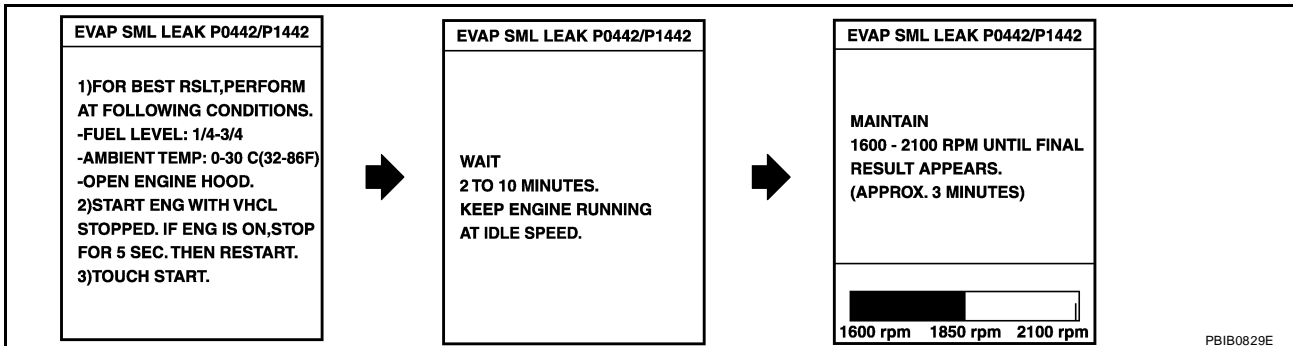
- If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See [EC-491](#).)
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
4. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 30°C (32 - 86°F)
5. Select “EVAP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
 Follow the instruction displayed.



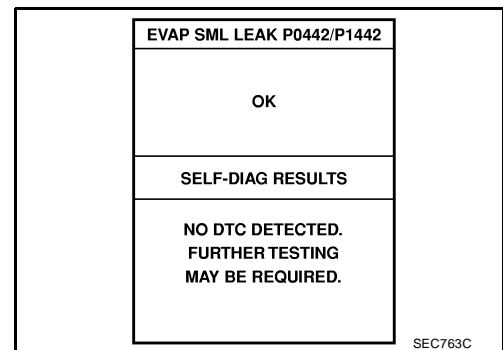
NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-84, "Basic Inspection"](#).

6. Make sure that “OK” is displayed.
 If “NG” is displayed, refer to [EC-309, "Diagnostic Procedure"](#).

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.



WITH GST

NOTE:

Be sure to read the explanation of “Driving Pattern” on [EC-64](#) before driving vehicle.

1. Start engine.

2. Drive vehicle according to “Driving Pattern”, [EC-64](#) .
3. Stop vehicle.
4. Select “MODE 1” with GST.
If SRT of EVAP system is not set yet, go to the following step.
If SRT of EVAP system is set, the result will be OK.
5. Turn ignition switch “OFF” and wait at least 10 seconds.
6. Start engine.
It is not necessary to cool engine down before driving.
7. Drive vehicle again according to the “Driving Pattern”, [EC-64](#) .
8. Stop vehicle.
9. Select “MODE 3” with GST.
If P0442 is displayed on the screen, go to [EC-309, "Diagnostic Procedure"](#) .
If P0441 is displayed on the screen, go to “Diagnostic Procedure” for DTC P0441, [EC-303](#) .
If P0441 and P0442 are not displayed on the screen, go to the following step.
10. Select “MODE 1” with GST.
If SRT of EVAP system is set, the result will be OK.
If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

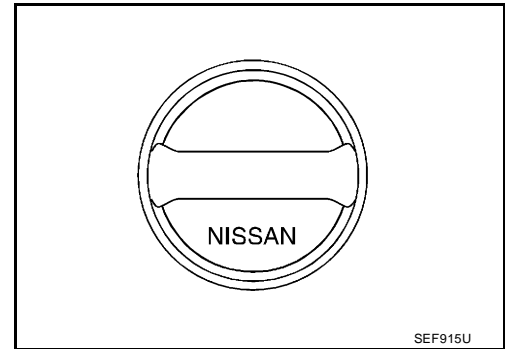
UBS002V3

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 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-617, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FULLER CAP\)"](#) .

OK or NG

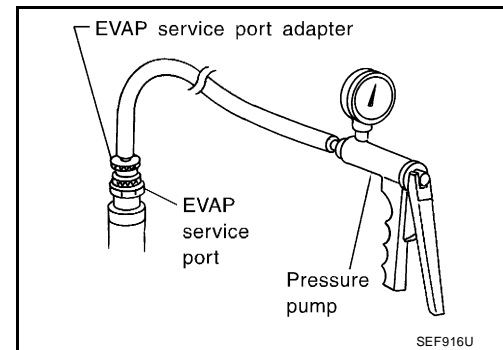
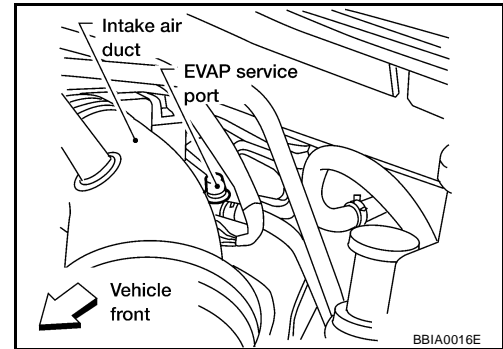
- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



Models with CONSULT-II >> GO TO 6.
 Models without CONSULT-II >> GO TO 7.

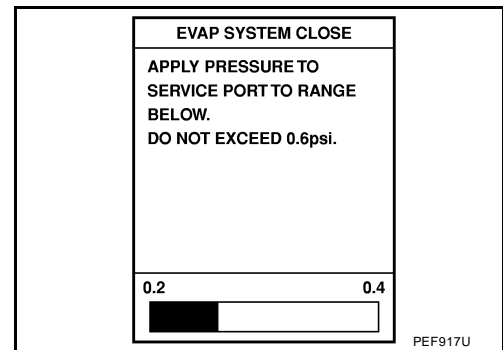
6. CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

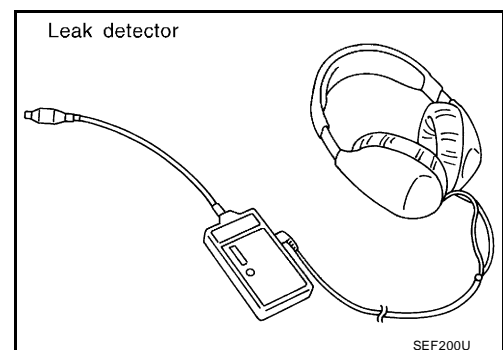
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#)

OK or NG

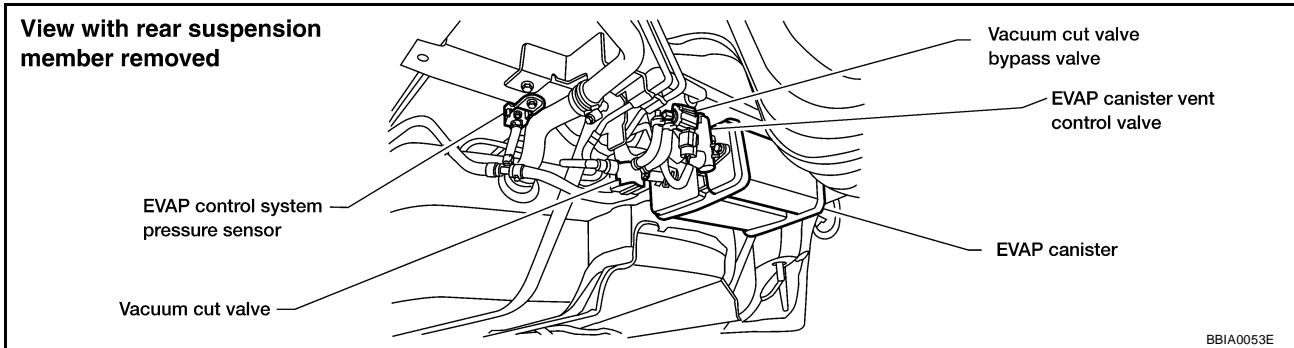
- OK >> GO TO 8.
- NG >> Repair or replace.



7. CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

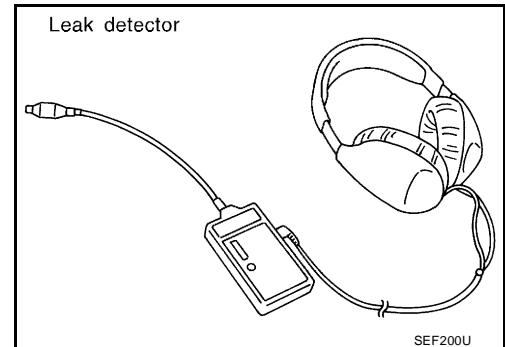
NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace.



8. CHECK WATER SEPARATOR

Refer to [EC-314, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace water separator.

9. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

Refer to [EC-491, "DTC Confirmation Procedure"](#) .

OK or NG

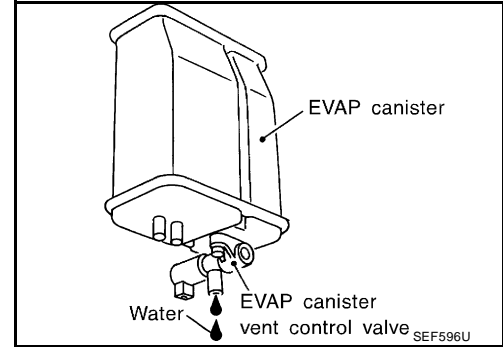
- OK >> GO TO 10.
- NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 11.
- No (With CONSULT-II)>>GO TO 13.
- No (Without CONSULT-II)>>GO TO 14.



11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

The weight should be less than 1.8 kg (4.0 lb).

OK or NG

- OK (With CONSULT-II)>>GO TO 13.
- OK (Without CONSULT-II)>>GO TO 14.
- NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓟ With CONSULT-II

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-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**⊗ Without CONSULT-II**

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-29, "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-320, "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
 NG >> Replace EVAP canister purge volume control solenoid valve.

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-233, "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-333, "Component Inspection"](#).

OK or NG

- OK >> GO TO 19.
 NG >> Replace EVAP control system pressure sensor.

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-615, "EVAPORATIVE EMISSION LINE DRAWING"](#).

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 REFUELING EVAP VAPOR LINE

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-620, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#)

OK or NG

- OK >> GO TO 22.
- NG >> Repair or replace hoses and tubes.

22. CHECK SIGNAL LINE AND RECIRCULATION LINE

Check signal line and 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 CONTROL VALVE

Refer to [EC-623, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 24.
- NG >> Replace refueling control valve with fuel tank.

24. CHECK FUEL LEVEL SENSOR

Refer to [DI-21, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 25.
- NG >> Replace fuel level sensor unit.

25. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

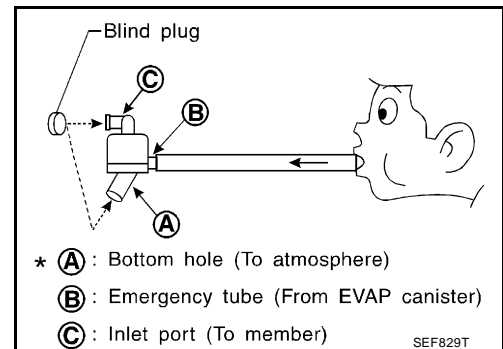
Component Inspection WATER SEPARATOR

UBS002V4

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

NOTE:

Do not disassemble water separator.



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

Description SYSTEM DESCRIPTION

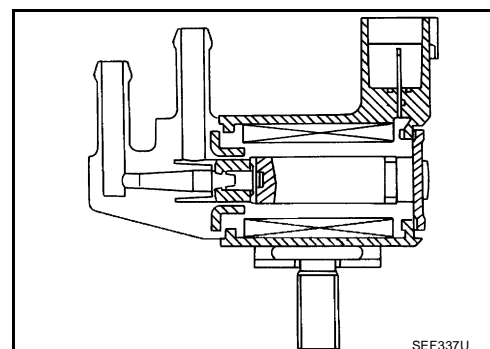
UBS002V5

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Closed throttle position		
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Vehicle speed sensor	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

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-II Reference Value in Data Monitor Mode

UBS002V6

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 ● Air conditioner switch: OFF ● No-load 	Idle	0%
		2,000 rpm	20 - 30%

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

On Board Diagnosis Logic

UBS002V7

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 (The sensor 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 (The sensor circuit is shorted.) ● EVAP canister purge volume control solenoid valve

DTC Confirmation Procedure

UBS002V8

NOTE:

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

TESTING CONDITION:

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

④ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 13 seconds.
4. If 1st trip DTC is detected, go to [EC-318, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

④ WITH GST

Follow the procedure "WITH CONSULT-II" above.

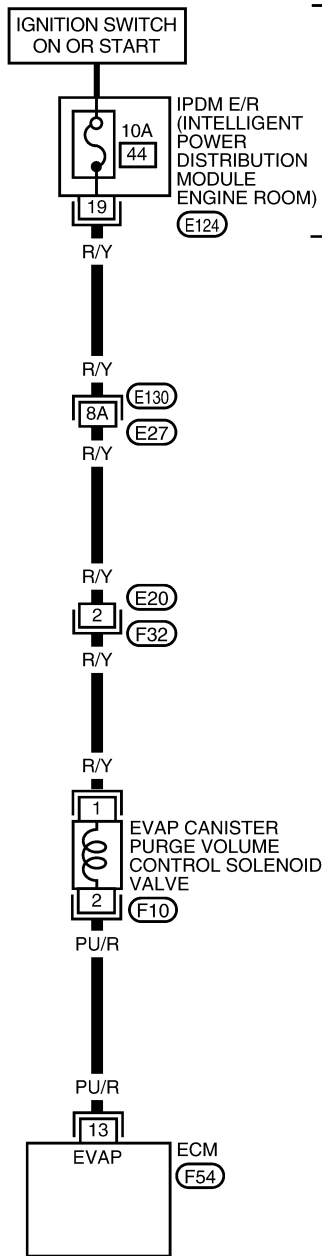
DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

Wiring Diagram

UBS002V9

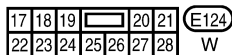
EC-PGC/V-01



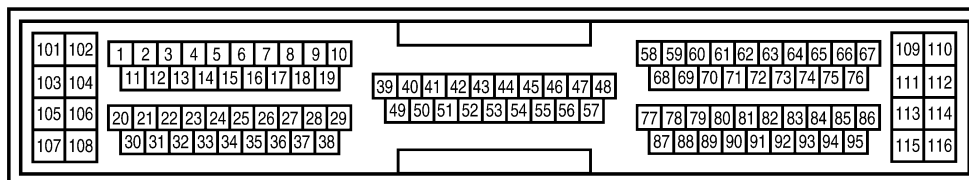
— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".

A
 EC
 C
 D
 E
 F
 G
 H
 I
 J
 K
 L
 M



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



WBWA0001E

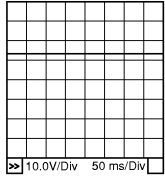
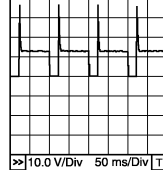
Specification data are reference values and are measured between each terminal and ground.

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	PU/R	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">PBIB0050E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine) 	<p>Approximately 10V★</p>  <p style="text-align: right; font-size: small;">PBIB0520E</p>

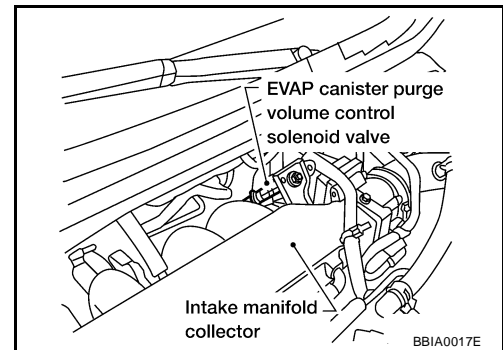
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS002 VA

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 harness connector.
3. Turn ignition switch "ON".

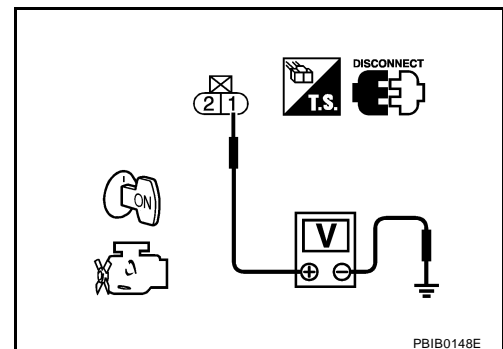


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- IPDM E/R connector E124
- 10A fuse
- Harness for open or short between EVAP canister purge volume control solenoid valve and fuse

>> Repair 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 13 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-II)>>GO TO 4.

OK (Without CONSULT-II)>>GO TO 5.

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

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

 **With CONSULT-II**

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0569E

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

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

OK or NG

OK >> GO TO 6.

NG >> Replace EVAP canister purge volume control solenoid valve.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

UBS002VB

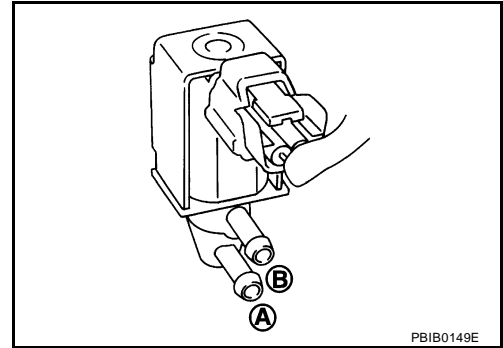
Component Inspection

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

④ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

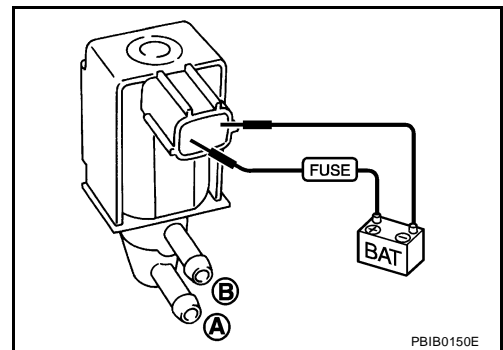
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100.0%	Yes
0.0%	No



⊗ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



Removal and Installation

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS002VC

Refer to [EM-16, "INTAKE MANIFOLD"](#) .

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR]

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

PFPP:14935

Component Description

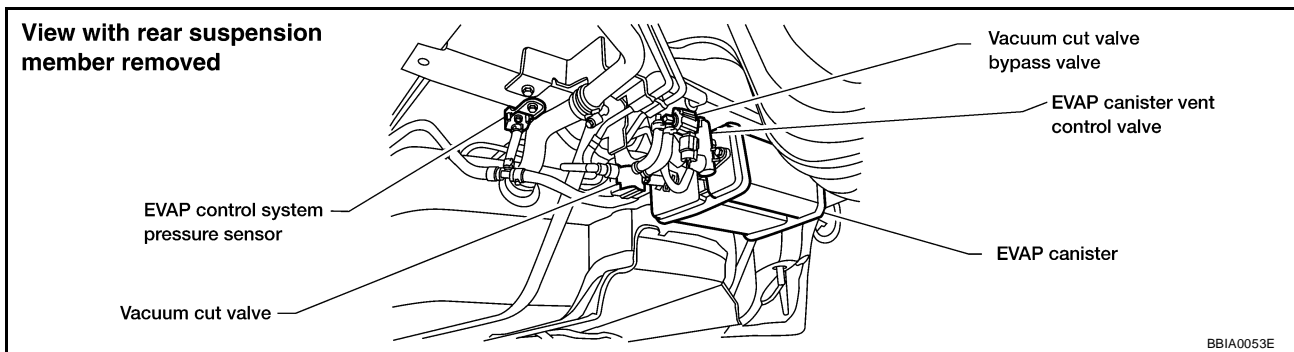
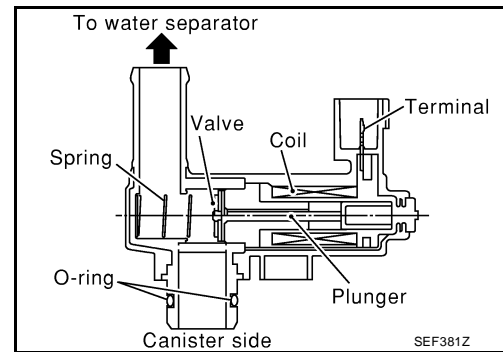
UBS002VD

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

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

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

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



CONSULT-II Reference Value in Data Monitor Mode

UBS002VE

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS002VF

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 (The valve circuit is open or shorted.) ● EVAP canister vent control valve

DTC Confirmation Procedure

UBS002VG

NOTE:

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

TESTING CONDITION:

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

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 8 seconds.
4. If 1st trip DTC is detected, go to [EC-324, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



WITH GST

Follow the procedure "WITH CONSULT-II" above.

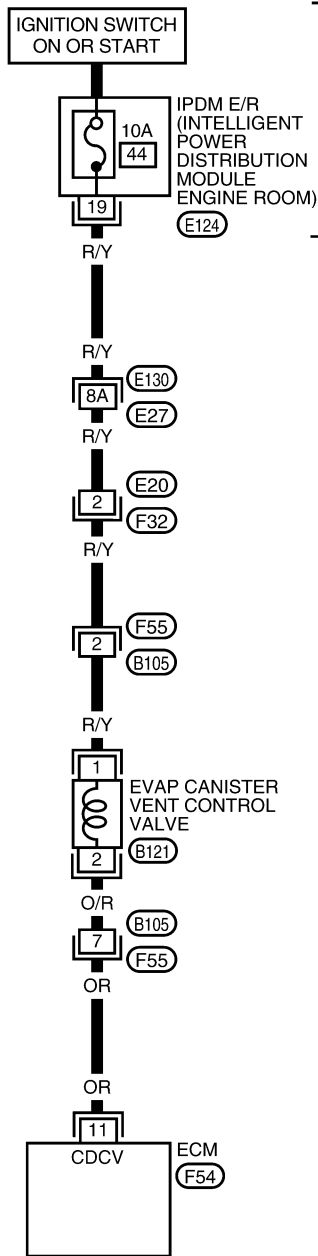
DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR]

Wiring Diagram

UBS002VH

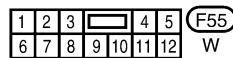
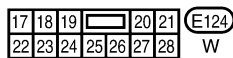
EC-VENT/V-01



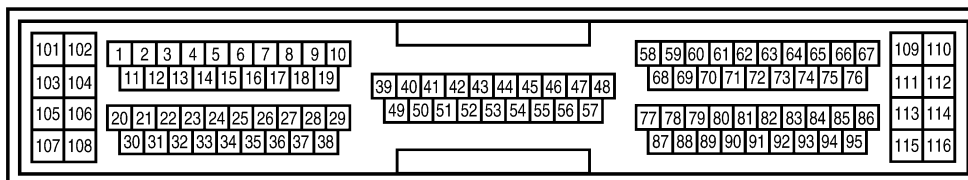
— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".

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REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0020E

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

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	OR	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS002VI

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

Ⓟ With CONSULT-II

1. Turn ignition switch "OFF" and then turn "ON".
2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.
3. Touch "ON/OFF" on CONSULT-II screen.
4. Check for operating sound of the valve.
Clicking noise should be heard.

OK or NG

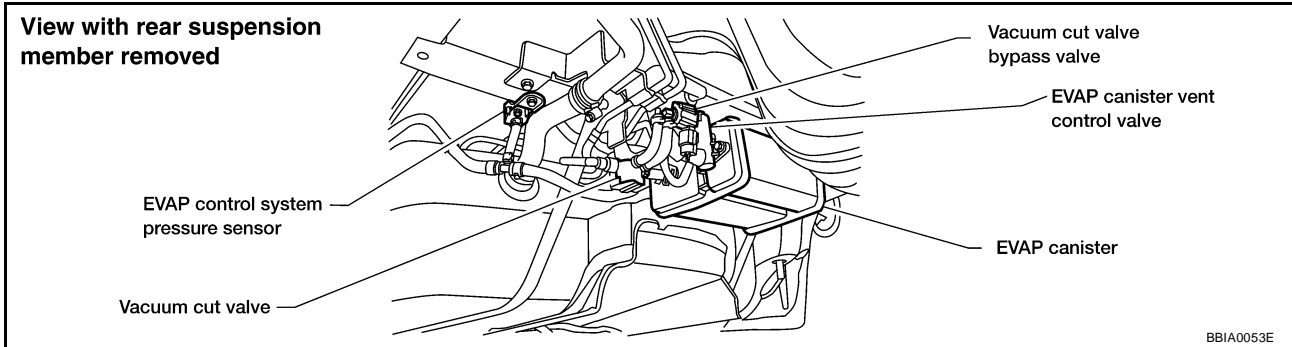
- OK >> GO TO 7.
- NG >> GO TO 3.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V

PBIB0834E

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister vent control valve harness connector.

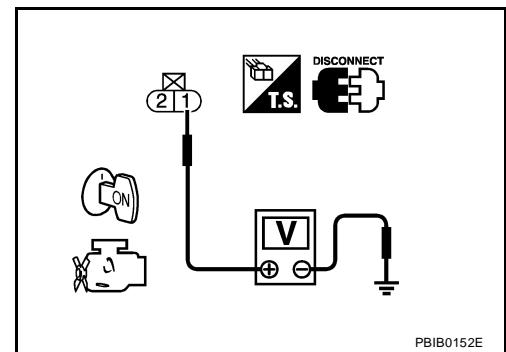


3. Turn ignition switch "ON".
4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- Harness connectors F32, E20
- Harness connectors E27, E130
- IPDM E/R harness connector E124
- 10A fuse
- Harness for open or short between EVAP canister vent control valve and fuse

>> Repair 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 11 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 B105, F55
- 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 EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-326, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP canister vent control valve.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

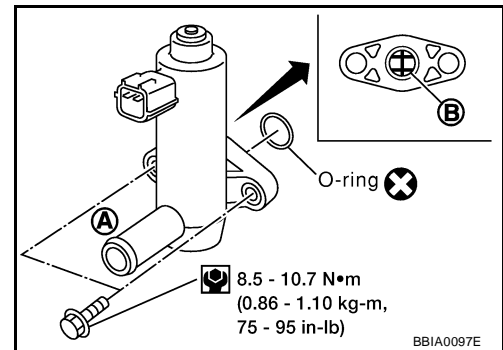
>> INSPECTION END

Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS002VJ

With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
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.

Condition	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.
Make sure new O-ring is installed properly.
 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.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V

PBIB0834E

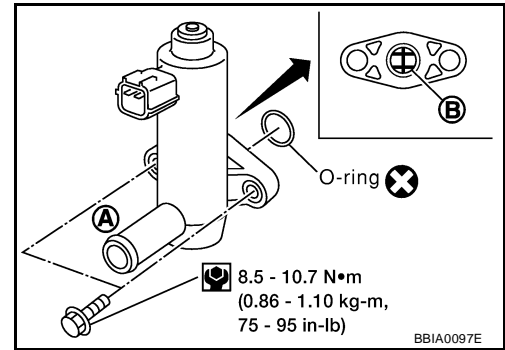
DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR]

8. Perform inspection again.

⊗ **Without CONSULT-II**

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

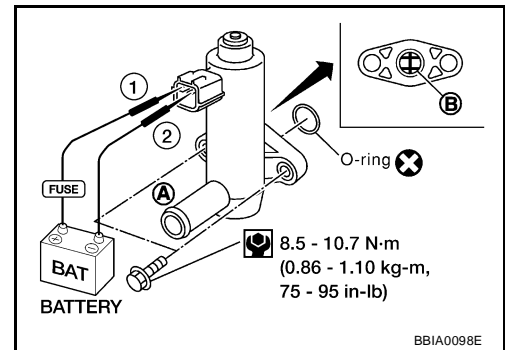


3. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.
Make sure new O-ring is installed properly.
 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 inspection again.



DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR]

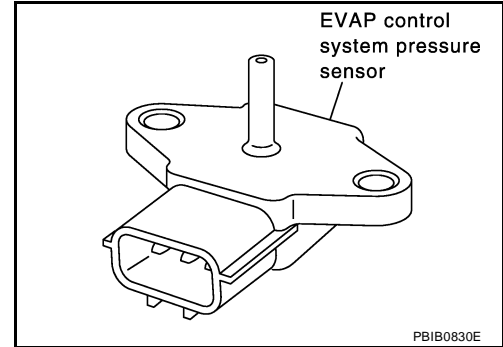
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

PFP:25085

Component Description

UBS002VK

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

UBS002VL

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 3.4V

On Board Diagnosis Logic

UBS002VM

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 (The sensor circuit is open or shorted.) ● EVAP control system pressure sensor

DTC Confirmation Procedure

UBS002VN

NOTE:

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

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
If 1st trip DTC is detected, go to [EC-331, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

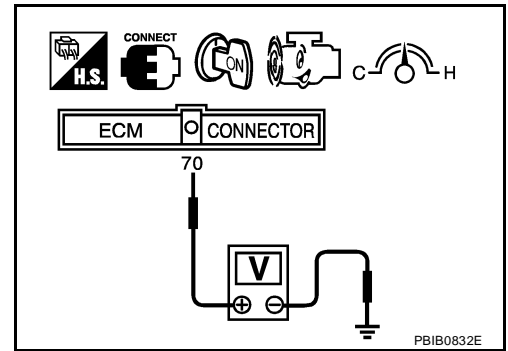
WITH GST

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

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR]

2. Check that voltage between ECM terminal 70 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select "MODE 7" with GST.
If 1st trip DTC is detected, go to [EC-331, "Diagnostic Procedure"](#)



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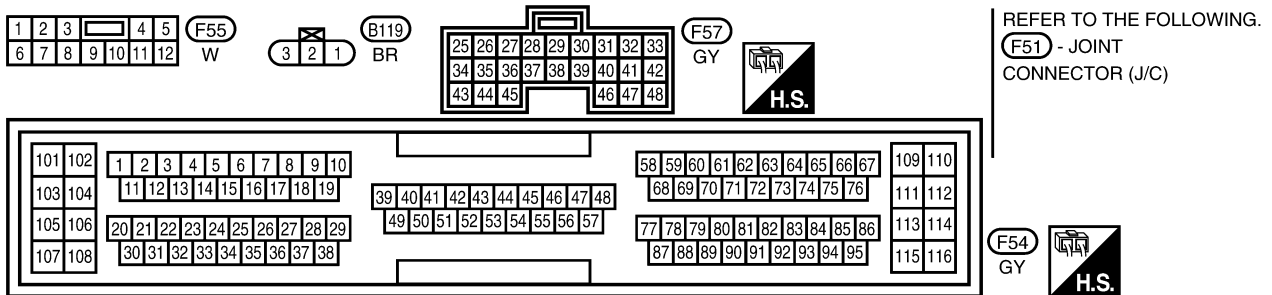
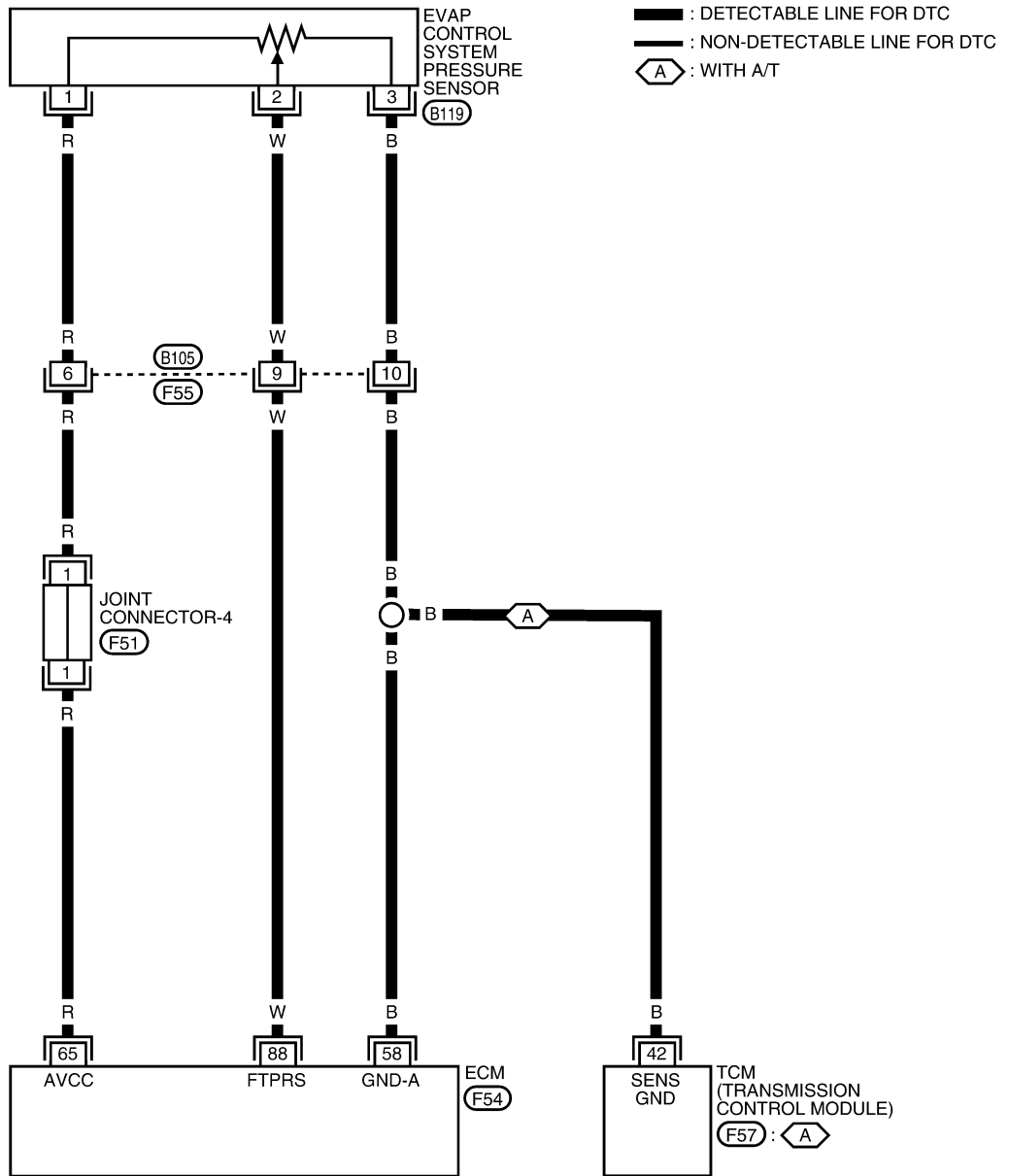
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR]

Wiring Diagram

UBS002V0

EC-PRE/SE-01



BBWA0021E

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

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR]

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
88	W	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 1.8 - 4.8V

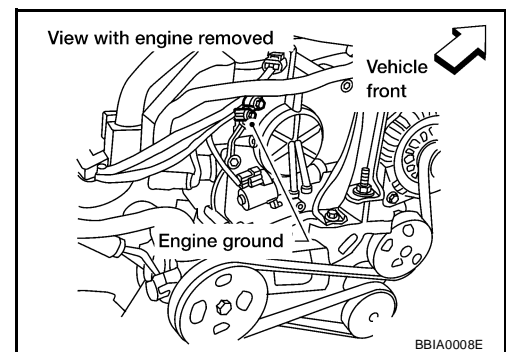
Diagnostic Procedure

UBS002VP

1. RETIGHTEN GROUND SCREWS

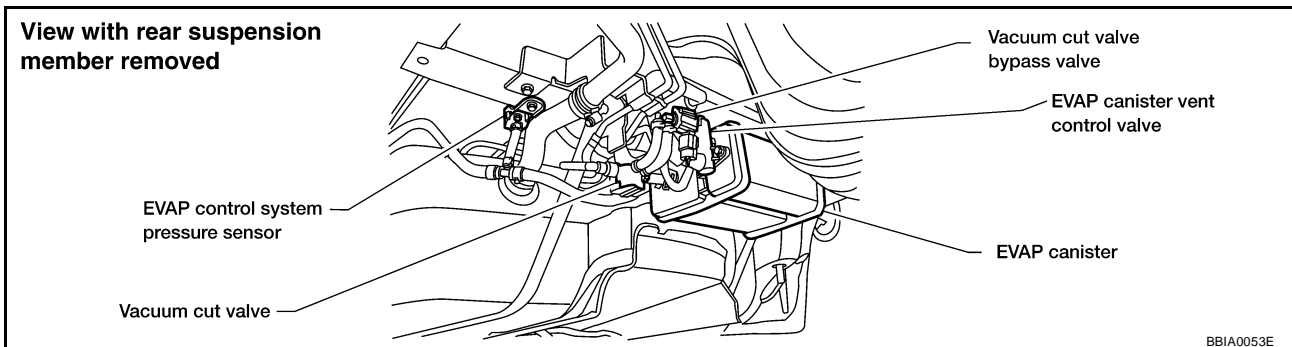
Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace harness connector.

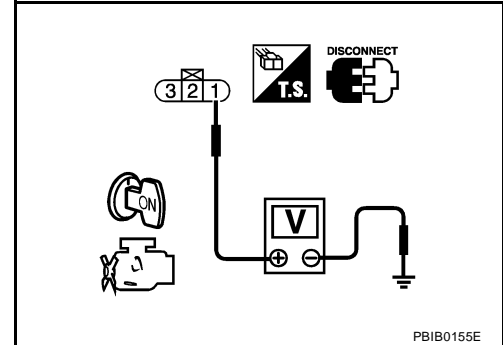
3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

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



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- Joint connector-4
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. 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 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- Harness for open or short between EVAP control system pressure sensor and ECM
- Harness for open or short between EVAP control system pressure sensor and TCM

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

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 88 and EVAP control system pressure 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 9.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- 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.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-333, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection EVAP CONTROL SYSTEM PRESSURE SENSOR

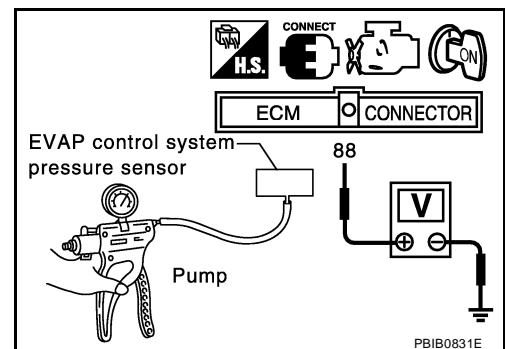
UBS002VQ

1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove hose from EVAP control system pressure sensor.
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 88 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
 - Do not apply vacuum below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).
5. If NG, replace EVAP control system pressure sensor.



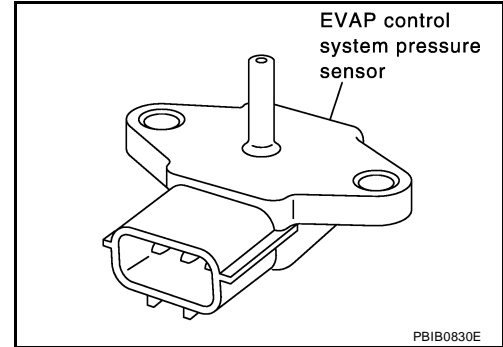
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

PFP:25085

Component Description

UBS002VR

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

UBS002VS

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

On Board Diagnosis Logic

UBS002VT

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 (The sensor circuit is open or shorted.) ● EVAP control system pressure sensor ● EVAP canister vent control valve ● EVAP canister ● Water separator ● Rubber hose from EVAP canister vent control valve to water separator

DTC Confirmation Procedure

UBS002VU

NOTE:

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

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Turn ignition switch “ON”.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. Make sure that “FUEL T/TEMP SE” is more than 0°C (32°F).
6. Wait at least 10 seconds.
7. If 1st trip DTC is detected, go to [EC-337, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

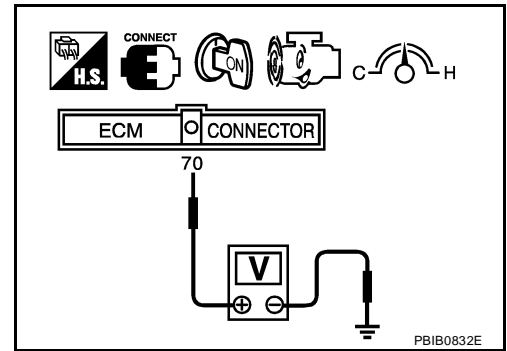
WITH GST

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

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR]

2. Check that voltage between ECM terminal (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Wait at least 10 seconds.
5. Select "MODE 7" with GST.
6. If 1st trip DTC is detected, go to [EC-337, "Diagnostic Procedure"](#)



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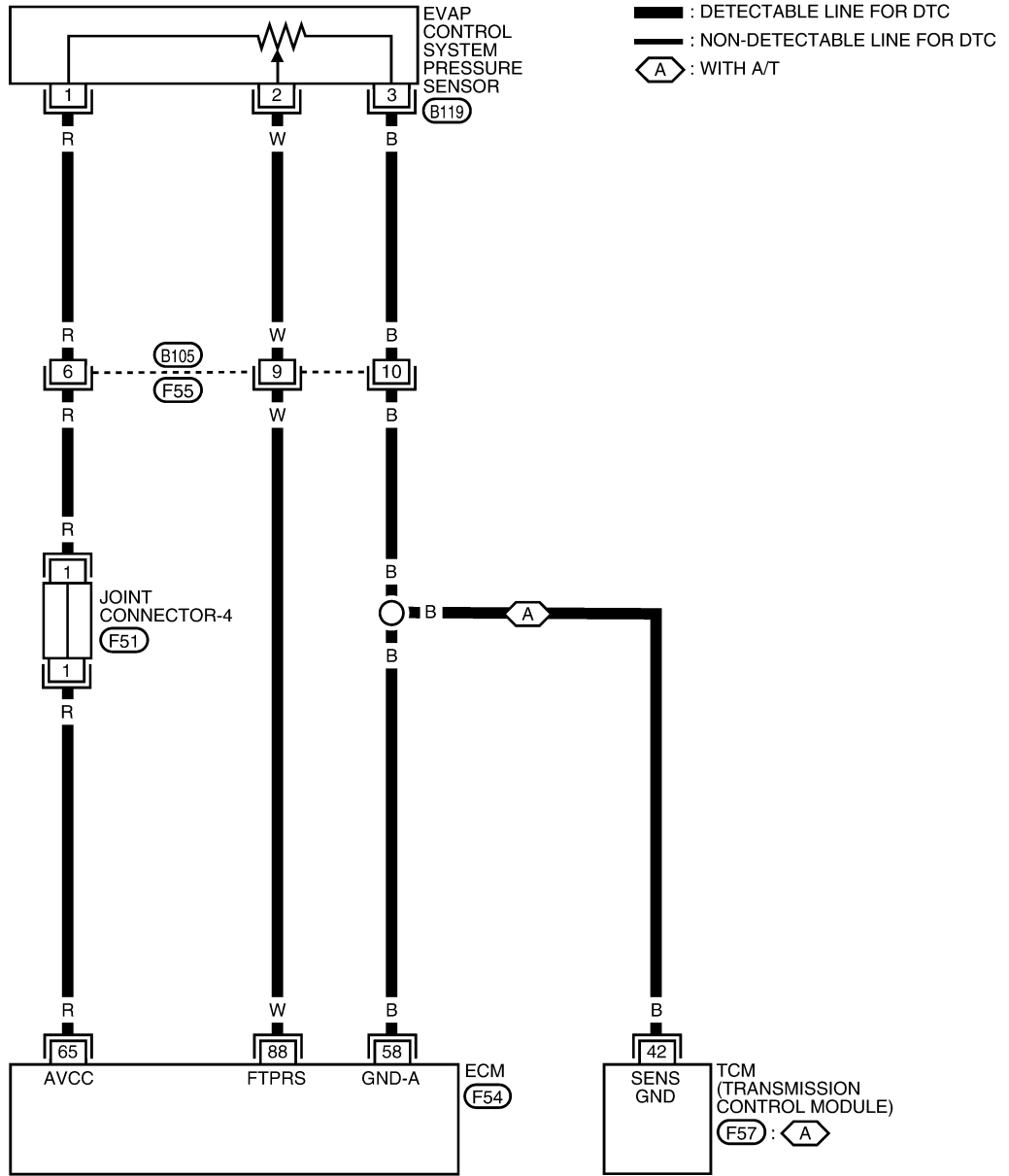
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR]

Wiring Diagram

UBS002VV

EC-PRE/SE-01



1	2	3	4	5
6	7	8	9	10

F55 W

3	2	1
---	---	---

B119 BR

25	26	27	28	29	30	31	32	33
34	35	36	37	38	39	40	41	42
43	44	45		46	47	48		

F57 GY

REFER TO THE FOLLOWING.

F51 - JOINT CONNECTOR (J/C)

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

F54 GY

H.S.

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

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR]

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
88	W	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 1.8 - 4.8V

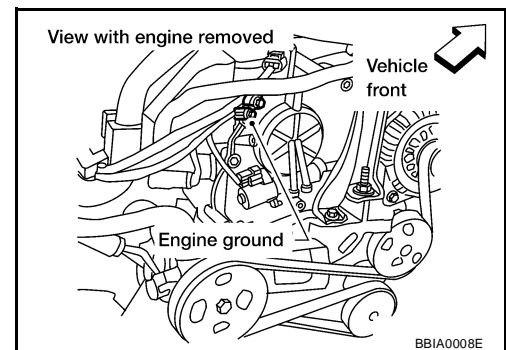
Diagnostic Procedure

UBS002VW

1. RETIGHTEN GROUND SCREWS

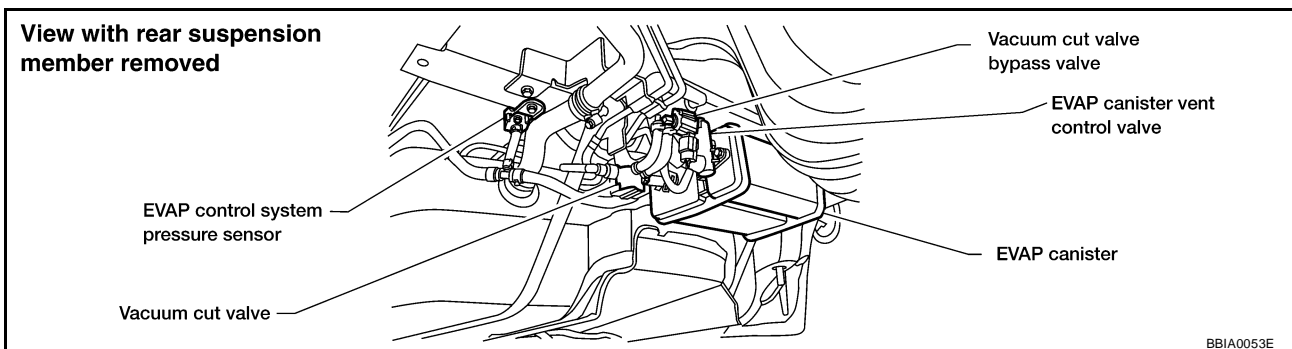
Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace harness connector.

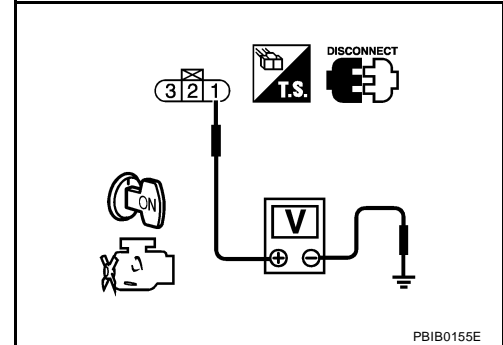
3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II 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 B105, F55
- Joint connector-4
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. 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 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- Harness for open or short between EVAP control system pressure sensor and ECM
- Harness for open or short between EVAP control system pressure sensor and TCM

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

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 88 and EVAP control system pressure 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 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- 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.

9. 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 10.
NG >> Clean the rubber tube using an air blower.

10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-326, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> Replace EVAP canister vent control valve.

11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-340, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.
NG >> Replace EVAP control system pressure sensor.

12. CHECK RUBBER TUBE

Check obstructed rubber tube connected to EVAP canister vent control valve.

OK or NG

- OK >> GO TO 13.
NG >> Clean rubber tube using an air blower, repair or replace rubber tube.

13. CHECK WATER SEPARATOR

Refer to [EC-314, "Component Inspection"](#) .

OK or NG

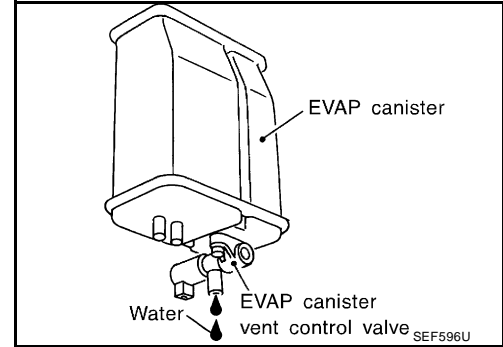
- OK >> GO TO 14.
NG >> Replace water separator.

14. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 15.
- No >> GO TO 17.



15. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

The weight should be less than 1.8 kg (4.0 lb).

OK or NG

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

16. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

17. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection EVAP CONTROL SYSTEM PRESSURE SENSOR

UBS002VX

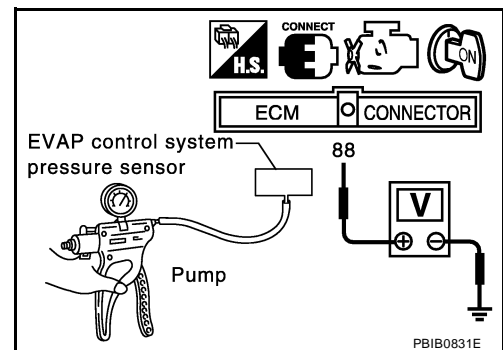
1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove hose from EVAP control system pressure sensor.
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 88 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply vacuum below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).

5. If NG, replace EVAP control system pressure sensor.



DTC P0455 EVAP CONTROL SYSTEM

PFP:14950

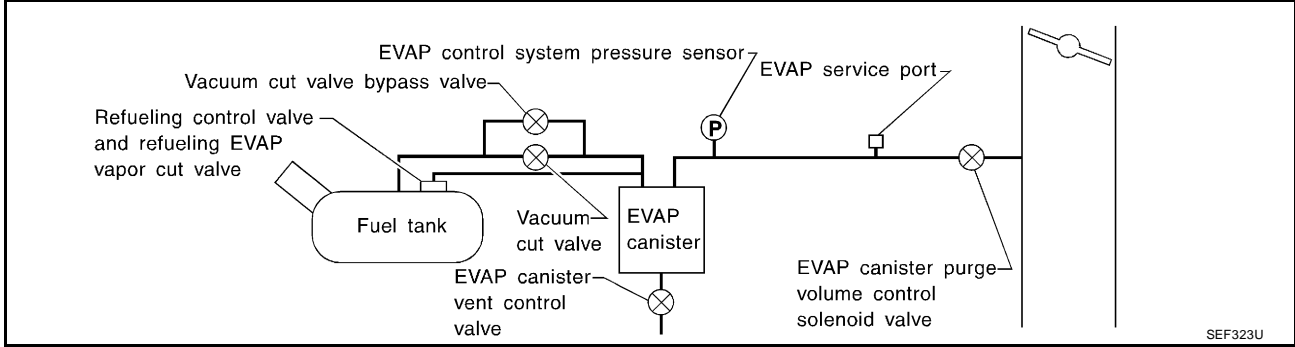
On Board Diagnosis Logic

UBS002VY

NOTE:

If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (EC-491.)

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	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. Blocked or bent rubber tube to EVAP control system pressure sensor Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor O-ring of EVAP canister vent control valve is missing or damaged. EVAP control system pressure sensor Refueling control 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

UBS002VZ

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

DTC P0455 EVAP CONTROL SYSTEM

[QR]

NOTE:

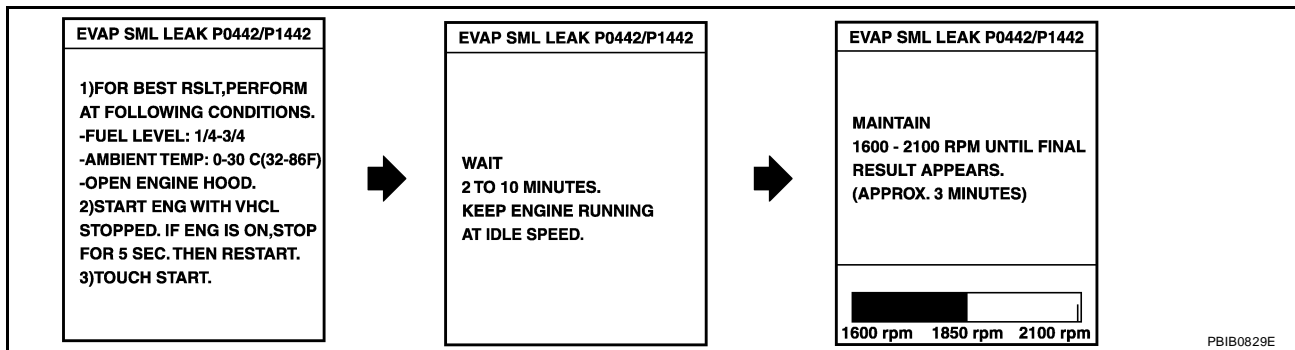
- If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. ([EC-491](#).)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedures.

④ WITH CONSULT-II

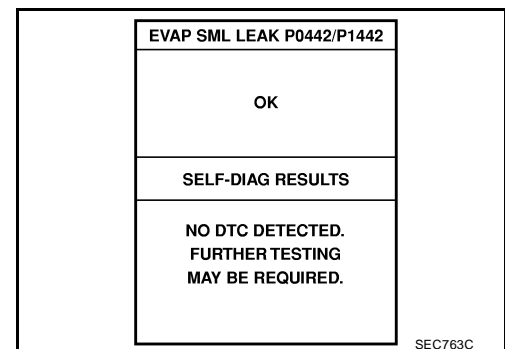
1. Tighten fuel filler cap securely until ratcheting sound is heard.
2. Turn ignition switch “ON”.
3. Turn ignition switch “OFF” and wait at least 10 seconds.
4. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
5. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
6. Select “EVAP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
Follow the instruction displayed.



NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-84, "Basic Inspection"](#).

7. Make sure that “OK” is displayed.
If “NG” is displayed, select “SELF-DIAG RESULTS” mode and make sure that “EVAP GROSS LEAK [P0455]” is displayed. If it is displayed, refer to [EC-343, "Diagnostic Procedure"](#).
If P0442 is displayed, perform “Diagnostic Procedure” for DTC P0442, [EC-309](#).



⑤ WITH GST

NOTE:

Be sure to read the explanation of “Driving Pattern” on [EC-64](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to “Driving Pattern”, [EC-64](#).
3. Stop vehicle.
4. Select “MODE 1” with GST.
 - If SRT of EVAP system is not set yet, go to the following step.

- If SRT of EVAP system is set, the result will be OK.
- 5. Turn ignition switch "OFF" and wait at least 10 seconds.
- 6. Start engine.
It is not necessary to cool engine down before driving.
- 7. Drive vehicle again according to the "Driving Pattern", [EC-64](#) .
- 8. Stop vehicle.
- 9. Select "MODE 3" with GST.
 - If P0455 is displayed on the screen, go to [EC-343, "Diagnostic Procedure"](#) .
 - If P0442 or P1442 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0442, [EC-309](#) .
 - If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, [EC-303](#) .
 - If P0455, P0441, P0442 and P1442 are not displayed on the screen, go to the following step.
- 10. Select "MODE 1" with GST.
 - If SRT of EVAP system is set, the result will be OK.
 - If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

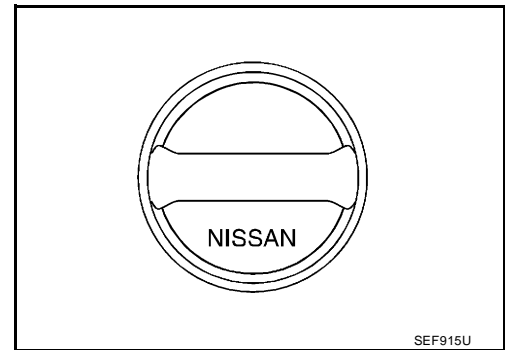
UBS002W0

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 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-617, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FULLER CAP\)"](#) .

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-615, "EVAPORATIVE EMISSION LINE DRAWING"](#).

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 EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

Refer to [EC-491, "DTC Confirmation Procedure"](#).

OK or NG

OK >> GO TO 8.

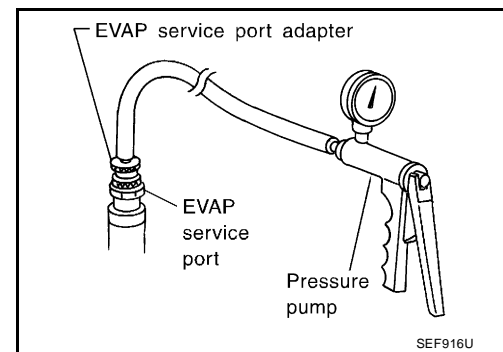
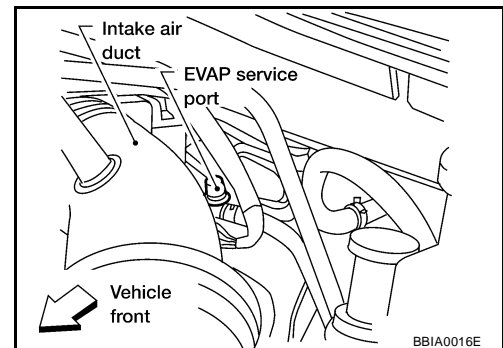
NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

8. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



Models with CONSULT-II >> GO TO 9.

Models without CONSULT-II >> GO TO 10.

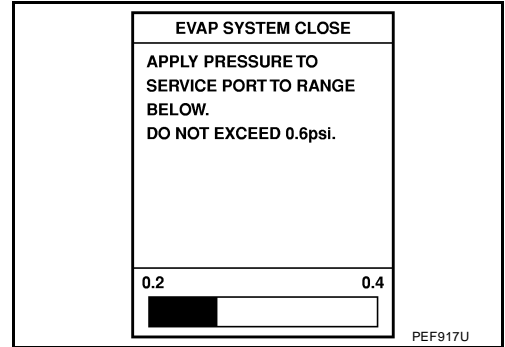
9. CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

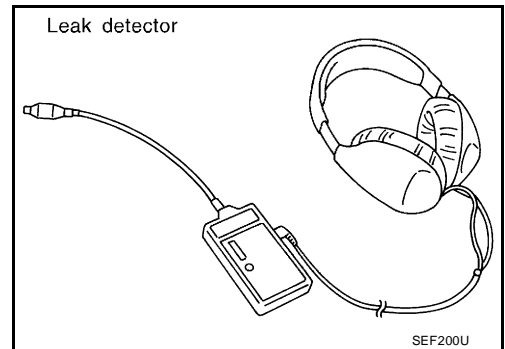
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#)

OK or NG

- OK >> GO TO 11.
- NG >> Repair or replace.

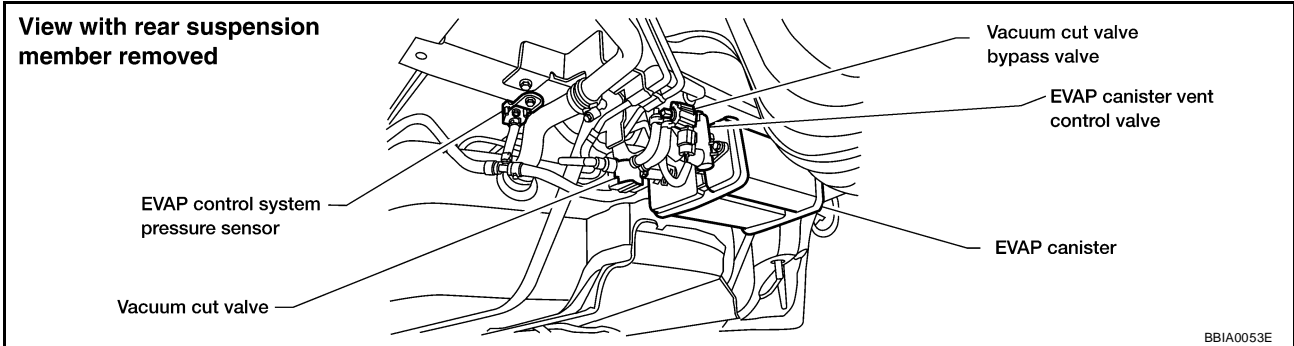


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10. CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

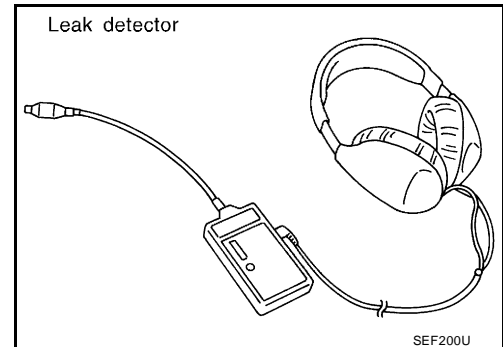
NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK >> GO TO 12.
 NG >> Repair or replace.



11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓟ With CONSULT-II

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-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

- OK >> GO TO 14.
 NG >> GO TO 13.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

⊗ Without CONSULT-II

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 15.
- NG >> GO TO 13.

13. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-29, "Vacuum Hose Drawing"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 14.
- OK (Without CONSULT-II)>>GO TO 15.
- NG >> Repair or reconnect the hose.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓜ With CONSULT-II

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

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

OK or NG

- OK >> GO TO 16.
- NG >> Replace EVAP canister purge volume control solenoid valve.

16. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-233, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.
- NG >> Replace fuel level sensor unit.

17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-333, "Component Inspection"](#) .

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor.

18. CHECK REFUELING EVAP VAPOR LINE

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-620, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#)

OK or NG

OK >> GO TO 19.

NG >> Repair or replace hoses and tubes.

19. CHECK SIGNAL LINE AND RECIRCULATION LINE

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 20.

NG >> Repair or replace hoses, tubes or filler neck tube.

20. CHECK REFUELING CONTROL VALVE

Refer to [EC-623, "Component Inspection"](#) .

OK or NG

OK >> GO TO 21.

NG >> Replace refueling control valve with fuel tank.

21. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

DTC P0456 EVAP CONTROL SYSTEM

PFP:14950

On Board Diagnosis Logic

UBS002W1

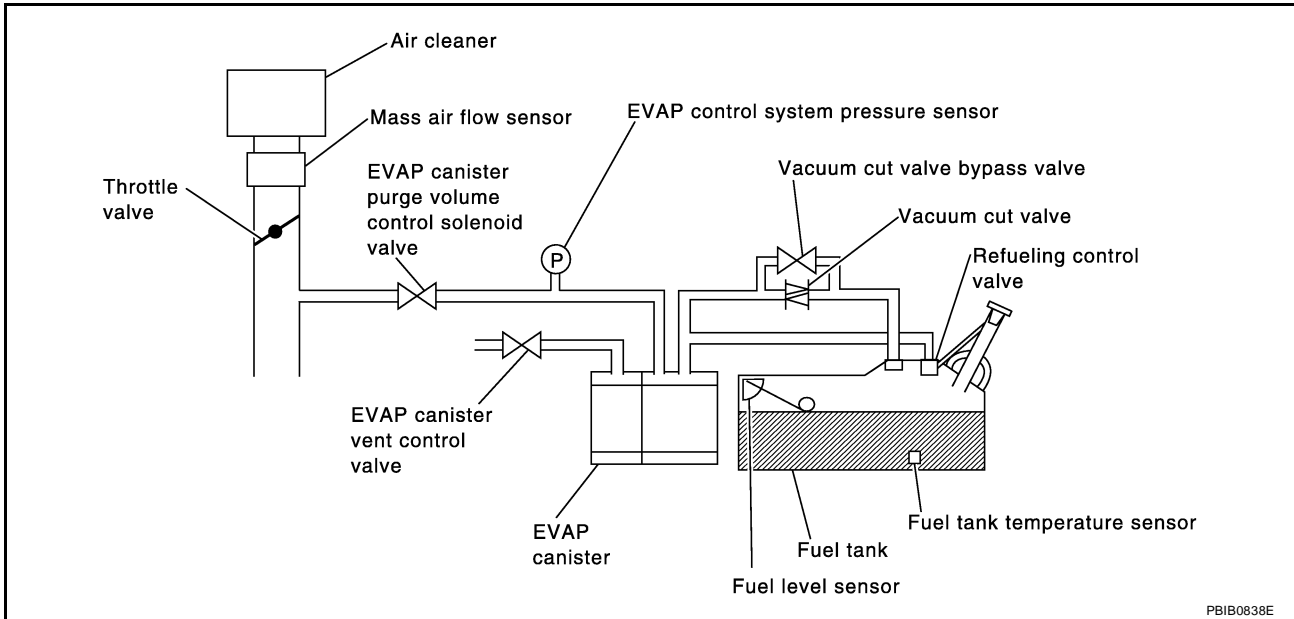
This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum. If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions.

The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.

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.



PBIB0838E

DTC P0456 EVAP CONTROL SYSTEM

[QR]

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 ● Blocked or bent rubber tube to EVAP control system pressure sensor ● Loose or disconnected rubber tube ● EVAP canister vent control valve and the circuit ● EVAP canister purge volume control solenoid valve and the circuit ● Fuel tank temperature sensor ● O-ring of EVAP canister vent control valve is missing or damaged ● Water separator ● EVAP canister is saturated with water ● EVAP control system pressure sensor ● Refueling control 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 Confirmation Procedure

UBS002W2

NOTE:

- If DTC P0456 is displayed with P0442, perform TROUBLE DIAGNOSIS FOR DTC P0456 first.
- 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 11V at idle.

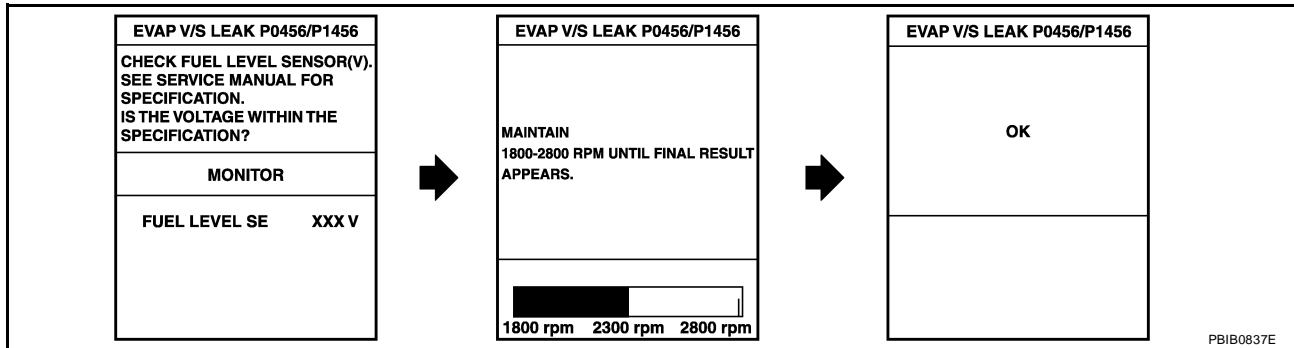
Ⓜ WITH CONSULT-II

1. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
2. Make sure the following conditions are met.

FUEL LEVEL SE: 0.25 - 1.15V
 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-II.
 Follow the instruction displayed.



6. Make sure that "OK" is displayed.
 If "NG" is displayed, refer to [EC-352, "Diagnostic Procedure"](#).

NOTE:

- If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to [EC-84, "Basic Inspection"](#).
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

Overall Function Check

WITH GST

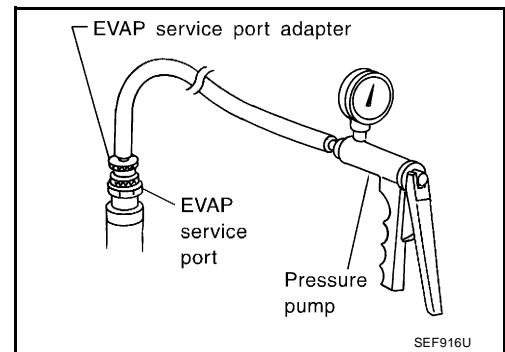
UBS002W3

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. Set the pressure pump and a hose.
3. Also set a vacuum gauge via 3-way connector and a hose.
4. Turn ignition switch "ON".
5. Connect GST and select MODE 8.
6. Using MODE 8 control the EVAP canister vent control valve (close) and vacuum cut valve bypass valve (open).
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-352, "Diagnostic 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.

Diagnostic Procedure

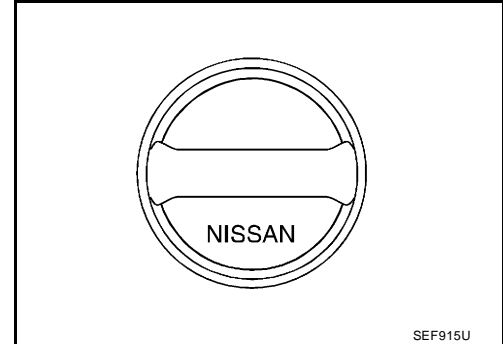
UBS002W4

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.



SEF915U

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-617, "Component Inspection"](#) .

OK or NG

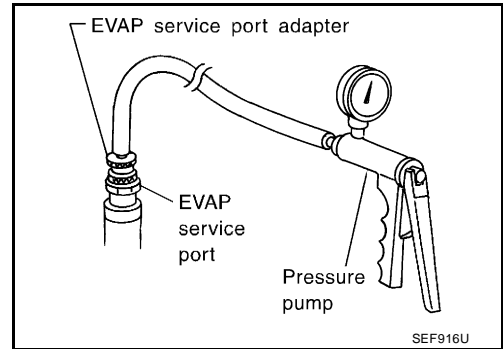
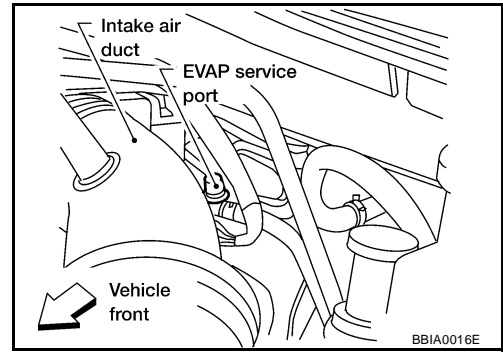
- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



Models with CONSULT-II>>GO TO 6.
Models without CONSULT-II>>GO TO 7.

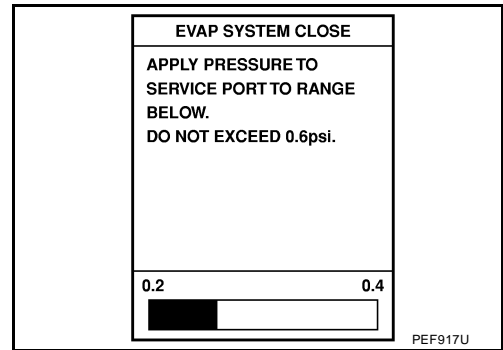
6. CHECK FOR EVAP LEAK

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

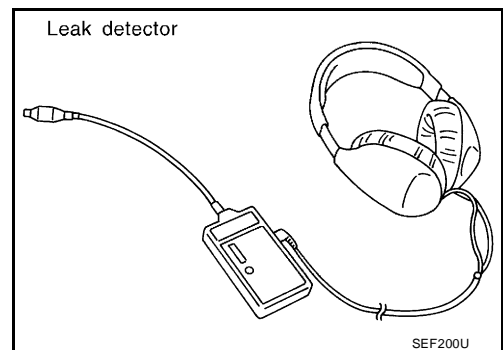
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#)

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace.

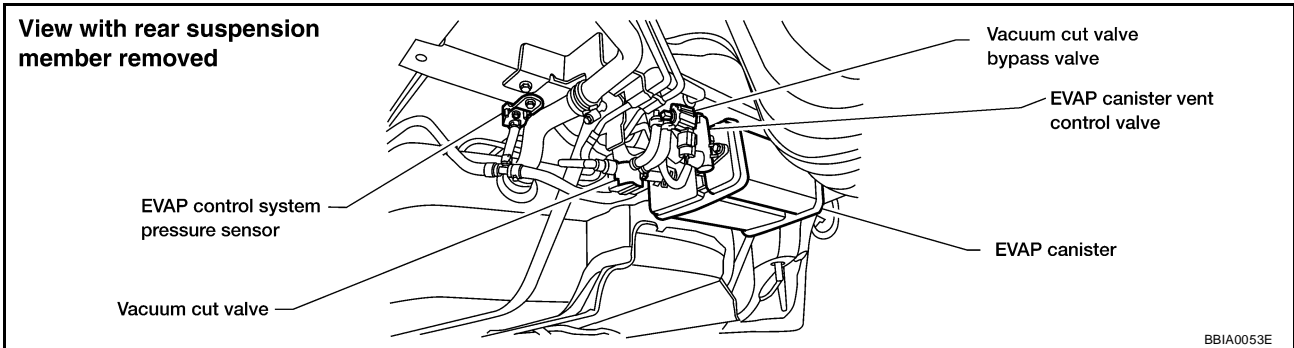


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7. CHECK FOR EVAP LEAK

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

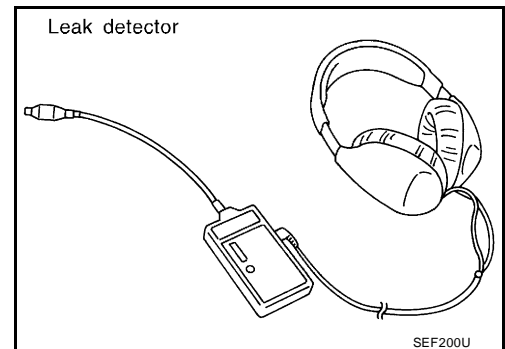
NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 8.
 NG >> Repair or replace.



8. CHECK WATER SEPARATOR

Refer to [EC-314, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
 NG >> Replace water separator.

9. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

Refer to [EC-497, "Component Inspection"](#) .

OK or NG

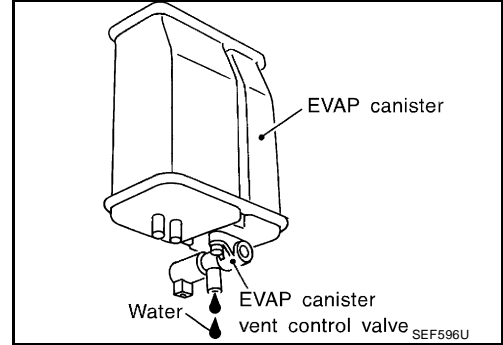
- OK >> GO TO 10.
 NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 11.
- No (With CONSULT-II)>>GO TO 13.
- No (Without CONSULT-II)>>GO TO 14.



11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

The weight should be less than 1.8 kg (4.0 lb).

OK or NG

- OK (With CONSULT-II)>>GO TO 13.
- OK (Without CONSULT-II)>>GO TO 14.
- NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓜ **With CONSULT-II**

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-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

⊗ Without CONSULT-II

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-29, "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-320, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.
NG >> Replace EVAP canister purge volume control solenoid valve.

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-233, "FUEL TANK TEMPERATURE SENSOR"](#) .

OK or NG

- OK >> GO TO 18.
NG >> Replace fuel level sensor unit.

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-333, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 19.
NG >> Replace EVAP control system pressure sensor.

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-615, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

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 REFUELING EVAP VAPOR LINE

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-620, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#)

OK or NG

- OK >> GO TO 22.
- NG >> Repair or replace hoses and tubes.

22. CHECK SIGNAL LINE AND RECIRCULATION LINE

Check signal line and 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 CONTROL VALVE

Refer to [EC-623, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 24.
- NG >> Replace refueling control valve with fuel tank.

24. CHECK FUEL LEVEL SENSOR

Refer to [DI-21, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 25.
- NG >> Replace fuel level sensor unit.

25. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

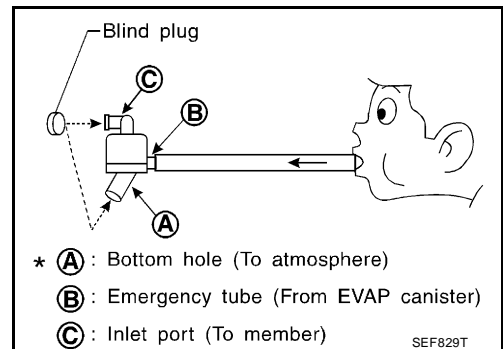
**Component Inspection
WATER SEPARATOR**

UBS002W5

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A** , and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

NOTE:

- Do not disassemble water separator.



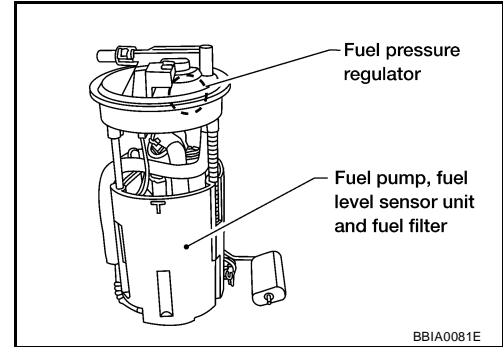
DTC P0460 FUEL LEVEL SENSOR

Component Description

UBS002W6

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

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



On Board Diagnosis Logic

UBS002W7

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 (The sensor circuit is open or shorted) ● Fuel level sensor

DTC Confirmation Procedure

UBS002W8

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and wait maximum of 2 consecutive minutes.
4. If 1st trip DTC is detected, go to [EC-360, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

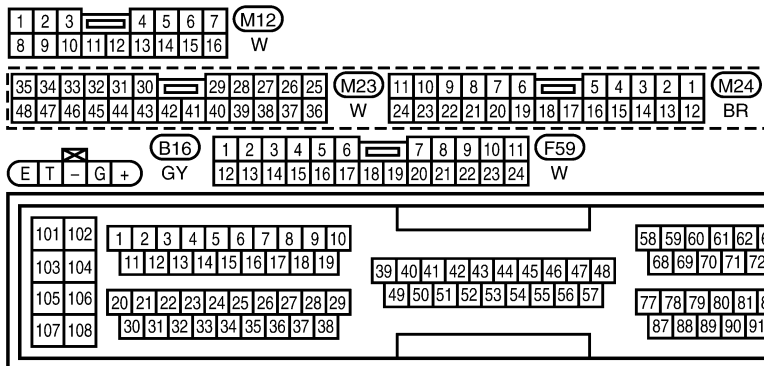
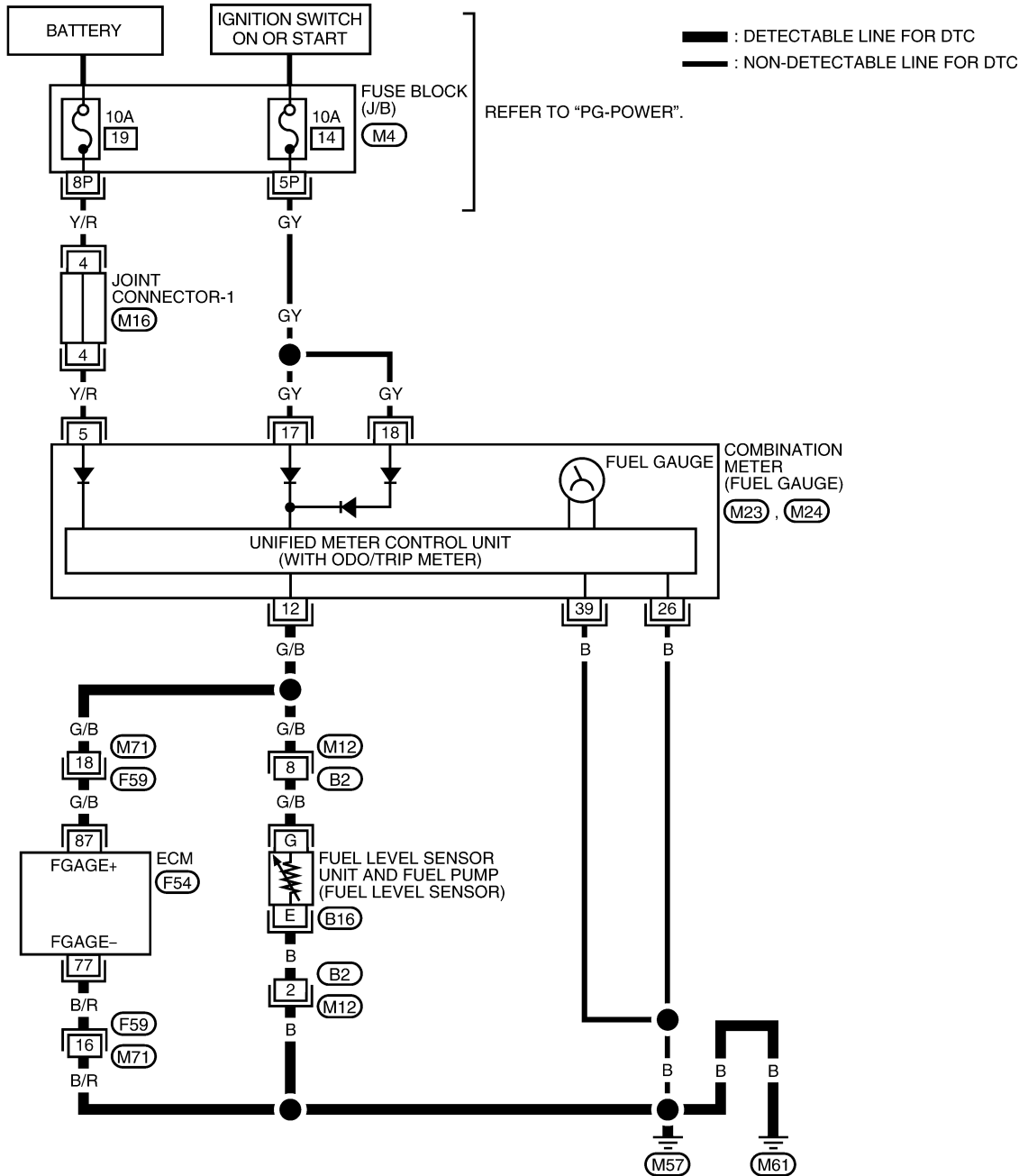
DTC P0460 FUEL LEVEL SENSOR

[QR]

Wiring Diagram

UBS002W9

EC-FLS1-01



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)
- (M16) - JOINT CONNECTOR (J/C)



BBWA0022E

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

DTC P0460 FUEL LEVEL SENSOR

[QR]

CAUTION:

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

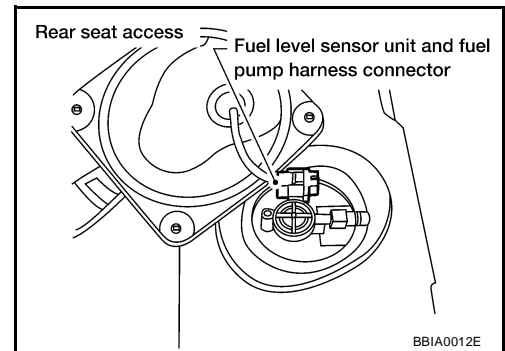
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
77	B/R	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V
87	G/B	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.

Diagnostic Procedure

UBS002WA

1. CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

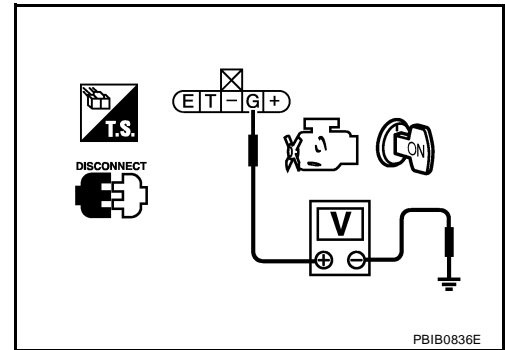


4. Check voltage between fuel level sensor unit and fuel pump terminal **G** and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness for open or short between combination meter and fuel level sensor until and fuel pump

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

3. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal **E** and body ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

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

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness for open or short between fuel level sensor unit and fuel pump and body ground

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

5. CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 87 and fuel level sensor unit and fuel pump terminal **G** , ECM terminal 77 and fuel level sensor unit and fuel pump terminal **E** . Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground or short to power.

OK or NG

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

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness connectors M71, F59
- 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 connectors.

7. CHECK FUEL LEVEL SENSOR

Refer to [DI-21, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace fuel level sensor unit.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

DTC P0460 FUEL LEVEL SENSOR

[QR]

Removal and Installation FUEL LEVEL SENSOR

UBS002WB

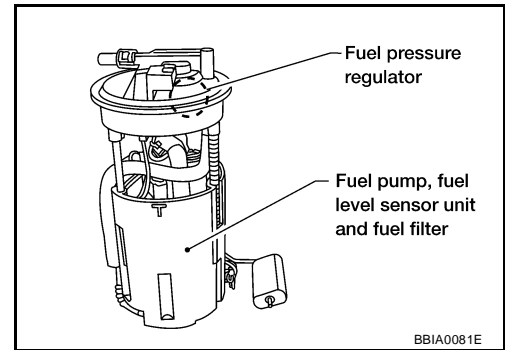
Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0461 FUEL LEVEL SENSOR

Component Description

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

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



On Board Diagnosis Logic

Driving long distances naturally affect fuel gauge level.

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 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 (The sensor circuit is open or shorted) ● Fuel level sensor

Overall Function Check

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-8, "FUEL TANK"](#).

TESTING CONDITION:

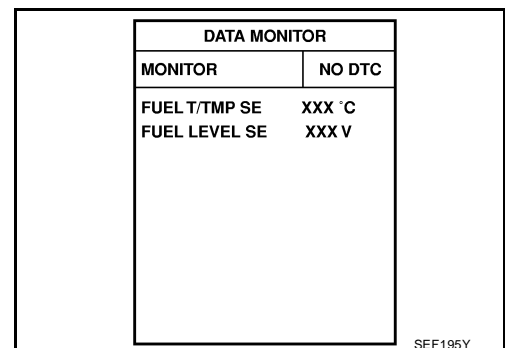
Before starting overall function check, preparation of draining fuel and refilling fuel is required.

WITH CONSULT-II

NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

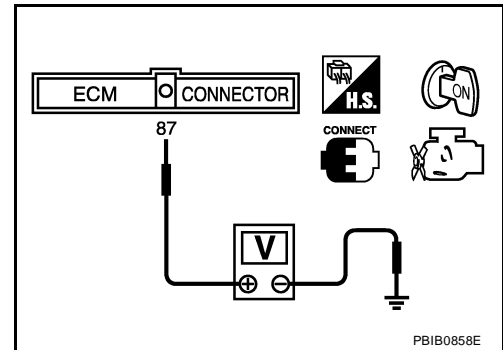
1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-51, "FUEL PRESSURE RELEASE"](#).
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
6. Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-II.
7. Check "FUEL LEVEL SE" output voltage and note it.
8. Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II.
9. Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11. Check "FUEL LEVEL SE" output voltage and note it.
12. Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11.
If NG, check the fuel level sensor, refer to [DI-21, "FUEL LEVEL SENSOR UNIT CHECK"](#).



 WITH GST
NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-51, "FUEL PRESSURE RELEASE"](#).
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch "OFF".
6. Set voltmeters probe between ECM terminal 87 (fuel level sensor signal) and ground.
7. Turn ignition switch "ON".
8. Check voltage between ECM terminal 87 and ground and note it.
9. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
10. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11. Confirm that the voltage between ECM terminal 69 and ground changes more than 0.03V during step 8 - 10.
If NG, check component of fuel level sensor, refer to [DI-21, "FUEL LEVEL SENSOR UNIT CHECK"](#).



DTC P0462, P0463 FUEL LEVEL SENSOR

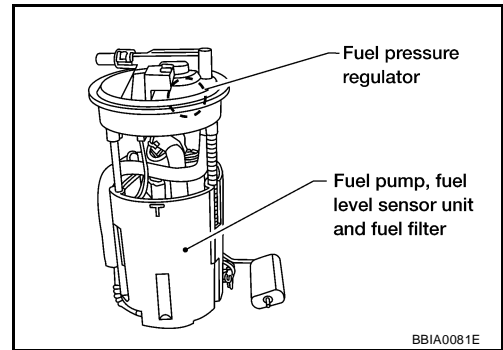
FFP:25060

Component Description

UBS002WF

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

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



On Board Diagnosis Logic

UBS002WG

ECM receives two signals from the fuel level sensor circuit.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage is sent from the sensor is sent to ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage is sent from the sensor is sent to ECM.	

DTC Confirmation Procedure

UBS002WH

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch "ON".

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-367, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

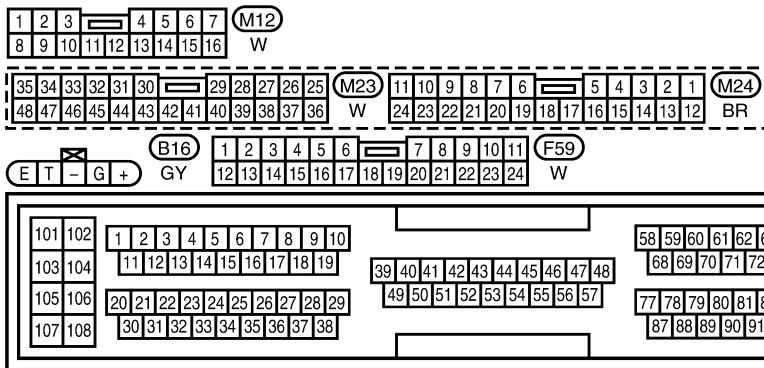
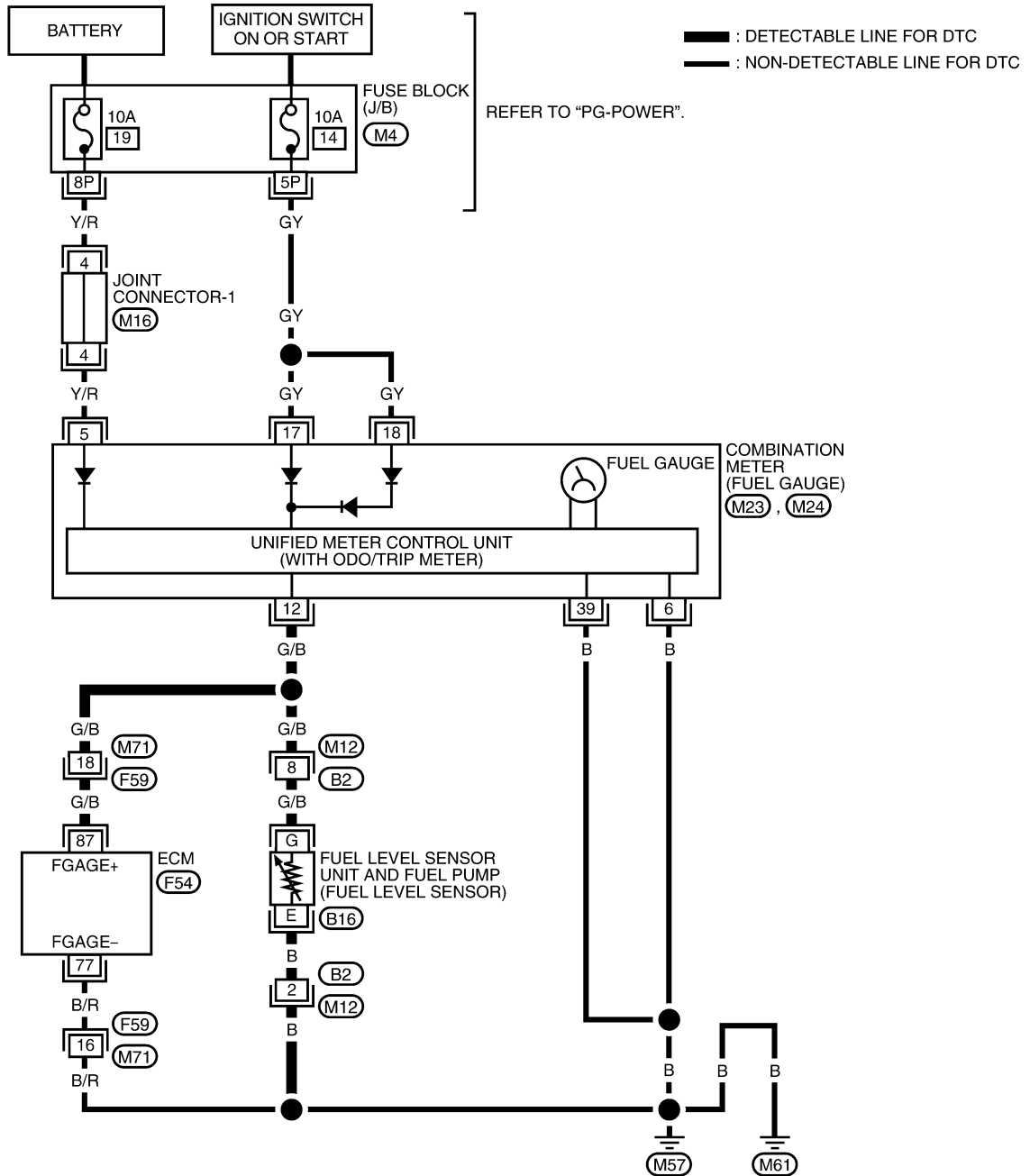
DTC P0462, P0463 FUEL LEVEL SENSOR

[QR]

UBS002W1

Wiring Diagram

EC-FLS2-01



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)
- (M16) - JOINT CONNECTOR (J/C)



BBWA0023E

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

DTC P0462, P0463 FUEL LEVEL SENSOR

[QR]

CAUTION:

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

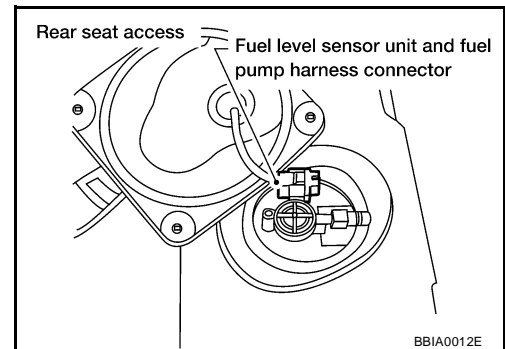
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
77	B/R	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V
87	G/B	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.

Diagnostic Procedure

UBS002WJ

1. CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

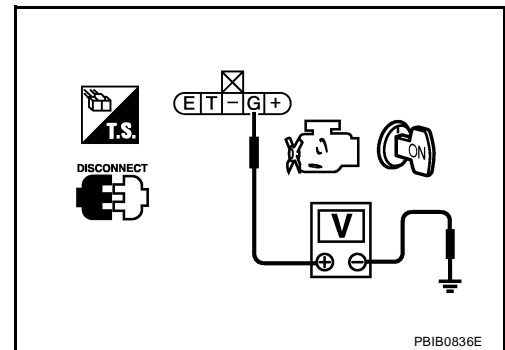


4. Check voltage between fuel level sensor unit and fuel pump terminal **G** and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness for open or short between combination meter and fuel level sensor unit and fuel pump

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

3. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal **E** and body ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

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

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness for open or short between fuel level sensor unit and fuel pump and body ground

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

5. CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 87 and fuel level sensor unit and fuel pump terminal **G** .
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground or short to power.

OK or NG

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

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness connectors M71, F59
- 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 connectors.

7. CHECK FUEL LEVEL SENSOR

Refer to [DI-21, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace fuel level sensor.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

Removal and Installation
FUEL LEVEL SENSOR

UBS002WK

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Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

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DTC P0500 VSS

PFP:32702

Description

UBS002WL

NOTE:

If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-138, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the combination meter. The combination meter then sends a signal to the ECM through CAN communication line.

On Board Diagnosis Logic

UBS002WM

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500 0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	<ul style="list-style-type: none"> ● Harness or connectors (The CAN communication line is open or shorted) ● Harness or connectors (The vehicle speed sensor circuit is open or shorted) ● Vehicle speed sensor ● Combination meter

DTC Confirmation Procedure

UBS002WN

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:

Steps 1 and 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-II

1. Start engine.
2. Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
If NG, go to [EC-371, "Diagnostic Procedure"](#).
If OK, go to following step.
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Warm engine up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	1,200 - 6,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	6.0 - 31.8 msec
Selector lever	Suitable position
PW/ST SIGNAL	OFF

6. If 1st trip DTC is detected, go to [EC-371, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

Overall Function Check

UBS002WO

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

WITH GST

1. Lift up drive wheels.

- 2. Start engine.
- 3. Read vehicle speed sensor signal in "MODE 1" with GST.
The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- 4. If NG, go to [EC-371, "Diagnostic Procedure"](#) .

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Diagnostic Procedure

UBS002WP

1. CHECK VEHICLE SPEED SENSOR CIRCUIT

C

Refer to [DI-19, "Vehicle Speed System"](#) .

OK or NG

D

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

2. CHECK COMBINATION METER

E

Check combination meter function.
Refer to [DI-4, "COMBINATION METERS"](#) .

F

>> INSPECTION END

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DTC P0506 ISC SYSTEM

Description

UBS002WQ

NOTE:

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC displayed.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

UBS002WR

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

UBS002WS

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-49, "Idle Air Volume Learning"](#), before conducting "DTC Confirmation Procedure". For the target idle speed, refer to the [EC-630, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

WITH CONSULT-II

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON" again and select "DATA MONITOR" mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-373, "Diagnostic Procedure"](#).

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

SEF174Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure**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 [EC-68, "VIS \(Nissan Vehicle Immobilizer System — NATS\)"](#).
4. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-49, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-49, "Idle Air Volume Learning"](#).

>> **INSPECTION END**

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DTC P0507 ISC SYSTEM

Description

UBS002WU

NOTE:

If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC displayed.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

UBS002WV

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

UBS002WW

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-49, "Idle Air Volume Learning"](#), before conducting "DTC Confirmation Procedure". For the target idle speed, refer to the [EC-630, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

WITH CONSULT-II

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON" again and select "DATA MONITOR" mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-375, "Diagnostic Procedure"](#)

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

SEF174Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

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.

3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-68, "VIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

4. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#) .

5. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .

6. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

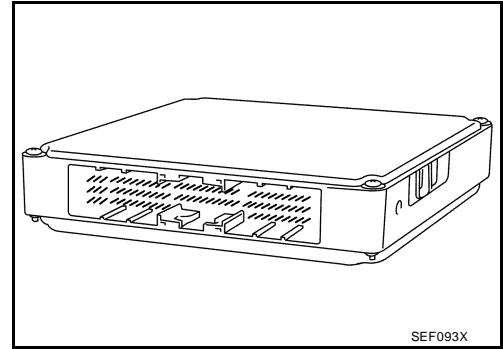
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DTC P0605 ECM

Component Description

UBS002WY

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

UBS002WZ

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	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

UBS002X0

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

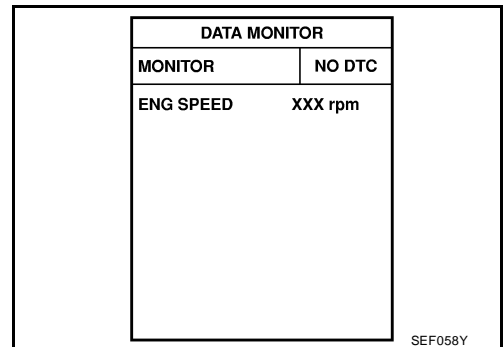
NOTE:

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

PROCEDURE FOR MALFUNCTION A

④ **With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-377, "Diagnostic Procedure"](#)



④ **With GST**

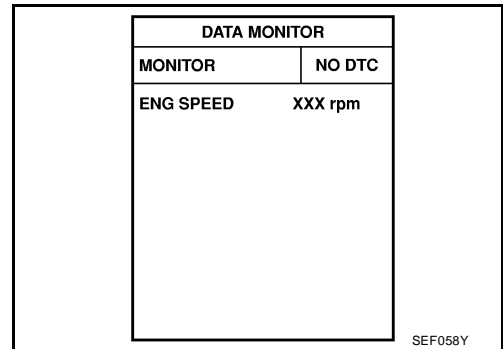
Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR MALFUNCTION B

④ **With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. If 1st trip DTC is detected, go to [EC-377, "Diagnostic Procedure"](#).



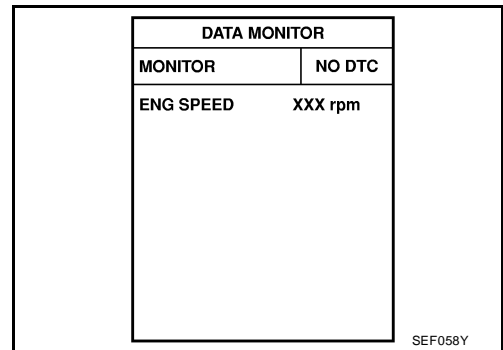
With GST

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. Repeat step 3 procedure, 32 times.
5. If 1st trip DTC is detected, go to [EC-377, "Diagnostic Procedure"](#).



With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

UBS002X1

1. INSPECTION START

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**. See [EC-376](#).
5. Is the 1st trip DTC P0605 displayed again?

With GST

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**. See [EC-376](#).
5. 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 [EC-68, "VIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .
3. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> INSPECTION END

DTC P0650 MIL

[QR]

PF2:24810

DTC P0650 MIL

Component Description

UBS002X2

Malfunction Indicator Lamp (MIL) is located on the instrument panel. When the ignition switch is turned ON without engine running, MIL will light up. This is a bulb check. When the engine is started, MIL should go off. If MIL remains on, the on board diagnostic system has detected an engine system malfunction.

On Board Diagnosis Logic

UBS002X3

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0650 0650	Malfunction indicator (MIL) control circuit	<ul style="list-style-type: none"> An excessively high voltage is sent to ECM through the MIL circuit under the condition that calls for MIL light up. An excessively low voltage is sent to ECM through the MIL circuit under the condition that calls for MIL not to light up. 	<ul style="list-style-type: none"> Harness or connectors (MIL circuit is open or shorted.) MIL

FAIL-SAFE MODE

ECM enters in fail-safe mode when both DTC P0650 and another DTC, which calls for MIL to light up, are detected at the same time.

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

DTC Confirmation Procedure

UBS002X4

NOTE:

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

④ WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-381, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

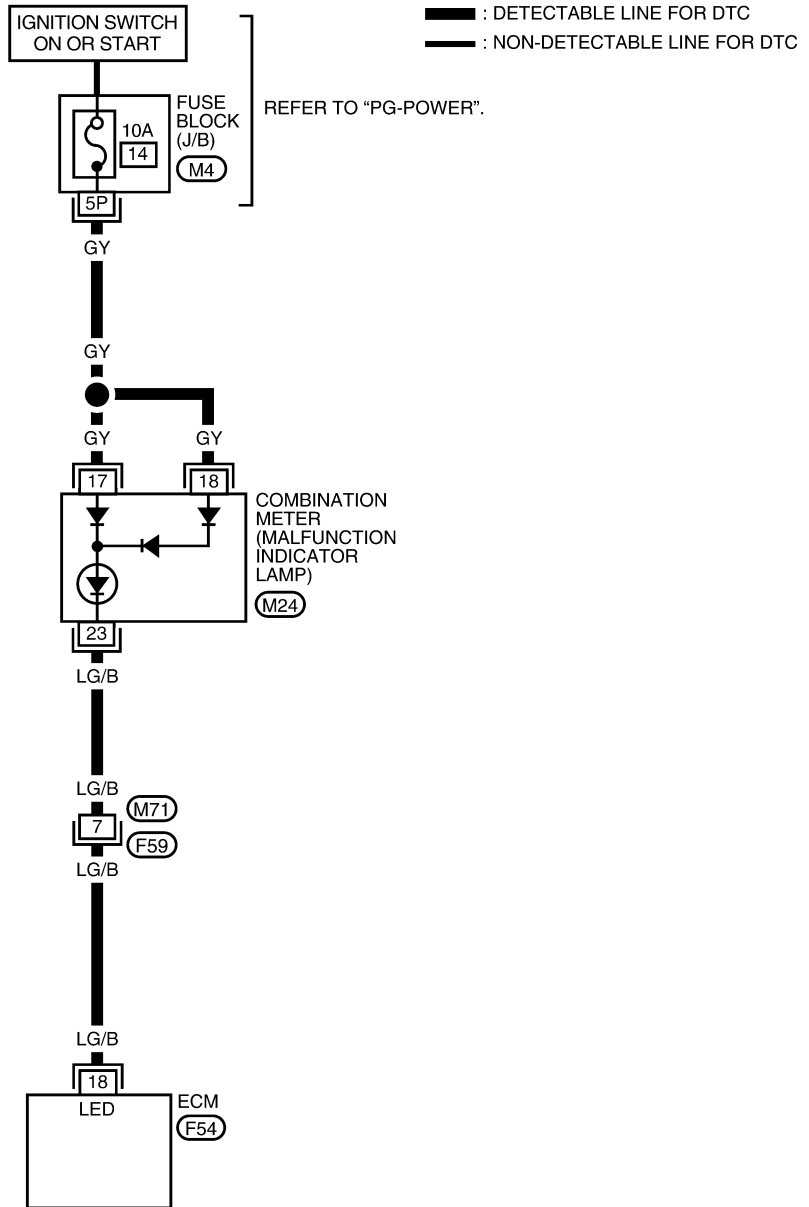
④ WITH GST

Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

UBS002X5

EC-MIL-01

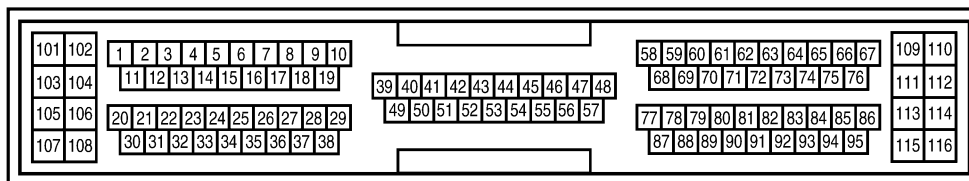


11	10	9	8	7	6	5	4	3	2	1	(M24)		
24	23	22	21	20	19	18	17	16	15	14	13	12	BR

1	2	3	4	5	6	7	8	9	10	11	(F59)		
12	13	14	15	16	17	18	19	20	21	22	23	24	W

REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)



(F54) GY

BBWA0025E

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
18	LG/B	MIL	[Ignition switch "ON"]	0 - 1.0V
			[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS002X6

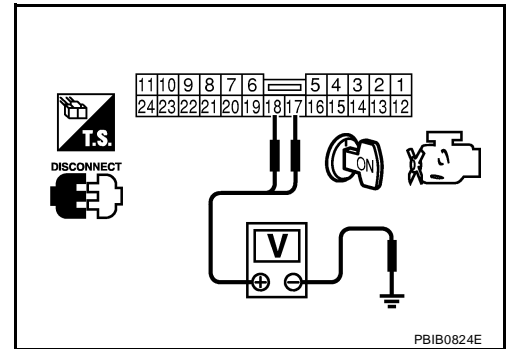
1. CHECK MIL POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect combination meter harness connector.
3. Turn ignition switch "ON".
4. Check voltage between combination meter terminal 17, 18 and ground with CONSULT-II or tester

Voltage: Battery voltage

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M4
- 10A fuse
- Harness for open or short between fuse block (J/B) and combination meter

>> Repair harness or connectors.

3. CHECK MIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 18 and combination meter terminal 23. 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.

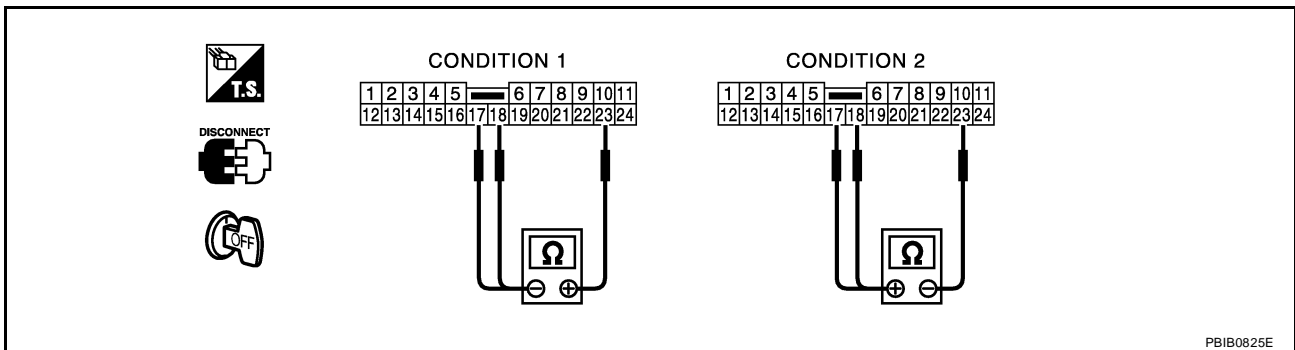
- Harness connectors M71, F59
- Harness for open or short between ECM and combination meter

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

5. CHECK COMBINATION METER

1. Turn ignition switch "OFF".
2. Disconnect combination meter harness connector.
3. Check continuity under the following conditions.

CONDITION	Combination meter terminal No. (Polarity)	Continuity
1	23 (+) - 17 (-)	Should exist.
	23 (+) - 18 (-)	
2	17 (+) - 23 (-)	Should not exist.
	18 (+) - 23 (-)	



OK or NG

OK >> GO TO 6.

NG >> Replace combination meter. Refer to [DI-4, "COMBINATION METERS"](#) .

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

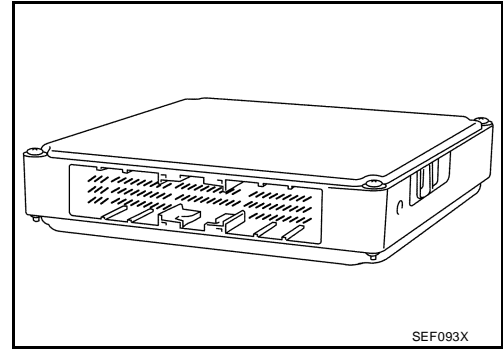
DTC P1065 ECM POWER SUPPLY

PFP:23710

Component Description

UBS002X7

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

UBS002X8

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065 1065	ECM power supply circuit	ECM back up RAM system does not function properly.	<ul style="list-style-type: none"> ● Harness or connectors [ECM power supply (back-up) circuit is open or shorted.] ● ECM

DTC Confirmation Procedure

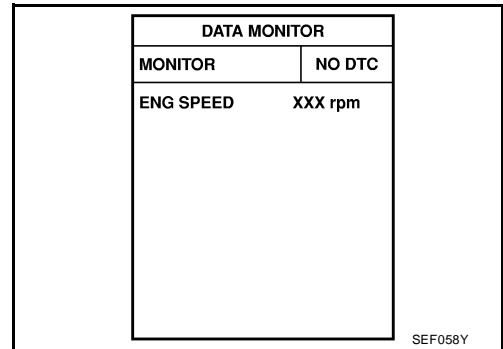
UBS002X9

NOTE:

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

④ WITH CONSULT-II

1. Turn ignition switch “ON” and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
5. Repeat steps 3 and 4 four times.
6. If 1st trip DTC is detected, go to [EC-385, "Diagnostic Procedure"](#)



④ WITH GST

Follow the procedure “WITH CONSULT-II” above.

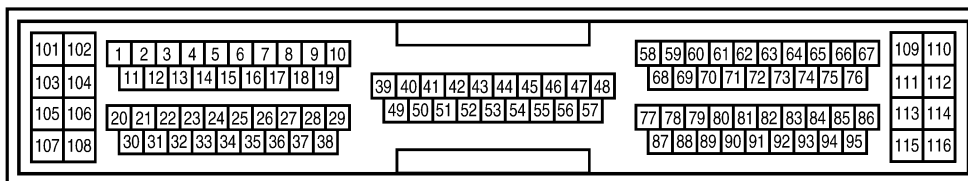
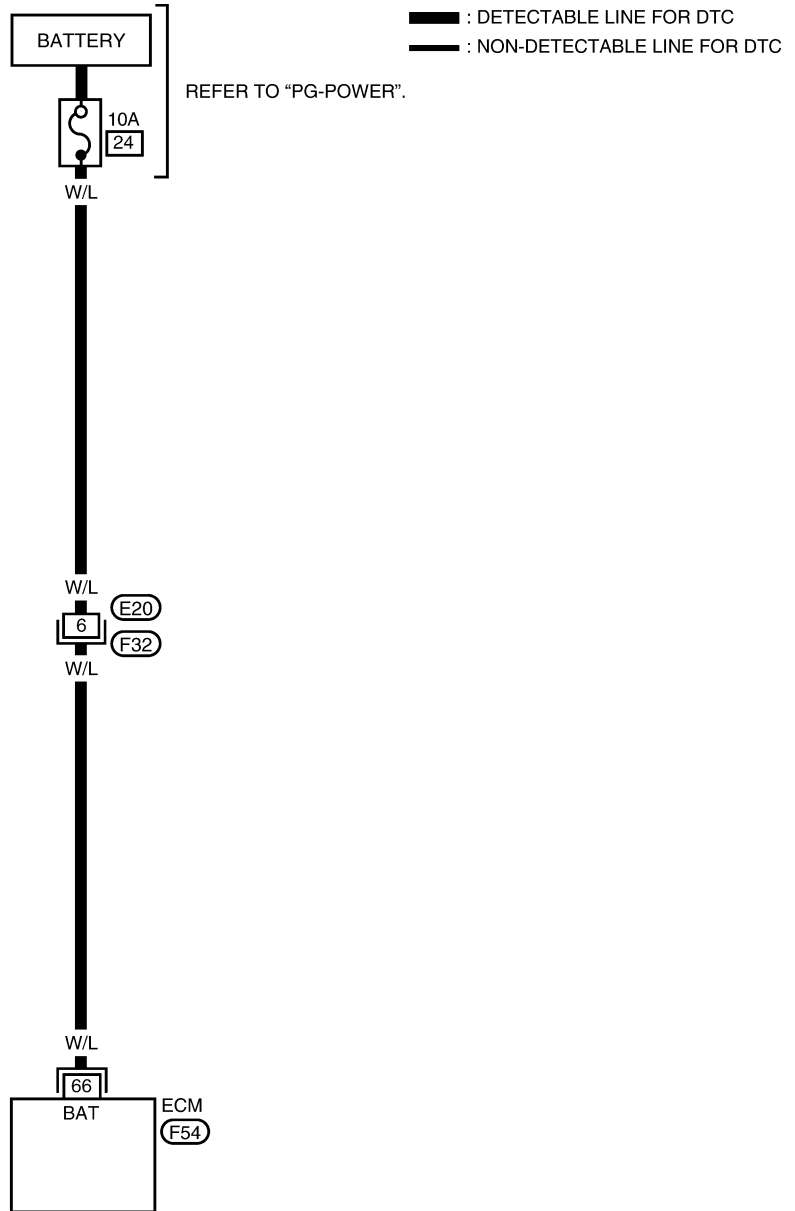
DTC P1065 ECM POWER SUPPLY

[QR]

Wiring Diagram

UBS002XA

EC-ECM/PW-01



BBWA0026E

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

DTC P1065 ECM POWER SUPPLY

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
66	W/L	Power supply for ECM (Buck-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS002XB

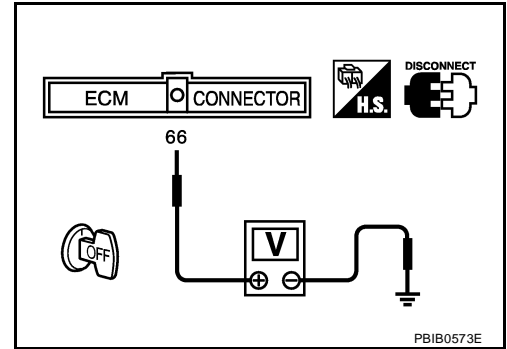
1. CHECK ECM POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check voltage between ECM terminal 66 and ground with CONSULT-II 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 E20, F32
- 10A fuse
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

 **With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**.
See [EC-383](#) .
5. Is the 1st trip DTC P1065 displayed again?

 **With GST**

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**.
See [EC-383](#) .
5. Is the 1st trip DTC P1065 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 [EC-68, "VIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .
3. Perform [EC-49, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-49, "Idle Air Volume Learning"](#) .

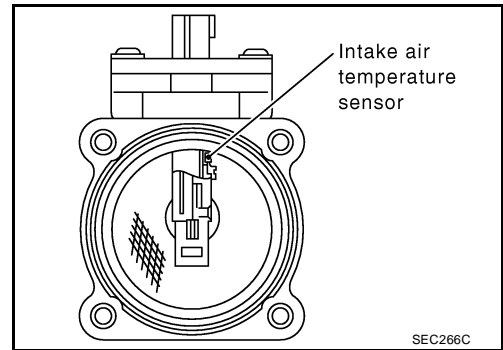
>> **INSPECTION END**

DTC P1102 MAF SENSOR

Component Description

UBS002XC

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

UBS002XD

Specification data are reference values.

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.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load 	Idle	Approx. 1.1 - 1.5V
		2,500 rpm	Approx. 1.6 - 2.0V
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N ● 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: N ● 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

UBS002XE

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1102 1102	Mass air flow sensor circuit range/performance problem	A voltage from the sensor is constantly approx.1.0V when engine is running.	<ul style="list-style-type: none"> ● Harness or connectors (The 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

UBS002XF

NOTE:

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

Ⓜ WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P1102 MAF SENSOR

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait 5 seconds at most.
4. If DTC is detected, go to [EC-390, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "With CONSULT-II" above.

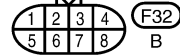
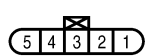
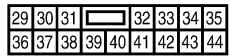
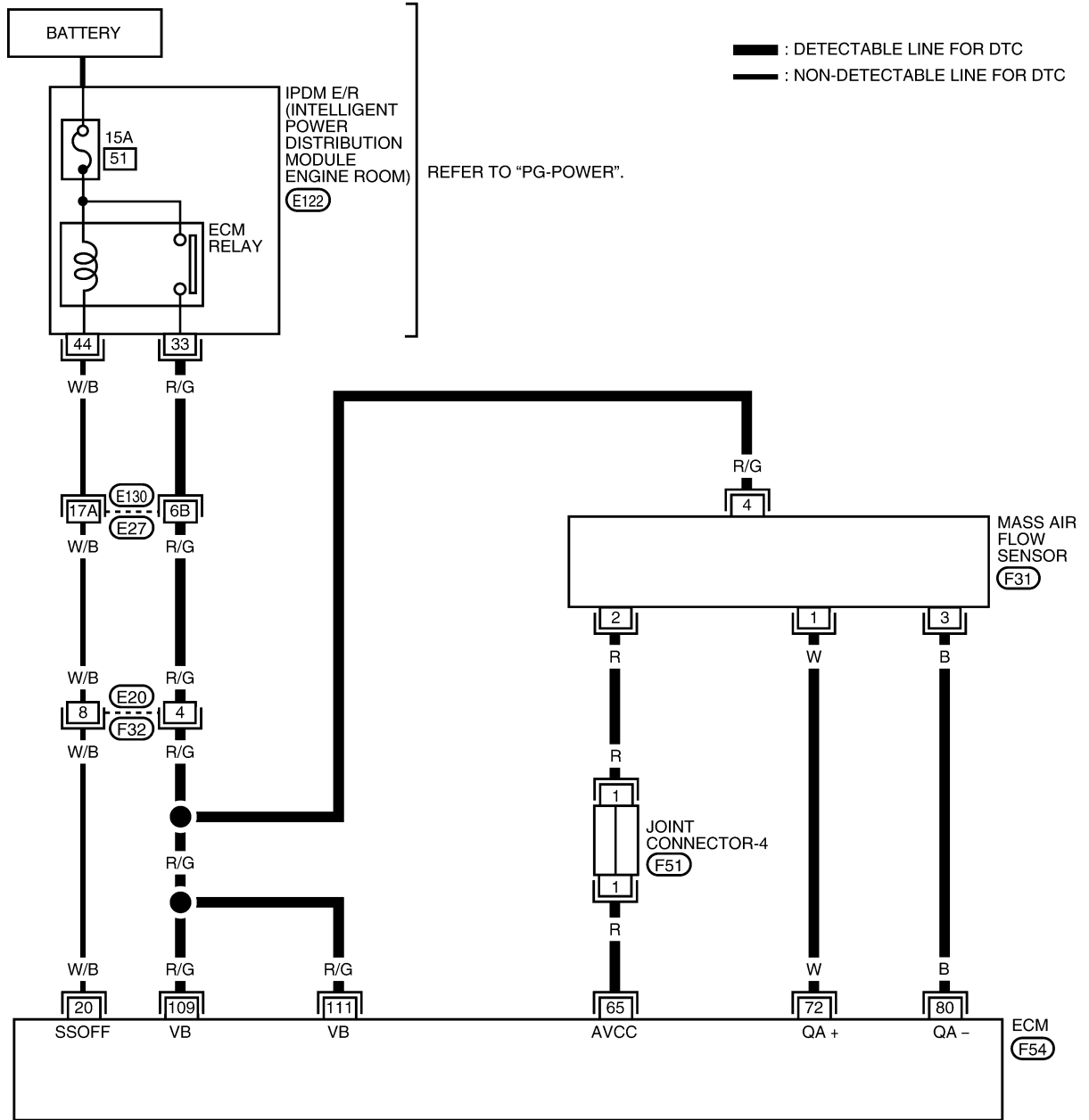
DTC P1102 MAF SENSOR

[QR]

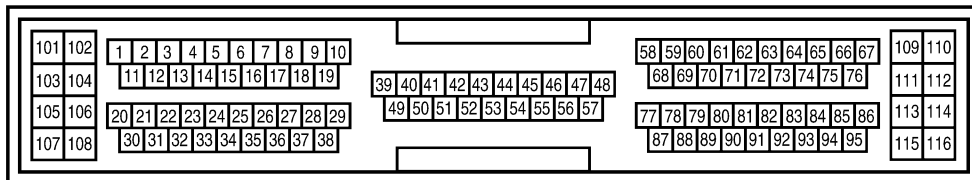
Wiring Diagram

UBS002XG

EC-MAFS-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F51) - JOINT CONNECTOR (J/C)



BBWA0006E

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

DTC P1102 MAF SENSOR

[QR]

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
72	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.6 - 2.0V
80	B	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

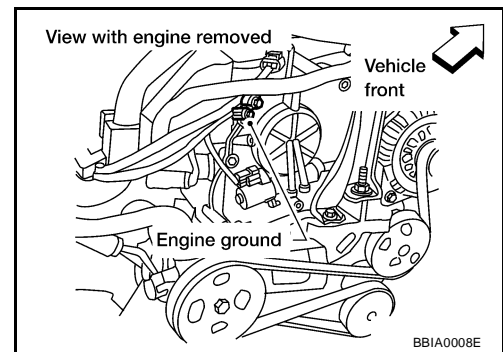
Diagnostic Procedure

UBS002XH

1. RETIGHTEN GROUND SCREWS

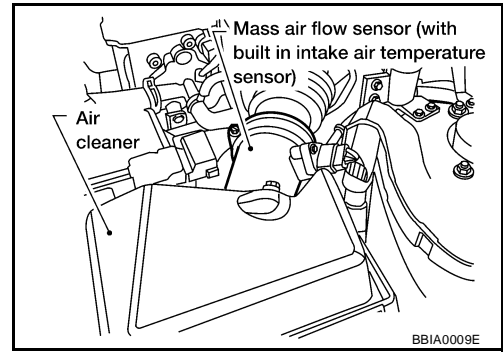
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

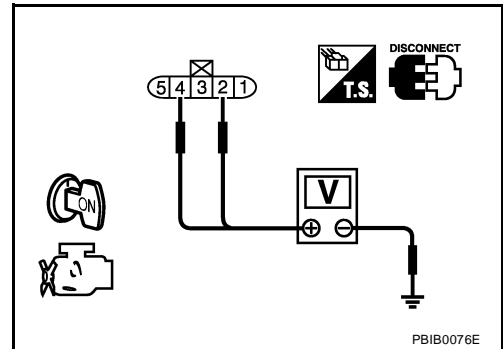


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Joint connector-4
- 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 harness or connectors.

4. 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 80. 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 MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 72.
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 MASS AIR FLOW SENSOR

Refer to [EC-392, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace mass air flow sensor.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection MASS AIR FLOW SENSOR

UBS002XI

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 72 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 2.0
Idle to about 4,000 rpm*	1.5 - 2.0 to Approx. 4.0

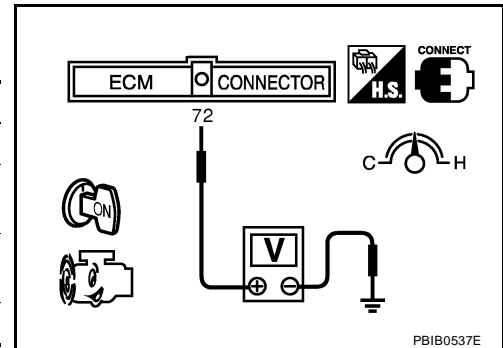
*: Check for liner voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
 - a. Turn ignition switch "OFF".
 - b. Disconnect mass air flow sensor harness connector and reconnect it again.
 - c. Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.

Removal and Installation MASS AIR FLOW SENSOR

UBS002XJ

Refer to [EM-14, "AIR CLEANER AND AIR DUCT"](#) .



DTC P1111 IVT CONTROL SOLENOID VALVE

PFP:23796

Component Description

UBS002XK

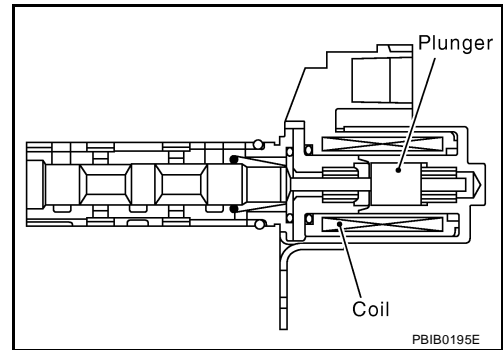
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

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-II Reference Value in Data Monitor Mode

UBS002XL

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V SOL (B1)	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load 	Idle	0% - 2%
		2,000 rpm	Approx. 25% - 60%

On Board Diagnosis Logic

UBS002XM

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111 1111	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

UBS002XN

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If 1st trip DTC is detected, go to [EC-395, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Following the procedure "WITH CONSULT-II" above.

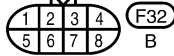
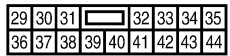
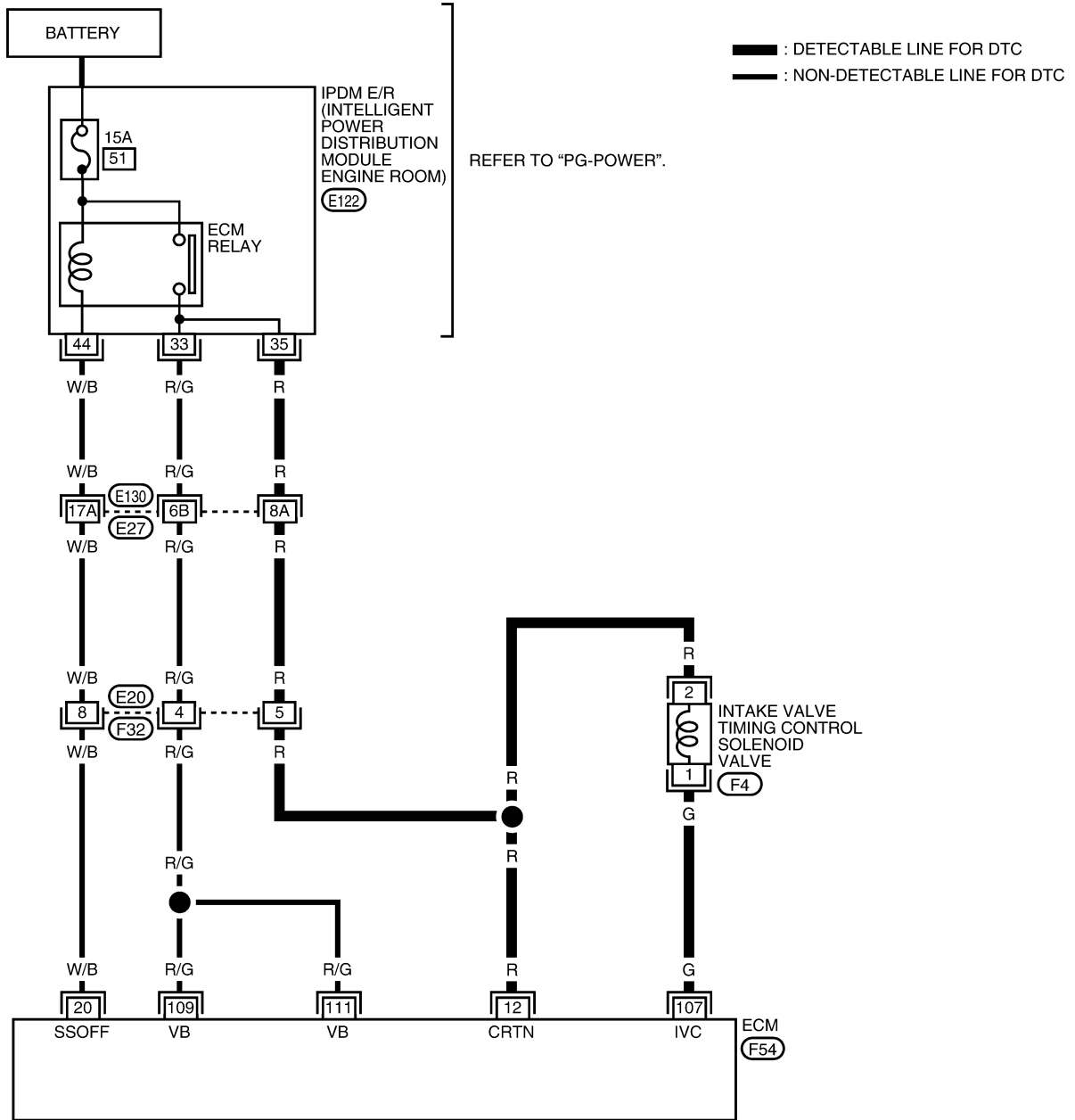
DTC P1111 IVT CONTROL SOLENOID VALVE

[QR]

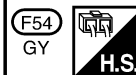
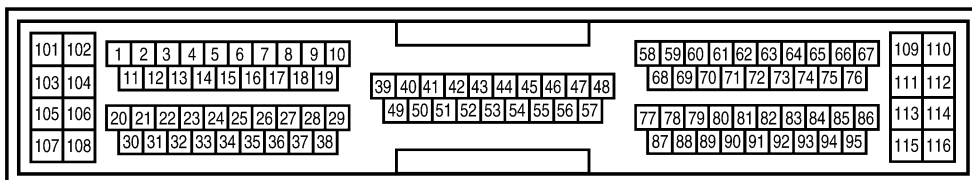
UBS002X0

Wiring Diagram

EC-IVC-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0027E

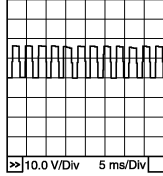
Specification data are reference values and are measured between each terminal and ground.

DTC P1111 IVT CONTROL SOLENOID VALVE

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
107	G	Intake valve timing control solenoid valve	[Engine is running] ● Warm-up condition ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm	Approximately 9V★ 

PBIB0532E

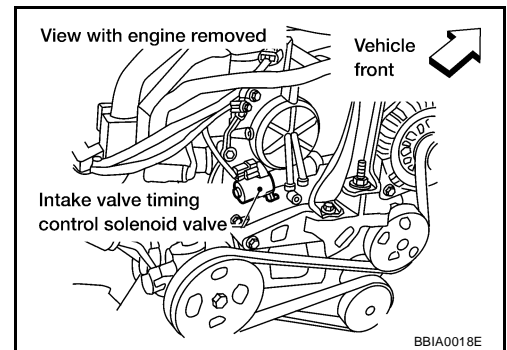
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS002XP

1. CHECK POWER SUPPLY CIRCUIT

- Turn ignition switch "OFF".
- Disconnect intake valve timing control solenoid valve harness connector.
- Turn ignition switch "ON".



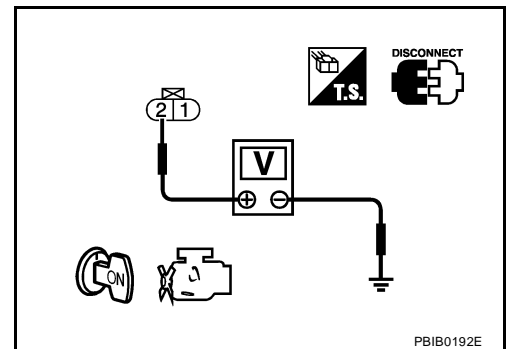
- Check voltage between intake valve timing control solenoid valve terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 3.

NG >> GO TO 2.



PBIB0192E

2. DETECT MALFUNCTION PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Harness for open or short between intake valve timing control solenoid valve and IPDM E/R
- Harness for open or short between intake valve timing control solenoid valve and ECM

>> 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 107 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-396, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace intake valve timing control solenoid valve.

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

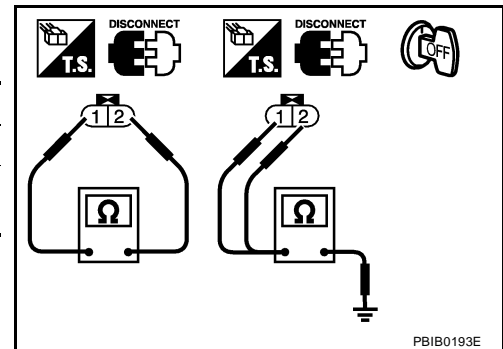
>> INSPECTION END

Component Inspection INTAKE VALVE TIMING CONTROL SOLENOID VALVE

UBS002XQ

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve terminals 1 and 2.

Terminals	Resistance
1 and 2	Approximately 8Ω at 20°C (68°F)
1 or 2 and ground	∞Ω (Continuity should not exist)



UBS002XR

Removal and Installation INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EM-45, "TIMING CHAIN"](#) .

DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PFP:16119

Component Description

UBS002XS

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

UBS002XT

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121 1121	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 detect the throttle valve is stuck open. This self-diagnosis has the one trip detection logic.	

FAIL-SAFE MODE

When the malfunction A or B is detected, the ECM enters in fail-safe mode.
When the malfunction C is detected, the ECM enters in fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	The 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, and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

UBS002XU

NOTE:

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

With CONSULT-II

1. Turn ignition witch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
5. If 1st trip DTC is detected, go to [EC-401, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

 **With GST**

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR MALFUNCTION C

 **With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Shift selector lever to "N" or "P" position.
5. Start engine and let it idle for 3 seconds.
6. If DTC is detected, go to [EC-401, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

 **With GST**

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

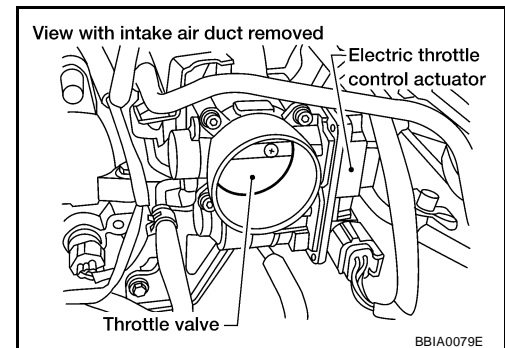
UBS002XV

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 and the housing.

OK or NG

- OK >> GO TO 2.
 NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QR]

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

PFP:16119

Description

UBS002XW

NOTE:

If DTC P1122 is displayed with DTC P1121 or 1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to [EC-397](#) or [EC-406](#).

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

UBS002XX

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122 1122	Electric throttle control performance problem	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

UBS002XY

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-401, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

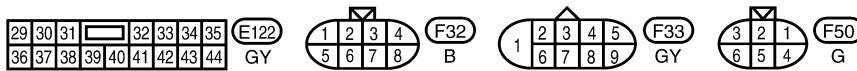
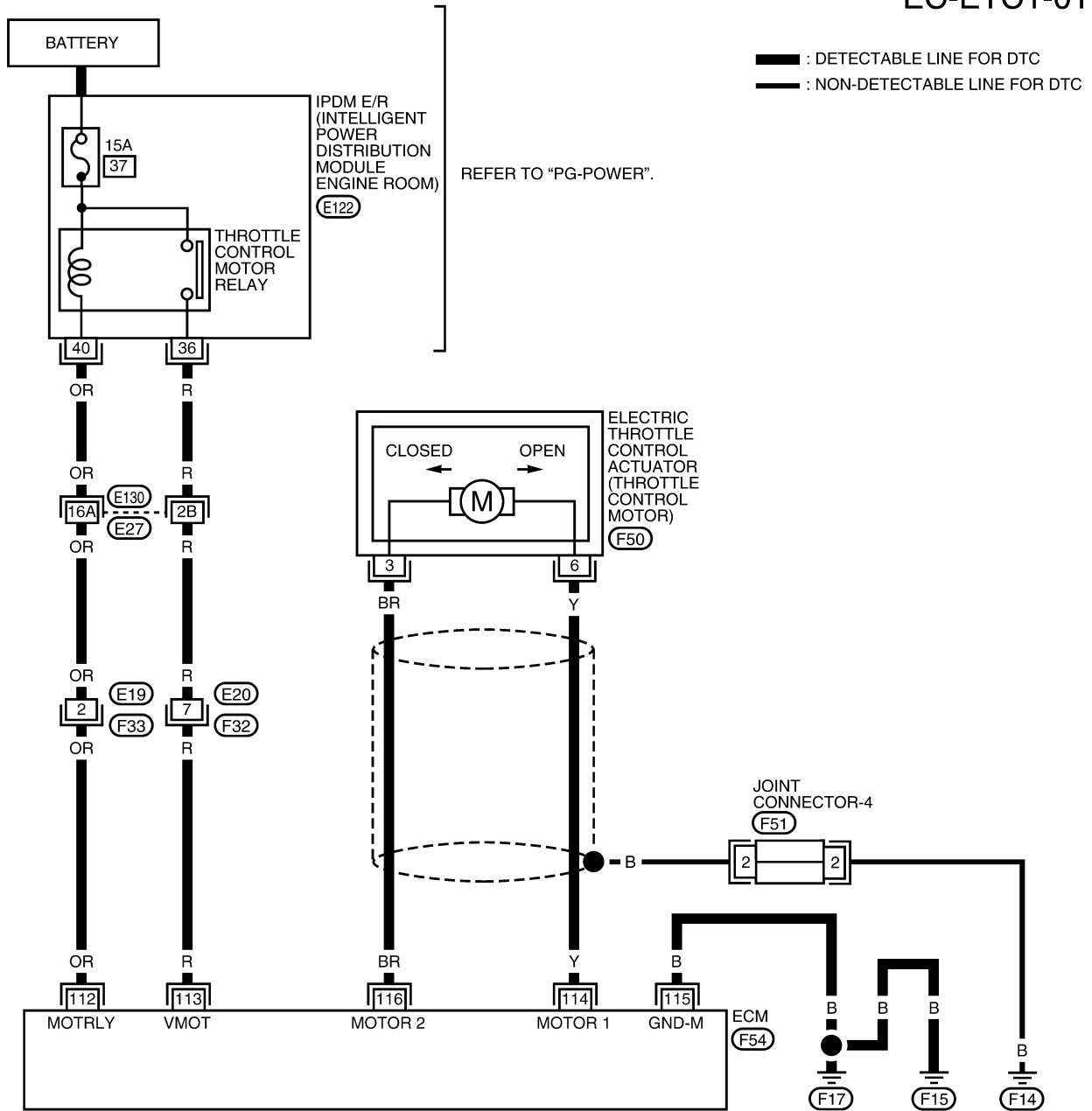
DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QR]

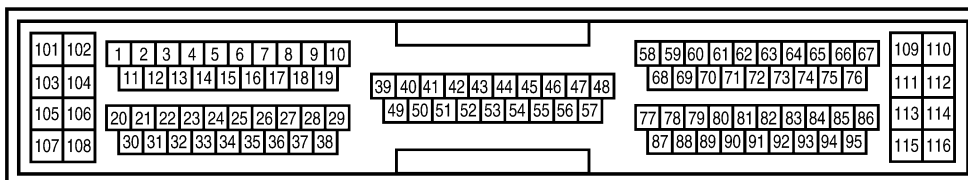
UBS002XZ

Wiring Diagram

EC-ETC1-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F51) - JOINT CONNECTOR (J/C)



BBWA0041E

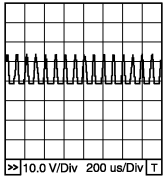
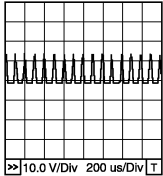
Specification data are reference values and are measured between each terminal and ground.

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
112	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
113	R	Throttle control motor relay power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
114	Y	Throttle control motor (Open)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is depressing 	<p>0 - 14V★</p>  <p>PBIB0533E</p>
115	B	Throttle control motor ground	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Idle speed 	Approximately 0V
116	BR	Throttle control motor (Close)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is releasing 	<p>0 - 14V★</p>  <p>PBIB0534E</p>

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

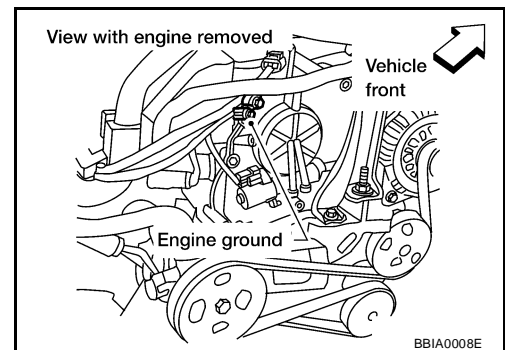
Diagnostic Procedure

UBS002Y0

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK THROTTLE CONTROL MOTOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 115 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 3.

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

3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

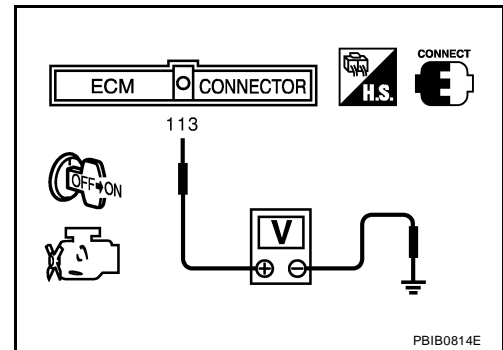
1. Reconnect harness connectors disconnected.
2. Check voltage between ECM terminal 113 and ground following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)

OK or NG

OK >> GO TO 11.

NG >> GO TO 4.



4. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E122.
3. Check continuity between ECM terminal 113 and IPDM E/R 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 6.

NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Harness for open or short between ECM and IPDM E/R

>> Repair or replace harness or connectors.

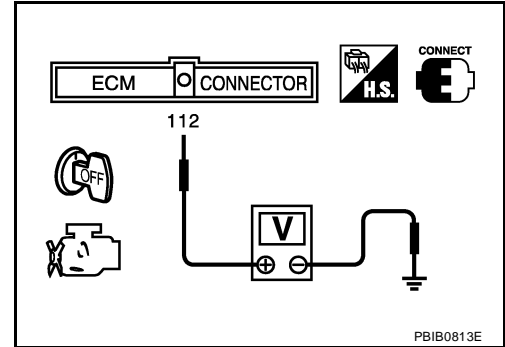
6. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "OFF".
3. Check voltage between ECM terminal 112 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 10.
 NG >> GO TO 7.



7. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E122.
3. Check continuity between ECM terminal 112 and IPDM E/R 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 9.
 NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E19, F33
- Harness for open or short between ECM and IPDM E/R

>> Repair or replace harness or connectors.

9. CHECK FUSE

Check 15A fuse.

OK or NG

- OK >> GO TO 10.
 NG >> Replace 15A fuse.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

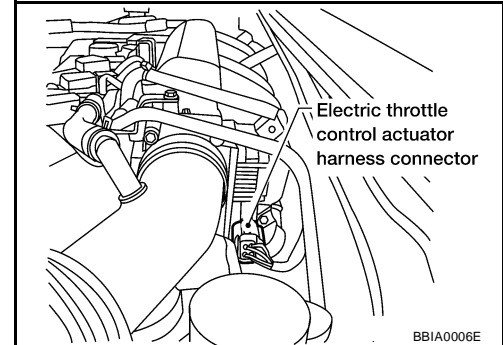
OK or NG

- OK >> Replace IPDM E/R. Refer to PG-[PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .
 NG >> Repair or replace harness or connectors.

11. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	114	Should not exist
	116	Should exist
6	114	Should exist
	116	Should not exist



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

OK or NG

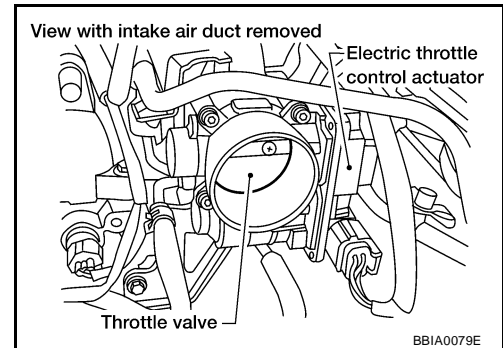
- OK >> GO TO 12.
- NG >> Repair or replace.

12. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve and the housing.

OK or NG

- OK >> GO TO 13.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



13. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-405, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 14.
- NG >> GO TO 15.

14. CHECK SHIELD CIRCUIT

1. Disconnect joint connector-4
2. Check the following.
 - Continuity between joint connector-4 terminal 2 and ground.
 - Joint connector-4
(Refer to [PG-37, "Harness Layout"](#) .)

Continuity should exist.

3. Also check harness for short to power.
4. Then reconnect joint connector-4.

OK or NG

- OK >> GO TO 15.
- NG >> Repair open circuit or short to power in harness or connectors.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 16.
 NG >> Repair or replace harness or connectors.

16. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> INSPECTION END

Component Inspection

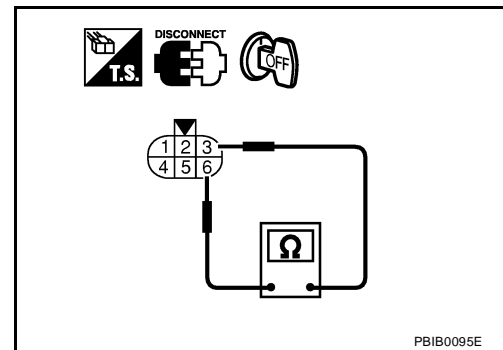
THROTTLE CONTROL MOTOR

UBS002Y1

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 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.
4. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-49, "Idle Air Volume Learning"](#) .



UBS002Y2

Remove and Installation

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-16, "INTAKE MANIFOLD"](#) .

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[QR]

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PF1:16119

Component Description

UBS002Y3

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-II Reference Value in Data Monitor Mode

UBS002Y4

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

On Board Diagnosis Logic

UBS002Y5

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124 1124	Throttle control motor relay circuit short	ECM detect 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
P1126 1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low. This self-diagnosis has the one trip detection logic.	<ul style="list-style-type: none">● Harness or connectors (Throttle control motor relay circuit is open)● Throttle control motor relay

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode (for DTC P1124).

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up (for DTC P1126).

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

UBS002Y6

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 P1124

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

④ With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-409, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR DTC P1126

With CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-409, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

A
EC
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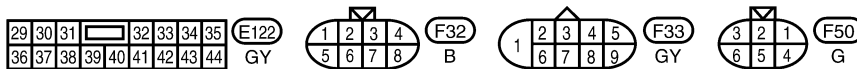
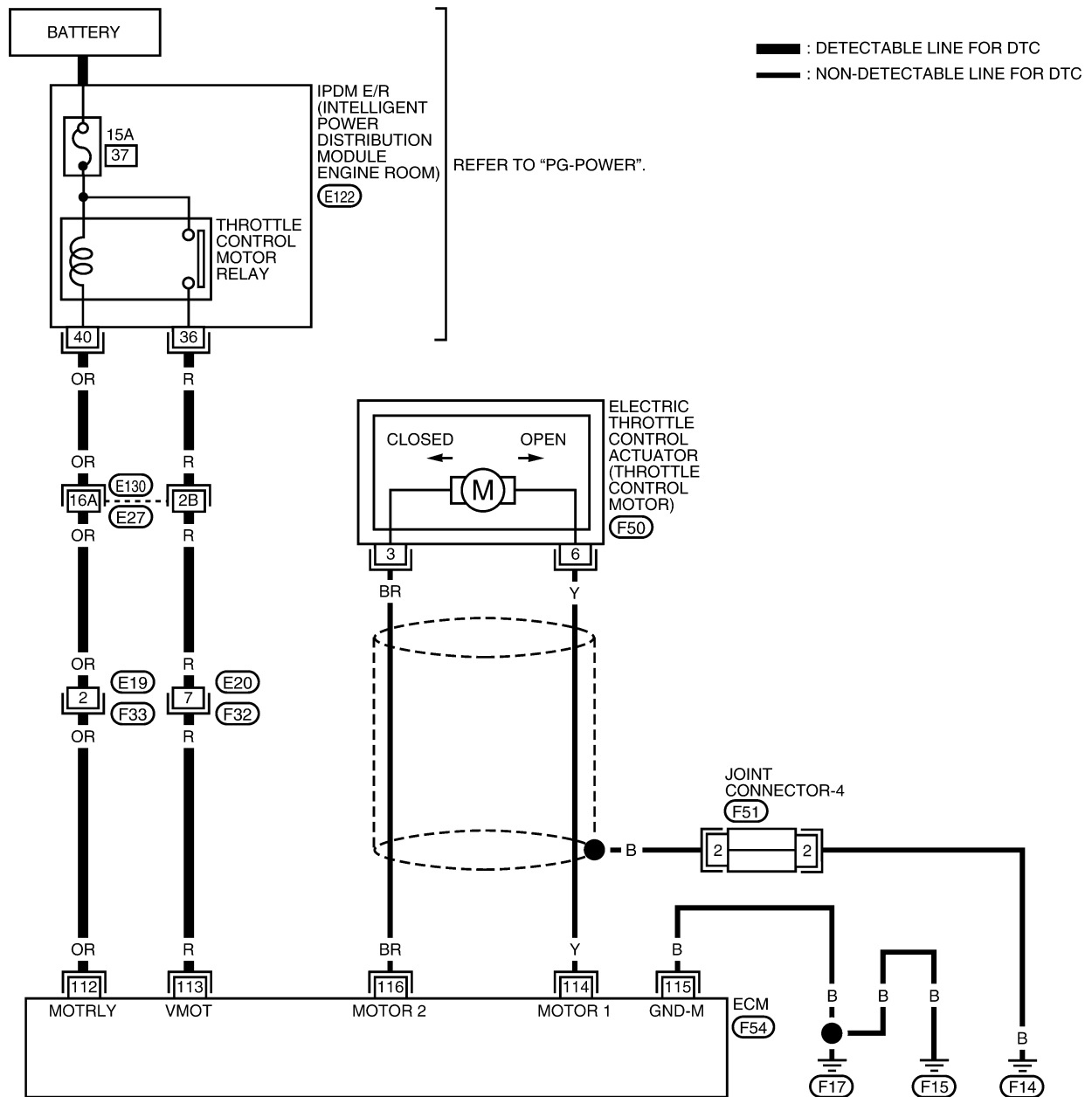
DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[QR]

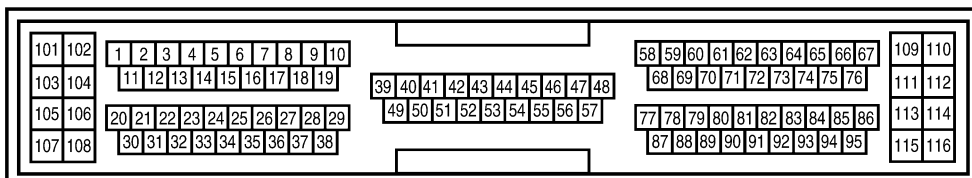
UBS002Y7

Wiring Diagram

EC-ETC2-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F51) - JOINT CONNECTOR (J/C)



BBWA0042E

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

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[QR]

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
112	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
113	R	Throttle control motor relay power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS002Y8

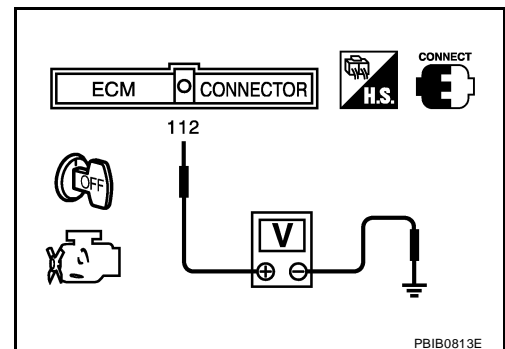
1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

- Turn ignition switch "OFF".
- Check voltage between ECM terminal 112 and ground with CONSULT-II 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 E122.
- Check continuity between ECM terminal 112 and IPDM E/R terminal 40. 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.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E19, F33
- Harness for open or short between ECM and IPDM E/R

>> Repair or replace harness or connectors.

4. CHECK FUSE

Check 15A fuse.

OK or NG

- OK >> GO TO 8.
- NG >> Replace 15A fuse.

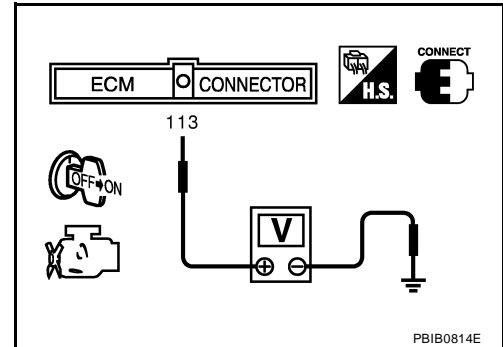
5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Check voltage between ECM terminal 113 and ground following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)

OK or NG

- OK >> GO TO 8.
 NG >> GO TO 6.



6. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E122.
3. Check continuity between ECM terminal 113 and IPDM E/R 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 8.
 NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Harness for open or short between ECM and IPDM E/R

>> Repair or replace harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .
 NG >> Repair or replace harness or connectors.

DTC P1128 THROTTLE CONTROL MOTOR

[QR]

DTC P1128 THROTTLE CONTROL MOTOR

PF16119

Component Description

UBS002Y9

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

UBS002YA

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128 1128	Throttle control motor circuit short	ECM detects short 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)

DTC Confirmation Procedure

UBS002YB

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-413, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

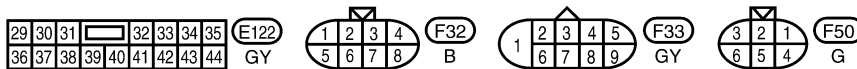
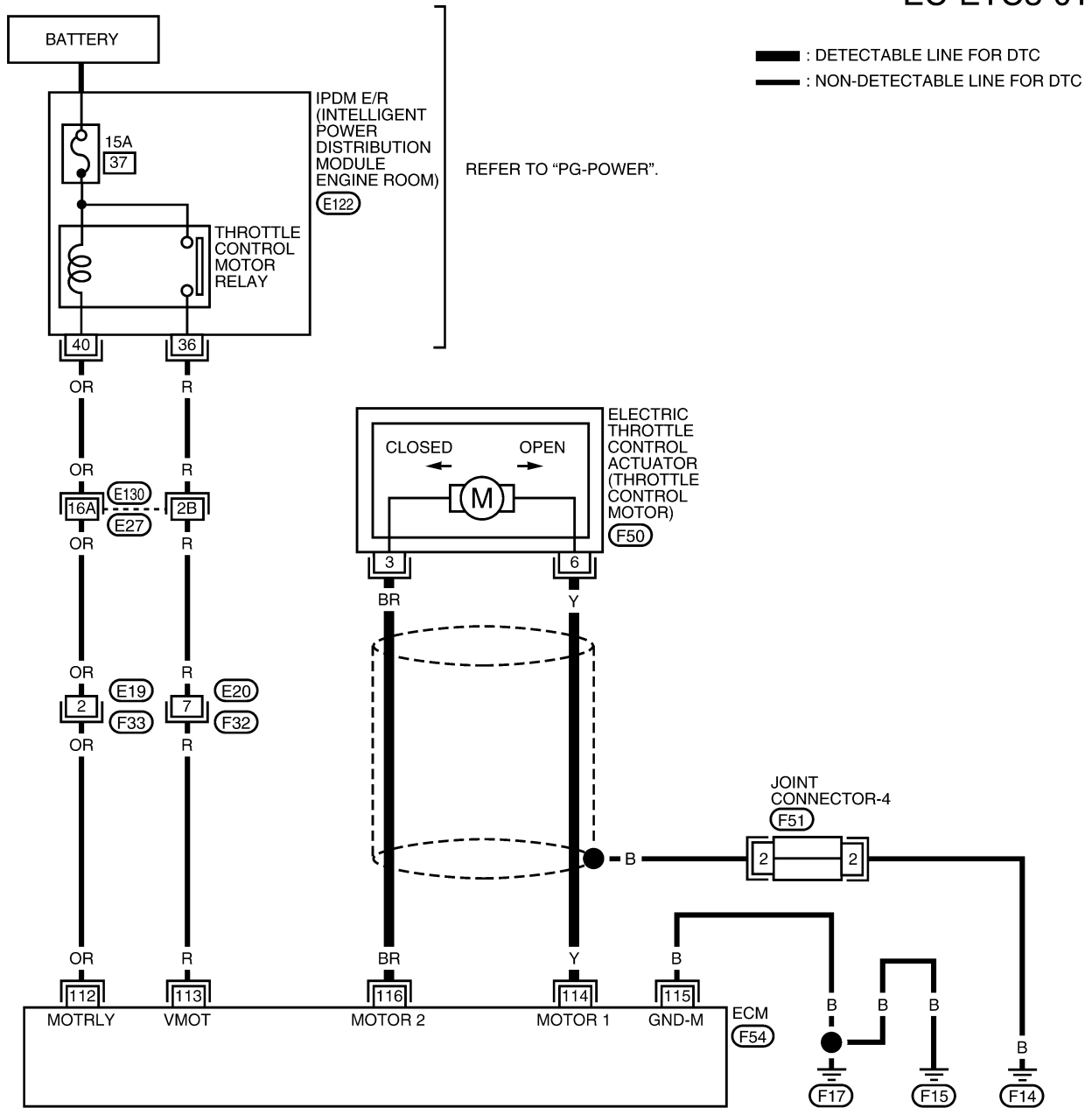
DTC P1128 THROTTLE CONTROL MOTOR

[QR]

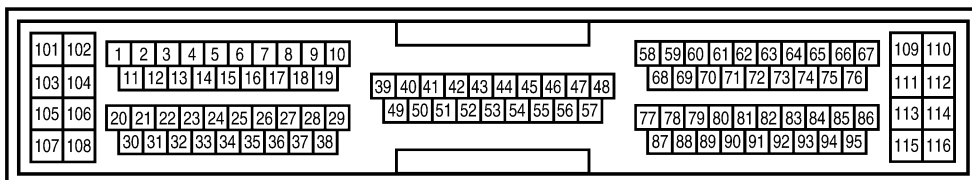
UBS002YC

Wiring Diagram

EC-ETC3-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F51) - JOINT CONNECTOR (J/C)



BBWA0043E

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

DTC P1128 THROTTLE CONTROL MOTOR

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
114	Y	Throttle control motor (Open)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is depressing 	<p>0 - 14V★</p> <p>PBIB0533E</p>
116	BR	Throttle control motor (Close)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is releasing 	<p>0 - 14V★</p> <p>PBIB0534E</p>

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

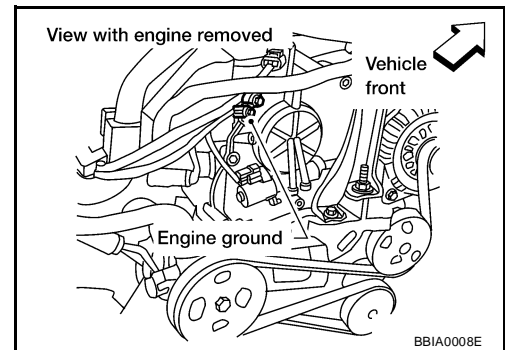
Diagnostic Procedure

UBS002YD

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

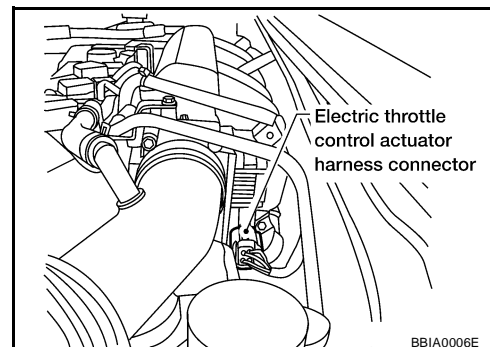
>> GO TO 2.



2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	114	Should not exist
	116	Should exist
6	114	Should exist
	116	Should not exist



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

OK or NG

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

3. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-415, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 6.

4. CHECK SHIELD CIRCUIT

1. Disconnect joint connector-4
2. Check the following.
 - Continuity between joint connector-4 terminal 2 and ground.
 - Joint connector-4
(Refer to [PG-37, "Harness Layout"](#) .)

Continuity should exist.

3. Also check harness for short to power.
4. Then reconnect joint connector-4.

OK or NG

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

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace harness or connectors.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> INSPECTION END

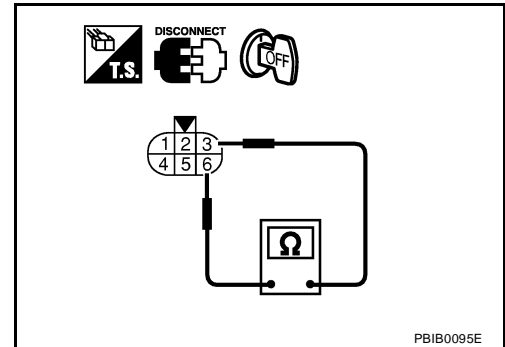
Component Inspection

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 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.
4. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-49, "Idle Air Volume Learning"](#) .



Removal and Installation

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-16, "INTAKE MANIFOLD"](#) .

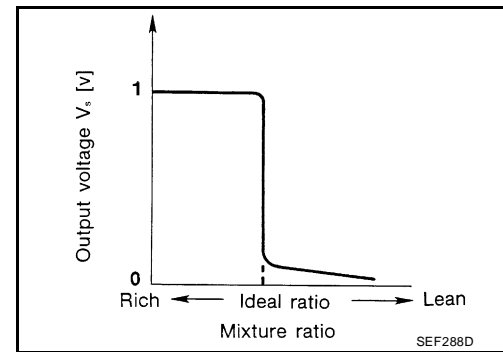
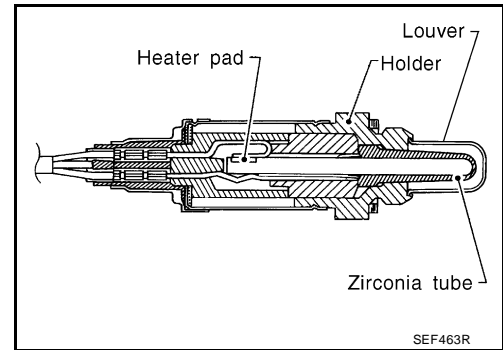
DTC P1143 HO2S1

PF2:22690

Component Description

UBS002YG

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



CONSULT-II Reference Value in Data Monitor Mode

UBS002YH

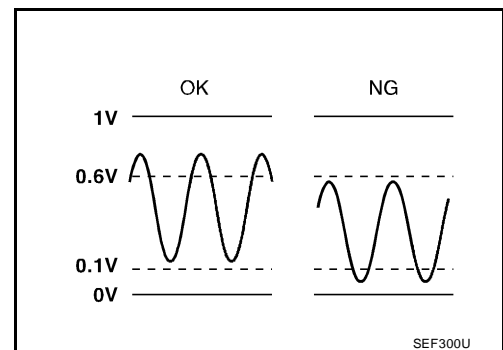
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS002YI

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



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1143 1143	Heated oxygen sensor 1 lean shift monitoring	The maximum and minimum voltage from the sensor are not reached to the specified voltages.	<ul style="list-style-type: none"> ● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Injectors ● Intake air leaks

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P1143” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

HO2S1 (B1) P1143	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0546E

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

ENG SPEED	1,200 - 3,200 rpm
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	1.9 - 13.0 msec
Selector lever	Suitable position

HO2S1 (B1) P1143	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0547E

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-418, "Diagnostic Procedure"](#).

HO2S1 (B1) P1143	
COMPLETED	

SEC769C

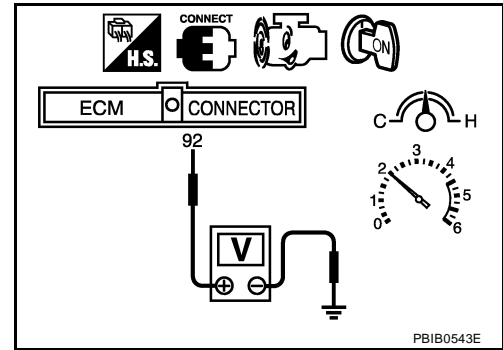
Overall Function Check

Use this procedure to check the overall function of the heated oxygen 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. Set voltmeter probes between ECM terminal 92 [HO2S1(B1) signal] and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is over 0.1V at least one time.
4. If NG, go to [EC-418, "Diagnostic Procedure"](#).

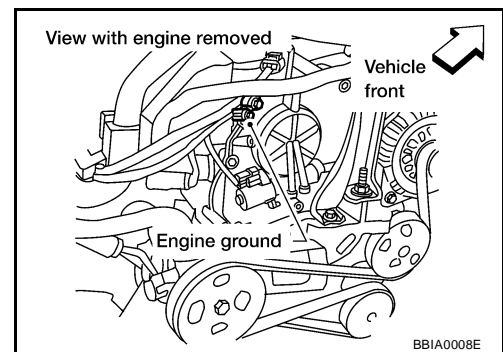


Diagnostic Procedure

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

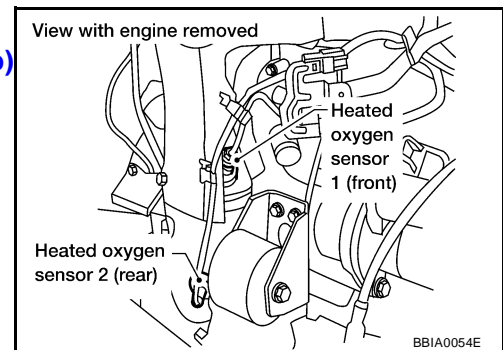


2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 40 - 50 N·m (4.1 - 5.1 kg·m, 30 - 37 ft·lb)

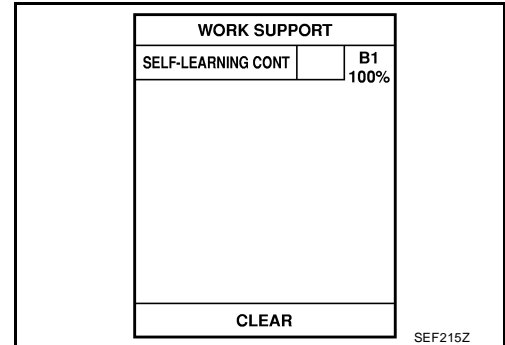
>> GO TO 3.



3. CLEAR THE SELF-LEARNING DATA

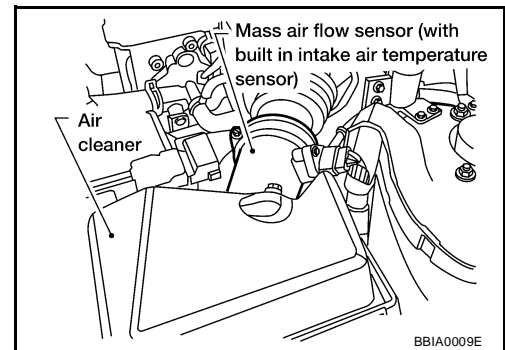
④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 detected?
Is it difficult to start engine?



⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-67, "HOW TO ERASE 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-220](#).
- No >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-148, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace heated oxygen sensor 1.

5. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-420, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

For circuit, refer to [EC-187, "Wiring Diagram"](#).

>> INSPECTION END

Component Inspection
HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.

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

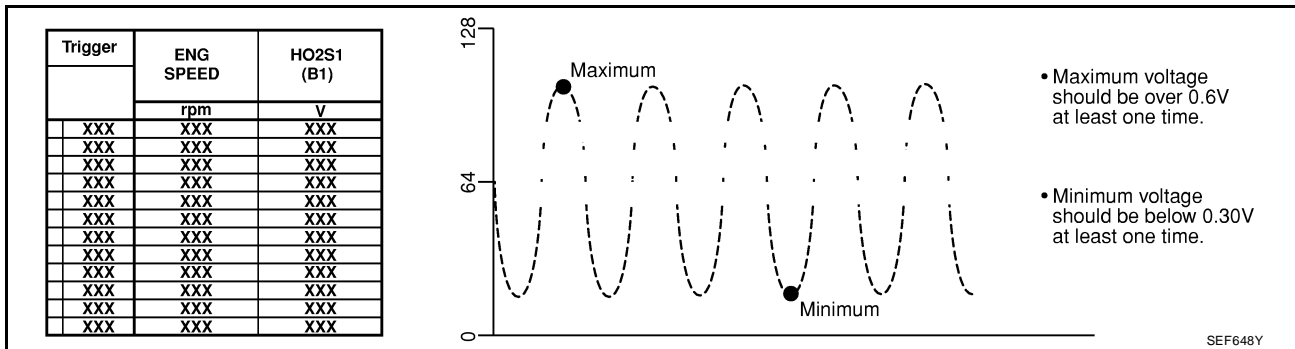
SEF646Y

6. Check the following.
 - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
 - “HO2S1 (B1)” voltage goes above 0.6V at least once.
 - “HO2S1 (B1)” voltage goes below 0.3V at least once.
 - “HO2S1 (B1)” voltage never exceeds 1.0V.

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

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

SEF217YA



CAUTION:

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

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.

3. Check the following with engine speed held at 2,000 rpm constant under no load.

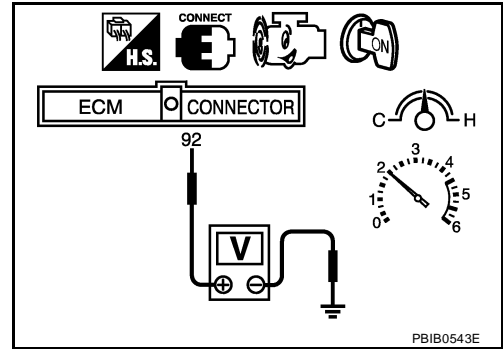
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

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.



**Removal and Installation
HEATED OXYGEN SENSOR 1**

UBS002YN

Refer to [EM-21, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

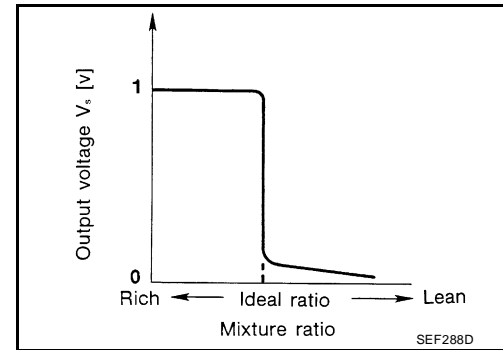
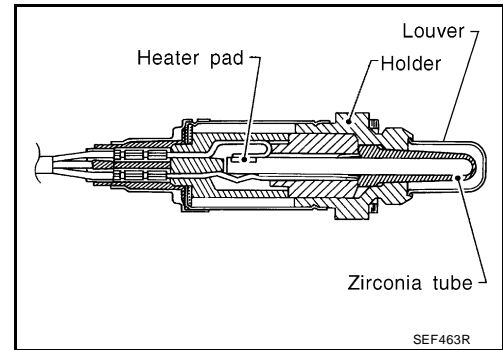
DTC P1144 HO2S1

PF2:22690

Component Description

UBS002Y0

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



CONSULT-II Reference Value in Data Monitor Mode

UBS002Y0

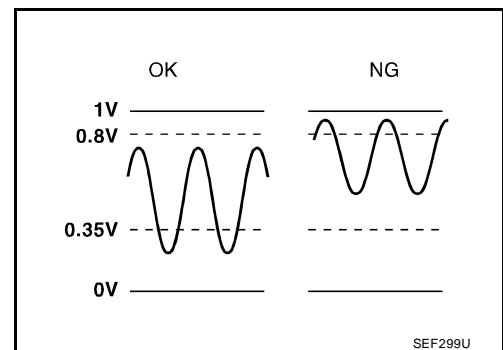
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS002Y0

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



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1144 1144	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	<ul style="list-style-type: none"> ● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Injectors

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 5 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P1144” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

HO2S1 (B1) P1144	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0548E

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

ENG SPEED	1,200 - 3,200 rpm
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	1.9 - 13.0 msec
Selector lever	Suitable position

HO2S1 (B1) P1144	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0549E

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-424, "Diagnostic Procedure"](#).

HO2S1 (B1) P1144	
COMPLETED	

SEC772C

Overall Function Check

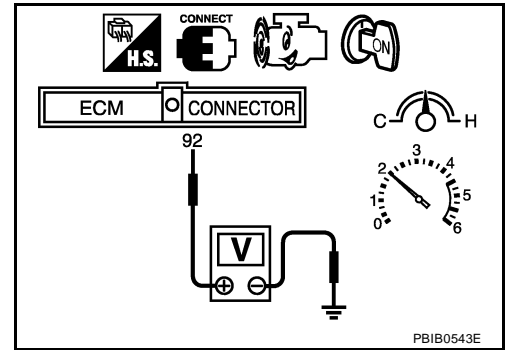
Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

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

A
EC
C
D
E
F
G
H
I
J
K
L
M

2. Set voltmeter probes between ECM terminal 92 [HO2S1(B1) signal] and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
 - The maximum voltage is below 0.8V at least one time.
 - The minimum voltage is below 0.35V at least one time.
4. If NG, go to [EC-424, "Diagnostic Procedure"](#).

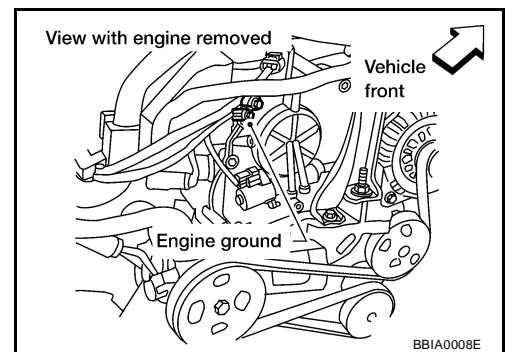


Diagnostic Procedure

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

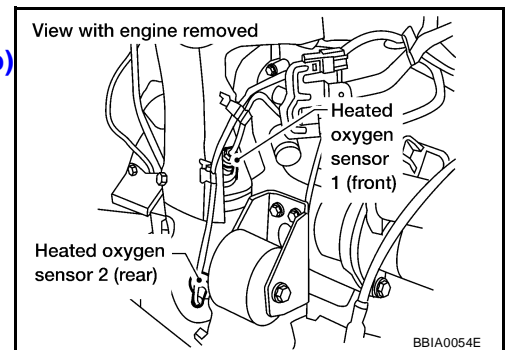


2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 40 - 50 N·m (4.1 - 5.1 kg·m, 30 - 37 ft·lb)

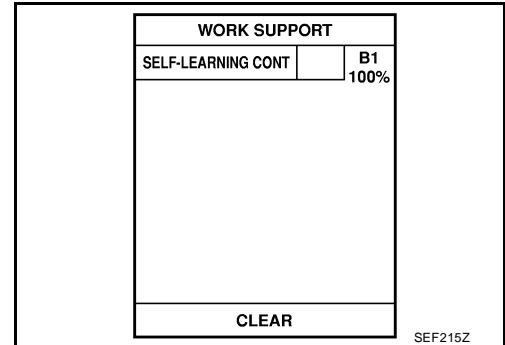
>> GO TO 3.



3. CLEAR THE SELF-LEARNING DATA

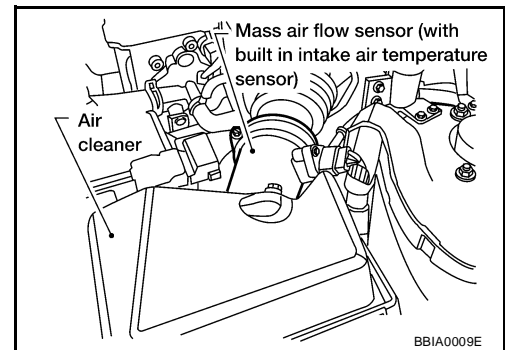
 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 detected?
Is it difficult to start engine?



 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-67, "HOW TO ERASE 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 P0172 detected?
Is it difficult to start engine?



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-226](#).
- No >> GO TO 4.

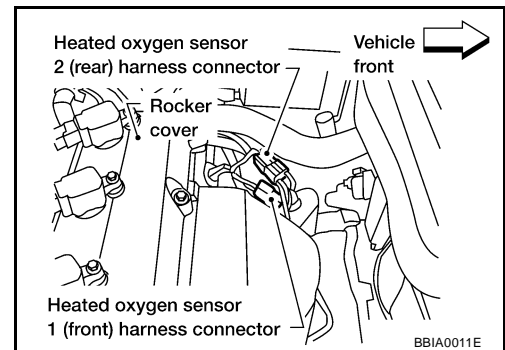
4. CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.

Water should not exist.

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.



5. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-148, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 1.

6. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-426, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace heated oxygen sensor 1.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

For circuit, refer to [EC-187, "Wiring Diagram"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 1

UBS002YU

Ⓟ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

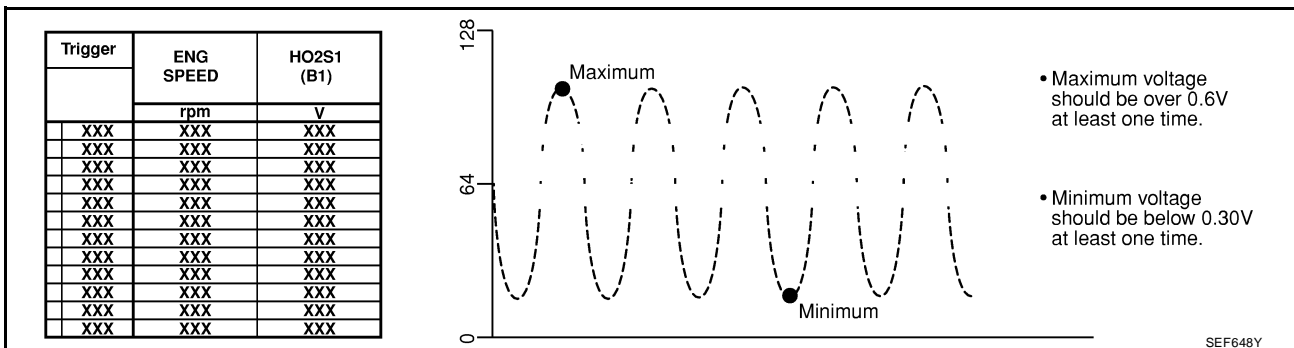
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
 - "HO2S1 (B1)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)" voltage never exceeds 1.0V.

cycle	1 2 3 4 5
HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1) indicates RICH	
L means HO2S1 MNTR (B1) indicates LEAN	

SEF217YA



CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

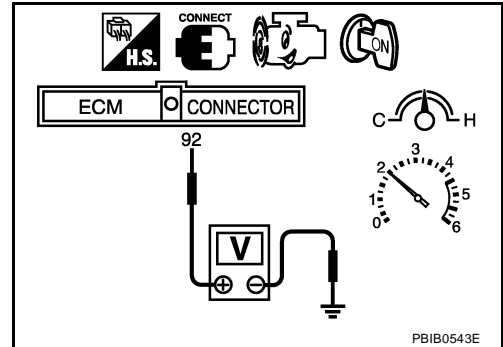
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

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.



**Removal and Installation
HEATED OXYGEN SENSOR 1**

UBS002YV

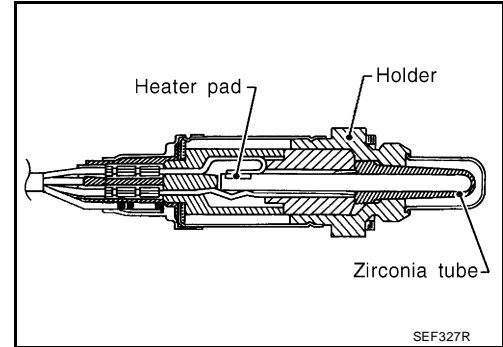
Refer to [EM-21, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P1146 HO2S2

Component Description

UBS002YW

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the heated oxygen 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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

UBS002YX

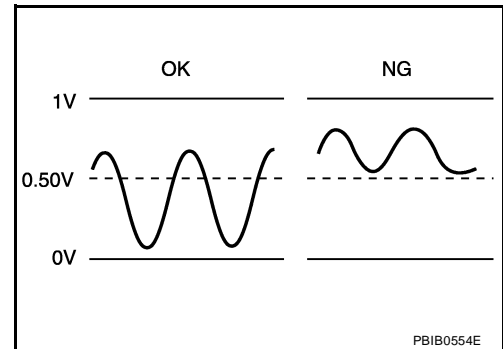
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

On Board Diagnosis Logic

UBS002YY

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. 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
P1146 1146	Heated oxygen sensor 2 minimum voltage monitoring	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors

DTC Confirmation Procedure

UBS002YZ

NOTE:

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

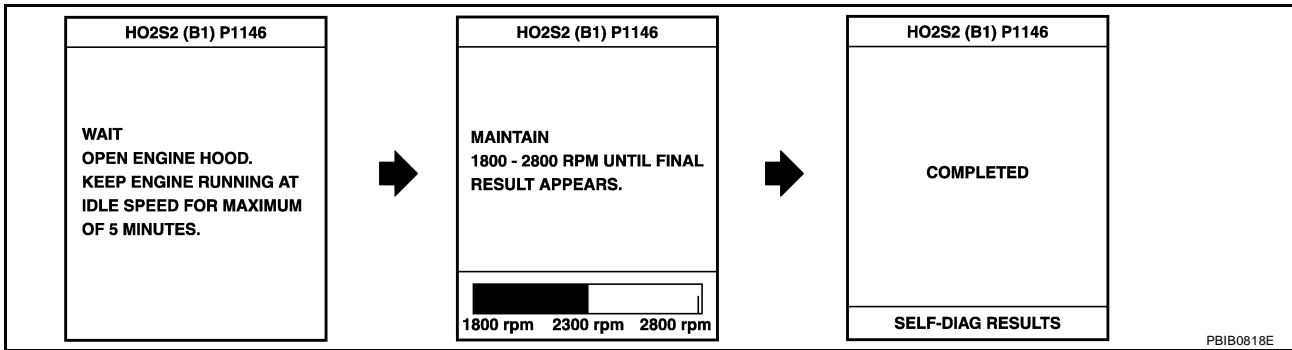
TESTING CONDITION:

Open engine hood before conducting following procedure.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).

6. Select "HO2S2 (B1) P1146" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7. Start engine and following the instruction of CONSULT-II.



8. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
 If "NG" is displayed, go to [EC-431, "Diagnostic Procedure"](#).
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
 - b. Turn ignition switch "ON".
 - c. Select "DATA MONITOR" mode with CONSULT-II.
 - d. Start engine.
 - e. Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

UBS002Z0

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.

CAUTION:

Always drive vehicle at a safe speed.

WITH GST

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)

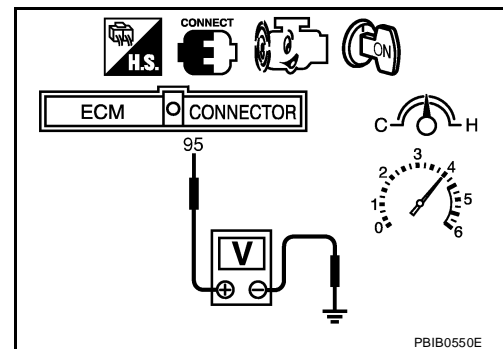
The voltage should be below 0.50V at least once during this procedure.

If the voltage can be confirmed in step 4, step 5 is not necessary.

5. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).

The voltage should be below 0.50V at least once during this procedure.

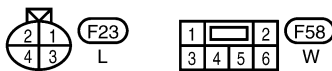
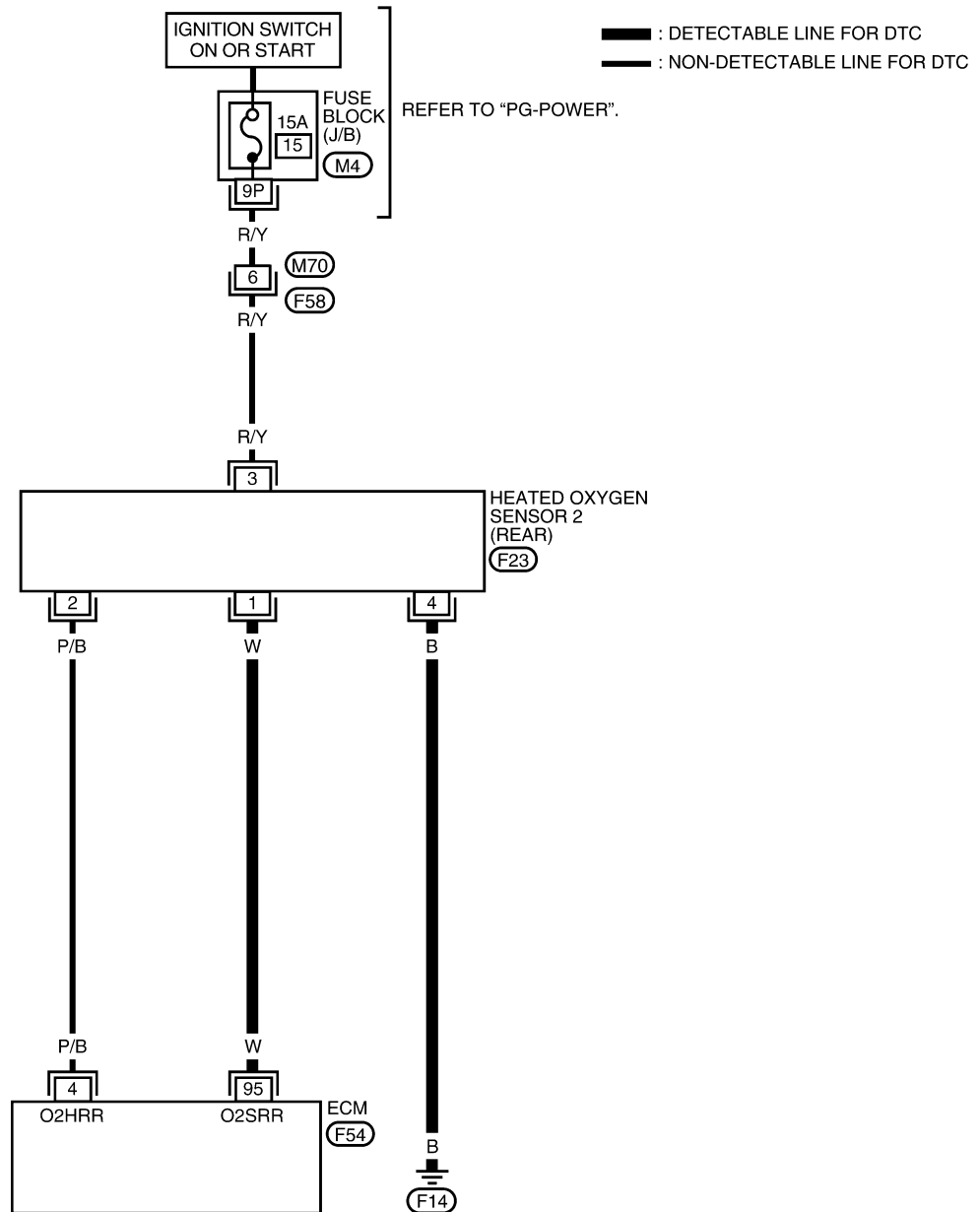
6. If NG, go to [EC-431, "Diagnostic Procedure"](#).



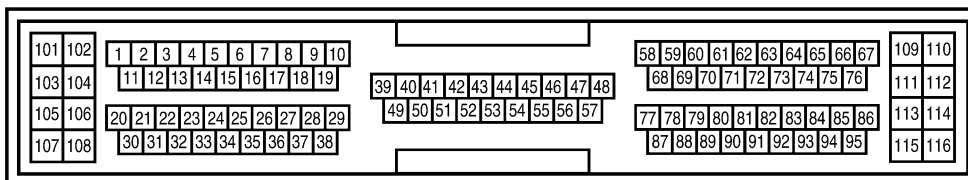
Wiring Diagram

UBS002Z1

EC-HO2S2-01



REFER TO THE FOLLOWING.
 M4 - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0011E

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Heated oxygen sensor 2	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V

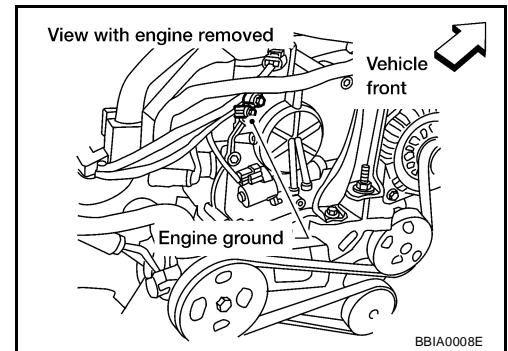
Diagnostic Procedure

UBS002Z2

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

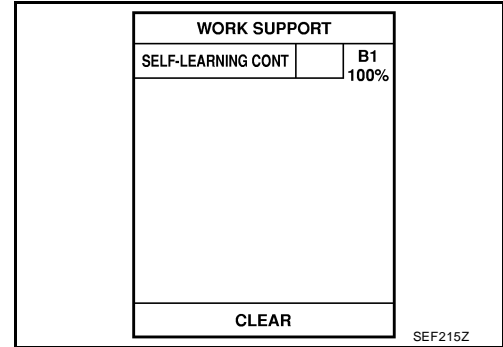
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

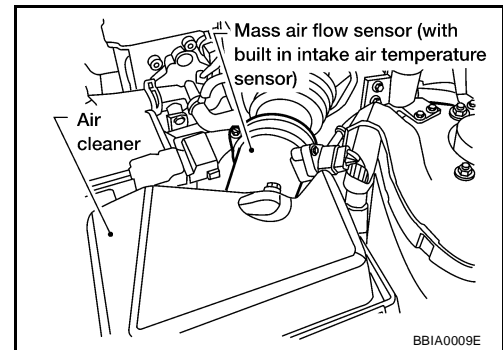
④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 detected?
Is it difficult to start engine?



⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-67, "HOW TO ERASE 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 P0172 detected?
Is it difficult to start engine?



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-226](#) .
 No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

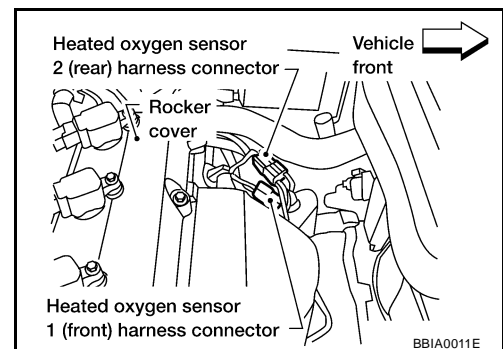
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check harness continuity between HO2S2 terminal 4 and engine ground.
 Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
 NG >> Repair open circuit or short to power in harness or connectors.



4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and HO2S2 terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

3. Check harness continuity between ECM terminal 95 or HO2S2 terminal 1 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

4. Also check harness for short to ground or 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-433, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
HEATED OXYGEN SENSOR 2**

UBS002Z3

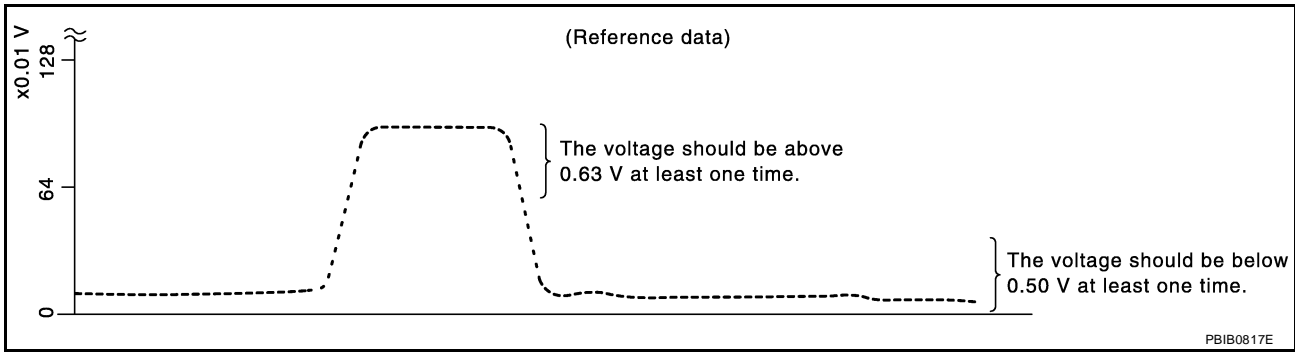
With CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

4. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

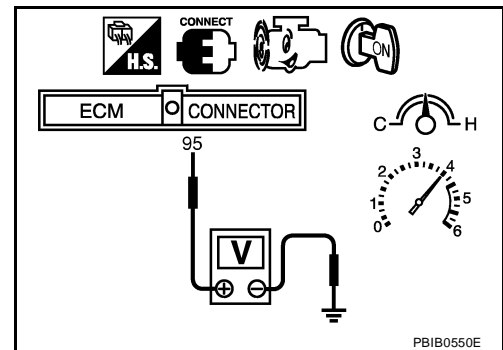
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved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

⊗ **Without CONSULT-II**

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage is above 0.63V at step 4, step 5 is not necessary.

5. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should be below 0.50V at least once during this procedure.



6. If NG, replace heated oxygen sensor 2.

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.

Removal and Installation HEATED OXYGEN SENSOR 2

UBS002Z4

Refer to [EX-3, "EXHAUST SYSTEM \(QR25DE\)"](#).

DTC P1147 HO2S2

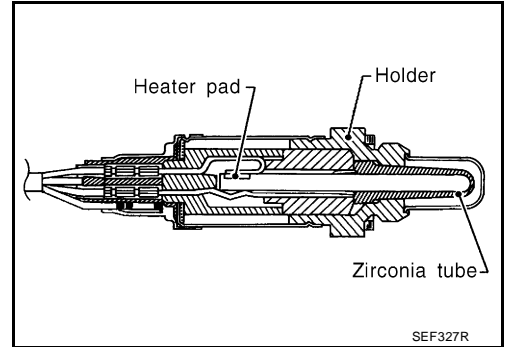
Component Description

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen 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 1V in richer conditions to 0V in leaner conditions.

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



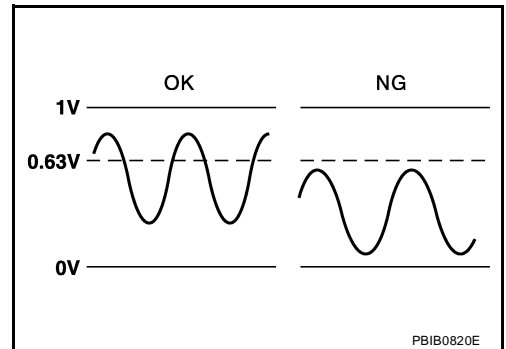
CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

On Board Diagnosis Logic

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst 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
P1147 1147	Heated oxygen sensor 2 maximum voltage monitoring	The maximum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors ● Intake air leaks

DTC Confirmation Procedure

NOTE:

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

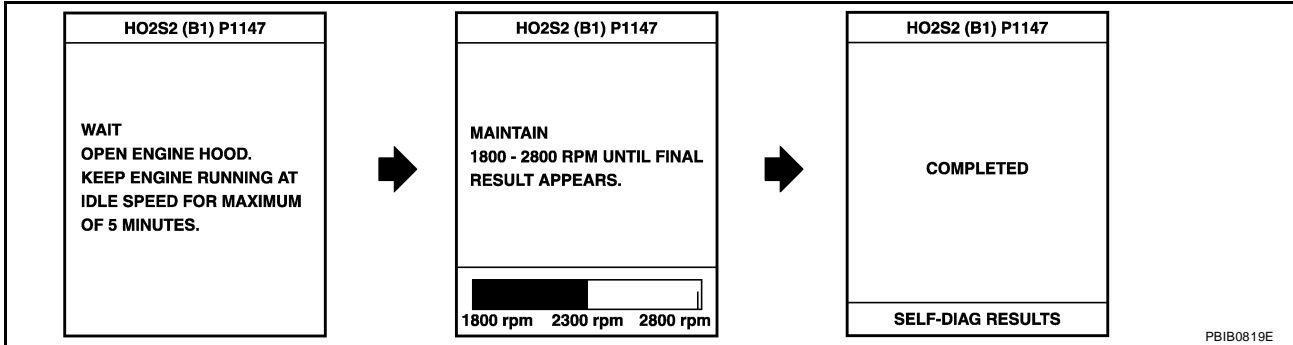
TESTING CONDITION:

Open engine hood before conducting following procedure.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.

5. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
6. Select "HO2S2 (B1) P1147" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7. Start engine and following the instruction of CONSULT-II.



8. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
 If "NG" is displayed, go to [EC-438, "Diagnostic Procedure"](#) .
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
 - b. Turn ignition switch "ON".
 - c. Select "DATA MONITOR" mode with CONSULT-II.
 - d. Start engine.
 - e. Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

UBS002Z9

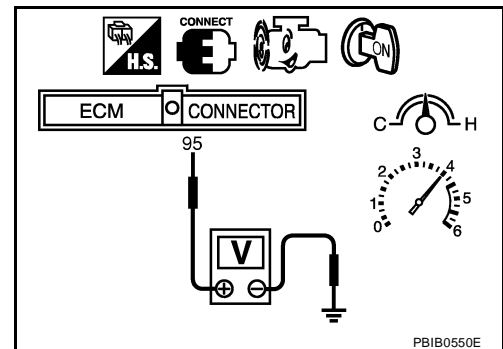
Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

CAUTION:

Always drive vehicle at a safe speed.

WITH GST

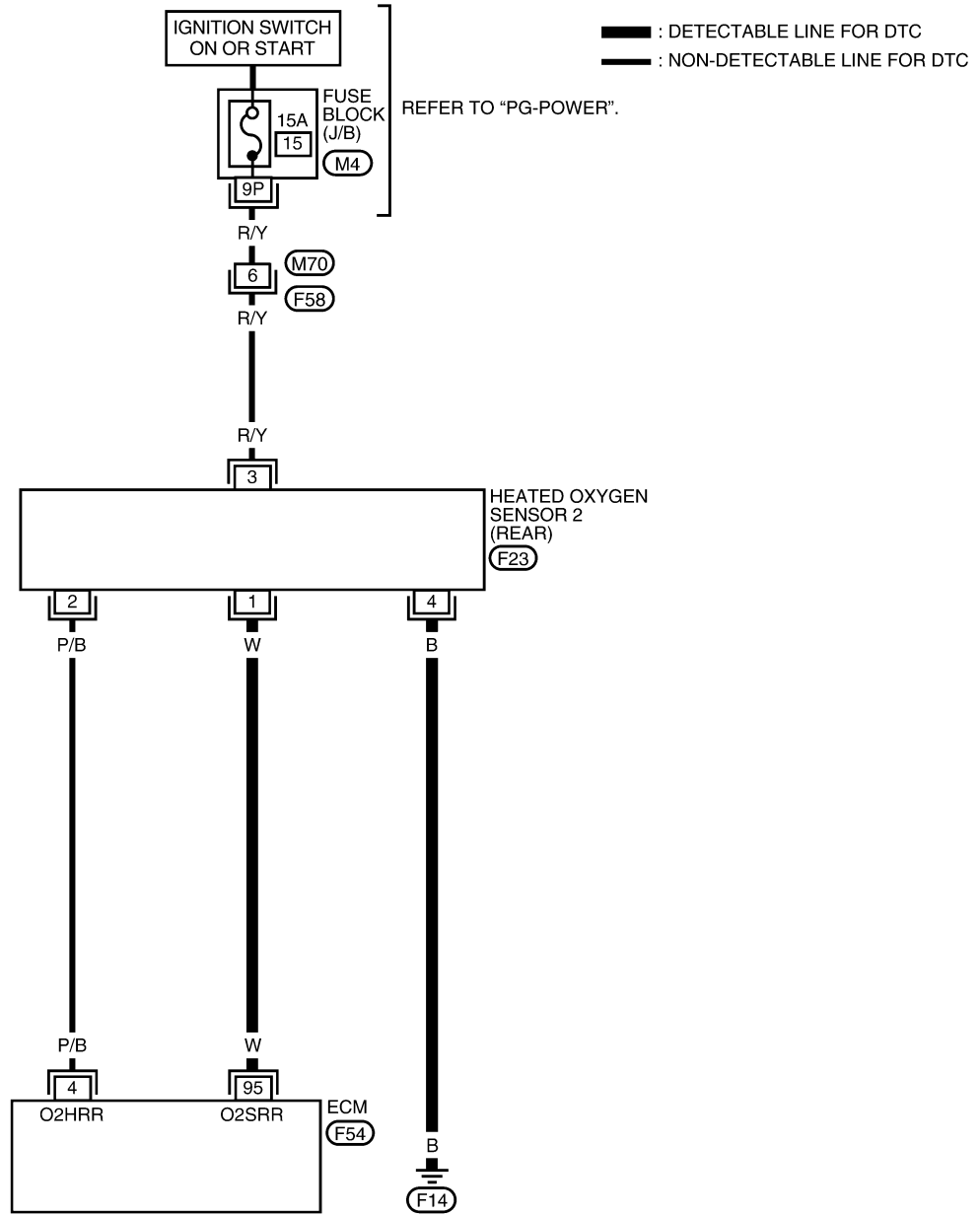
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
5. 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 with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should be above 0.63V at least once during this procedure.
6. If NG, go to [EC-438, "Diagnostic Procedure"](#) .



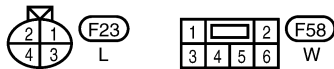
Wiring Diagram

UBS002ZA

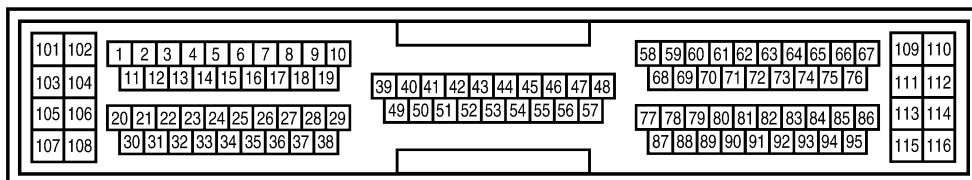
EC-HO2S2-01



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REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0011E

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Heated oxygen sensor 2	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V

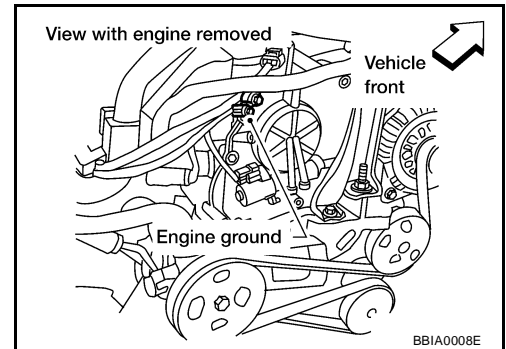
Diagnostic Procedure

UBS002ZB

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

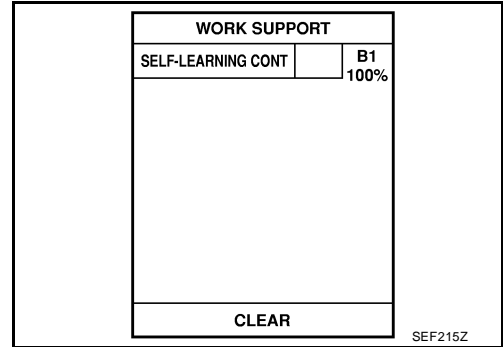
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

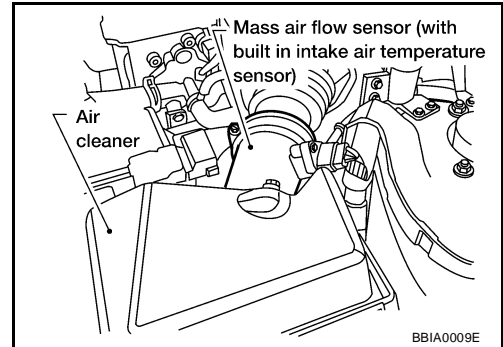
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 detected?
Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-67, "HOW TO ERASE 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-220](#).
- No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

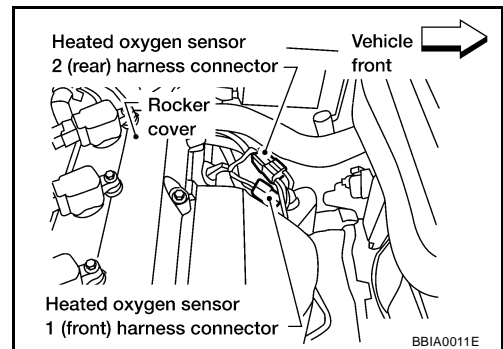
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check harness continuity between HO2S2 terminal 4 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to power in harness or connectors.



4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and HO2S2 terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

3. Check harness continuity between ECM terminal 95 or HO2S2 terminal 1 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

4. Also check harness for short to ground or 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-440, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
HEATED OXYGEN SENSOR 2**

UBS002ZC

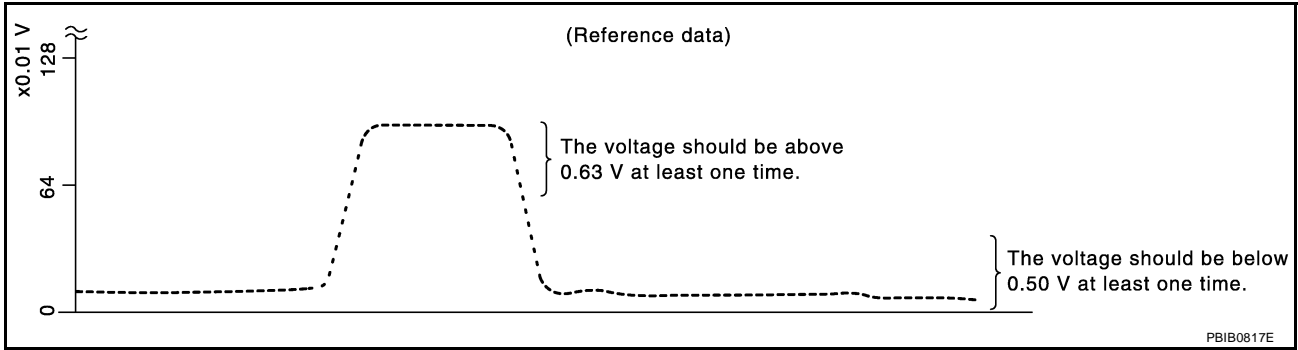
With CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

4. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

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

⊗ **Without CONSULT-II**

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)

The voltage should be above 0.63V at least once during this procedure.

If the voltage is above 0.63V at step 4, step 5 is not necessary.

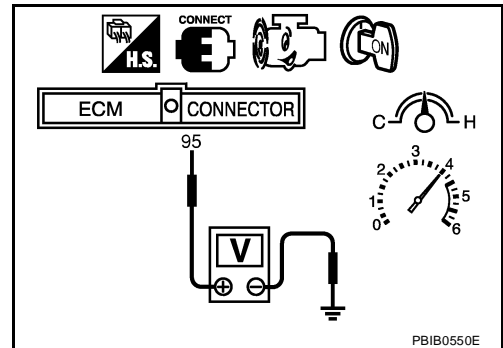
5. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).

The voltage should be below 0.50V at least once during this procedure.

6. If NG, replace heated oxygen sensor 2.

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.



**Removal and Installation
 HEATED OXYGEN SENSOR 2**

UBS002ZD

Refer to [EX-3, "EXHAUST SYSTEM \(QR25DE\)"](#).

DTC P1148 CLOSED LOOP CONTROL

[QR]

DTC P1148 CLOSED LOOP CONTROL

PF2:22690

On Board Diagnosis Logic

UBS002ZE

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"> ● The heated oxygen sensor 1 circuit is open or shorted. ● Heated oxygen sensor 1 ● Heated oxygen sensor heater

DTC Confirmation Procedure

UBS002ZF

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

- Never raise engine speed above 3,600 rpm during the "DTC Confirmation Procedure". If the engine speed limit is exceeded, retry the procedure from step 2.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Hold engine speed at 2,000 rpm and check one of the following.
 - "HO2S1 (B1)" voltage should go above 0.70V at least once.
 - "HO2S1 (B1)" voltage should go below 0.21V at least once.
 If the check result is NG, perform [EC-443, "Diagnostic Procedure"](#).
 If the check result is OK, perform the following step.
4. Let engine idle at least 5 minutes.
5. Maintain the following condition at least 50 consecutive seconds.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
VHCL SPEED SE	XXX km/h

SEF682Y

B/FUEL SCHDL	2.8 msec or more
ENG SPEED	More than 1,600 rpm
Selector lever	Suitable position
VHCL SPEED SE	More than 70 km/h (43 MPH)

During this test, P0134 may be displayed on CONSULT-II screen.

6. If DTC is detected, go to [EC-443, "Diagnostic Procedure"](#).

Overall Function Check

UBS002ZG

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed.

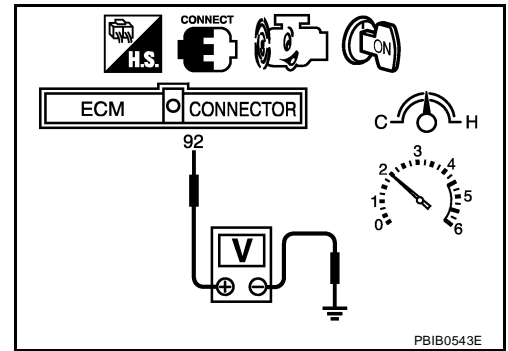
WITH GST

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

DTC P1148 CLOSED LOOP CONTROL

[QR]

2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no-load.
 - The voltage should go above 0.70V at least once.
 - The voltage should go below 0.21V at least once.
4. If NG, go to [EC-443, "Diagnostic Procedure"](#) .



Diagnostic Procedure

Perform trouble diagnosis for "DTC P0133", [EC-195](#) .

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DTC P1217 ENGINE OVER TEMPERATURE

System Description

NOTE:

If DTC P1217 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-138, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

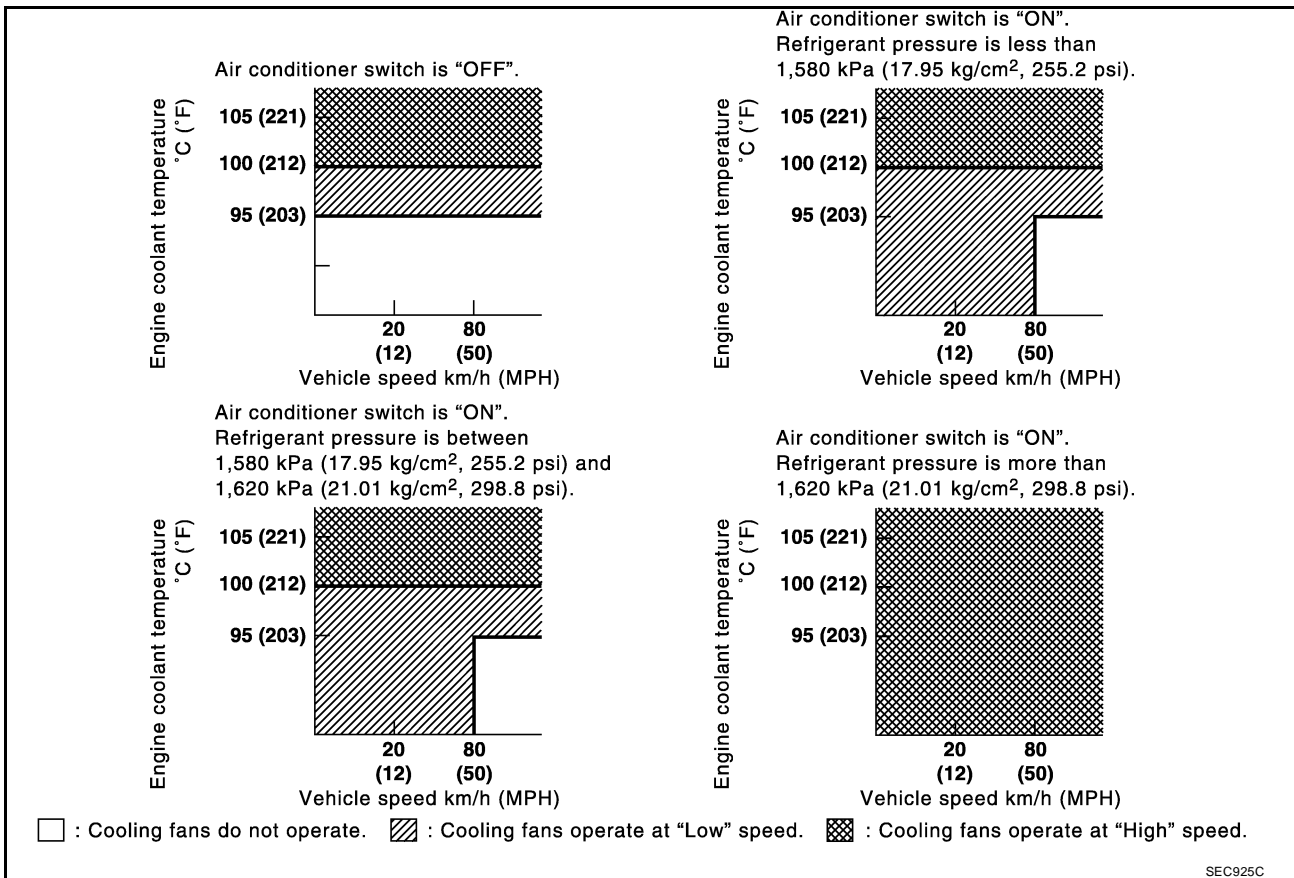
COOLING FAN CONTROL

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed*	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal*		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

*: These signals are 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]. The ECM controls cooling fan relays through CAN communication line.

OPERATION



SEC925C

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

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

DTC P1217 ENGINE OVER TEMPERATURE

[QR]

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine ● Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH

On Board Diagnosis Logic

UBS002ZK

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise. When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 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. 	<ul style="list-style-type: none"> ● Harness or connectors (The cooling fan circuit is open or shorted.) ● Cooling fan ● Radiator hose ● Radiator ● Radiator cap ● Water pump ● Thermostat <p>For more information, refer to EC-453, "Main 12 Causes of Overheating".</p>

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [MA-14](#), "Changing Engine Coolant". Also, replace the engine oil. Refer to [LU-7](#), "Changing Engine Oil".

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-13](#), "ANTI-FREEZE COOLANT MIXTURE RATIO".
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

Overall Function Check

UBS002ZL

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

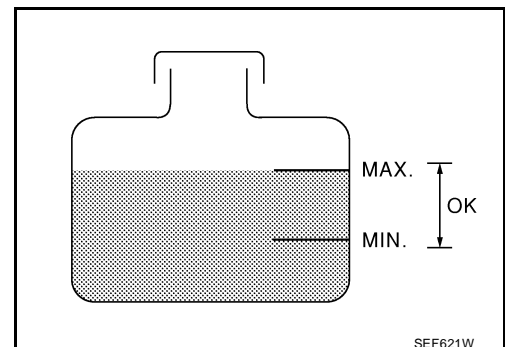
WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

WITH CONSULT-II

1. Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-448](#), "Diagnostic Procedure".
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-448](#), "Diagnostic Procedure".
3. Turn ignition switch "ON".



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DTC P1217 ENGINE OVER TEMPERATURE

[QR]

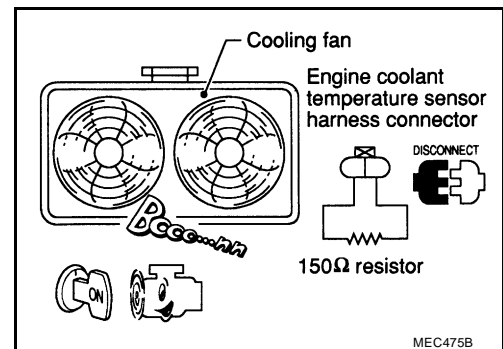
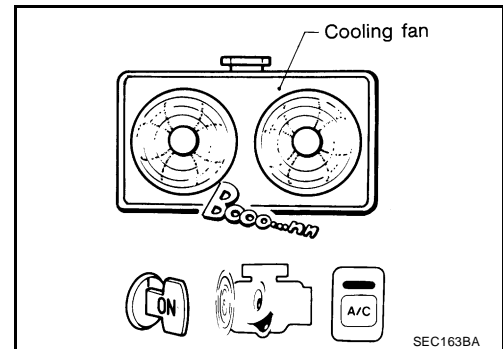
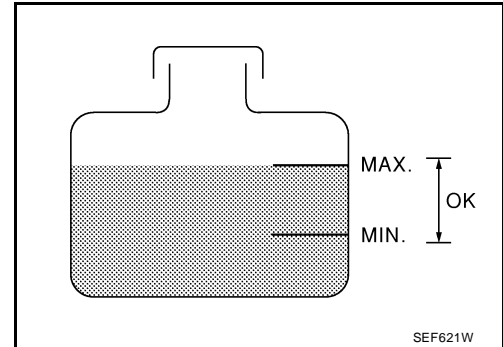
4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
5. If the results are NG, go to [EC-448, "Diagnostic Procedure"](#).

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLANT TEMP/S	XXX °C

SEF646X

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-448, "Diagnostic Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-448, "Diagnostic Procedure"](#).
3. Start engine.
Be careful not to overheat engine.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fan operates at low speed.
 If NG, go to [EC-448, "Diagnostic Procedure"](#).
 If OK, go to the following step.
7. Turn ignition switch "OFF".
8. Turn air conditioner switch and blower fan switch "OFF".
9. Disconnect engine coolant temperature sensor harness connector.
10. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
11. Restart engine and make sure that cooling fan operates at higher speed than low speed.
Be careful not to overheat engine.
12. If NG, go to [EC-448, "Diagnostic Procedure"](#).



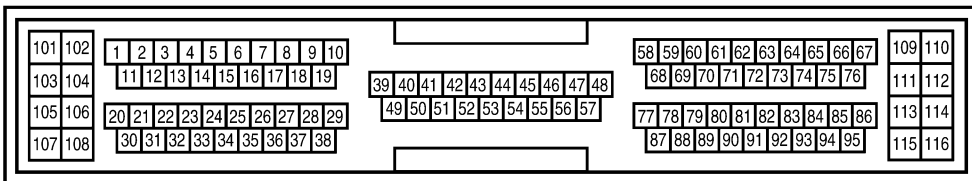
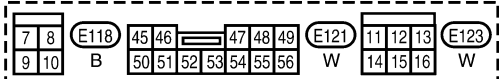
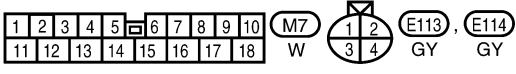
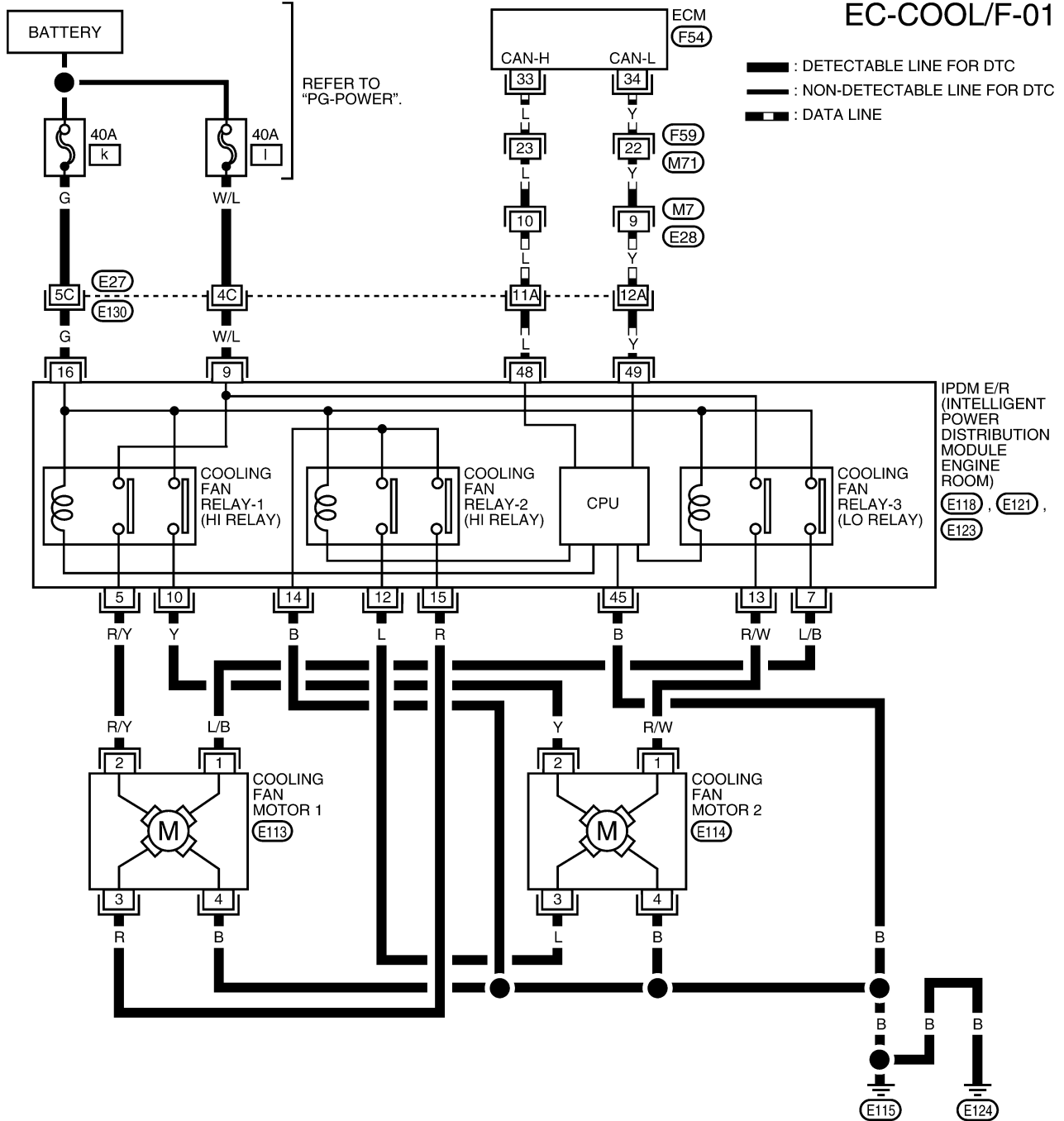
DTC P1217 ENGINE OVER TEMPERATURE

[QR]

UBS002ZM

Wiring Diagram

EC-COOL/F-01



REFER TO THE FOLLOWING.
 E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBIA0225E

Diagnostic Procedure

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.

2. CHECK COOLING FAN LOW SPEED OPERATION

 **With CONSULT-II**

1. Start engine and let it idle.
2. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II and touch "LOW" on the CONSULT-II screen.
3. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

- OK >> GO TO 3.
- NG >> Check cooling fan low speed control circuit. (Go to [EC-451, "PROCEDURE A"](#).)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

3. CHECK COOLING FAN HIGH SPEED OPERATION

 **With CONSULT-II**

1. Touch "HIGH" on the CONSULT-II screen.
2. Make sure that cooling fans-1 and -2 operate at higher speed than low speed.

OK or NG

- OK >> GO TO 6.
- NG >> Check cooling fan high speed control circuit. (Go to [EC-453, "PROCEDURE B"](#).)

ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

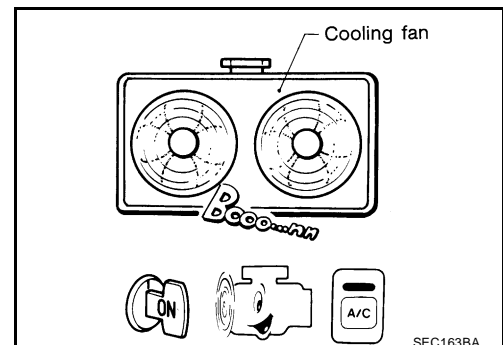
4. CHECK COOLING FAN LOW SPEED OPERATION

 **Without CONSULT-II**

1. Start engine and let it idle.
2. Turn air conditioner switch "ON".
3. Turn blower fan switch "ON".
4. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

- OK >> GO TO 5.
- NG >> Check cooling fan low speed control circuit. (Go to [EC-451, "PROCEDURE A"](#).)



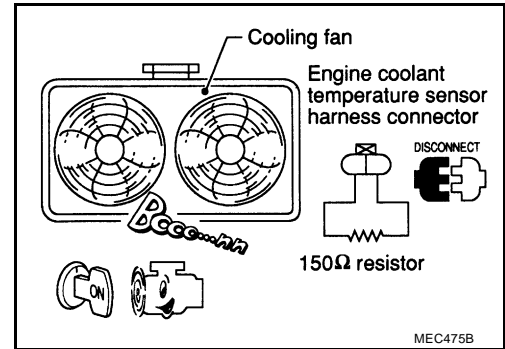
5. CHECK COOLING FAN HIGH SPEED OPERATION

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Turn air conditioner switch and blower fan switch "OFF".
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fans-1 and -2 operate at higher speed than low speed.

OK or NG

- OK >> GO TO 6.
 NG >> Check cooling fan high speed control circuit. (Go to [EC-453, "PROCEDURE B"](#) .)



6. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

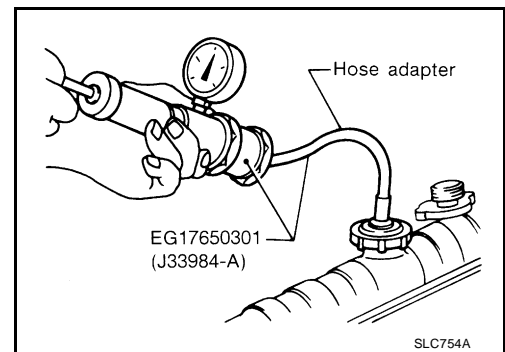
Testing pressure: 157 kPa (1.6 kg/cm² , 23 psi)

CAUTION:

Higher than the specified pressure may cause radiator damage. Pressure should not drop.

OK or NG

- OK >> GO TO 7.
 NG >> Check the following for leak
- Hose
 - Radiator
 - Water pump
- Refer to [CO-18, "WATER PUMP"](#) .



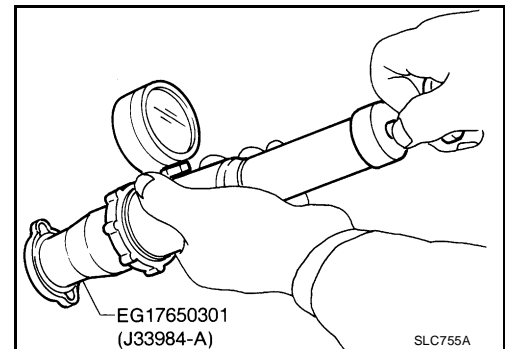
7. CHECK RADIATOR CAP

Apply pressure to cap with a tester.

**Radiator cap relief pressure: 59 - 98 kPa
 (0.6 - 1.0 kg/cm² , 9 - 14 psi)**

OK or NG

- OK >> GO TO 8.
 NG >> Replace radiator cap.



8. CHECK THERMOSTAT

1. Check valve seating condition at normal room temperatures.
It should seat tightly.
2. Check valve opening temperature and valve lift.

Valve opening temperature: 82°C (180°F) [standard]

**Valve lift: More than 8 mm/95°C
(0.31 in/203°F)**

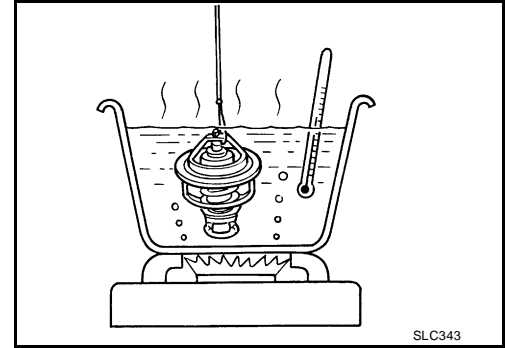
3. Check if valve is closed at 5°C (9°F) below valve opening temperature.

For details, refer to [CO-20, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

OK or NG

OK >> GO TO 9.

NG >> Replace thermostat



9. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-176, "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> Replace engine coolant temperature sensor.

10. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to [EC-453, "Main 12 Causes of Overheating"](#).

>> **INSPECTION END**

PROCEDURE A

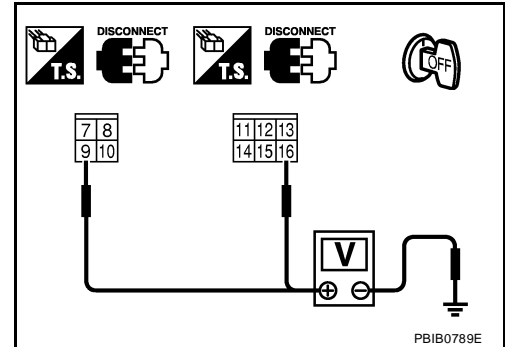
1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect IPDM E/R harness connectors E118 and E123.
3. Check voltage between IPDM E/R terminals 9, 16 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- 40A fusible links
- Harness connectors E27, E130
- 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 MOTORS CIRCUIT

1. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
2. Check harness continuity between cooling fan motor-1 terminal 1 and IPDM E/R terminal 7, cooling fan motor-1 terminal 4 and body ground. Refer to wiring diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.
4. Check harness continuity between cooling fan motor-2 terminal 1 and IPDM E/R terminal 13, cooling fan motor-2 terminal 4 and body ground. Refer to wiring diagram.

Continuity should exist.

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

OK or NG

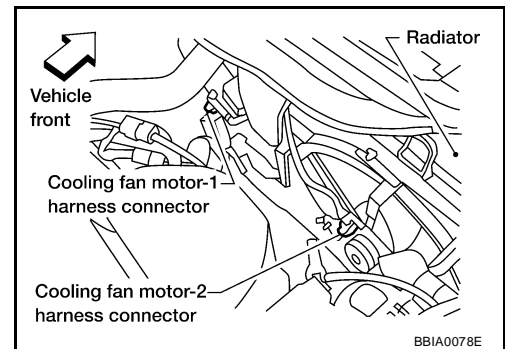
- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK COOLING FAN MOTORS

Refer to [EC-454, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace cooling fan motors.



5. CHECK INTERMITTENT INCIDENT

Perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .
- NG >> Repair or replace harness or connector.

PROCEDURE B

1. CHECK COOLING FAN MOTORS CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between the following; cooling fan motor-1 terminal 2 and IPDM E/R terminal 5, cooling fan motor-1 terminal 3 and IPDM E/R terminal 15, IPDM E/R terminal 14 and body ground. Refer to wiring diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.
5. Check harness continuity between the following; cooling fan motor-2 terminal 2 and IPDM E/R terminal 10, cooling fan motor-2 terminal 3 and IPDM E/R terminal 12, IPDM E/R terminal 14 and body ground. Refer to wiring diagram.

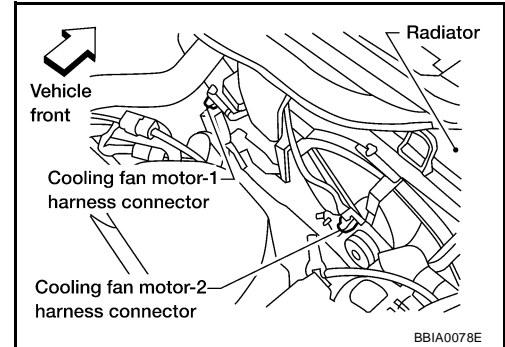
Continuity should exist.

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

OK or NG

OK >> GO TO 2.

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



2. CHECK COOLING FAN MOTORS

Refer to [EC-454, "Component Inspection"](#) .

OK or NG

OK >> GO TO 3.

NG >> Replace cooling fan motors.

3. CHECK INTERMITTENT INCIDENT

Perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .

NG >> Repair or replace harness connectors.

Main 12 Causes of Overheating

UBS002Z0

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 	50 - 50% coolant mixture	See MA-13, "ANTI-FREEZE COOLANT MIXTURE RATIO" .
	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 MA-14, "Changing Engine Coolant" .
	4	<ul style="list-style-type: none"> ● Radiator cap 	<ul style="list-style-type: none"> ● Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See CO-11, "CHECKING RADIATOR CAP" .

DTC P1217 ENGINE OVER TEMPERATURE

[QR]

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*2	5	● Coolant leaks	● Visual	No leaks	See CO-10, "CHECKING COOLING SYSTEM FOR LEAKS" .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See CO-20, "THERMOSTAT AND THERMOSTAT HOUSING" , and CO-12, "RADIATOR" .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P1217 (EC-444) .
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	See MA-14, "Changing Engine Coolant" .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See CO-10, "CHECKING RESERVOIR LEVEL" .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-53, "CYLINDER HEAD" .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See EM-53, "CYLINDER HEAD" .

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to [CO-7, "OVERHEATING CAUSE ANALYSIS"](#) .

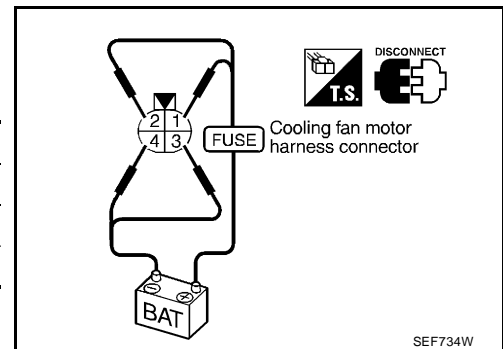
Component Inspection COOLING FAN MOTORS-1 AND -2

UBS002ZP

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
	High	1, 2	3, 4

Cooling fan motor should operate.
If NG, replace cooling fan motor.



DTC P1223, P1224 TP SENSOR

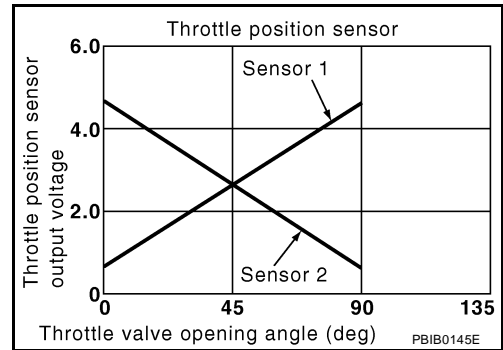
PF16119

Component Description

UBS002ZQ

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 the 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-II Reference Value in Data Monitor Mode

UBS002ZR

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL SEN2	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) 	Accelerator pedal: Fully released More than 0.36V
	<ul style="list-style-type: none"> Shift lever: D (A/T model) 1st (M/T model) 	Accelerator pedal: Fully depressed Less than 4.75V

On Board Diagnosis Logic

UBS002ZS

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1223 1223	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 (The TP sensor 2 circuit is open or shorted.) Electric throttle control actuator (TP sensor 2)
P1224 1224	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, the ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS002ZT

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P1223, P1224 TP SENSOR

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-458, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



WITH GST

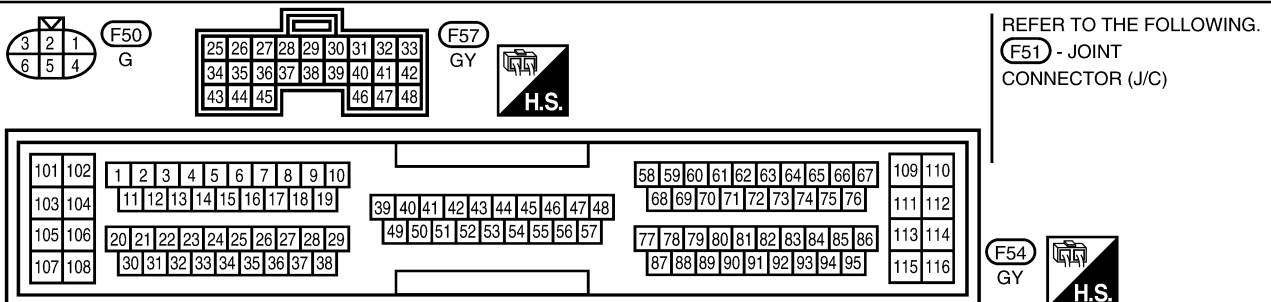
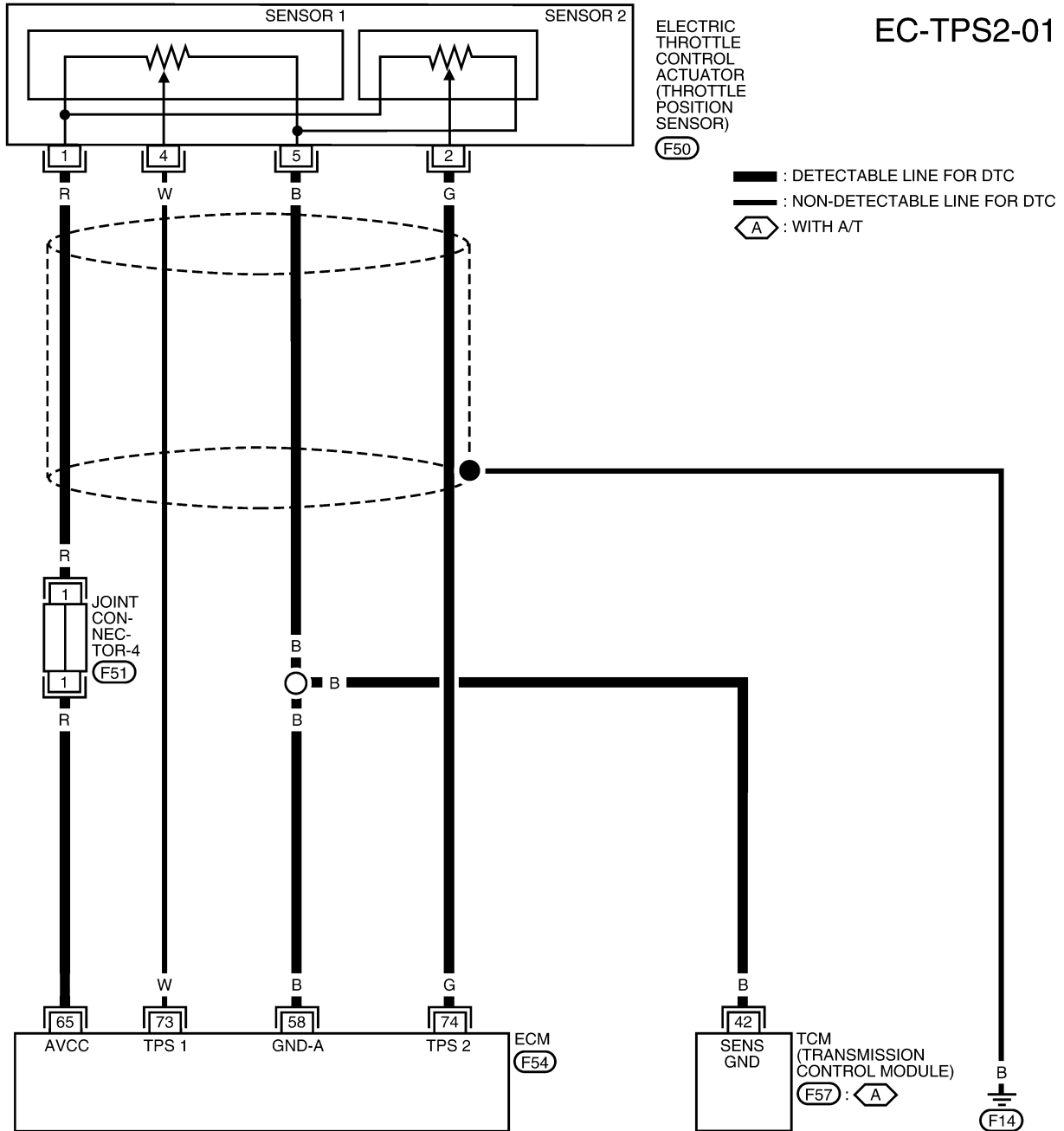
Follow the procedure "WITH CONSULT-II" above.

DTC P1223, P1224 TP SENSOR

[QR]

UBS002ZU

Wiring Diagram



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

DTC P1223, P1224 TP SENSOR

[QR]

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
73	W	Throttle position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released 	More than 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed 	Less than 4.75V
74	G	Throttle position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released 	Less than 4.75V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed 	More than 0.36V

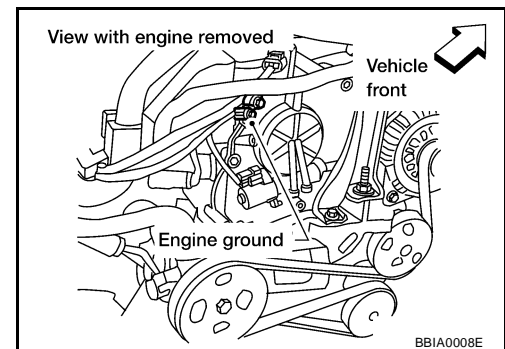
Diagnostic Procedure

UBS002ZV

1. RETIGHTEN GROUND SCREWS

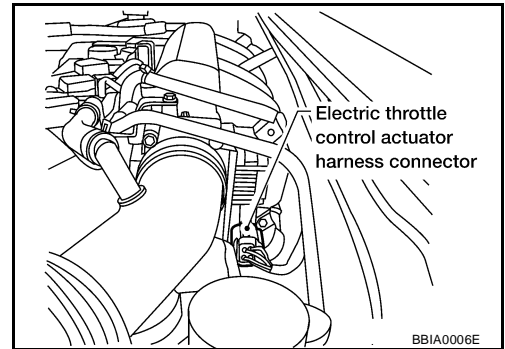
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

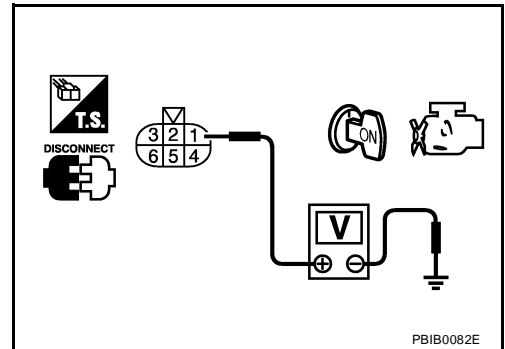


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-4
- Harness for open or short between electric throttle control actuator and ECM

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

4. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between electric throttle control actuator and ECM
- Harness for open or short between electric throttle control actuator and TCM

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

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

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 74 and electric throttle control actuator 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 7.

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

7. CHECK THROTTLE POSITION SENSOR

Refer to [EC-460, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.

8. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

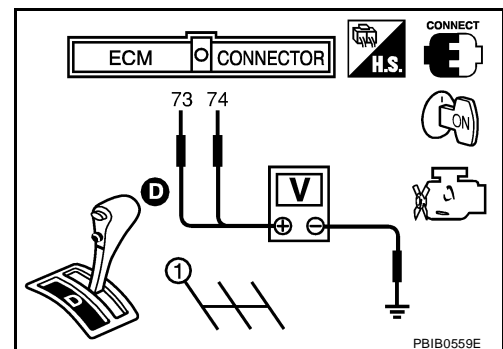
Component Inspection THROTTLE POSITION SENSOR

UBS002ZW

1. Reconnect all harness connectors disconnected.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 73 (TP sensor 1), 74 (TP sensor 2) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
74 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-49, "Idle Air Volume Learning"](#) .



Remove and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

UBS002ZX

Refer to [EM-16, "INTAKE MANIFOLD"](#) .

DTC P1225 TP SENSOR

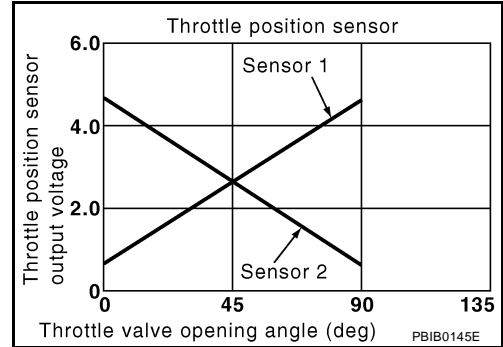
PFP:16119

Component Description

UBS002ZY

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 the 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

UBS002ZZ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance problem	Closed throttle position learning value is excessively low.	● Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

UBS00300

NOTE:

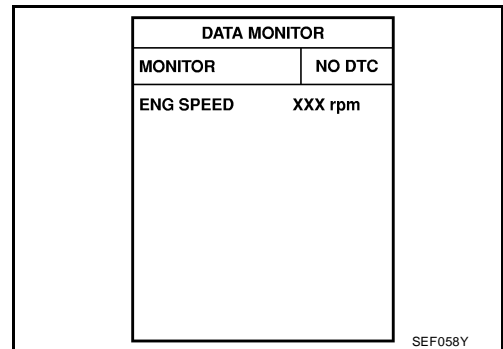
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Turn ignition switch "ON".
5. If 1st trip DTC is detected, go to [EC-462, "Diagnostic Procedure"](#)



WITH GST

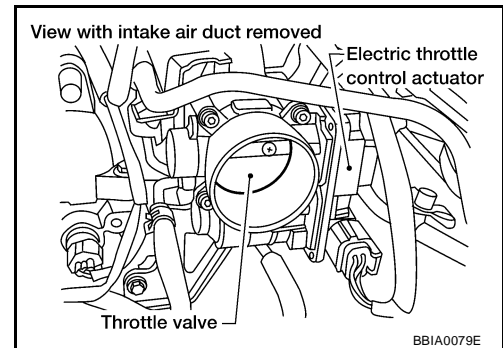
Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure**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 and the housing.

OK or NG

- OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**Remove and Installation
ELECTRIC THROTTLE CONTROL ACTUATOR**

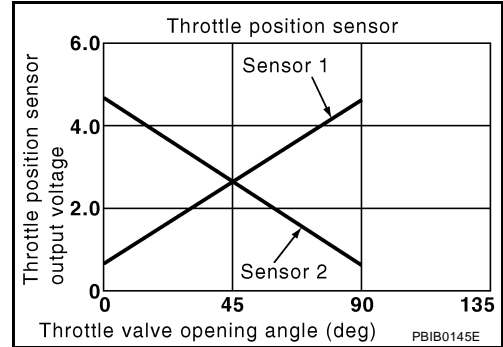
Refer to [EM-16, "INTAKE MANIFOLD"](#) .

DTC P1226 TP SENSOR

Component Description

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 the 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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance problem	Closed throttle position learning is not performed successfully, repeatedly.	● Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

NOTE:

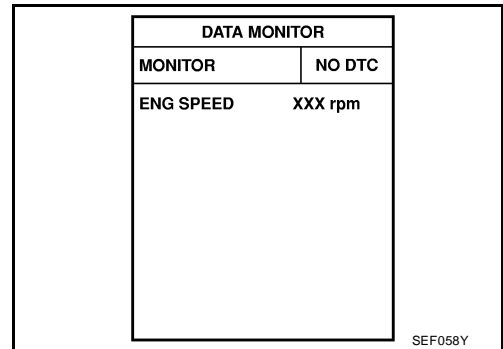
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Turn ignition switch "ON".
5. Repeat steps 3 and 4, 32 times.
6. If 1st trip DTC is detected, go to [EC-464, "Diagnostic Procedure"](#)



WITH GST

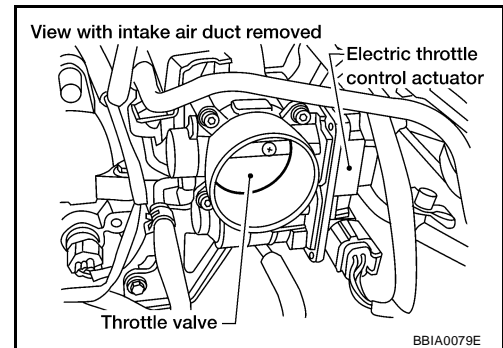
Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure**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 and the housing.

OK or NG

- OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**Remove and Installation
ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-16, "INTAKE MANIFOLD"](#) .

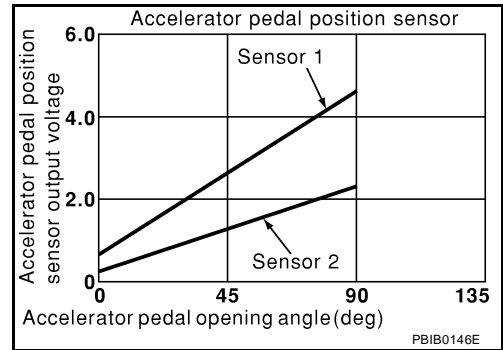
DTC P1227, P1228 APP SENSOR

Component Description

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-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN2	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
CLSD THL POS	● Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

These half-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1227 1227	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	● Harness or connectors (The APP sensor 2 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2)
P1228 1228	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, the ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P1227, P1228 APP SENSOR

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-468, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P1227, P1228 APP SENSOR

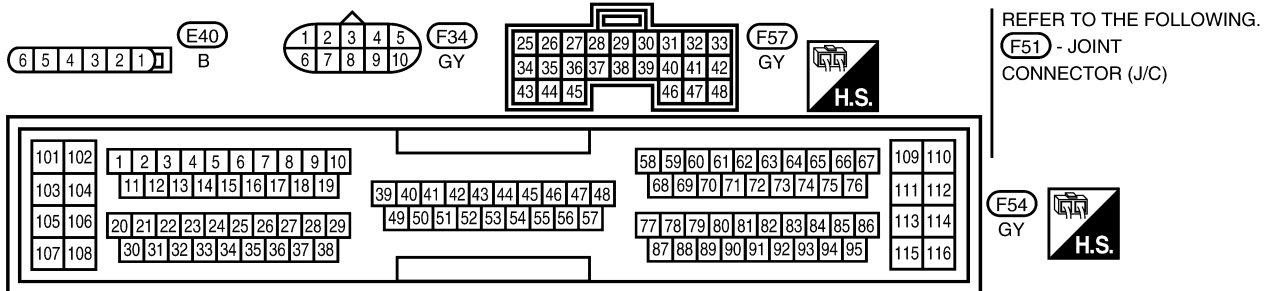
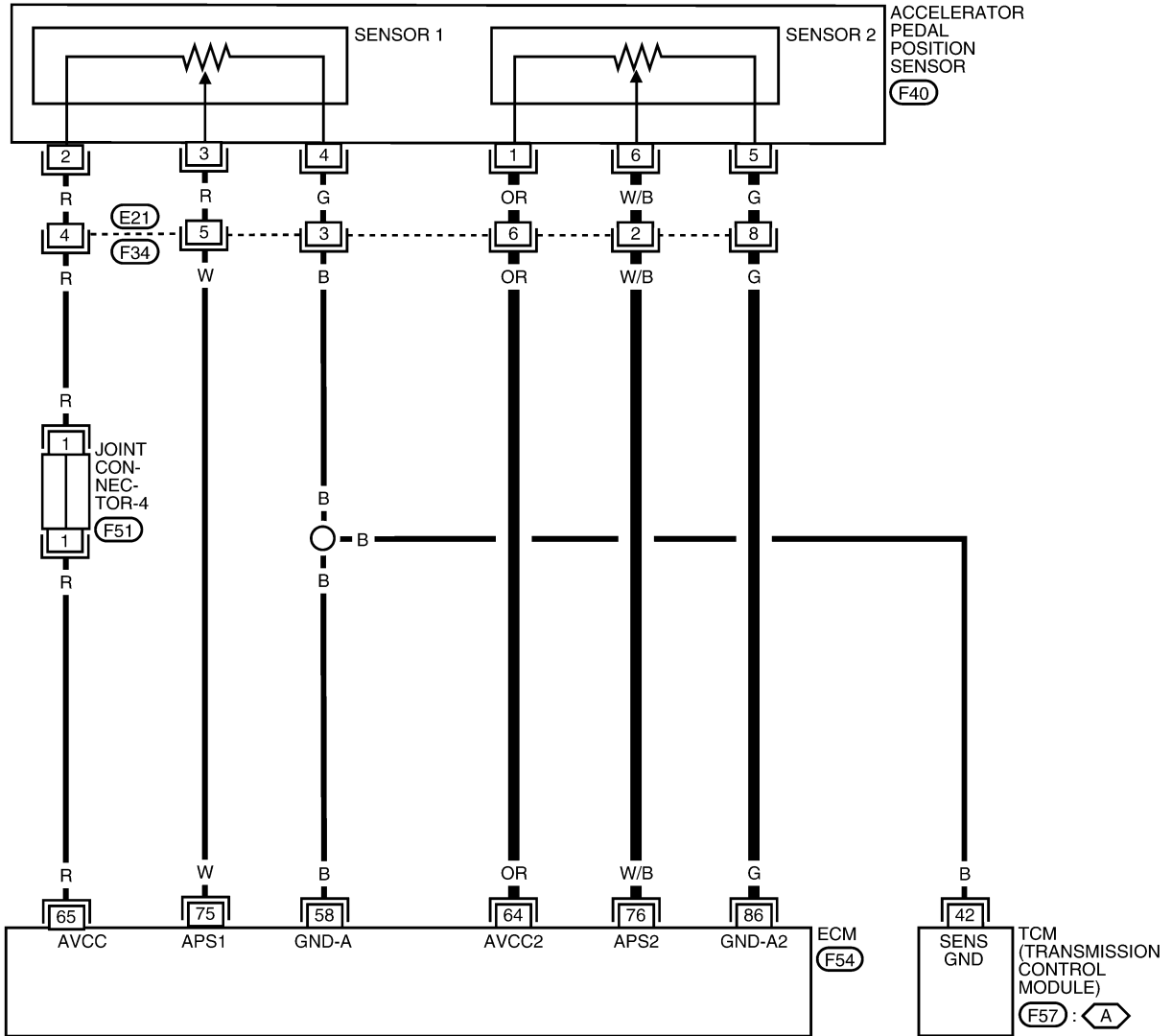
[QR]

UBS0030C

Wiring Diagram

EC-APPS2-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC
A : WITH A/T



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

DTC P1227, P1228 APP SENSOR

[QR]

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
75	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] ● Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 4.2V
76	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] ● Accelerator pedal fully released	0.21 - 0.36V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 2.1V
86	G	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V

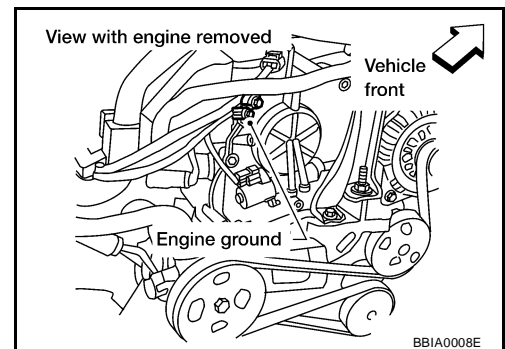
Diagnostic Procedure

UBS0030D

1. RETIGHTEN GROUND SCREWS

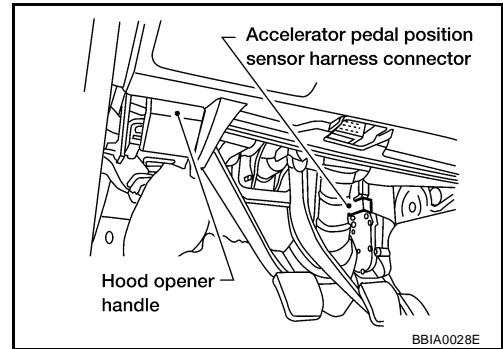
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

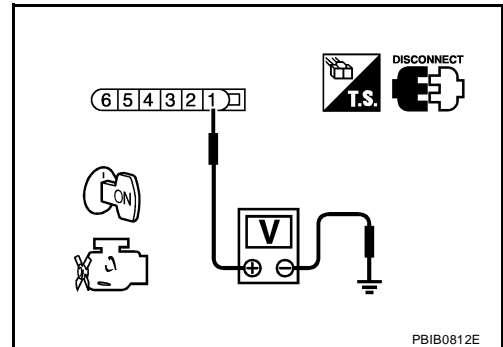


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 2.5V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

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

4. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminal 5 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

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

6. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 76 and APP sensor terminal 6.
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 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

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

8. CHECK APP SENSOR

Refer to [EC-470, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

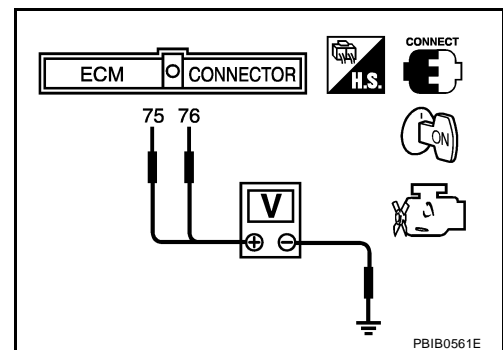
>> INSPECTION END

Component Inspection ACCELERATOR PEDAL POSITION SENSOR

UBS0030E

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 75 (APP sensor 1 signal), 76 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
75 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 4.2V
76 (Accelerator pedal position sensor 2)	Fully released	0.21 - 0.36V
	Fully depressed	More than 2.1V



4. If NG, replace accelerator pedal assembly.

Remove and Installation ACCELERATOR PEDAL

UBS0030F

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

DTC P1229 SENSOR POWER SUPPLY

[QR]

DTC P1229 SENSOR POWER SUPPLY

PFP:16119

On Board Diagnosis Logic

UBS0030G

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229 1229	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 (The TP sensor 1 and 2 circuit is shorted.) (APP sensor 1 circuit is shorted.) (MAF sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) ● Electric throttle control actuator (TP sensor 1 and 2) ● Accelerator pedal position sensor (APP sensor 1) ● MAF sensor ● EVAP control system pressure sensor ● Refrigerant pressures sensor ● ECM pin terminal

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters in 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

UBS0030H

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-473, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

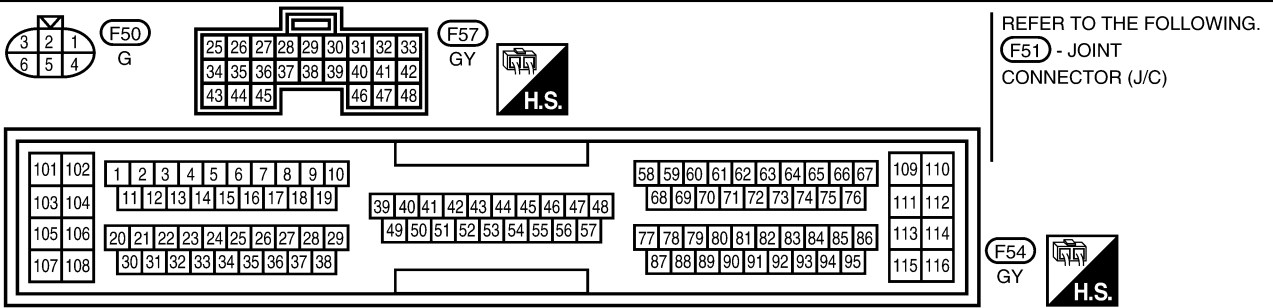
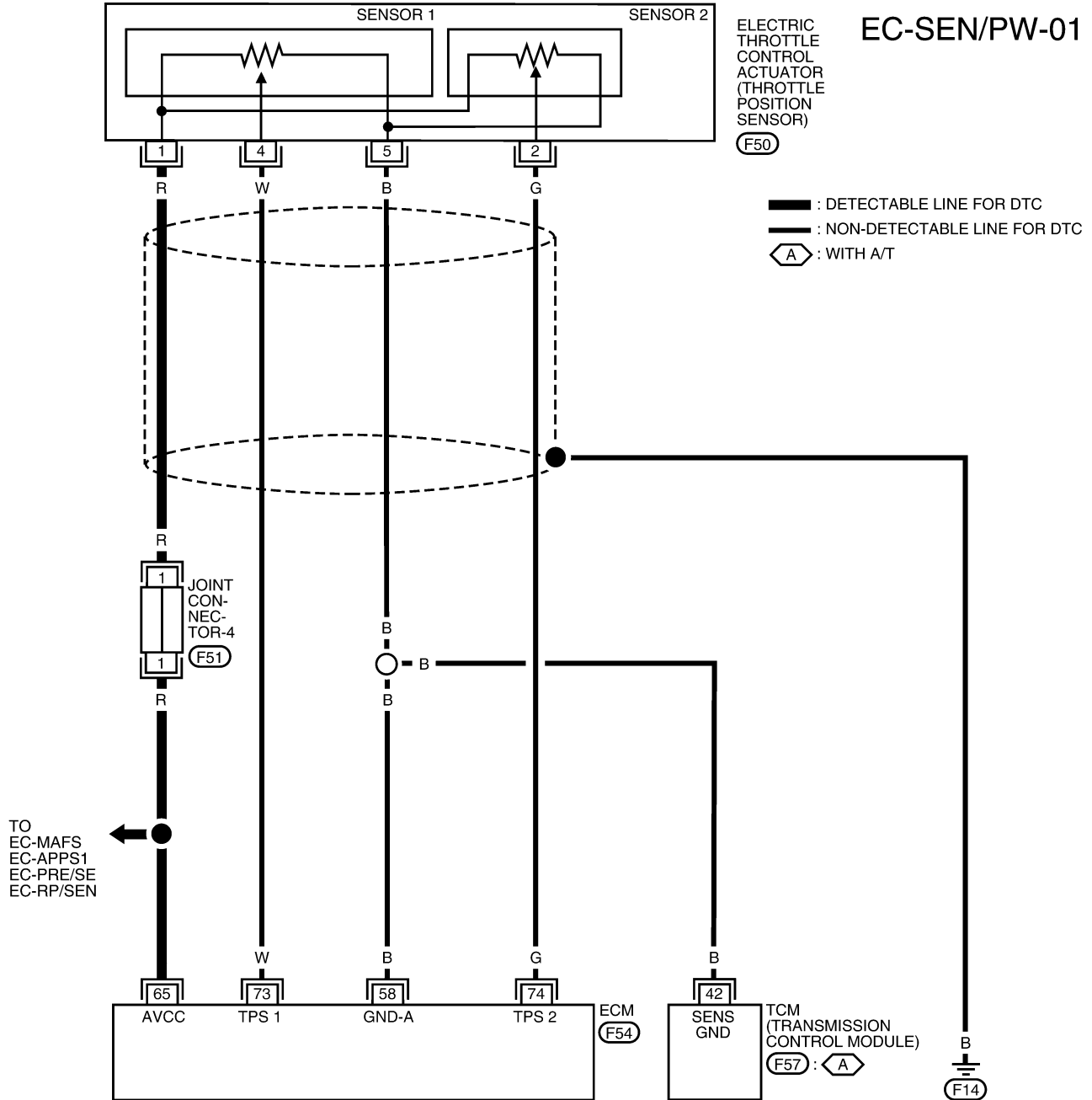
Follow the procedure "WITH CONSULT-II" above.

DTC P1229 SENSOR POWER SUPPLY

[QR]

UBS00301

Wiring Diagram



WBWA0003E

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

DTC P1229 SENSOR POWER SUPPLY

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

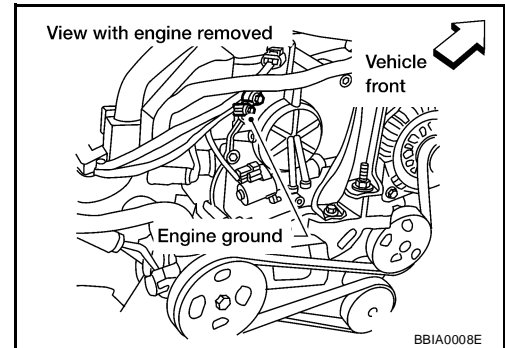
Diagnostic Procedure

UBS0030J

1. RETIGHTEN GROUND SCREWS

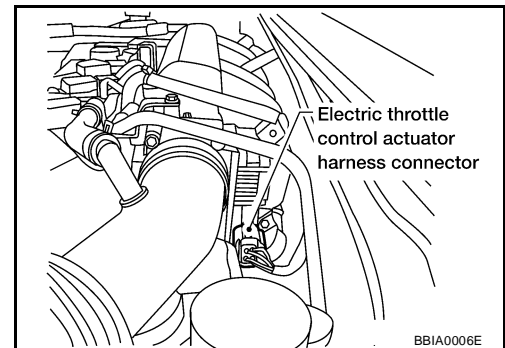
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

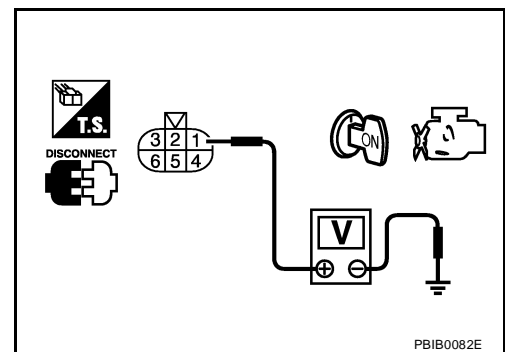


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 3.



3. CHECK SENSOR POWER SUPPLY CIRCUITS FOR SHORT

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminals	Reference Wiring Diagram
65	Electric throttle control actuator terminal 1	EC-252
	APP sensor terminal 2	EC-265
	MAF sensor terminal 2	EC-157
	EVAP control system pressure sensor terminal 1	EC-330
	Refrigerant pressure sensor terminal 1	EC-597

- Joint connector-4
- ECM pin terminal.

OK or NG

OK >> GO TO 4.

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

4. CHECK COMPONENTS

Check the following.

- Accelerator pedal position sensor (Refer to [EC-268, "Component Inspection"](#) .)
- Mass air flow sensor (Refer to [EC-160, "Component Inspection"](#) .)
- EVAP control system pressure sensor (Refer to [EC-333, "Component Inspection"](#) .)
- Refrigerant pressure sensor (Refer to [EC-596, "REFRIGERANT PRESSURE SENSOR"](#) .)

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning component.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-255, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform [EC-49, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-49, "Idle Air Volume Learning"](#) .

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P1442 EVAP CONTROL SYSTEM

PFP:14950

On Board Diagnosis Logic

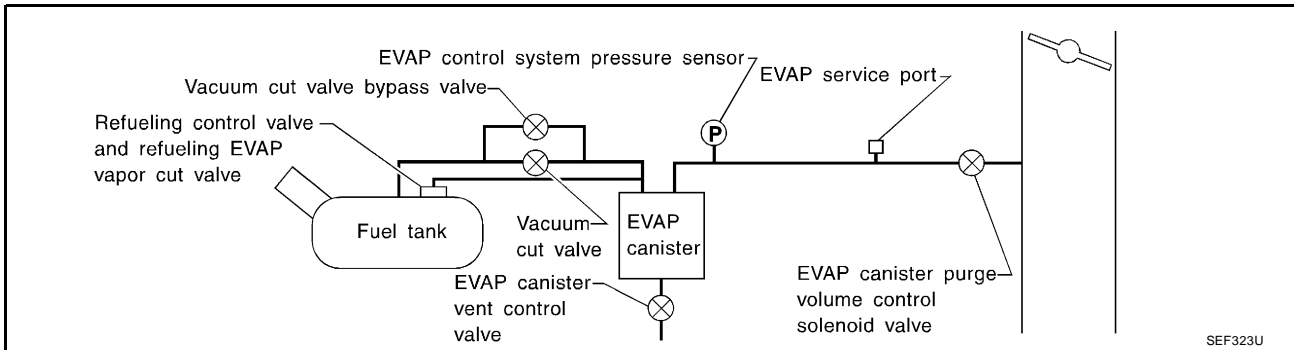
UBS0030K

NOTE:

If DTC P1442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-491.)

This diagnosis detects leaks in the EVAP purge line using of vapor pressure in the fuel tank.

The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank. If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1442 1442	EVAP control system small leak detected (positive 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 ● Blocked or bent rubber tube to EVAP control system pressure sensor ● Loose or disconnected rubber tube ● EVAP canister vent control valve and the circuit ● EVAP canister purge volume control solenoid valve and the circuit ● Fuel tank temperature sensor ● O-ring of EVAP canister vent control valve is missing or damaged ● Water separator ● EVAP canister is saturated with water ● EVAP control system pressure sensor ● Fuel level sensor and the circuit ● Refueling control valve ● ORVR system leaks ● 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 Confirmation Procedure

UBS0030L

Refer to "DTC P0442 EVAP CONTROL SYSTEM", [EC-308](#) .

Diagnostic Procedure

UBS0030M

Refer to "DTC P0442 EVAP CONTROL SYSTEM", [EC-309](#) .

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

UBS0030N

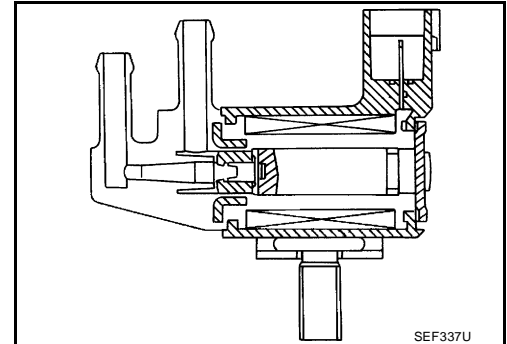
Description SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	EVAP canister purge flow control	EVAP canister purge vol- ume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Accelerator pedal position switch	Accelerator pedal position		
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor (CAN communication line)	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

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-II Reference Value in Data Monitor Mode

UBS0030O

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	0%
	Idle	20 - 30%
	2,000 rpm	

On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1444 1444	EVAP canister purge volume control solenoid valve	The canister purge flow is detected during the specified driving conditions, 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 (The valve is stuck open.) ● EVAP canister vent control valve ● EVAP canister ● Hoses (Hoses are connected incorrectly or clogged.)

DTC Confirmation Procedure

NOTE:

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

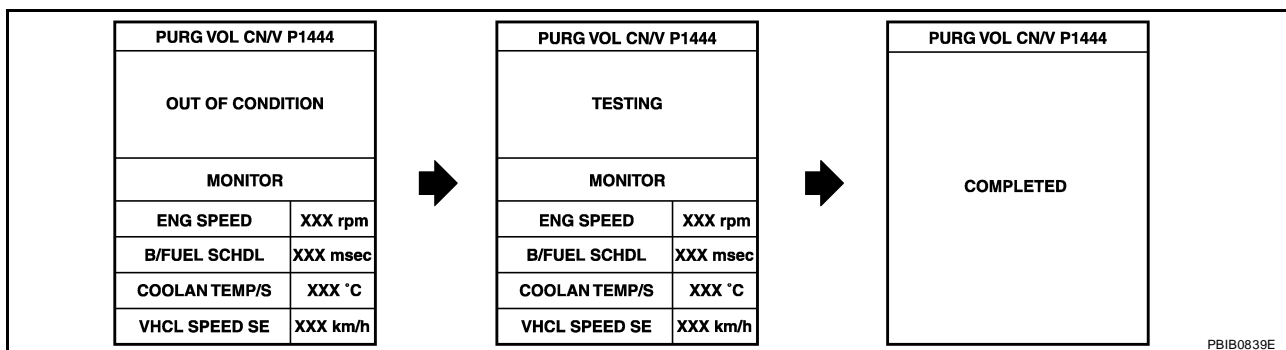
TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
5. Touch "START".
6. Start engine and let it idle until "TESTING" on CONSULT-II changes to "COMPLETED". (It will take 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-480, "Diagnostic Procedure"](#).

WITH GST

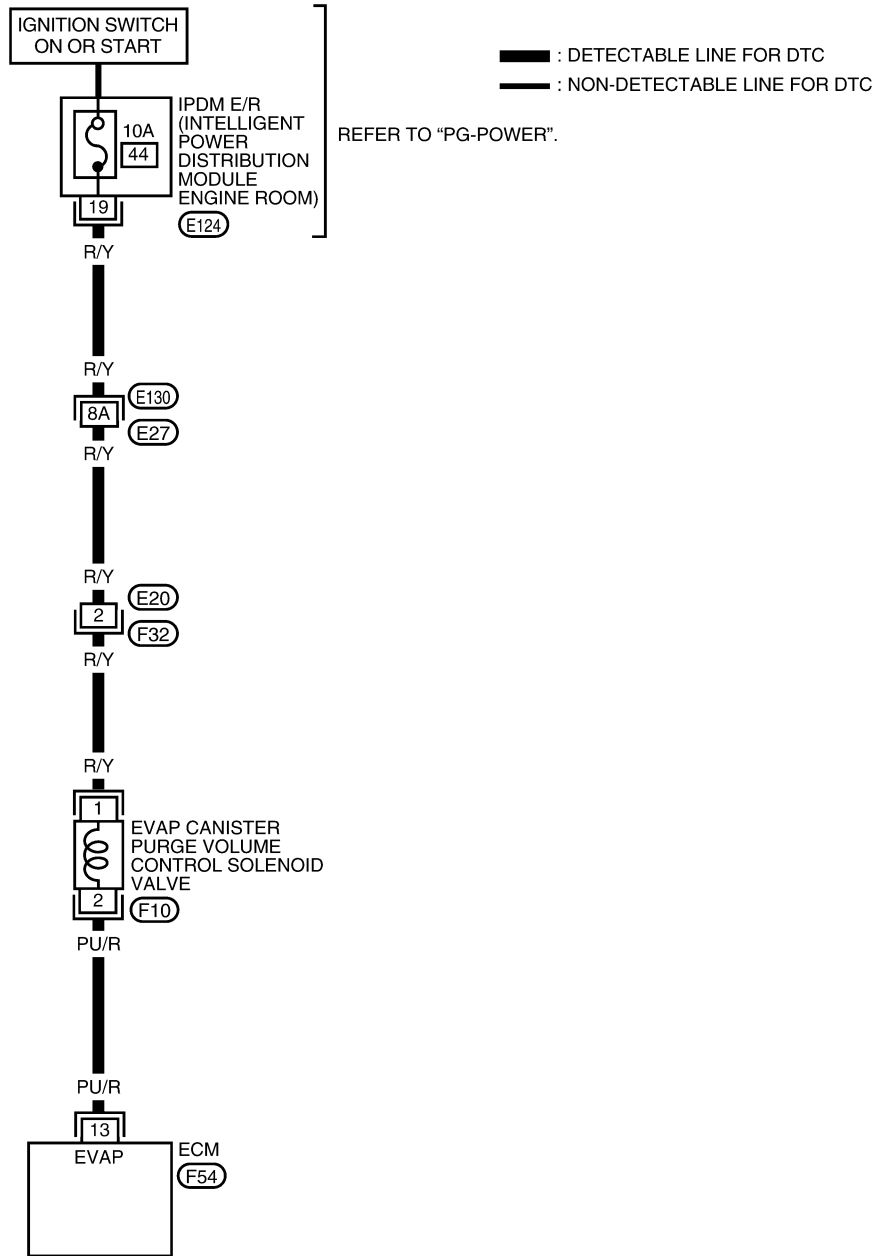
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Select "MODE 7" with GST.
5. If 1st trip DTC is detected, go to [EC-480, "Diagnostic Procedure"](#).

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR]

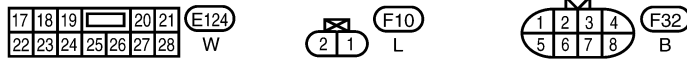
UBS0030R

Wiring Diagram

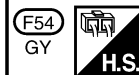
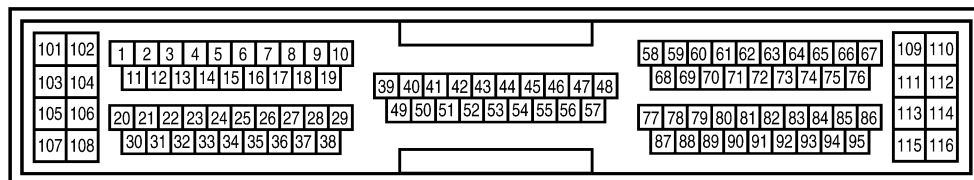
EC-PGC/V-01



A
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REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



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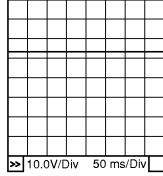
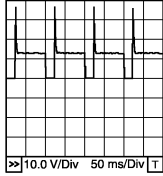
Specification data are reference values and are measured between each terminal and ground.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	PU/R	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>10.0V/Div 50 ms/Div</p> <p>PBIB0050E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine) 	<p>Approximately 10V★</p>  <p>10.0 V/Div 50 ms/Div</p> <p>PBIB0520E</p>

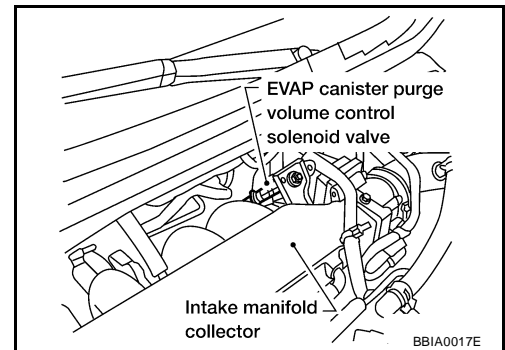
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS0030S

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 harness connector.
3. Turn ignition switch "ON".

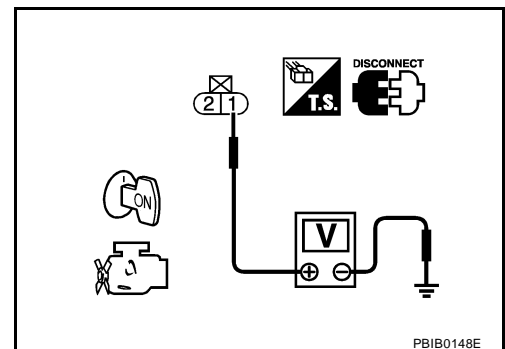


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and engine ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR]

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- IPDM E/R harness connector E124
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R

>> Repair 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 13 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 HOSE

Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

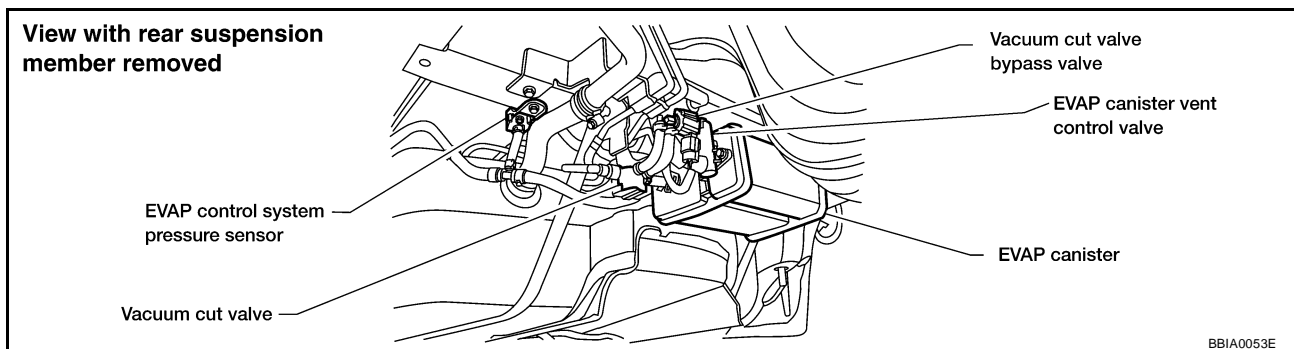
OK or NG

OK >> GO TO 5.

NG >> Repair it.

5. 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 6.

NG >> Replace EVAP control system pressure sensor.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

6. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-333, "Component Inspection"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 7.
- OK (Without CONSULT-II)>>GO TO 8.
- NG >> Replace EVAP control system pressure sensor.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

 **With CONSULT-II**

1. Turn ignition switch "OFF".
2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

8. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

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

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP canister purge volume control solenoid valve.

9. 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 10.
- NG >> Clean the rubber tube using an air blower.

10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-326, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
- NG >> Replace EVAP canister vent control valve.

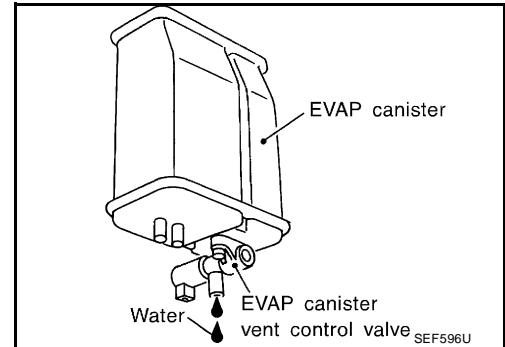
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR]

11. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 12.
No >> GO TO 15.



12. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

- OK >> GO TO 14.
NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

14. CHECK WATER SEPARATOR

Refer to [EC-314, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 15.
NG >> Clean or replace water separator.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR]

UBS0030T

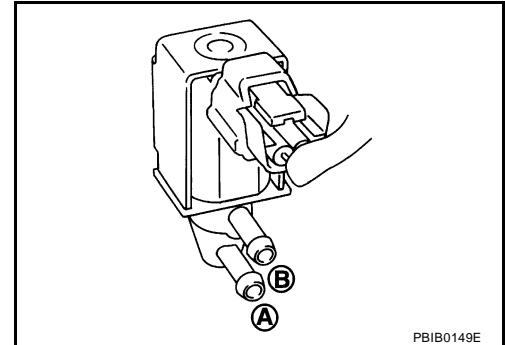
Component Inspection

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

🔧 With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

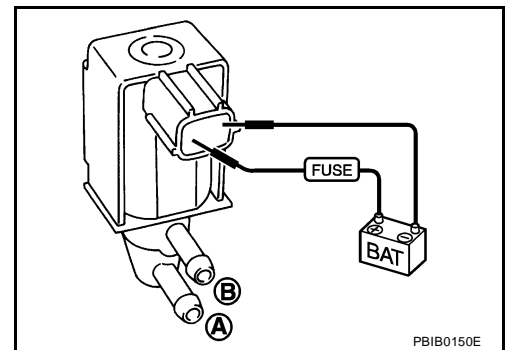
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100.0%	Yes
0.0%	No



⊗ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



Removal and Installation

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS0030U

Refer to [EM-16, "INTAKE MANIFOLD"](#) .

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

PF:14935

UBS0030V

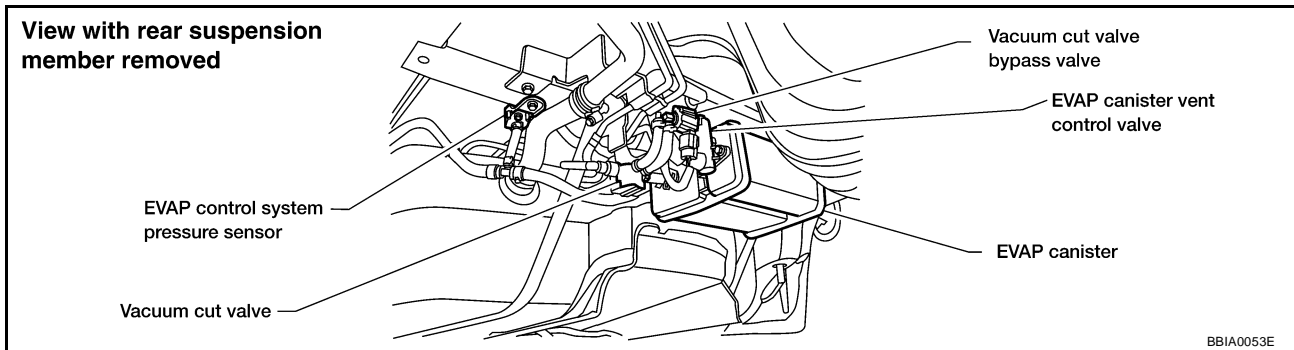
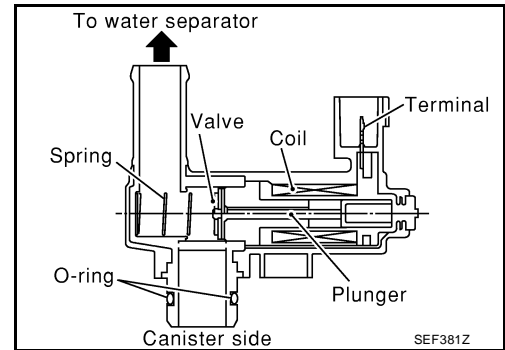
Component Description

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

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

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

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



CONSULT-II Reference Value in Data Monitor Mode

UBS0030W

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS0030X

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1446 1446	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 ● Water separator ● EVAP canister is saturated with water

DTC Confirmation Procedure

UBS0030Y

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine.
4. Drive vehicle at a speed of approximately 80 km/h (50 MPH) for a maximum of 15 minutes.

NOTE:

If a malfunction exists, NG result may be displayed quicker.

5. If 1st trip DTC is detected, go to [EC-488. "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

 **WITH GST**

Follow the procedure "WITH CONSULT-II" above.

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

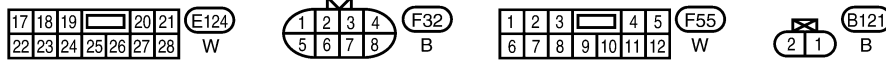
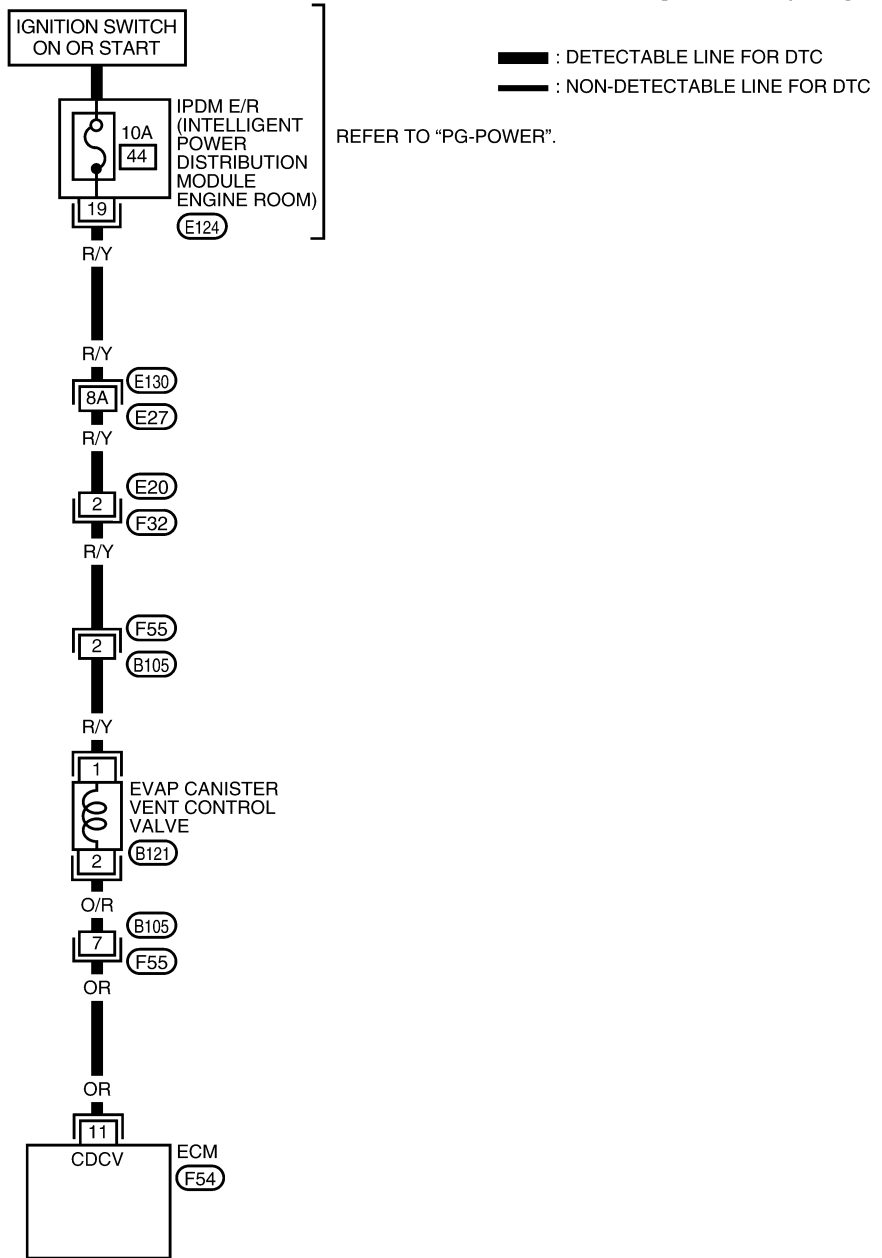
[QR]

UBS0030Z

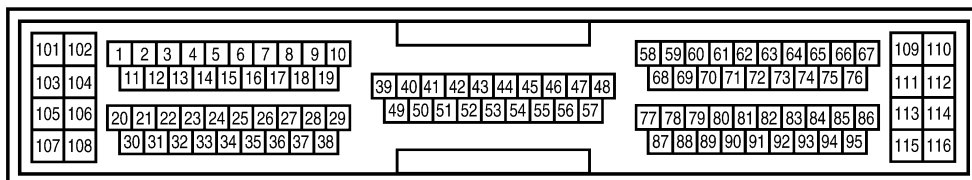
Wiring Diagram

EC-VENT/V-01

A
EC
C
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0020E

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

CAUTION:

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

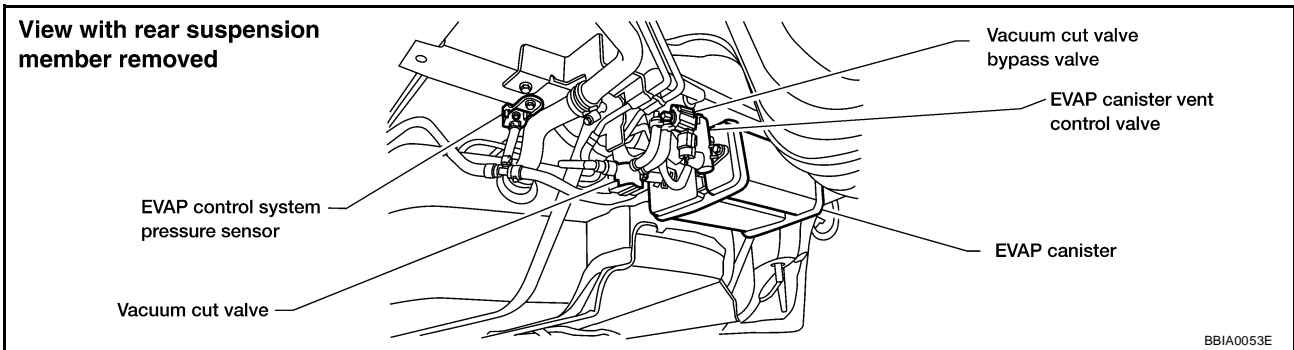
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	OR	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00310

1. CHECK RUBBER TUBE

1. Turn ignition switch "OFF".
2. Disconnect rubber tube connected to EVAP canister vent control valve.



3. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 2.
- NG >> Clean rubber tube using an air blower.

2. CHECK WATER SEPARATOR

Refer to [EC-314, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Clean or replace water separator.

3. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-490, "Component Inspection"](#) .

OK or NG

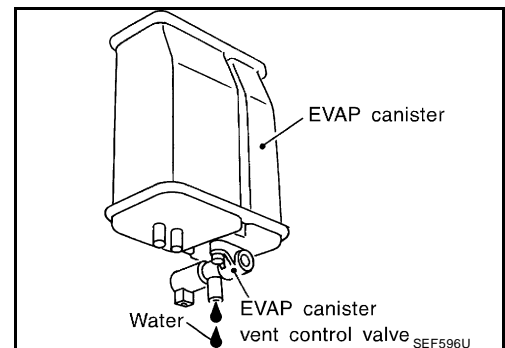
- OK >> GO TO 4.
- NG >> Replace EVAP canister vent control valve.

4. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will 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 attached.
The weight should be less than 1.8 kg (4.0 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 water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

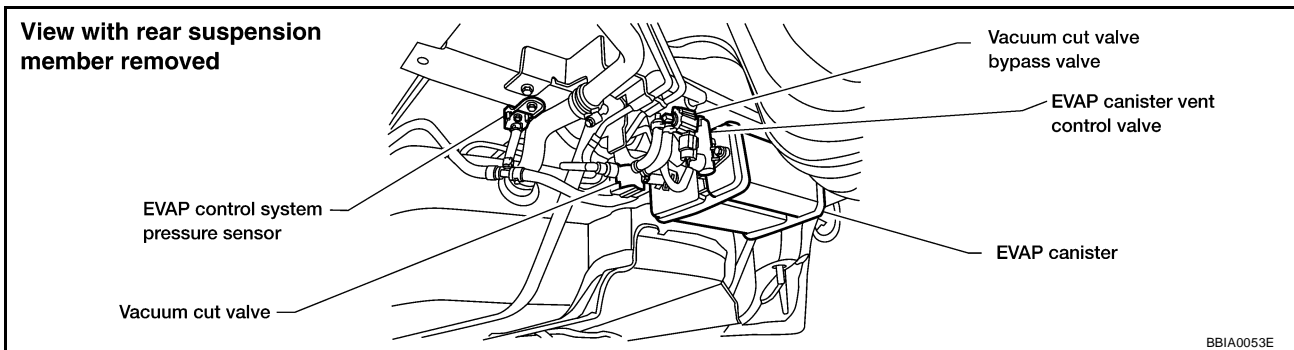
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 8.
- NG >> Repair it.

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.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-333, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor.

10. CHECK INTERMITTENT INCIDENT

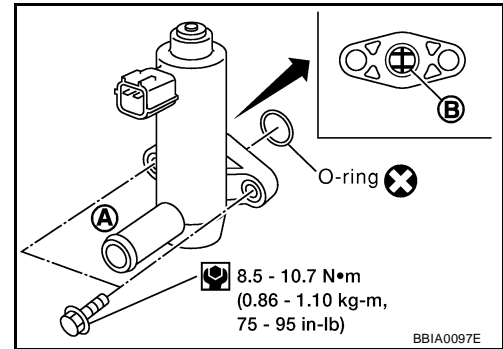
Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection EVAP CANISTER VENT CONTROL VALVE

With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
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.

Condition	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.
Make sure new O-ring is installed properly.
If NG, go to next step.

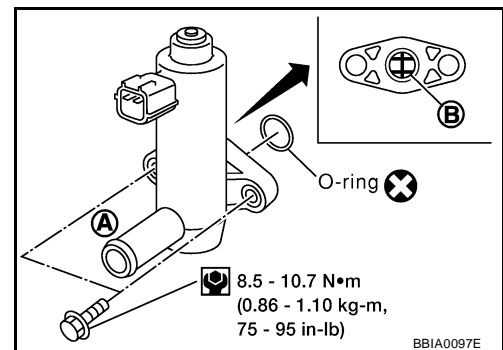
7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform inspection again.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V

PBIB0834E

Without CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

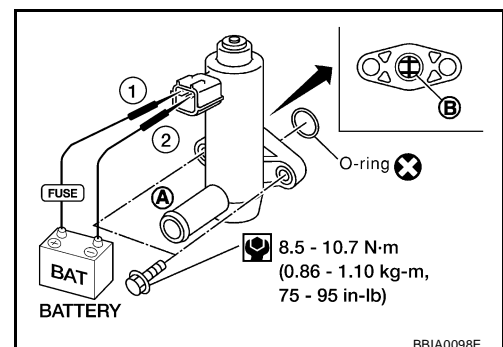


3. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.
Make sure new O-ring is installed properly.
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 inspection again.



DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[QR]

DTC P1448 EVAP CANISTER VENT CONTROL VALVE

PF14935

Component Description

UBS00312

NOTE:

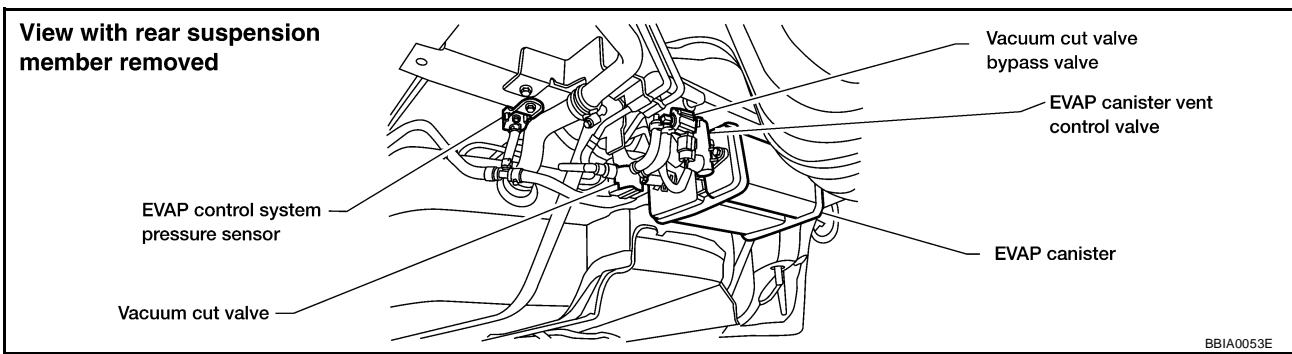
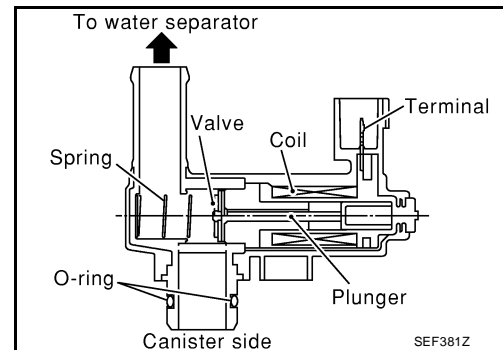
If DTC P1448 is displayed with P0442, perform trouble diagnosis for DTC P1448 first.

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

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

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

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



CONSULT-II Reference Value in Data Monitor Mode

UBS00313

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS00314

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1448 1448	EVAP canister vent control valve open	EVAP canister vent control valve remains opened 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 ● Water separator ● EVAP canister is saturated with water ● Vacuum cut valve

DTC Confirmation Procedure

UBS00315

NOTE:

- If DTC P1448 is displayed with P0442, perform trouble diagnosis for DTC P1448 first.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.

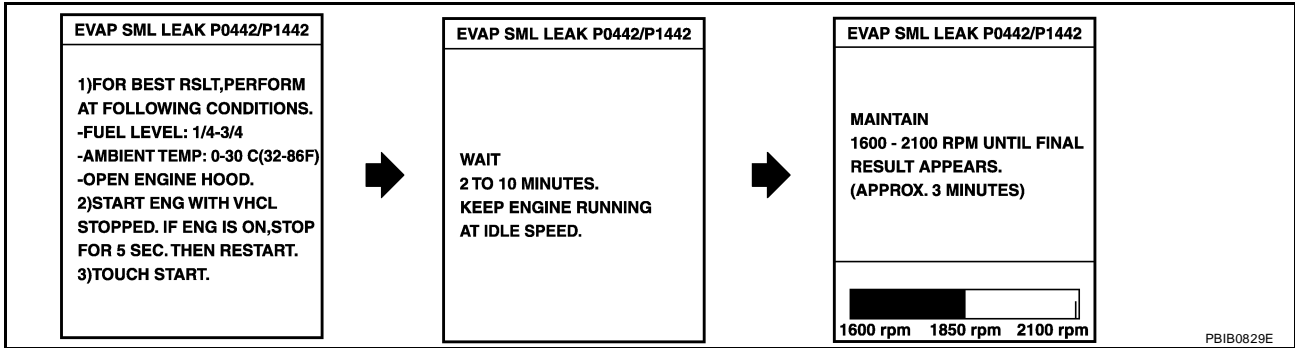
DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[QR]

- **Always perform test at a temperature of 0 to 30°C (32 to 86°F).**
- 1. Turn ignition switch “ON”.
- 2. Turn ignition switch “OFF” and wait at least 10 seconds.
- 3. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
- 4. Make sure that the following conditions are met.

COOLAN TEMP/S	0 - 70°C (32 - 158°F)
INT/A TEMP SE	0 - 30°C (32 - 86°F)

- 5. Select “EVAP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
Follow the instruction displayed.



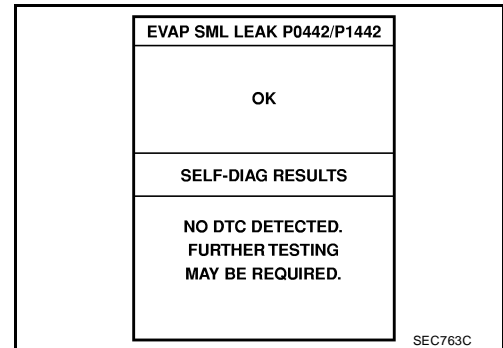
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-84, "Basic Inspection"](#).

- 6. Make sure that “OK” is displayed.
If “NG” is displayed, go to the following step.

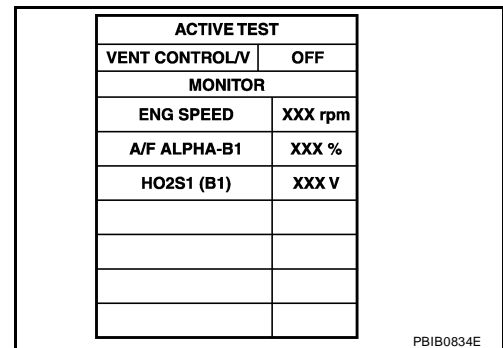
NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

- 7. Stop engine and wait at least 10 seconds, then turn “ON”.
- 8. Disconnect hose from water separator.



- 9. Select “VENT CONTROL/V” of “ACTIVE TEST” mode with CONSULT-II.
- 10. Touch “ON” and “OFF” alternately.



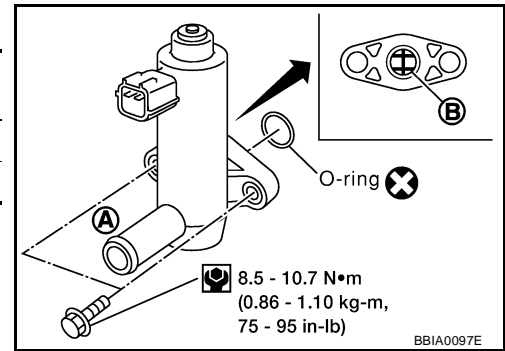
DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[QR]

11. Make sure the following.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

If the result is NG, go to [EC-495, "Diagnostic Procedure"](#) .
If the result is OK, go to "Diagnostic Procedure" for DTC P0442, [EC-309](#) .



UBS00316

Overall Function Check

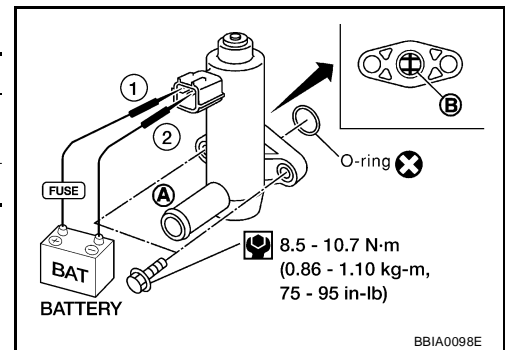
Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a DTC might not be confirmed.

WITH GST

1. Disconnect hose from water separator.
2. Disconnect EVAP canister vent control valve harness connector.
3. Verify the following.

Condition	Air passage continuity
12V direct current supply between terminals 1 and 2	No
No supply	Yes

If the result is NG, go to [EC-495, "Diagnostic Procedure"](#) .
If the result is OK, go to "Diagnostic Procedure" for DTC P0442, [EC-309](#) .



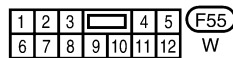
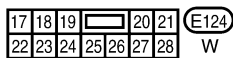
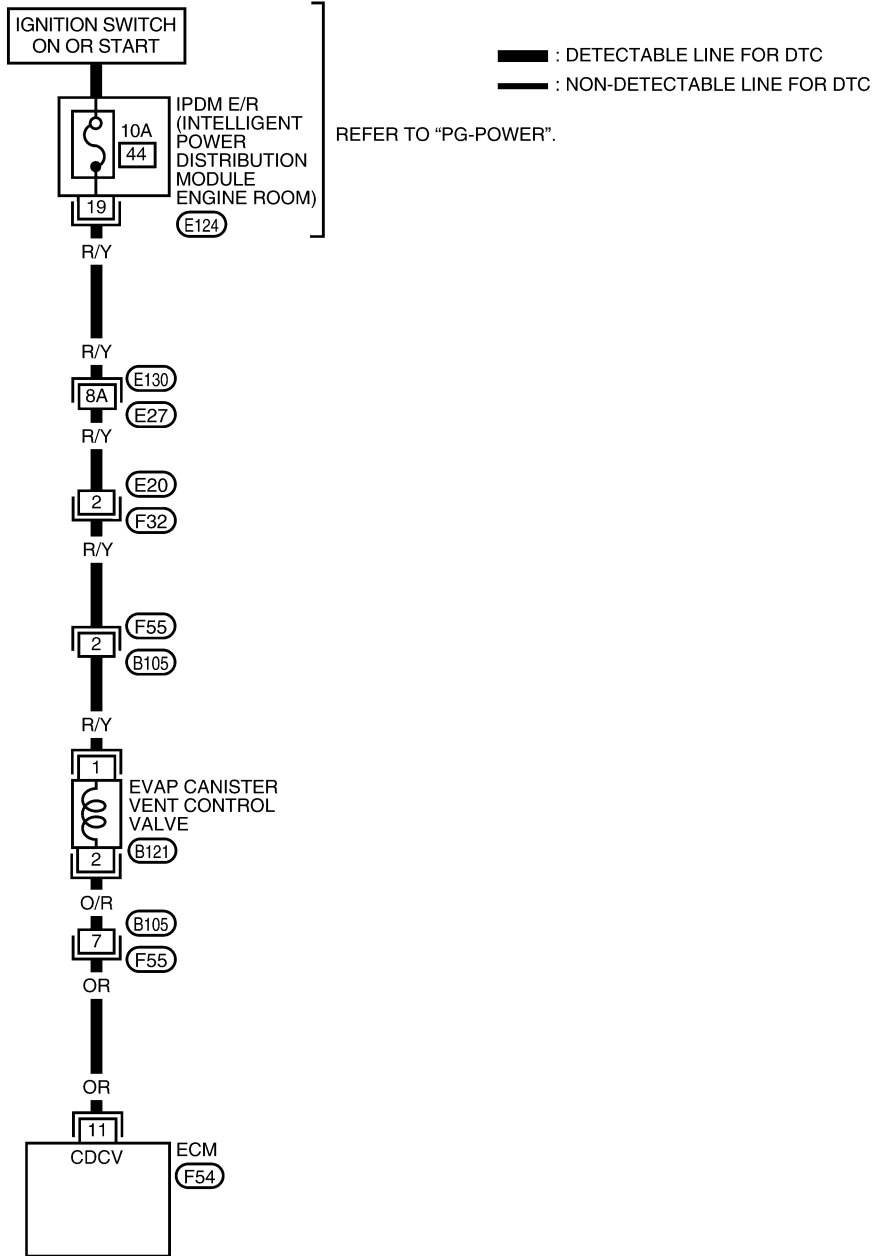
DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[QR]

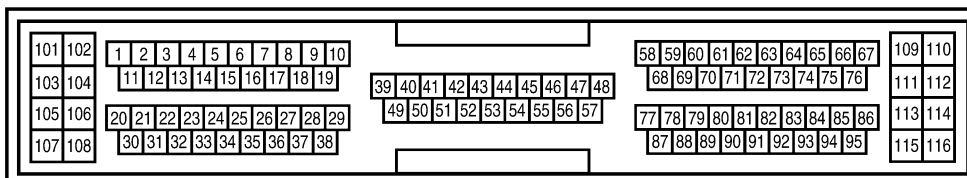
UBS00317

Wiring Diagram

EC-VENT/V-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0020E

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

DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[QR]

CAUTION:

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

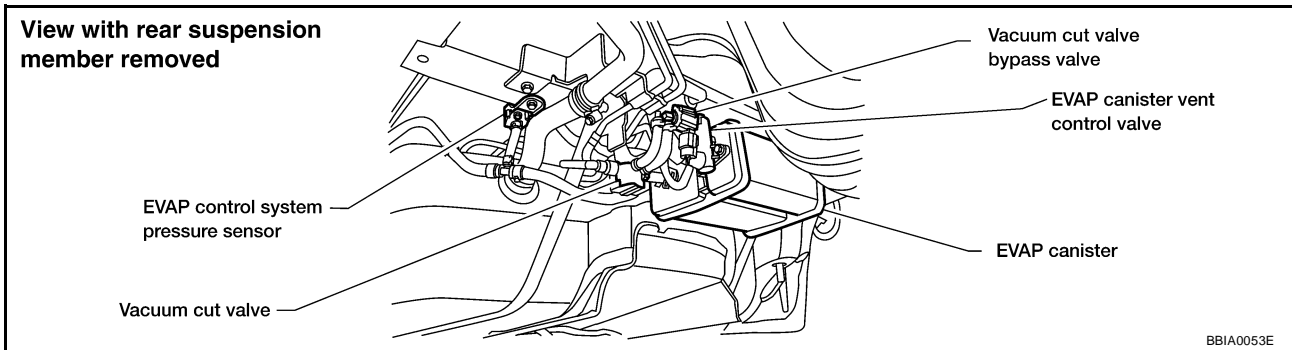
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	OR	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00318

1. CHECK RUBBER TUBE

1. Turn ignition switch "OFF".
2. Disconnect rubber tube connected to EVAP canister vent control valve.



3. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 2.
- NG >> Clean rubber tube using an air blower.

2. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-497, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Replace EVAP canister vent control valve.

3. CHECK VACUUM CUT VALVE

Refer to [EC-524, "Component Inspection"](#) .

OK or NG

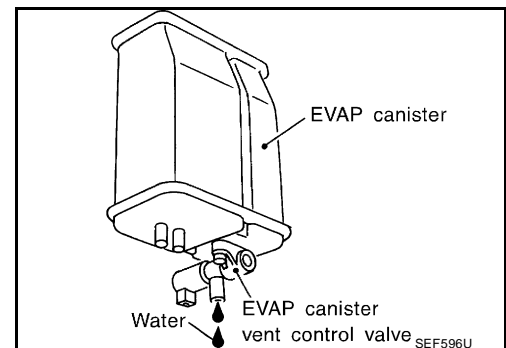
- OK >> GO TO 4.
- NG >> Replace vacuum cut valve.

4. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will 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 attached.
The weight should be less than 1.8 kg (4.0 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 water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

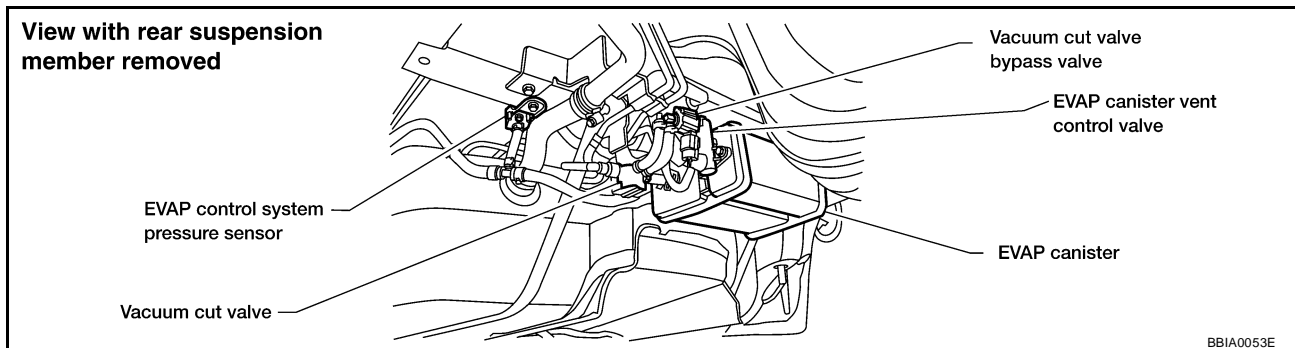
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 8.
- NG >> Repair it.

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.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-333, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor.

10. CHECK INTERMITTENT INCIDENT

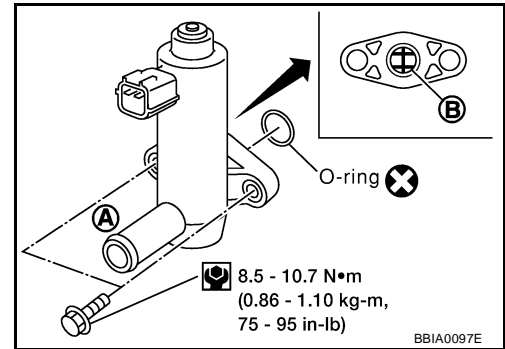
Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection EVAP CANISTER VENT CONTROL VALVE

With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
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.

Condition	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.
Make sure new O-ring is installed properly.
If NG, go to next step.

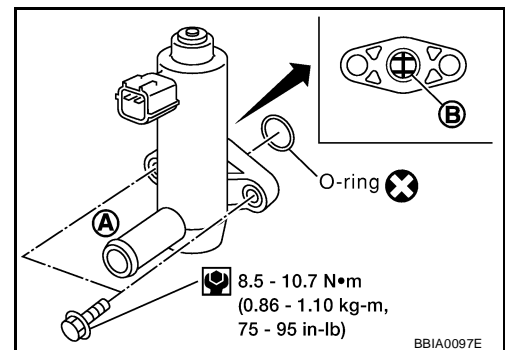
7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform inspection again.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
H02S1 (B1)	XXX V

PBIB0834E

Without CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

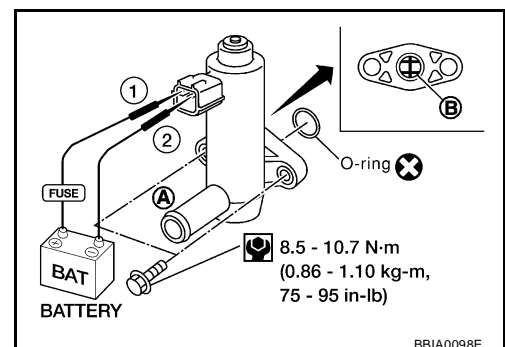


3. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.
Make sure new O-ring is installed properly.
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 inspection again.



DTC P1456 EVAP CONTROL SYSTEM

PFP:14710

On Board Diagnosis Logic

UBS0031A

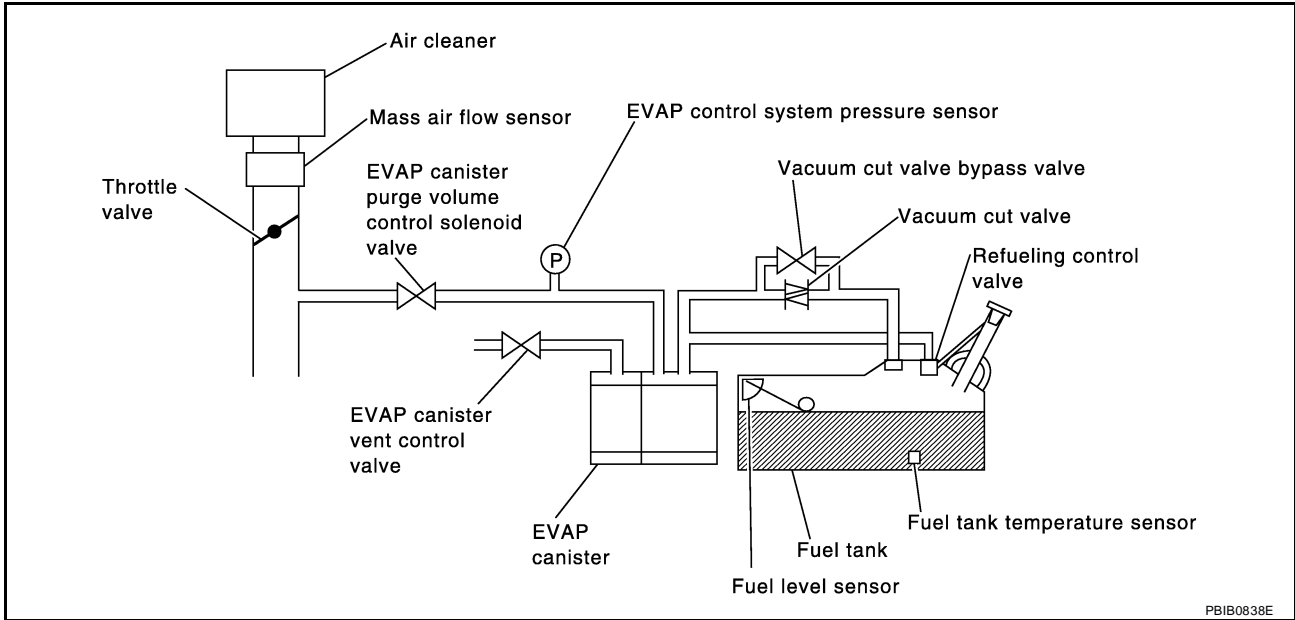
This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using of vapor pressure in the fuel tank.

The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank. If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.

If ECM judges a leak which corresponds to a very small leak, the very small leak P1456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P1442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



PBIB0838E

DTC P1456 EVAP CONTROL SYSTEM

[QR]

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1456 1456	Evaporative emission control system very small leak (positive 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 ● Blocked or bent rubber tube to EVAP control system pressure sensor ● Loose or disconnected rubber tube ● EVAP canister vent control valve and the circuit ● EVAP canister purge volume control solenoid valve and the circuit ● Fuel tank temperature sensor ● O-ring of EVAP canister vent control valve is missing or damaged ● Water separator ● EVAP canister is saturated with water ● EVAP control system pressure sensor ● Refueling control valve ● ORVR system leaks ● Fuel level sensor and the circuit ● Foreign matter caught in EVAP canister purge volume control solenoid valve

A
EC
C
D
E
F
G
H
I
J

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.

K
L

DTC Confirmation Procedure

UBS0031B

NOTE:

- If DTC P1456 is displayed with P1442, perform TROUBLE DIAGNOSIS FOR DTC P1456 first.
- 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.

M

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 11V at idle.

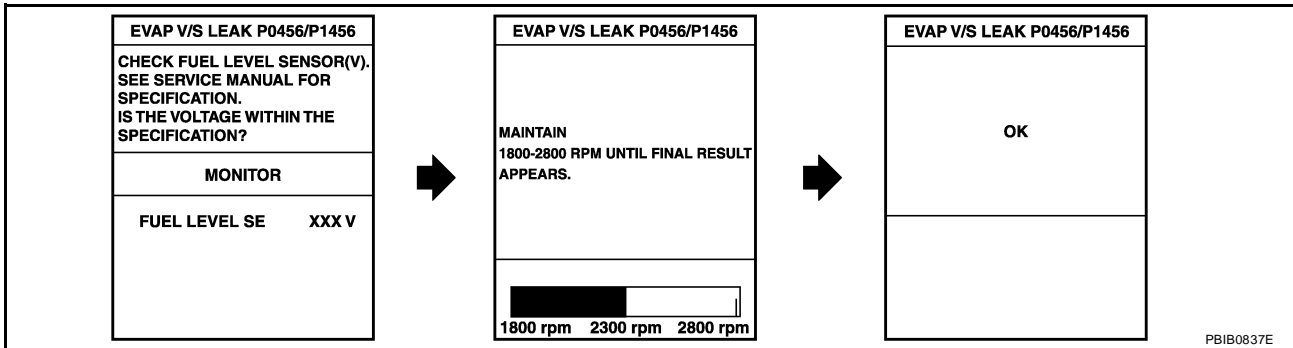
④ WITH CONSULT-II

1. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
2. Make sure the following conditions are met.

FUEL LEVEL SE: 0.25 - 1.15V
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-II.
Follow the instruction displayed.



6. Make sure that "OK" is displayed.
If "NG" is displayed, refer to [EC-501, "Diagnostic Procedure"](#).

NOTE:

- If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to [EC-84, "Basic Inspection"](#).
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

Overall Function Check

UBS0031C

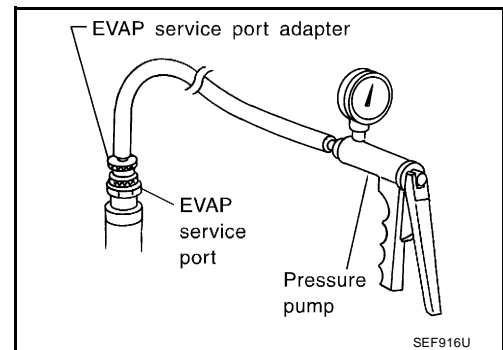
WITH GST

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. Set the pressure pump and a hose.
3. Also set a vacuum gauge via 3-way connector and a hose.
4. Turn ignition switch "ON".
5. Connect GST and select MODE 8.
6. Using MODE 8 control the EVAP canister vent control valve (close) and vacuum cut valve bypass valve (open).
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-501, "Diagnostic 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.

Diagnostic Procedure

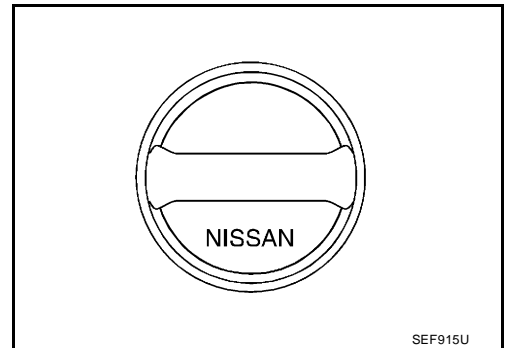
UBS0031D

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 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-617, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FULLER CAP\)"](#).

OK or NG

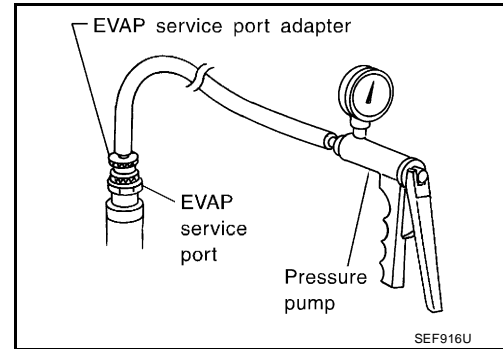
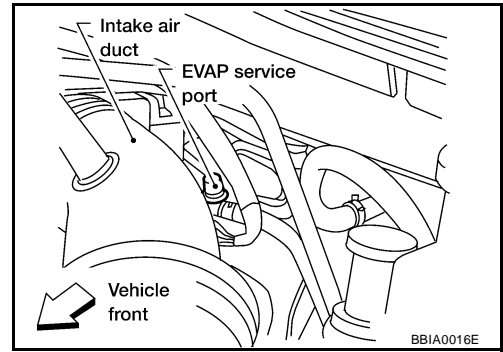
- OK >> GO TO 5.
- NG >> Replace fuel filler cap with a genuine one.

5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



Models with CONSULT-II >> GO TO 6.
Models without CONSULT-II >> GO TO 7.

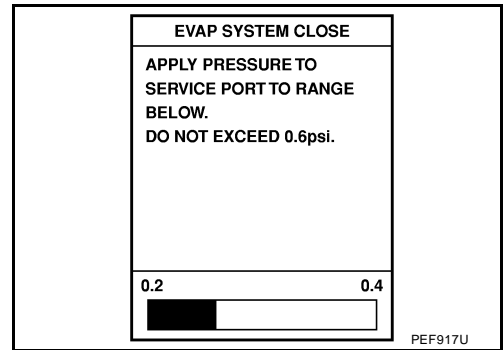
6. CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

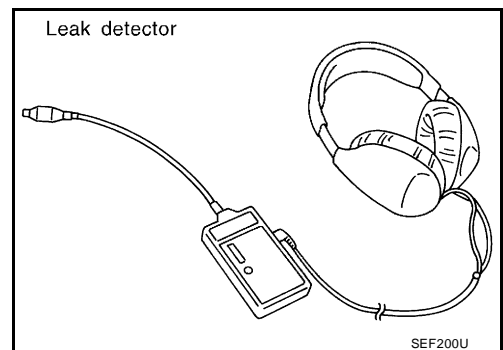
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#)

OK or NG

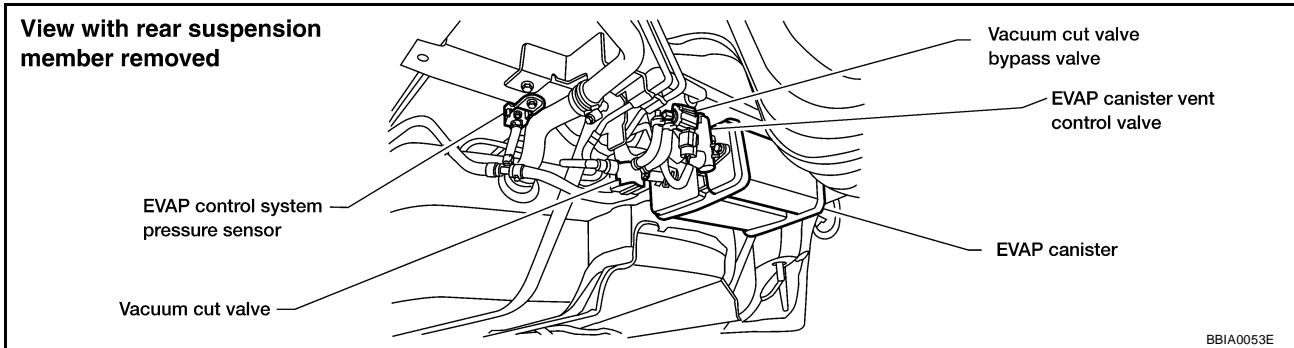
- OK >> GO TO 8.
- NG >> Repair or replace.



7. CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)

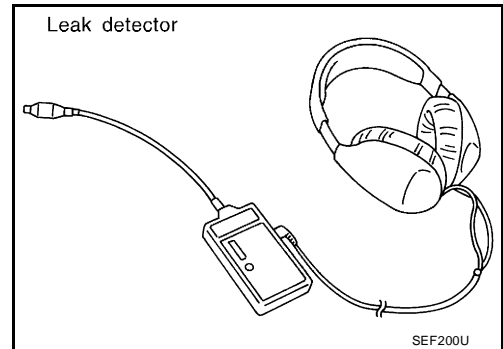


4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#).



OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace.

8. CHECK WATER SEPARATOR

Refer to [EC-506, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace water separator.

9. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

Refer to "DTC Confirmation Procedure", [EC-491](#).

OK or NG

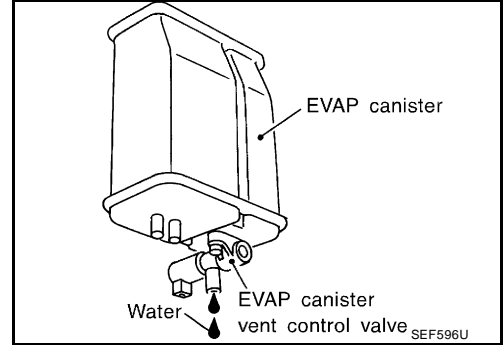
- OK >> GO TO 10.
- NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 11.
- No (With CONSULT-II)>>GO TO 13.
- No (Without CONSULT-II)>>GO TO 14.



11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

The weight should be less than 1.8 kg (4.0 lb).

OK or NG

- OK (With CONSULT-II)>>GO TO 13.
- OK (Without CONSULT-II)>>GO TO 14.
- NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓟ With CONSULT-II

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-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

⊗ Without CONSULT-II

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-29, "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-320, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.
- NG >> Replace EVAP canister purge volume control solenoid valve.

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-233, "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-333, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 19.
- NG >> Replace EVAP control system pressure sensor.

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-615, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

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 REFUELING EVAP VAPOR LINE

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-620, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#)

OK or NG

- OK >> GO TO 22.
- NG >> Repair or replace hoses and tubes.

22. CHECK SIGNAL LINE AND RECIRCULATION LINE

Check signal line and 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 CONTROL VALVE

Refer to [EC-623, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 24.
- NG >> Replace refueling control valve with fuel tank.

24. CHECK FUEL LEVEL SENSOR

Refer to [DI-21, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 25.
- NG >> Replace fuel level sensor unit.

25. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

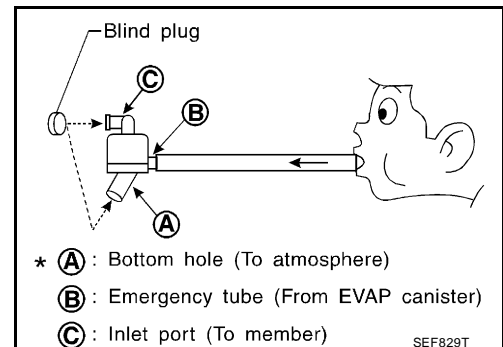
Component Inspection WATER SEPARATOR

UBS0031E

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

NOTE:

Do not disassemble water separator.



DTC P1464 FUEL LEVEL SENSOR

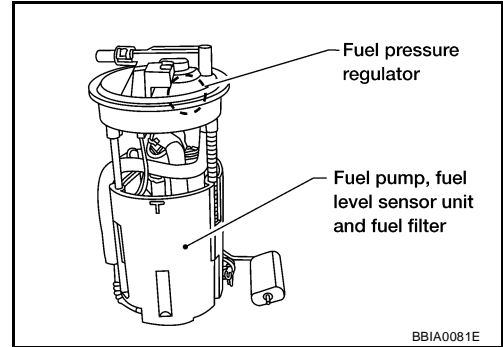
PFP:25060

Component Description

UBS0031F

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

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



BBIA0081E

UBS0031G

On Board Diagnosis Logic

ECM receives two signals from the fuel level sensor.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the latter to detect open circuit malfunction.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1464 1464	Fuel level sensor circuit ground signal	A high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted)

DTC Confirmation Procedure

UBS0031H

NOTE:

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

WITH CONSULT-II

- Turn ignition switch "ON".
- Select "DATA MONITOR" mode with CONSULT-II.
- Wait at least 5 seconds.
- If 1st trip DTC is detected, go to [EC-509, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

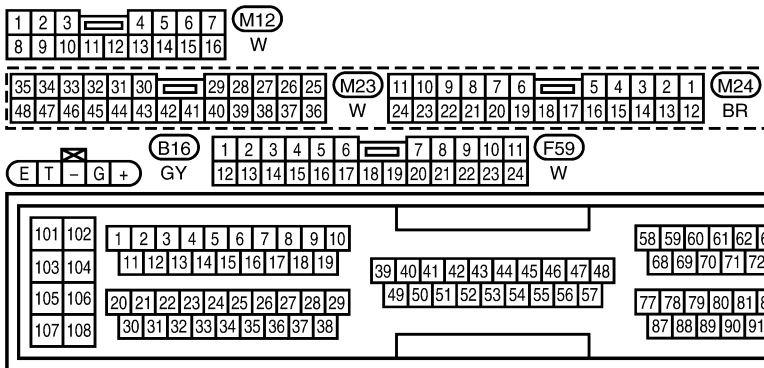
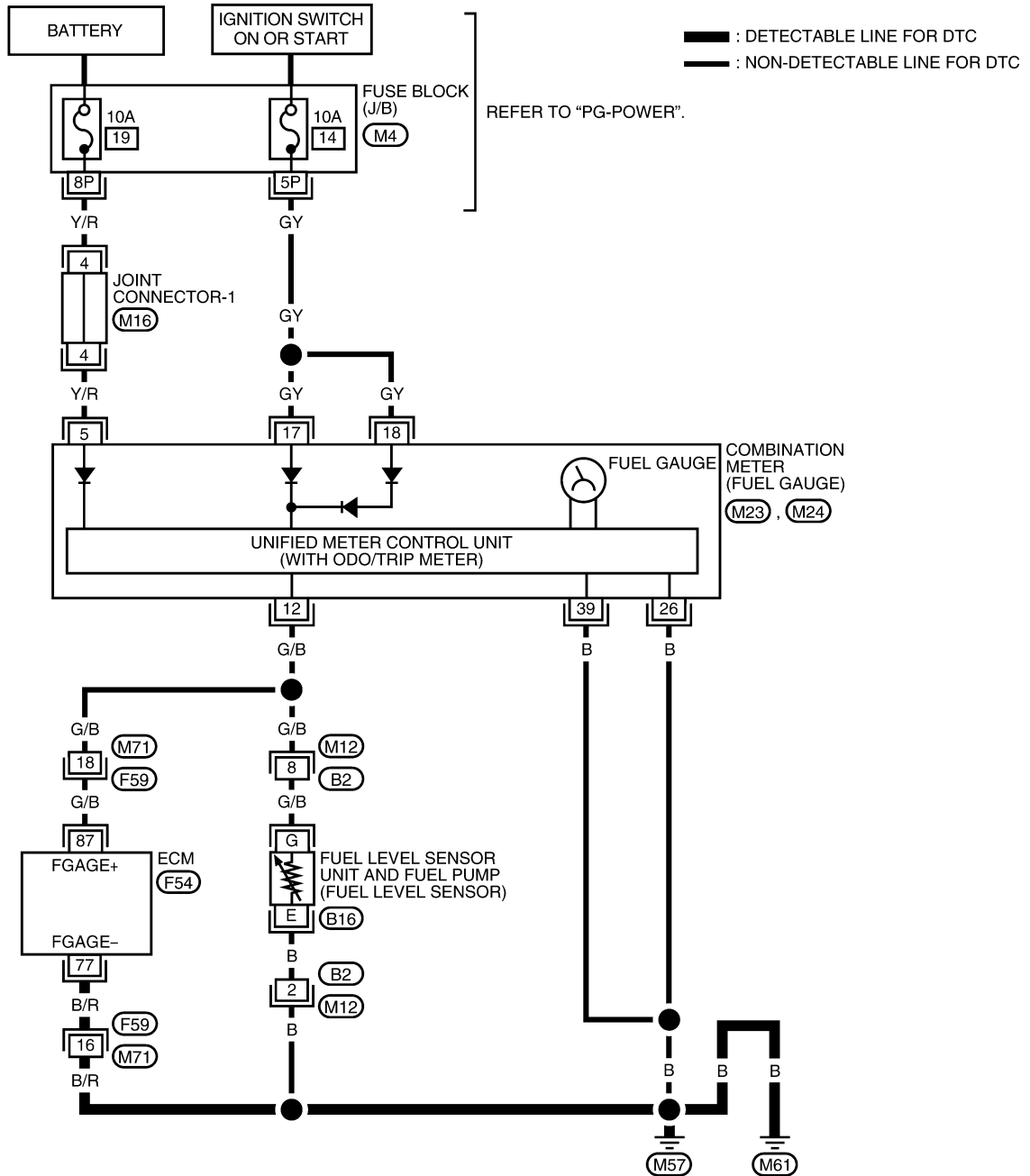
DTC P1464 FUEL LEVEL SENSOR

[QR]

UBS00311

Wiring Diagram

EC-FLS3-01



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)
- (M16) - JOINT CONNECTOR (J/C)



BBWA0031E

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

DTC P1464 FUEL LEVEL SENSOR

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
77	B/R	Fuel level sensor ground	[Engine is running] <ul style="list-style-type: none">● Idle speed	Approximately 0V
87	G/B	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.

Diagnostic Procedure

UBS0031J

1. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 77 and body ground.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

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

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F59, M71
- Harness for open and short between ECM and body ground

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

3. CHECK FUEL LEVEL SENSOR

Refer to [DI-21, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Replace fuel level sensor unit.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

Removal and Installation FUEL LEVEL SENSOR

UBS0031K

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

PFP:17372

Description COMPONENT DESCRIPTION

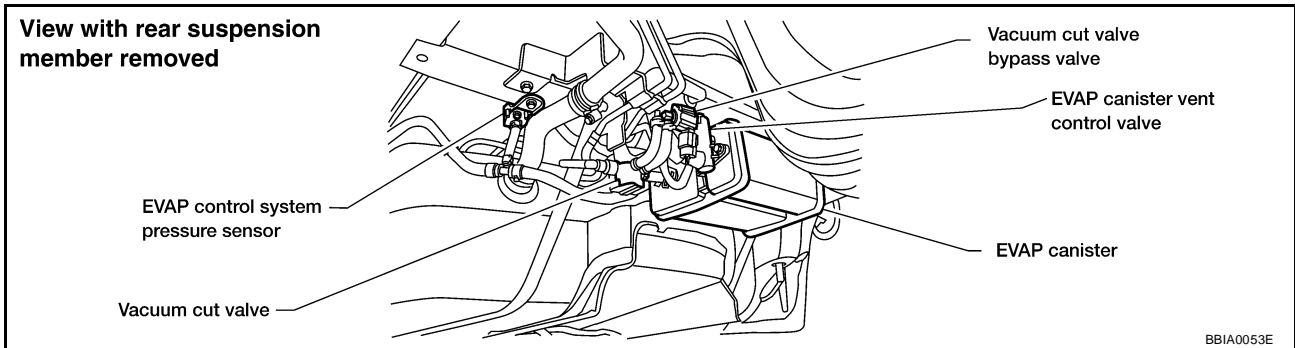
UBS0031L

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

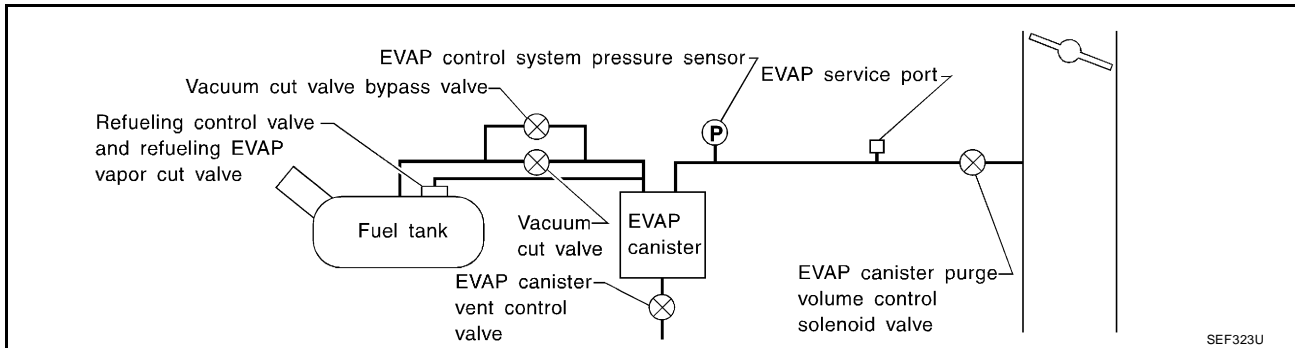
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.



EVAPORATIVE EMISSION SYSTEM DIAGRAM



CONSULT-II Reference Value in Data Monitor Mode

UBS0031M

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPAS S/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS0031N

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1490 1490	Vacuum cut valve bypass valve circuit	An improper voltage signal is sent to ECM through vacuum cut valve bypass valve.	<ul style="list-style-type: none"> ● Harness or connectors (The vacuum cut valve bypass valve circuit is open or shorted) ● Vacuum cut valve bypass valve

DTC Confirmation Procedure

UBS0031O

NOTE:

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

TESTING CONDITION:

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

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

[QR]

④ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-513, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

④ WITH GST

Follow the procedure "WITH CONSULT-II" above.

A

EC

C

D

E

F

G

H

I

J

K

L

M

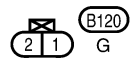
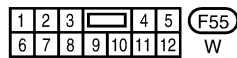
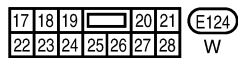
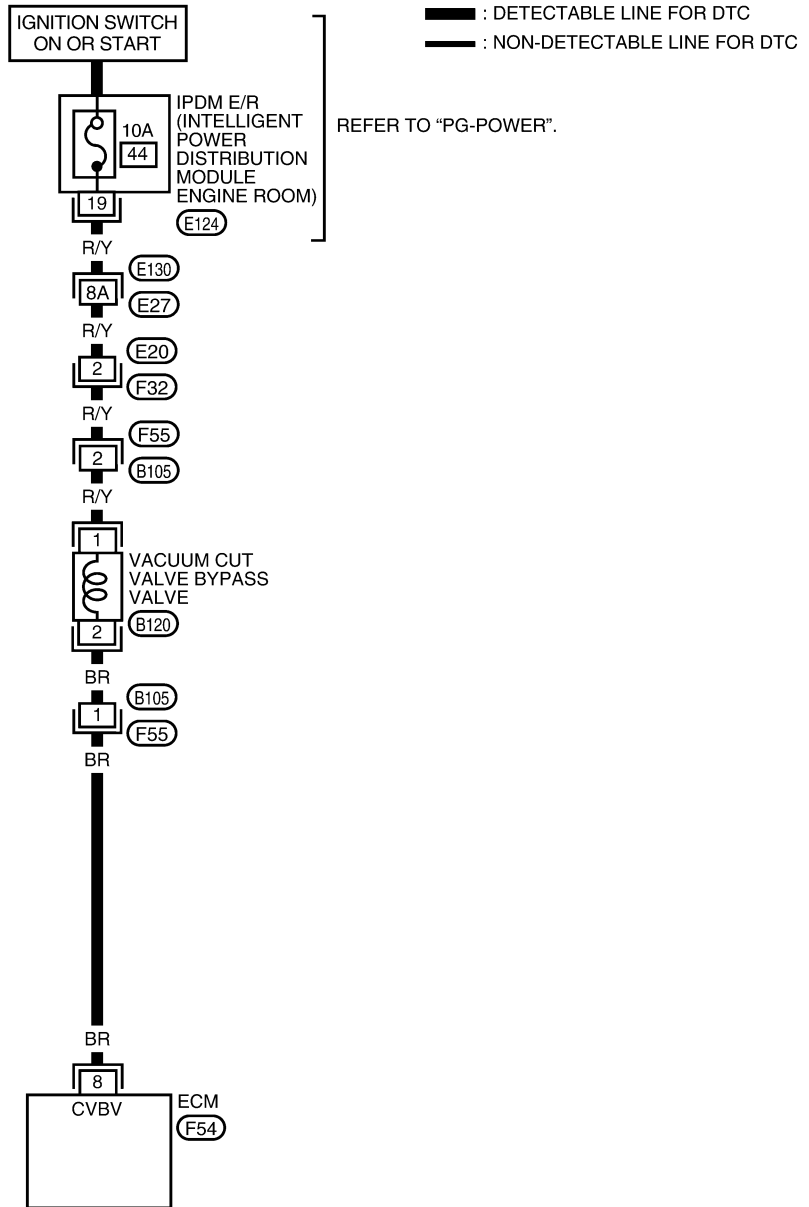
DTC P1490 VACUUM CUT VALVE BYPASS VALVE

[QR]

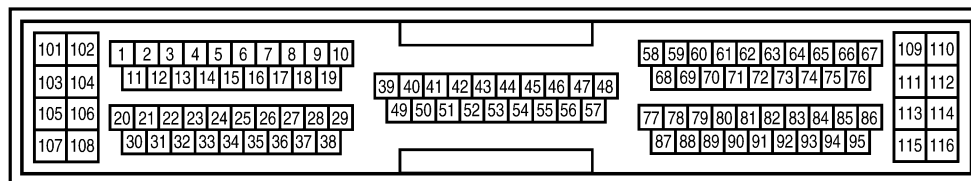
Wiring Diagram

UBS0031P

EC-BYPS/V-01



REFER TO THE FOLLOWING.
 E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0032E

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

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS0031Q

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

2. CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT

 **With CONSULT-II**

1. Turn ignition switch "OFF" and then "ON".
2. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II.
3. Touch "ON/OFF" on CONSULT-II screen.
4. Make sure that clicking sound is heard from the vacuum cut valve bypass valve.

OK or NG

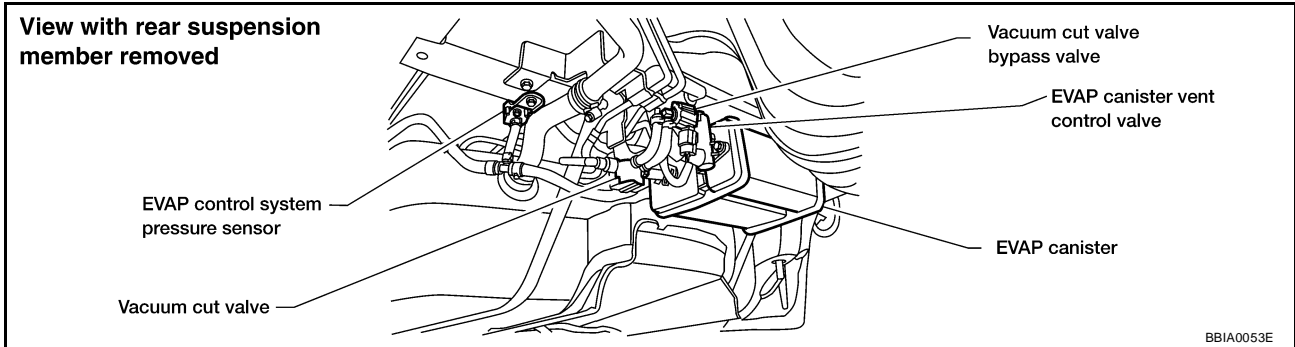
- OK >> GO TO 7.
- NG >> GO TO 3.

ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0840E

3. CHECK VACUUM CUT VALVE BYPASS VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect vacuum cut valve bypass valve harness connector.

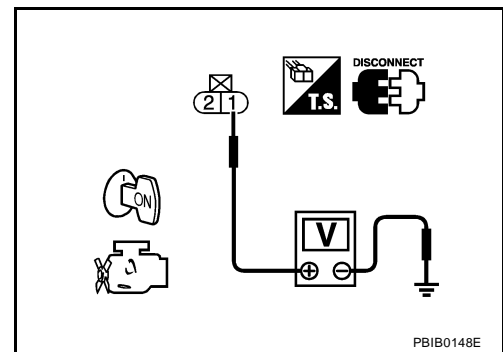


3. Turn ignition switch "ON".
4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Harness connectors F55, B105
- IPDM E/R connector E124
- 10A fuse
- Harness for open or short between vacuum cut valve bypass valve and fuse

>> Repair harness or connectors.

5. CHECK VACUUM CUT VALVE BYPASS 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 8 and vacuum cut valve bypass 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 B105, F55
- Harness for open or short between vacuum cut valve bypass valve and ECM

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

7. CHECK VACUUM CUT VALVE BYPASS VALVE

Refer to [EC-515, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace vacuum cut valve bypass valve.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection VACUUM CUT VALVE BYPASS VALVE

UBS0031R

Ⓟ With CONSULT-II

1. Reconnect harness disconnected connectors.
2. Turn ignition switch ON.
3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.

ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

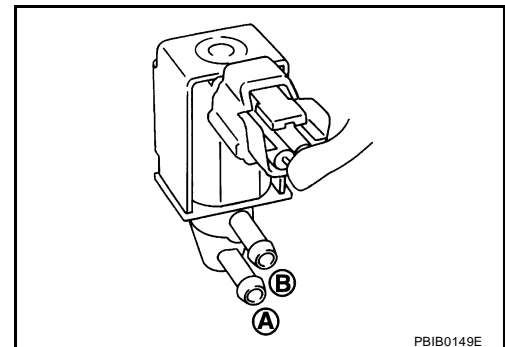
PBIB0840E

4. Check air passage continuity and operation delay time under the following conditions.

Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

Operation takes less than 1 second.

If NG, replace vacuum cut valve bypass valve.



DTC P1490 VACUUM CUT VALVE BYPASS VALVE

[QR]

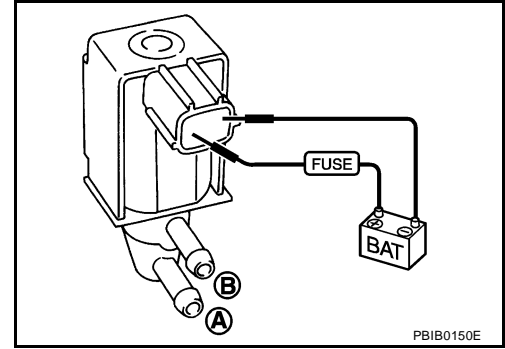
⊗ Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

Operation takes less than 1 second.

If NG, replace vacuum cut valve bypass valve.



DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[QR]

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

PF:17372

Description COMPONENT DESCRIPTION

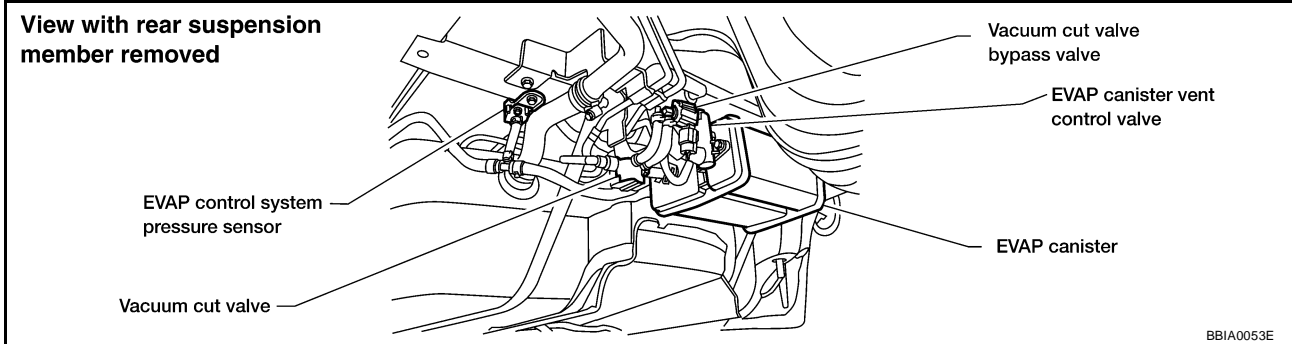
UBS0031S

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

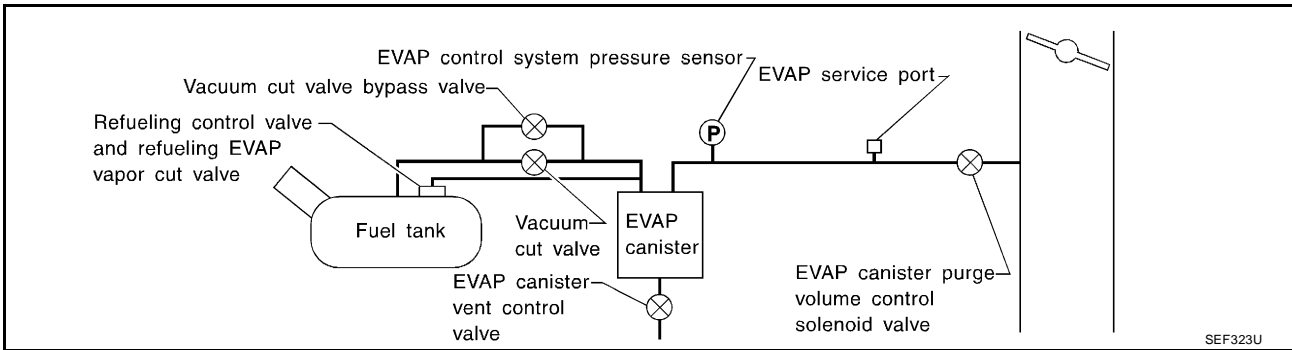
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.



EVAPORATIVE EMISSION SYSTEM DIAGRAM



CONSULT-II Reference Value in Data Monitor Mode

UBS0031T

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPAS S/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS0031U

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1491 1491	Vacuum cut valve bypass valve	Vacuum cut valve bypass valve does not operate properly.	<ul style="list-style-type: none"> ● Vacuum cut valve bypass valve ● Vacuum cut valve ● Bypass hoses for clogging ● EVAP control system pressure sensor and circuit ● EVAP canister vent control valve ● Hose between fuel tank and vacuum cut valve clogged ● Hose between vacuum cut valve and EVAP canister clogged ● EVAP canister ● EVAP purge port of fuel tank for clogging

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

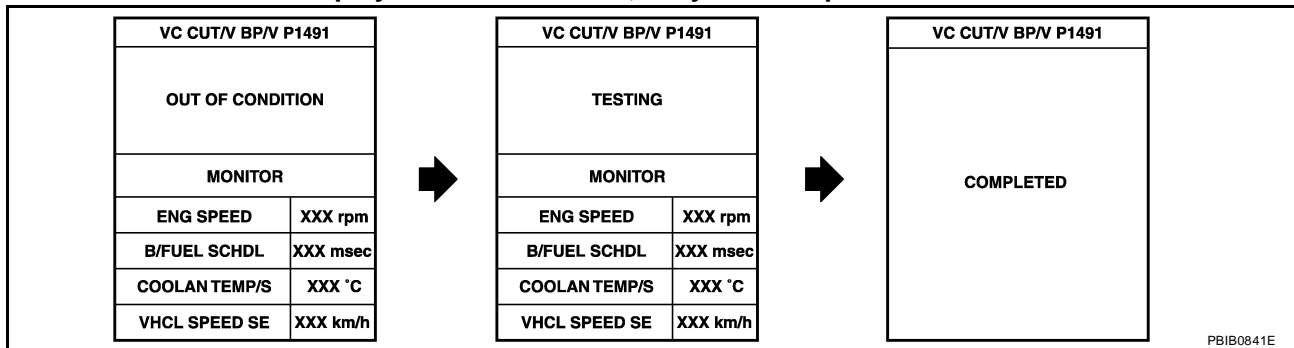
Always perform test at a temperature of 5 to 30°C (41 to 86°F).

WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch “OFF” and wait at least 10 seconds.
4. Start engine and let it idle for at least 70 seconds.
5. Select “VC CUT/V BP/V P1491” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
6. Touch “START”.
7. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take at least 30 seconds.)

ENG SPEED	1,000 - 3,800 rpm
Selector lever	Suitable position
Vehicle speed	36 - 120 km/h (22 - 75 MPH)
B/FUEL SCHDL	1.0 - 7.2 msec

If “TESTING” is not displayed after 5 minutes, retry from step 3.



8. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-521, "Diagnostic Procedure"](#).

Overall Function Check

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

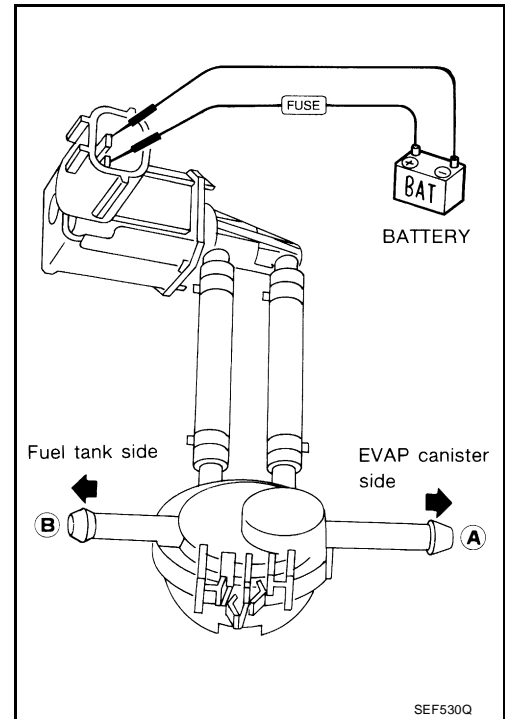
WITH GST

1. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[QR]

2. Apply vacuum to port **A** and check that there is no suction from port **B**.
3. Apply vacuum to port **B** and check that there is suction from port **A**.
4. Blow air in port **B** and check that there is a resistance to flow out of port **A**.
5. Supply battery voltage to the terminal.
6. Blow air in port **A** and check that air flows freely out of port **B**.
7. Blow air in port **B** and check that air flows freely out of port **A**.
8. If NG, go to [EC-521, "Diagnostic Procedure"](#).



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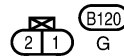
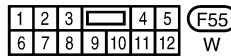
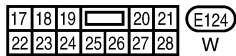
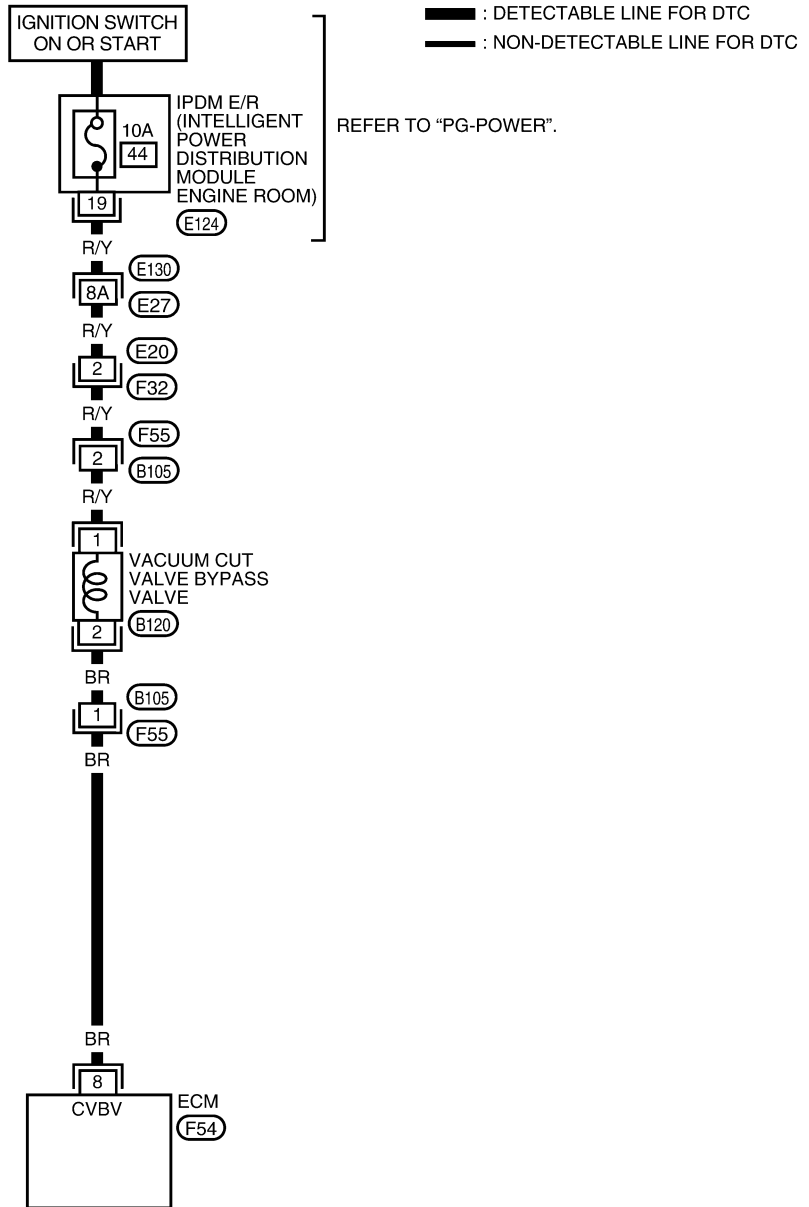
DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[QR]

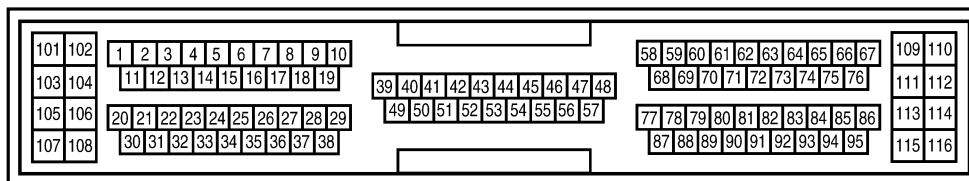
UBS0031X

Wiring Diagram

EC-BYPS/V-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0032E

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

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS0031Y

1. INSPECTION START

Do you have CONSULT-II?

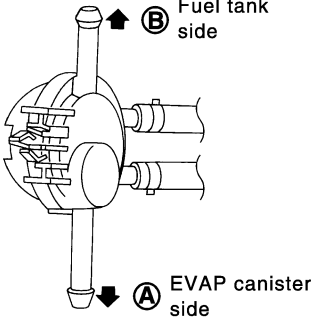
Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

2. CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION

 With CONSULT-II

1. Turn ignition switch "OFF".
2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
3. Apply vacuum to port **A** and check that there is no suction from port **B**.
4. Apply vacuum to port **B** and check that there is suction from port **A**.
5. Blow air in port **B** and check that there is a resistance to flow out of port **A**.
6. Turn ignition switch "ON".
7. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II and touch "ON".
8. Blow air in port **A** and check that air flows freely out of port **B**.
9. Blow air in port **B** and check that air flows freely out of port **A**.



ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0842E

OK or NG

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

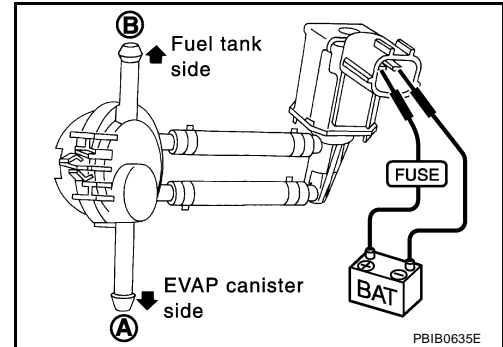
3. CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
3. Apply vacuum to port **A** and check that there is no suction from port **B** .
4. Apply vacuum to port **B** and check that there is suction from port **A** .
5. Blow air in port **B** and check that there is a resistance to flow out of port **A** .
6. Disconnect vacuum cut valve bypass valve harness connector.
7. Supply battery voltage to the terminal.
8. Blow air in port **A** and check that air flows freely out of port **B** .
9. Blow air in port **B** and check that air flows freely out of port **A** .

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 7.



4. CHECK EVAP PURGE LINE

Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection.

OK or NG

- OK >> GO TO 5.
 NG >> Repair it.

5. CHECK EVAP PURGE PORT

Check EVAP purge port of fuel tank for clogging.

OK or NG

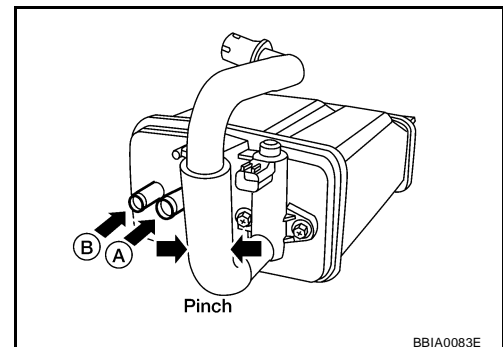
- OK >> GO TO 6.
 NG >> Clean EVAP purge port.

6. CHECK EVAP CANISTER

1. Pinch the fresh air hose.
2. Blow air into port **A** and check that it flows freely out of port **B** .

OK or NG

- OK >> GO TO 12.
 NG >> Replace EVAP canister.



7. CHECK BYPASS HOSE

Check bypass hoses for clogging.

OK or NG

- OK >> GO TO 8.
 NG >> Repair or replace hoses.

8. CHECK VACUUM CUT VALVE BYPASS VALVE

Refer to [EC-524, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace vacuum cut valve bypass valve.

9. CHECK VACUUM CUT VALVE

Refer to [EC-524, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace vacuum cut valve.

10. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

1. Turn ignition switch "OFF".
2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 11.
- NG >> Repair or replace.

11. 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 12.
- NG >> Replace EVAP control system pressure sensor.

12. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-333, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 13.
- NG >> Replace EVAP control system pressure sensor.

13. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 14.
- NG >> Clean the rubber tube using an air blower.

14. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-326, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 15.
- NG >> Replace EVAP canister vent control valve.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection VACUUM CUT VALVE BYPASS VALVE

UBS0031Z

④ With CONSULT-II

1. Reconnect harness disconnected connectors.
2. Turn ignition switch ON.
3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.

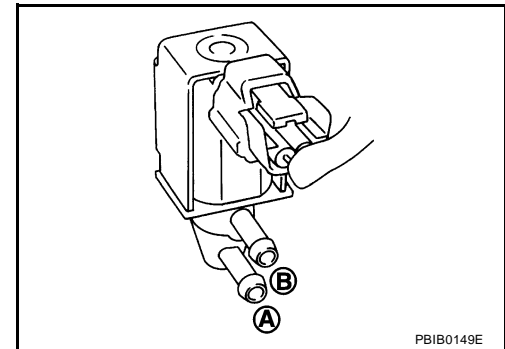
ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0840E

4. Check air passage continuity and operation delay time under the following conditions.

Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

Operation takes less than 1 second.
If NG, replace vacuum cut valve bypass valve.

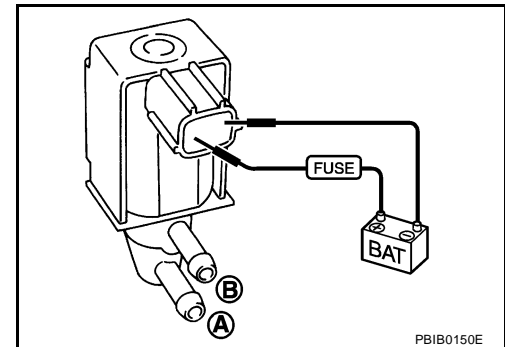


⊗ Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

Operation takes less than 1 second.
If NG, replace vacuum cut valve bypass valve.



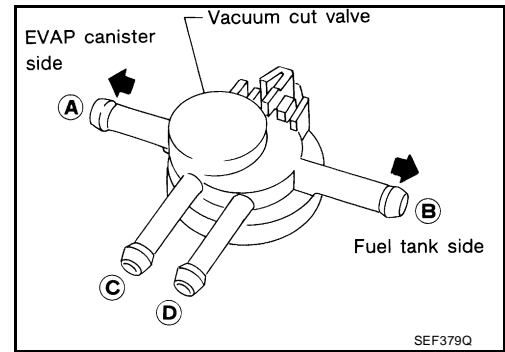
DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[QR]

VACUUM CUT VALVE

Check vacuum cut valve as follows:

1. Plug port **C** and **D** with fingers.
2. Apply vacuum to port **A** and check that there is no suction from port **B**.
3. Apply vacuum to port **B** and check that there is suction from port **A**.
4. Blow air in port **B** and check that there is a resistance to flow out of port **A**.
5. Open port **C** and **D**.
6. Blow air in port **A** check that air flows freely out of port **C**.
7. Blow air in port **B** check that air flows freely out of port **D**.
8. If NG, replace vacuum cut valve.



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DTC P1564 ASCD STEERING SWITCH

[QR]

PF:25551

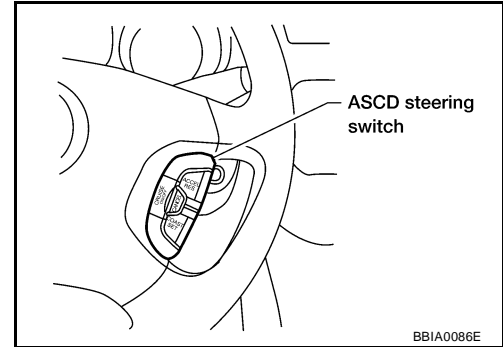
DTC P1564 ASCD STEERING SWITCH

UBS00320

Component Description

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

Refer to [EC-628, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

UBS00321

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	● Ignition switch: ON	● CRUISE switch pressed	ON
		● CRUISE switch released	OFF
CANCEL	● Ignition switch: ON	● CANCEL switch pressed	ON
		● CANCEL switch released	OFF
RESUME/ACC SW	● Ignition switch: ON	● ACCEL RES switch pressed	ON
		● ACCEL RES switch released	OFF
SET SW	● Ignition switch: ON	● COAST/SET switch pressed	ON
		● COAST/SET switch released	OFF

On Board Diagnosis Logic

UBS00322

NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-376](#).

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 (The switch circuit is open or shorted.) ● ASCD steering switch ● ECM

DTC Confirmation Procedure

UBS00323

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P1564 ASCD STEERING SWITCH

[QR]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
4. Press "CRUISE" switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press "ACCEL/RES" switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press "COAST/SET" switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Press "CANCEL" switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If 1st trip DTC is detected, go to [EC-530, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

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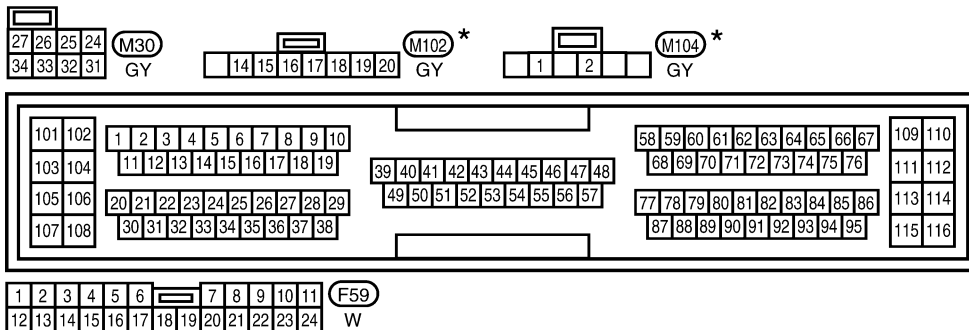
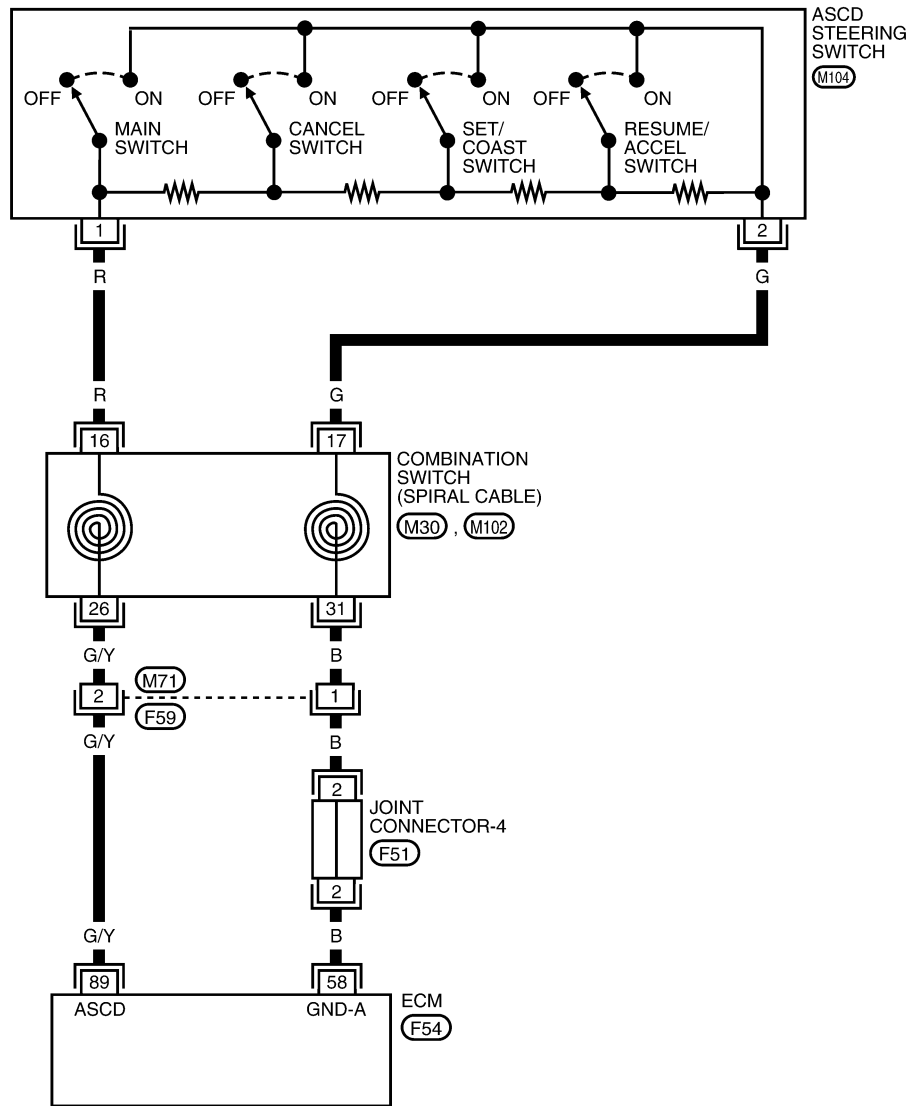
DTC P1564 ASCD STEERING SWITCH

[QR]

Wiring Diagram

UBS0032.4

EC-ASC/SW-01



REFER TO THE FOLLOWING.
 (F51) - JOINT CONNECTOR (J/C)



*: This connector is not shown in "HARNESS LAYOUT" of PG section.

BBWA0101E

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

DTC P1564 ASCD STEERING SWITCH

[QR]

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)
58	B	Sensors' ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
89	G/Y	ASCD steering switch	[Ignition switch "ON"] <ul style="list-style-type: none"> ● ASCD steering switch is "OFF". 	Approximately 4V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● CRUISE switch is "ON". 	Approximately 0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● CANCEL switch is "ON". 	Approximately 1V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● SET/COAST switch is "ON". 	Approximately 2V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● RESUME/ACCEL switch is "ON". 	Approximately 3V

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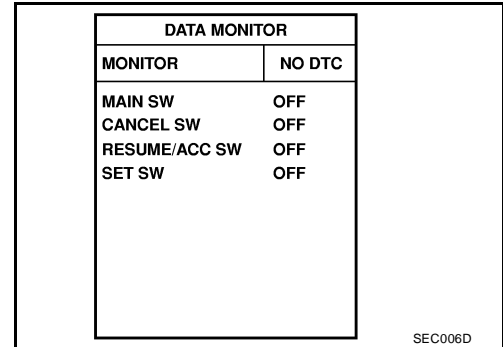
Diagnostic Procedure

1. CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "MAIN SW", "RESUME/ACC SW", "SET SW" and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-II.
3. Check each item indication under the following conditions.

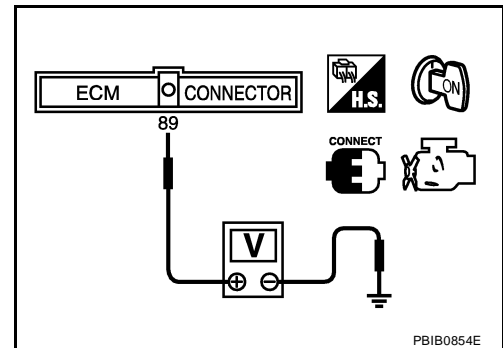
Switch	Monitor item	Condition	Indication
CRUISE	MAIN SW	Pressed	ON
		Released	OFF
COAST/SET	SET SW	Pressed	ON
		Released	OFF
ACCEL/RES	RESUME/ACC SW	Pressed	ON
		Released	OFF
CANCEL	CANCEL SW	Pressed	ON
		Released	OFF



Without CONSULT-II

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 89 and ground with pressing each button.

Switch	Condition	Voltage [V]
CRUISE	Pressed	Approx. 0.5
	Released	Approx. 5.0
COAST/SET	Pressed	Approx. 2.0
	Released	Approx. 5.0
ACCEL RES	Pressed	Approx. 3.0
	Released	Approx. 5.0
CANCEL	Pressed	Approx. 1.0
	Released	Approx. 5.0



OK or NG

- OK >> GO TO 7.
 NG >> GO TO 2.

2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

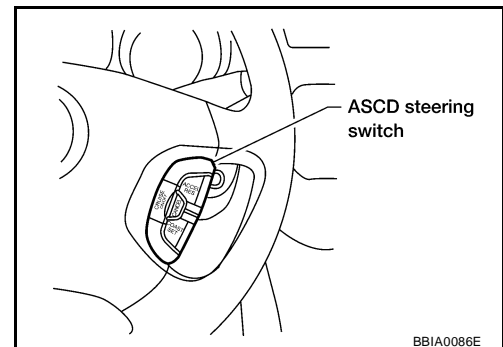
1. Turn ignition switch "OFF".
2. Disconnect ASCD steering switch harness connector and ECM harness connector.
3. Check harness continuity between ASCD steering switch terminal 2 and ECM terminal 58. Refer to Wiring Diagram.

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 M71, F59
- Joint connector-4
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCD steering switch

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

4. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 89 and ASCD steering switch 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 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, F59
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCD steering switch

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

6. CHECK ASCD STEERING SWITCH

Refer to [EC-531, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
NG >> Replace ASCD steering switch.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
ASCD STEERING SWITCH**

UBS00326

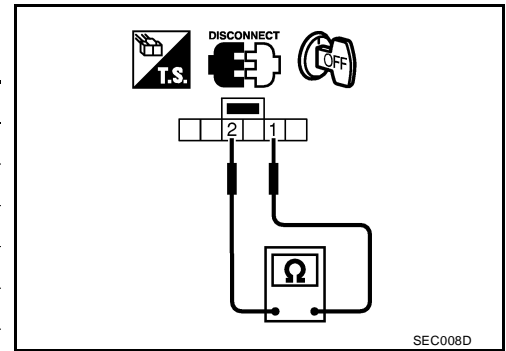
1. Disconnect ASCD steering switch.

DTC P1564 ASCD STEERING SWITCH

[QR]

2. Check continuity between ASCD steering switch terminals 1 and 2 with pushing each switch.

Switch	Condition	Resistance [Ω]
CRUISE SW	Pressed	Approx. 0
	Released	Approx. 4,000
COAST/SET SW	Pressed	Approx. 660
	Released	Approx. 4,000
ACCEL RES SW	Pressed	Approx. 1,480
	Released	Approx. 4,000
CANCEL SW	Pressed	Approx. 250
	Released	Approx. 4,000



If NG, replace ASCD steering switch.

DTC P1572 ASCD BRAKE SWITCH

[QR]

DTC P1572 ASCD BRAKE SWITCH

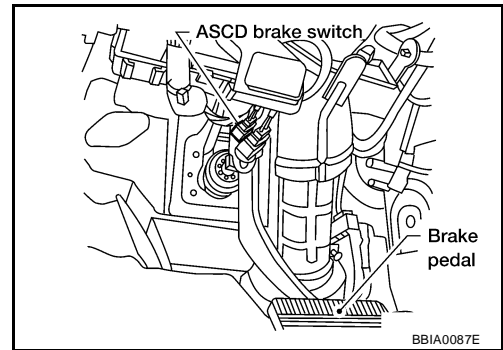
PFP:25320

Component Description

UBS00327

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).

Refer to [EC-628, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

UBS00328

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal fully released	ON
		● Brake pedal depressed	OFF
BRAKE SW2 (stop lamp switch)	● Ignition switch: ON	● Brake pedal fully released	OFF
		● Brake pedal depressed	ON

On Board Diagnosis Logic

UBS00329

NOTE:

If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-376](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1572 1572	ASCD brake switch	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 (The stop lamp switch circuit is open or shorted.) ● Harness or connectors (The ASCD brake switch circuit is open or shorted.) ● Harness or connectors (The ASCD clutch switch circuit is open or shorted.) ● Stop lamp switch ● ASCD brake switch ● ASCD clutch switch ● Incorrect stop lamp switch installation ● Incorrect ASCD brake switch installation ● Incorrect ASCD clutch switch installation ● ECM

DTC Confirmation Procedure

UBS0032A

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:

Steps 3 and 4 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.

DTC P1572 ASCD BRAKE SWITCH

[QR]

WITH CONSULT-II

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. 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

If 1st trip DTC is detected, go to [EC-536, "Diagnostic Procedure"](#) .
If 1st trip DTC is not detected, go to the following step.

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
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned condition.

5. If 1st trip DTC is detected, go to [EC-536, "Diagnostic Procedure"](#) .

WITH GST

Follow the procedure "WITH CONSULT-II" above.

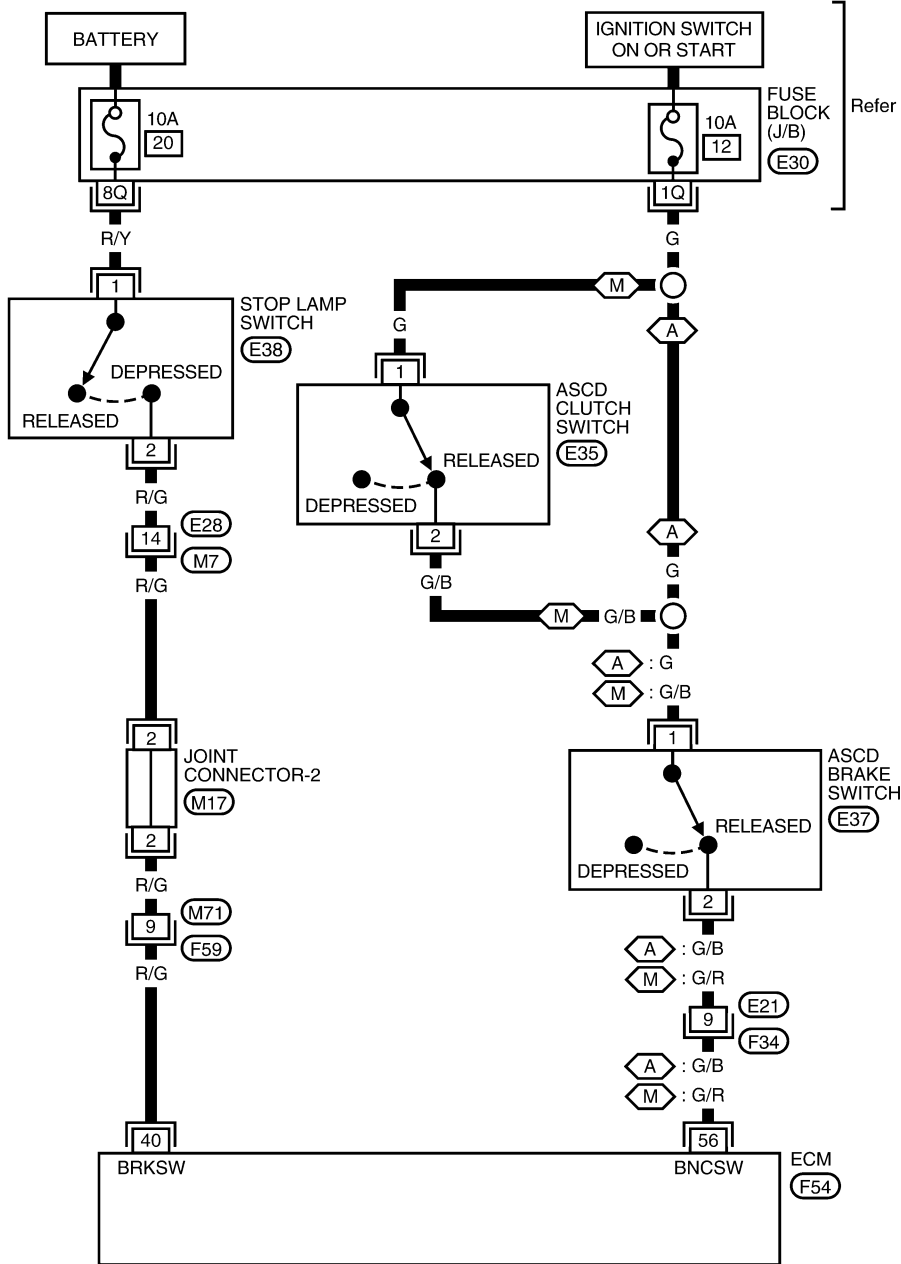
DTC P1572 ASCD BRAKE SWITCH

[QR]

UBS0032B

Wiring Diagram

EC-ASC/BS-01



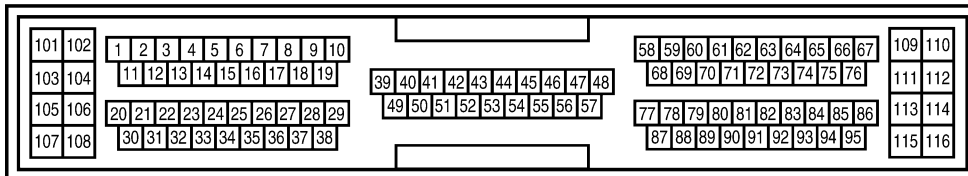
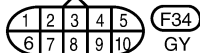
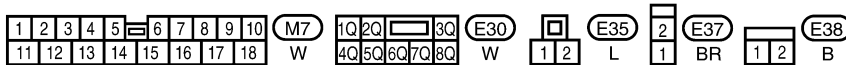
Refer to "PG-POWER".

A : WITH A/T
M : WITH M/T

A : G
M : G/B

A : G/B
M : G/R

A : G/B
M : G/R



REFER TO THE FOLLOWING.
M17 - JOINT CONNECTOR (J/C)



BBWA0186E

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

DTC P1572 ASCD BRAKE SWITCH

[QR]

CAUTION:

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

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
40	R/G	Stop lamp switch	[Engine is running] ● Brake pedal fully released	Approximately 0V
			[Engine is running] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
56	G/B (A/T) G/R (M/T)	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS0032C

1. CHECK OVERALL FUNCTION-I

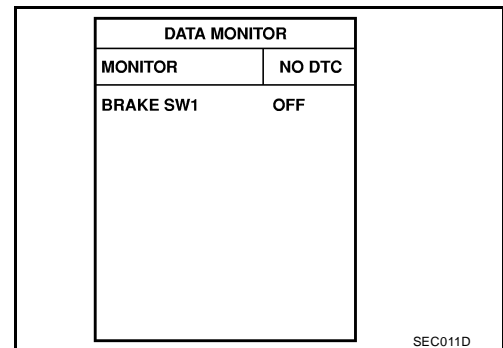
With CONSULT-II

- Turn ignition switch "ON".
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
- Check "BRAKE SW1" indication under the following conditions.
M/T models

CONDITION	INDICATION
When clutch pedal or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON

A/T models

CONDITION	INDICATION
When brake pedal is depress	OFF
When brake pedal is fully released	ON



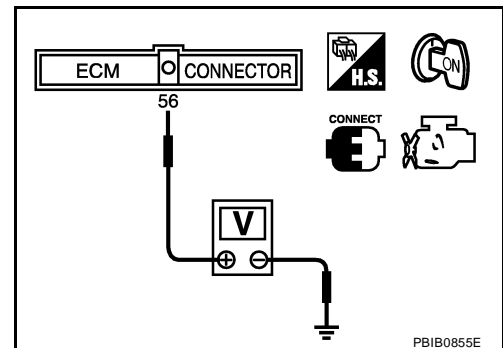
Without CONSULT-II

- Turn ignition switch "ON".
- Check voltage between ECM terminal 56 and ground under the following conditions.
A/T models

CONDITION	VOLTAGE
When brake pedal is depress	Approximately 0V
When brake pedal is fully released	Battery voltage

M/T models

CONDITION	VOLTAGE
When clutch pedal or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
- NG (M/T models) >>>GO TO 3.
- NG (A/T models) >>>GO TO 8.

DTC P1572 ASCD BRAKE SWITCH

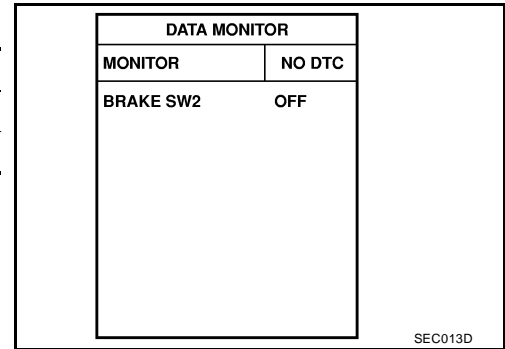
[QR]

2. CHECK OVERALL FUNCTION-II

With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

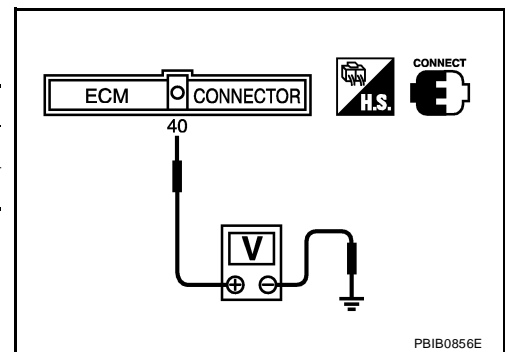
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



Without CONSULT-II

Check voltage between ECM terminal 40 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

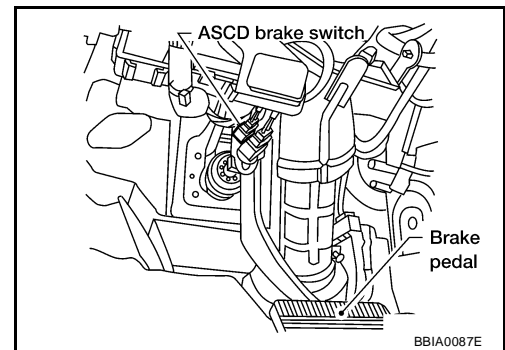


OK or NG

- OK >> GO TO 18.
- NG >> GO TO 13.

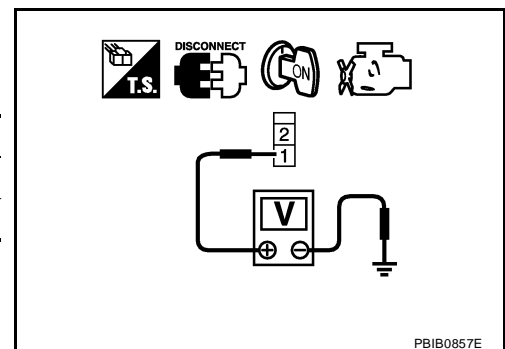
3. CHECK ASCD CLUTCH SWITCH CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".



4. Check voltage between ASCD brake switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When clutch pedal is released	Battery voltage
When clutch pedal is depressed	Approx. 0V

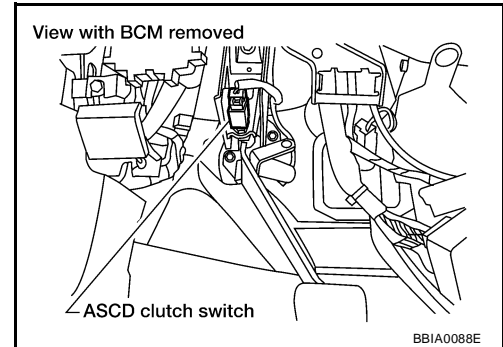


OK or NG

- OK >> GO TO 10.
- NG >> GO TO 4.

4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".

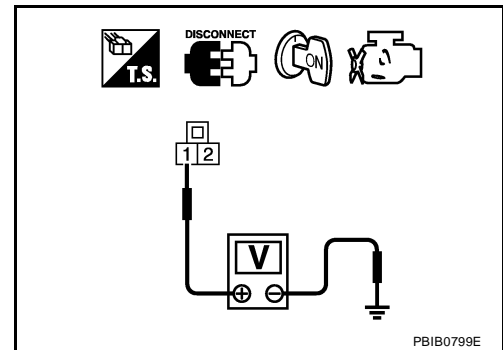


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 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. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD clutch switch terminal 2 and ASCD brake switch 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 7.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH

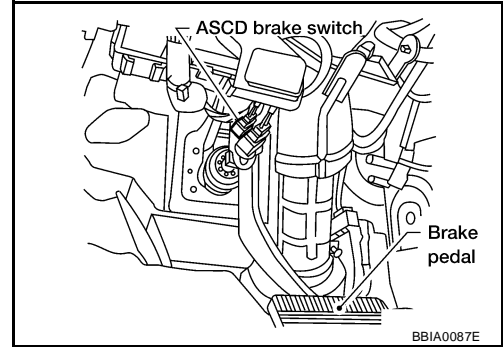
Refer to [EC-541, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.
- NG >> Replace ASCD clutch switch.

8. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

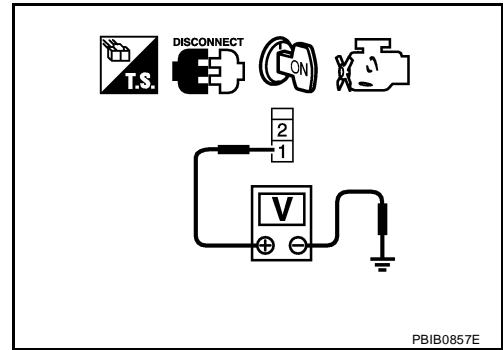


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 9.



9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 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.

10. 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 56 and ASCD brake switch terminal 2. 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 12.
- NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and ASCD brake switch

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

12. CHECK ASCD BRAKE SWITCH

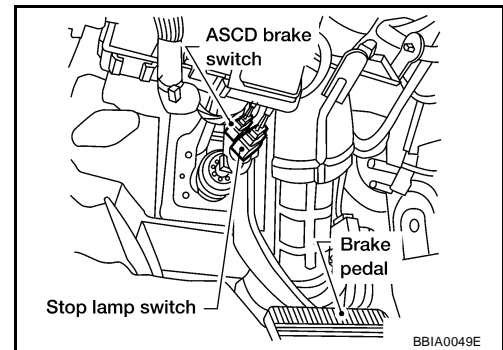
Refer to [EC-541, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.
- NG >> Replace ASCD brake switch.

13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.

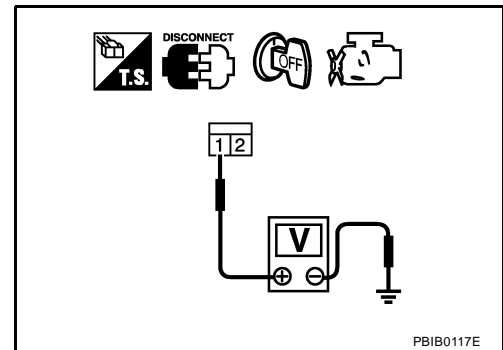


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.



14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

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

15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 40 and stop lamp 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 17.
- NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E28, M7
- Harness connectors M71, F59
- Joint connector-2
- Harness for open or short between ECM and stop lamp switch

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

17. CHECK STOP LAMP SWITCH

Refer to [EC-541, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.
- NG >> Replace stop lamp switch.

18. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

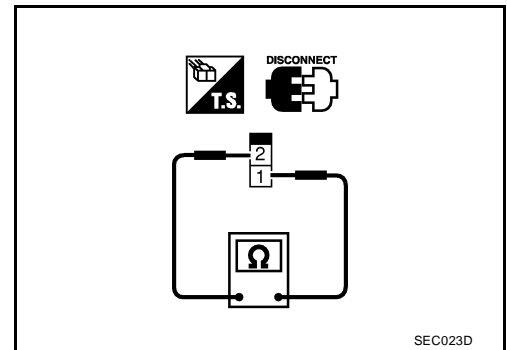
**Component Inspection
ASC D BRAKE SWITCH**

UBS0032D

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
When brake pedal is fully released.	Should exist.
When brake pedal is depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-6, "BRAKE PEDAL"](#) , and perform step 3 again.

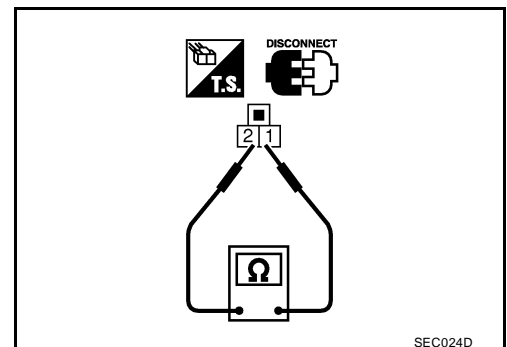


ASC D CLUTCH SWITCH (FOR M/T MODELS)

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
When clutch pedal is fully released.	Should exist.
When clutch pedal is depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-5, "CLUTCH PEDAL"](#) , and perform step 3 again.



STOP LAMP SWITCH

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.

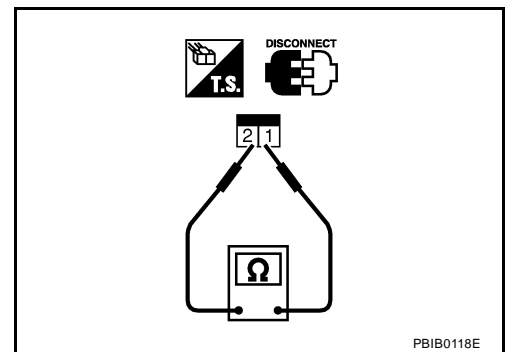
DTC P1572 ASCD BRAKE SWITCH

[QR]

3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-6](#), "[BRAKE PEDAL](#)", and perform step 3 again.



DTC P1574 ASCD VEHICLE SPEED SENSOR

[QR]

DTC P1574 ASCD VEHICLE SPEED SENSOR

PFP:31036

Component Description

UBS0032E

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-628, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for ASCD functions.

On Board Diagnosis Logic

UBS0032F

NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-138, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-370, "DTC P0500 VSS"](#)

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 (The CAN communication line is open or shorted.) ● Harness or connectors (The combination meter circuit is open or shorted.) ● TCM ● Combination meter ● Vehicle speed sensor ● ECM

DTC Confirmation Procedure

UBS0032G

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-II

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Drive the vehicle at more than 40 km/h (25MPH).
4. If 1st trip DTC is detected, go to [EC-544, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [AT-36, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION"](#) .

OK or NG

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated.

2. CHECK VEHICLE SPEED SENSOR CIRCUIT

Refer to [DI-19, "Vehicle Speed System"](#) .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3. CHECK COMBINATION METER

Check combination meter function.

Refer to [DI-4, "COMBINATION METERS"](#) .

>> **INSPECTION END**

DTC P1706 PNP SWITCH

[QR]

PFP:32006

UBS0032I

UBS0032J

UBS0032K

UBS0032L

DTC P1706 PNP SWITCH

Component Description

When the shift lever position is “P” (A/T models only) or “N”, park/neutral position (PNP) switch is “ON”. ECM detects the position because the continuity of the line (the “ON” signal) exists.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T model) Neutral (M/T model)	ON
		Shift lever: Except above	OFF

On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706 1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	<ul style="list-style-type: none"> ● Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] ● Park/neutral position (PNP) switch

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II. Then check the “P/N POSI SW” signal under the following conditions.

Position (Selector lever)	Known-good signal
“N” and “P” position	ON
Except the above position	OFF

If NG, go to [EC-548, "Diagnostic Procedure"](#) .

If OK, go to following step.

3. Select “DATA MONITOR” mode with CONSULT-II.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	1,500 - 3,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	3.0 - 31.8 msec
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

6. If 1st trip DTC is detected, go to [EC-548, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
P/N POSI SW	ON

SEF212Y

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

Overall Function Check

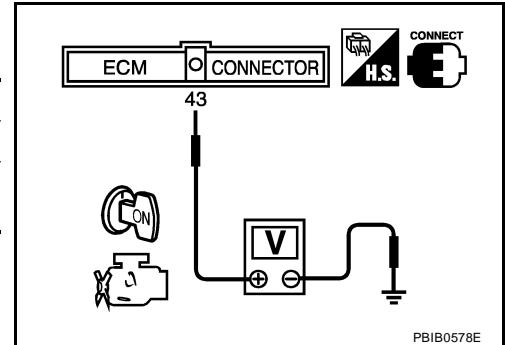
Use this procedure to check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 43 (PNP switch signal) and body ground under the following conditions.

Condition (Gear position)	Voltage V (Known good data)
"P" (A/T models only) and "N" position	Approx. 0
Except the above position	A/T models: Battery voltage M/T: Approximately 5V

3. If NG, go to [EC-548, "Diagnostic Procedure"](#) .



PBIB0578E

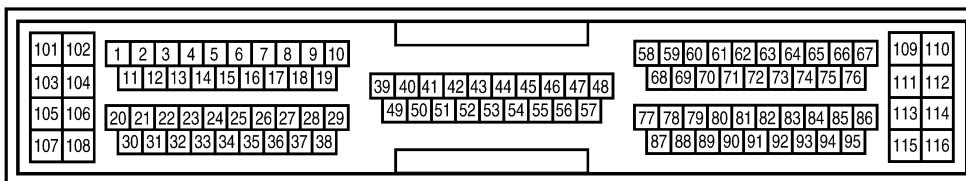
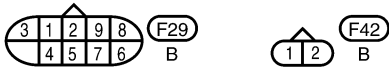
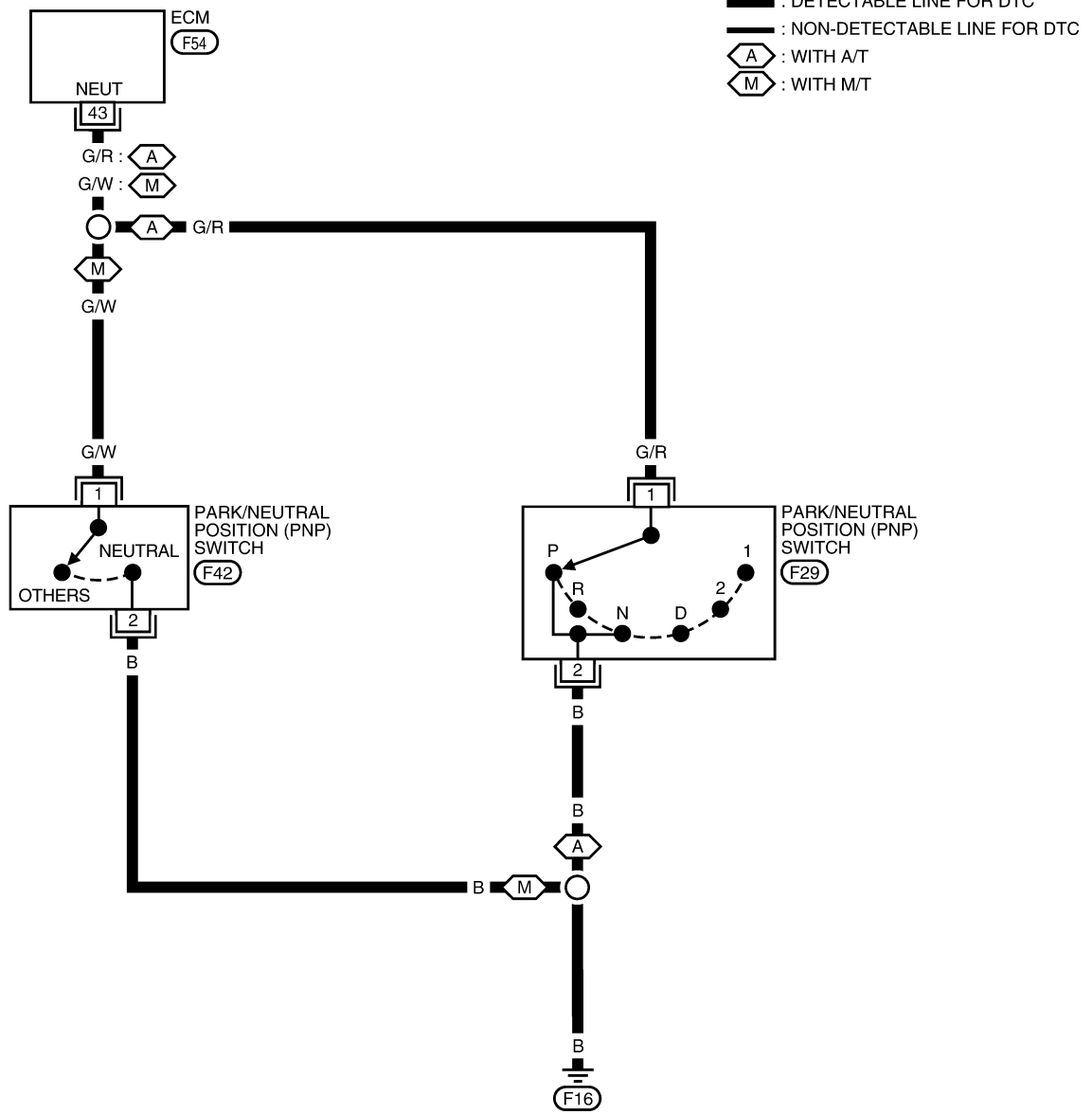
DTC P1706 PNP SWITCH

[QR]

UBS0032N

Wiring Diagram

EC-PNP/SW-01



BBWA0033E

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
43	G/R (A/T) G/W (M/T)	PNP switch	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever position is "P" or "N" (A/T models), "Neutral" (M/T models). 	Approximately 0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Except the above gear position 	A/T models BATTERY VOLTAGE (11 - 14V) M/T models Approximately 5V

Diagnostic Procedure

UBS00320

1. CHECK GROUND CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect PNP switch harness connector.
3. Check harness continuity between PNP switch terminal 2 and body ground.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 2.

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

2. CHECK INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 43 and PNP switch 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 power in harness or connectors.

3. CHECK PNP SWITCH

Refer to [AT-103, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#) (A/T models) or [MT-12, "POSITION SWITCH"](#) (M/T models).

OK or NG

OK >> GO TO 4.

NG >> Replace PNP switch.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P1805 BRAKE SWITCH

[QR]

DTC P1805 BRAKE SWITCH

PF2:25320

Description

UBS0032P

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-II Reference Value in Data Monitor Mode

UBS0032Q

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

UBS0032R

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for an 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

DTC Confirmation Procedure

UBS0032S

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-II.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. If 1st trip DTC is detected, go to [EC-551, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

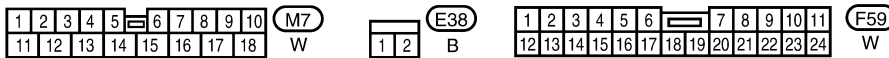
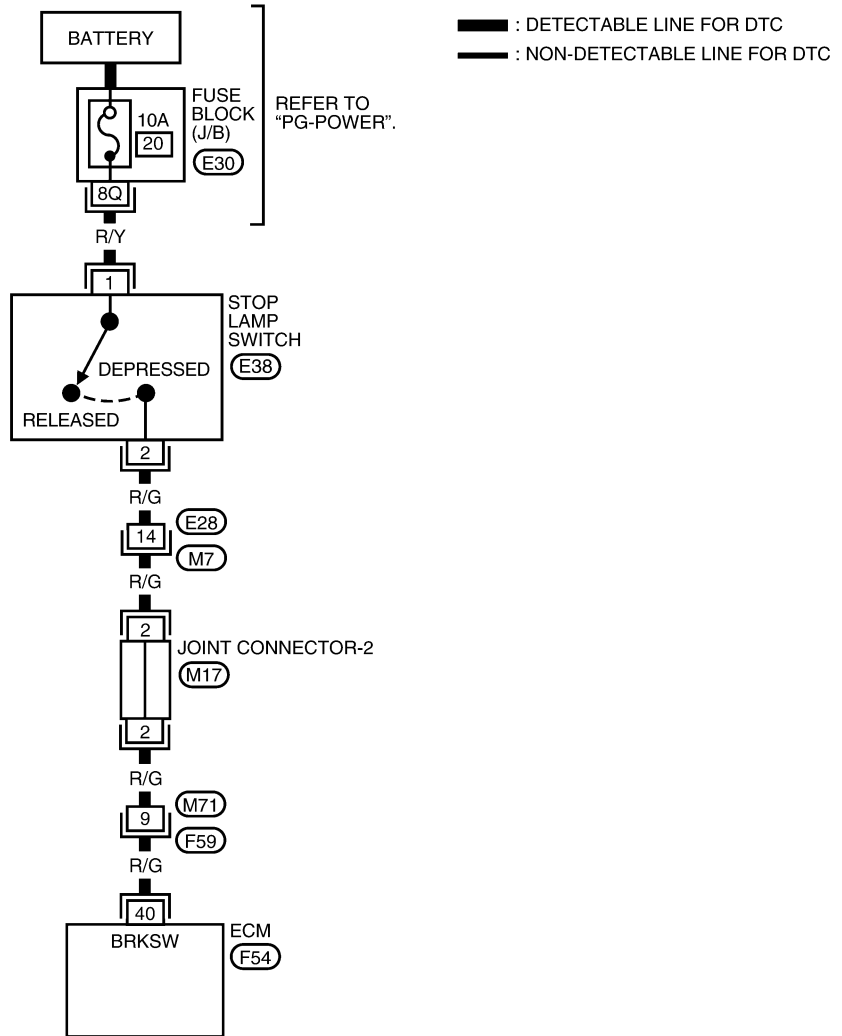
DTC P1805 BRAKE SWITCH

[QR]

Wiring Diagram

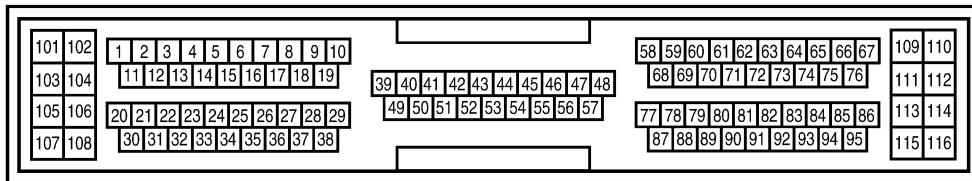
UBS0032T

EC-BRK/SW-01



REFER TO THE FOLLOWING.

- (M17) - JOINT CONNECTOR (J/C)
- (E30) - FUSE BLOCK - JUNCTION BOX (J/B)



BBWA0207E

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

DTC P1805 BRAKE SWITCH

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
40	R/G	Stop lamp switch	[Engine is running] ● Brake pedal fully released	Approximately 0V
			[Engine is running] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS0032U

1. CHECK STOP LAMP SWITCH CIRCUIT

- Turn ignition switch "OFF".
- Check the stop lamp when depressing and releasing the brake pedal.

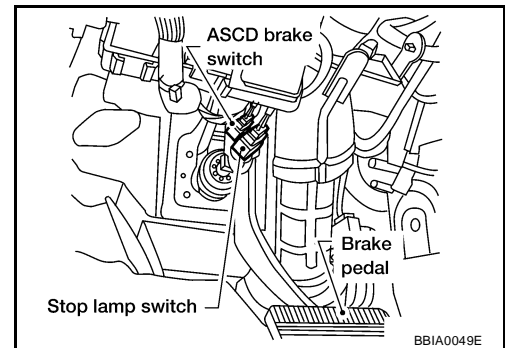
Brake pedal	Stop lamp
Fully released	Not illuminated
Depressed	Illuminated

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

- Disconnect stop lamp switch harness connector.



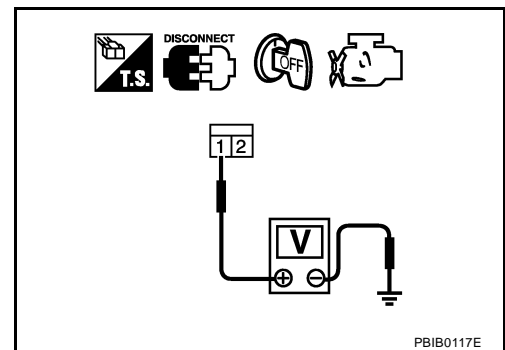
BBIA0049E

- Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



PBIB0117E

3. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector E30
- Harness for open and short between stop lamp switch and battery

>> 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

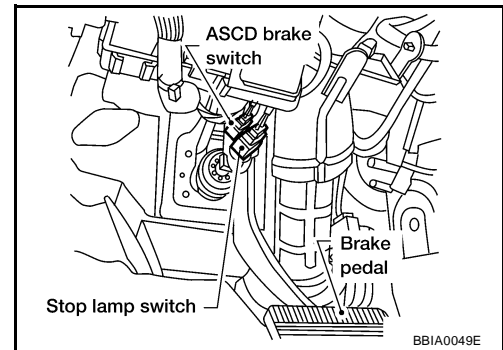
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Disconnect stop lamp switch harness connector.
4. Check harness continuity between ECM terminal 40 and stop lamp switch terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E28, M7
- Harness connectors M71, F59
- Joint connector-2
- Harness for open or short between ECM and stop lamp switch

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

6. CHECK STOP LAMP SWITCH

Refer to [EC-553, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
NG >> Replace stop lamp switch.

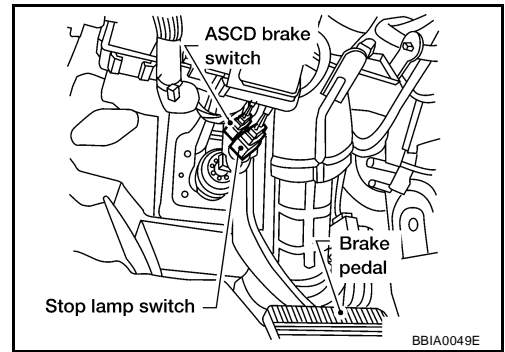
7. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

Component Inspection STOP LAMP SWITCH

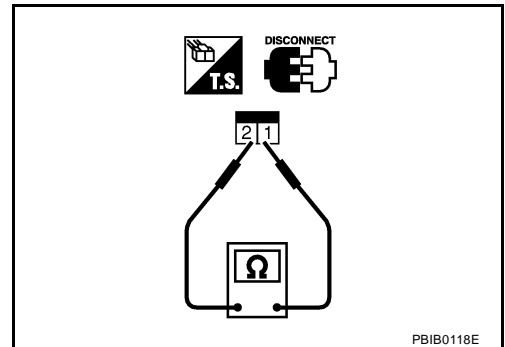
1. Disconnect stop lamp switch harness connector.



2. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Conditions	Continuity
Brake pedal fully released	Should not exist.
Brake pedal depressed	Should exist.

If NG, adjust brake pedal installation, refer to [BR-6, "BRAKE PEDAL"](#), and perform step 2 again.



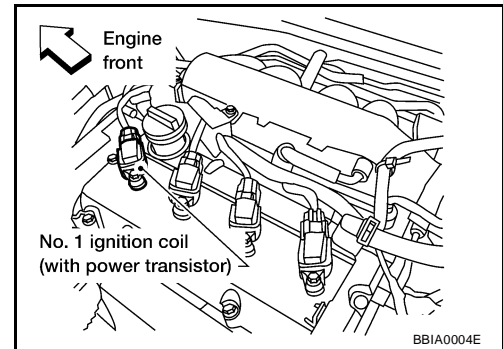
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IGNITION SIGNAL

Component Description

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.



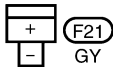
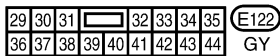
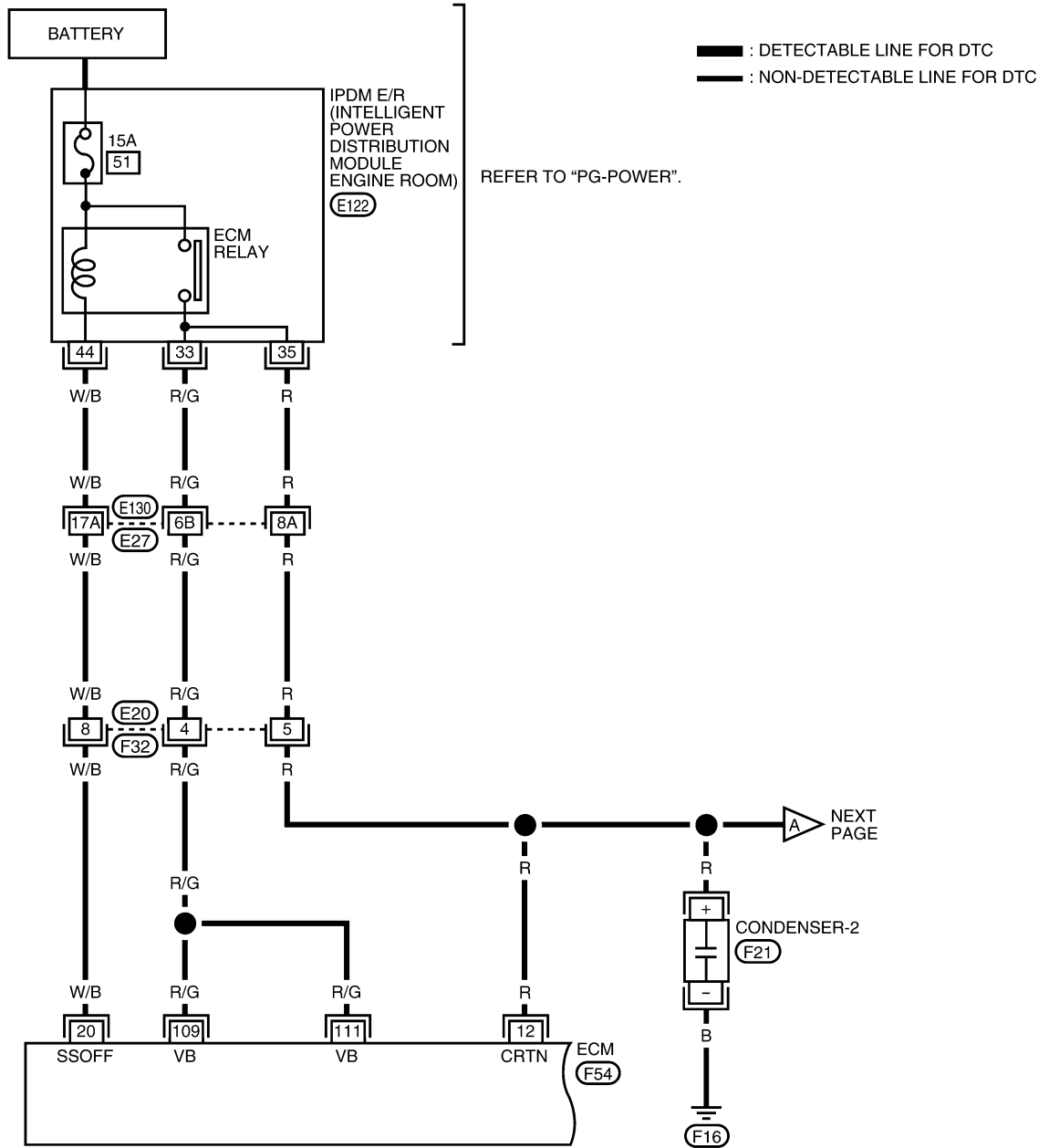
IGNITION SIGNAL

[QR]

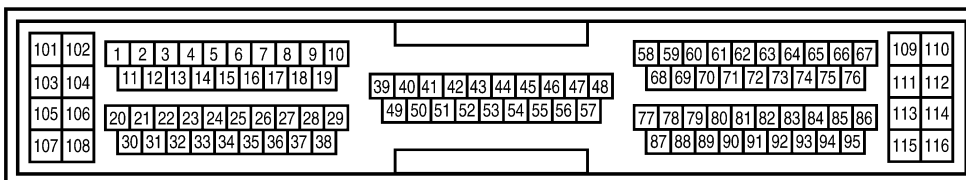
UBS0032X

Wiring Diagram

EC-IGNSYS-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0028E

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

IGNITION SIGNAL

[QR]

CAUTION:

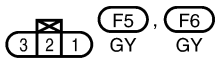
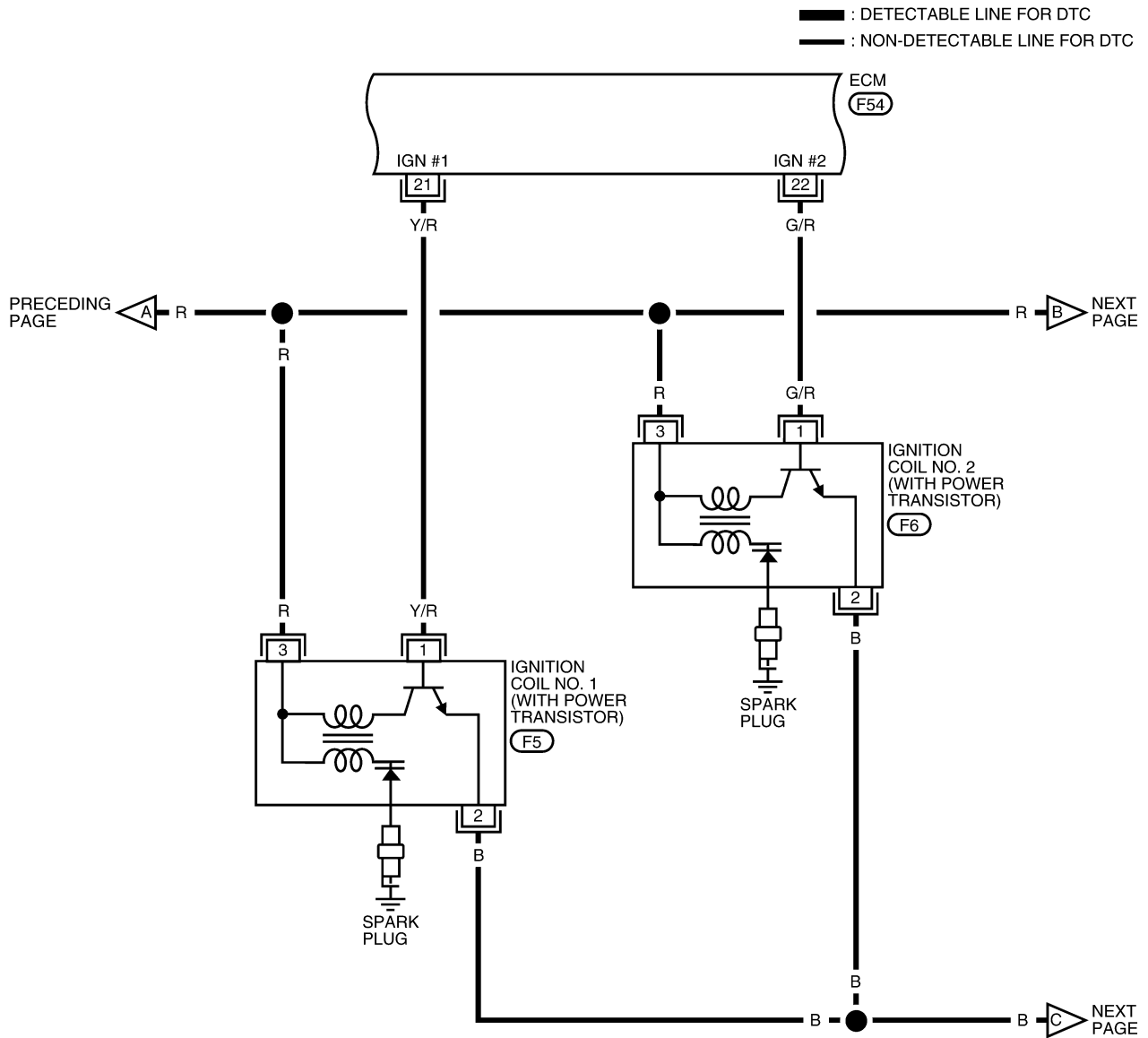
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12	R	Counter current return	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
20	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 3 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 3 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
109 111	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

IGNITION SIGNAL

[QR]

EC-IGNSYS-02



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



BBWA0029E

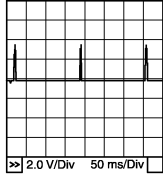
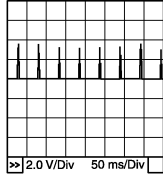
Specification data are reference values and are measured between each terminal and ground.

IGNITION SIGNAL

[QR]

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)
21 22	Y/R G/R	Ignition signal No. 1 Ignition signal No. 2	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>0 - 0.1V★</p>  <p style="text-align: right; font-size: small;">PBIB0521E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	<p>0 - 0.2V★</p>  <p style="text-align: right; font-size: small;">PBIB0522E</p>

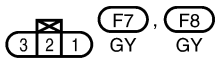
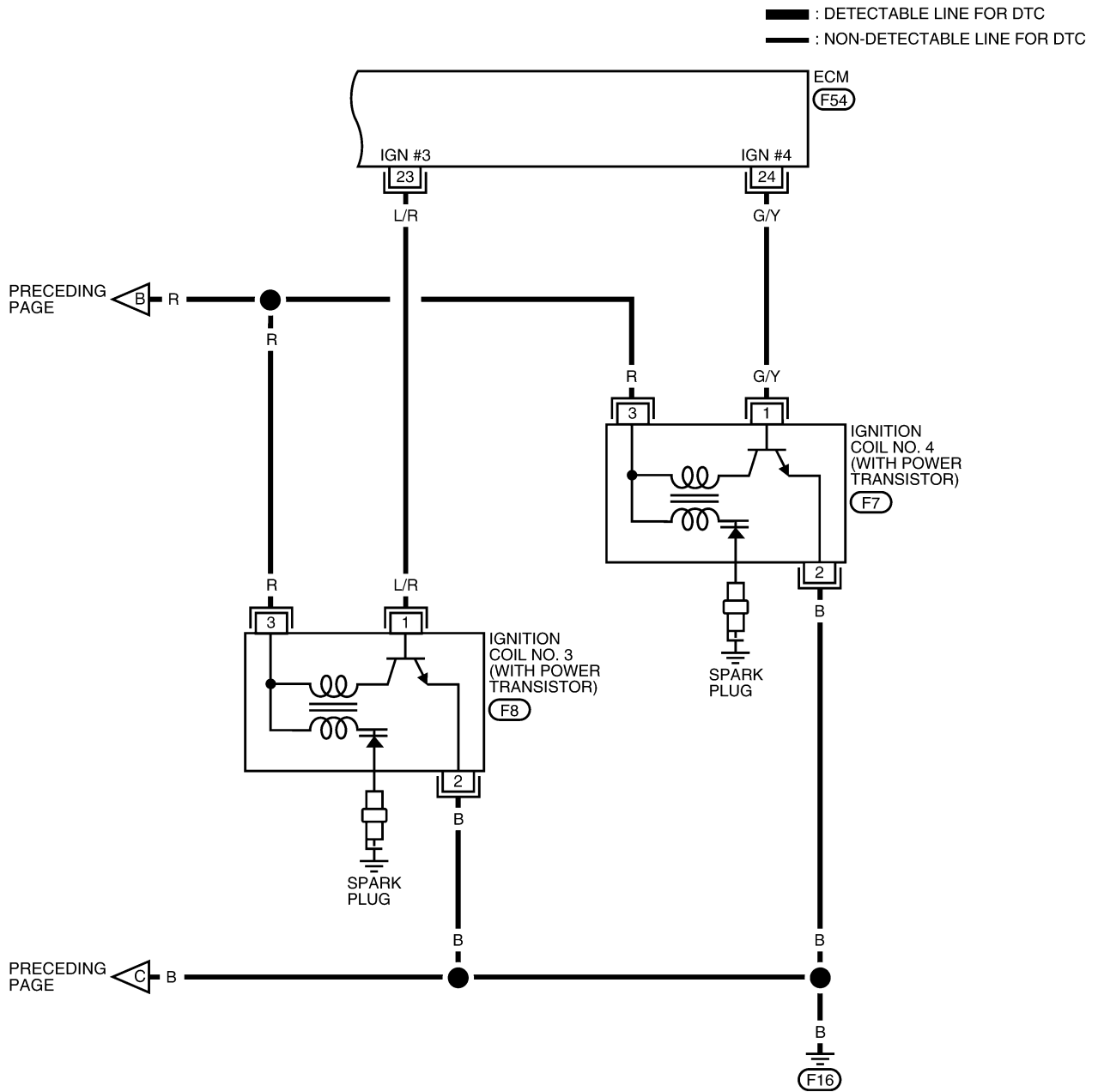
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

IGNITION SIGNAL

[QR]

EC-IGNSYS-03

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



BBWA0030E

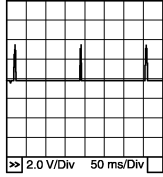
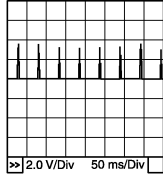
Specification data are reference values and are measured between each terminal and ground.

IGNITION SIGNAL

[QR]

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)
23 24	L/R G/Y	Ignition signal No. 3 Ignition signal No. 4	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>0 - 0.1V★</p>  <p style="text-align: right; font-size: small;">PBIB0521E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	<p>0 - 0.2V★</p>  <p style="text-align: right; font-size: small;">PBIB0522E</p>

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

Diagnostic Procedure

UBS0032Y

1. CHECK ENGINE START

Turn ignition switch "OFF", and restart engine.

Is engine running?

Yes or No

- Yes (With CONSULT-II)>>GO TO 2.
- Yes (Without CONSULT-II)>>GO TO 3.
- No >> GO TO 4.

2. CHECK OVERALL FUNCTION

④ **With CONSULT-II**

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
2. Make sure that all circuits do not produce a momentary engine speed drop.

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 8.

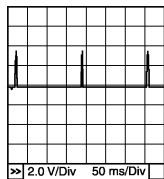
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

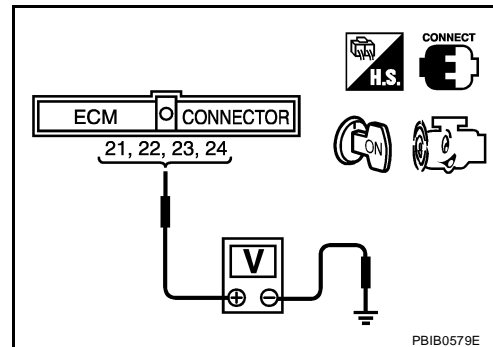
3. CHECK OVERALL FUNCTION

⊗ Without CONSULT-II

1. Let engine idle.
2. Read the voltage signal between ECM terminals 21, 22, 23, 24 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.



PBIB0521E



PBIB0579E

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 8.

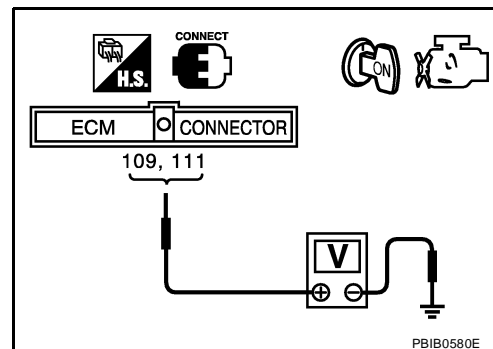
4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between ECM terminals 109, 111 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> Go to [EC-131, "POWER SUPPLY CIRCUIT FOR ECM"](#)



PBIB0580E

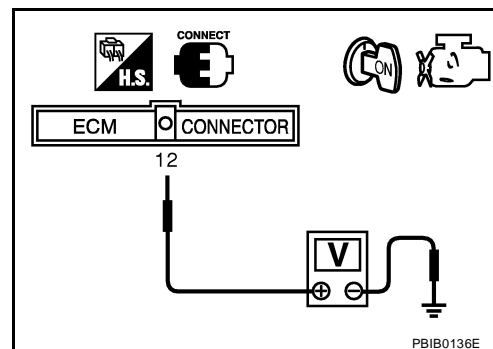
5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

Check voltage between ECM terminal 12 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> Go to [EC-131, "POWER SUPPLY CIRCUIT FOR ECM"](#)



PBIB0136E

6. CHECK CONDENSER CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Check harness continuity between ECM terminal 12 and condenser terminal + , condenser terminal – and engine ground. 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 CONDENSER

Refer to [EC-563, "Component Inspection"](#) .

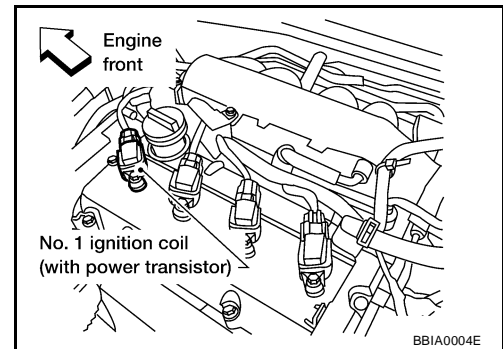
OK or NG

OK >> GO TO 8.

NG >> Replace condenser.

8. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.
4. Turn ignition switch ON.



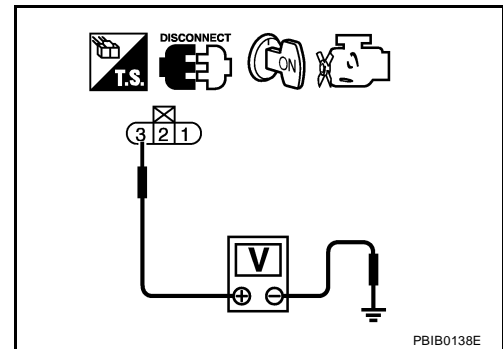
5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.



9. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ignition coil and IPDM E/R
- Harness for open or short between ignition coil and ECM

>> Repair or replace harness or connectors.

10. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ignition coil terminal 2 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 11.

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

11. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 21, 22, 23, 24 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 12.

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

12. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-563, "Component Inspection"](#) .

OK or NG

OK >> GO TO 13.

NG >> Replace ignition coil with power transistor.

13. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

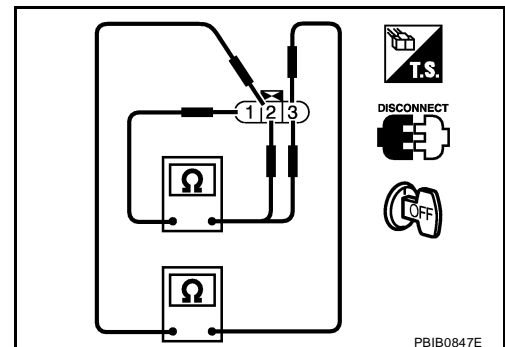
>> INSPECTION END

Component Inspection IGNITION COIL WITH POWER TRANSISTOR

UBS0032Z

1. Turn ignition switch "OFF".
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No.	Resistance Ω [at 25°C (77°F)]
1 and 2	Except 0 or ∞
1 and 3	Except 0
2 and 3	



CONDENSER

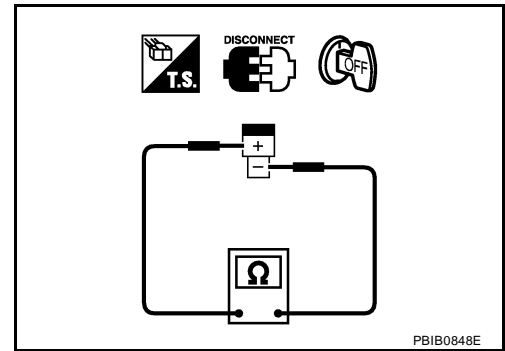
1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.

IGNITION SIGNAL

[QR]

3. Check resistance between condenser terminals as + and - .

Resistance: Above 1 MΩ at 25°C (77°F)



UBS00330

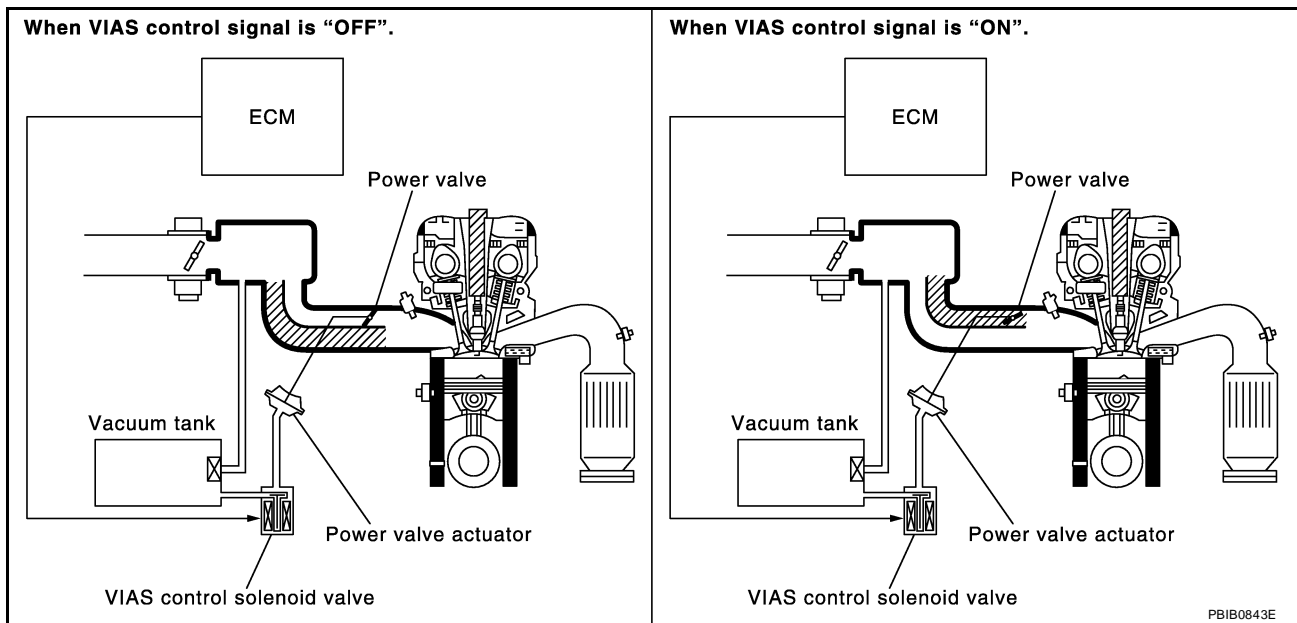
Removal and Installation IGNITION COIL WITH POWER TRANSISTOR

Refer to [EM-26, "IGNITION COIL"](#) .

VIAS

**Description
SYSTEM DESCRIPTION**

Sensor	Input Signal to ECM	ECM function	Actuator
Mass air flow sensor	Amount of intake air	VIAS control	VIAS control solenoid valve
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Closed throttle position		
Ignition switch	Start signal		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		



When the engine is running at low or medium speed, the power valve is fully closed. Under this condition, the effective suction port length is equivalent to the total length of the intake manifold collector's suction port including the intake valve. This long suction port provides increased air intake which results in improved suction efficiency and higher torque generation.

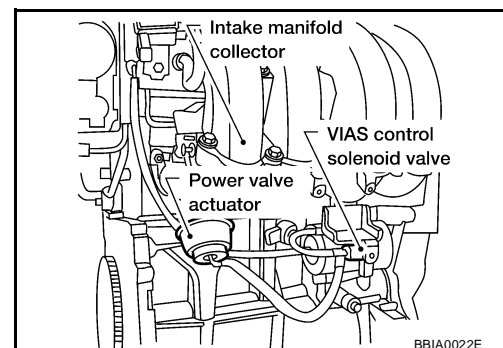
The surge tank and one-way valve are provided. When engine is running at high speed, the ECM sends the signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore opens the power valve to two suction passages together in the collector.

Under this condition, the effective port length is equivalent to the length of the suction port provided independently for each cylinder. This shortened port length results in enhanced engine output with reduced suction resistance under high speeds.

COMPONENT DESCRIPTION

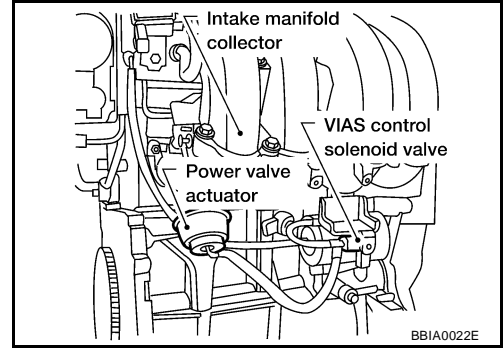
Power Valve

The power valve is installed in intake manifold collector and used to control the suction passage of the variable induction air control system. It is set in the fully closed or fully opened position by the power valve actuator operated by the vacuum stored in the surge tank. The vacuum in the surge tank is controlled by the VIAS control solenoid valve.



VIAS Control Solenoid Valve

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



CONSULT-II Reference Value in Data Monitor Mode

UBS00332

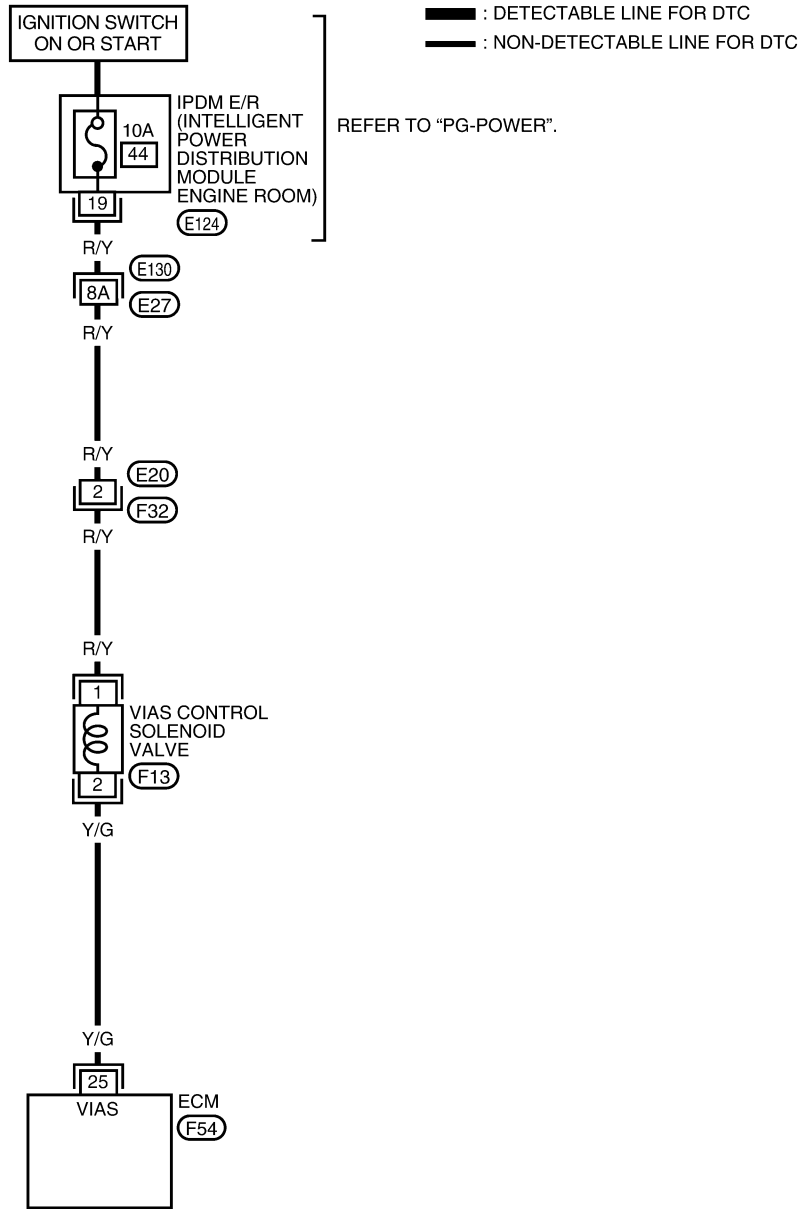
MONITOR ITEM	CONDITION		SPECIFICATION
VIAS S/V	● Engine: After warming up	Idle	OFF
		More than 5,000 rpm	ON

Wiring Diagram

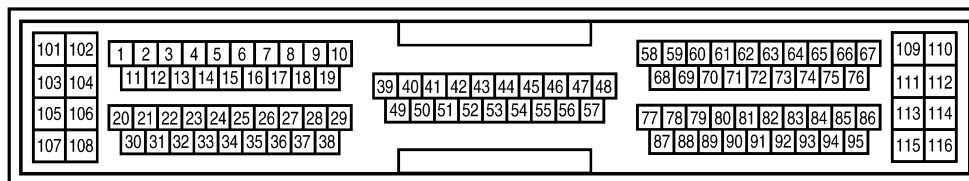
UBS00333

EC-VIAS-01

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REFER TO THE FOLLOWING.
E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0191E

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

VIAS

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25	Y/G	VIAS control solenoid valve	[Engine is running] <ul style="list-style-type: none">● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none">● Engine speed is above 5,000 rpm	0 - 1.0V

Diagnostic Procedure

1. CHECK OVERALL FUNCTION

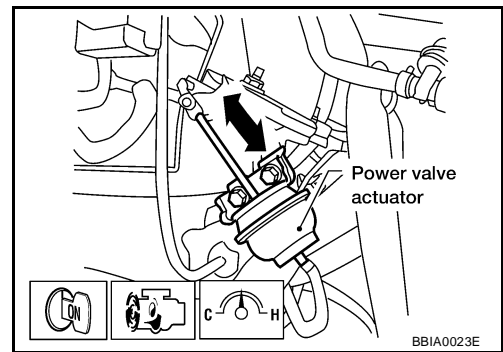
① With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT-II.

ACTIVE TEST	
VIAS SOL VALVE	OFF
MONITOR	
ENG SPEED	XXX rpm

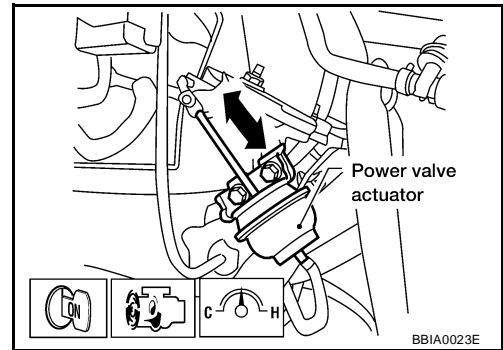
PBI0844E

3. Turn VIAS control solenoid valve "ON" and "OFF", and make sure that power valve actuator rod moves.



⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Rev engine quickly up to above 5,000 rpm and make sure that power valve actuator rod moves.



OK or NG

- OK >> **INSPECTION END**
- NG (With CONSULT-II) >>GO TO 2.
- NG (Without CONSULT-II) >>GO TO 3.

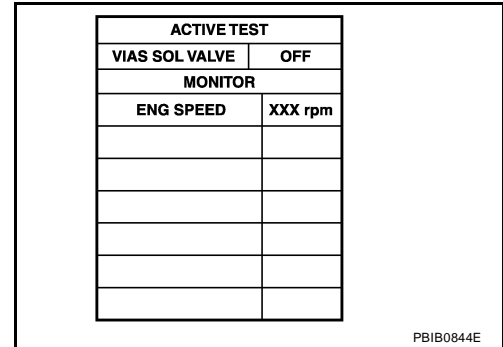
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2. CHECK VACUUM EXISTENCE

With CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Start engine and let it idle.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT-II.
4. Turn VIAS control solenoid valve "ON" and "OFF", and check vacuum existence under the following conditions.

VIAS SOL VALVE	Vacuum
ON	Should exist.
OFF	Should not exist.



OK or NG

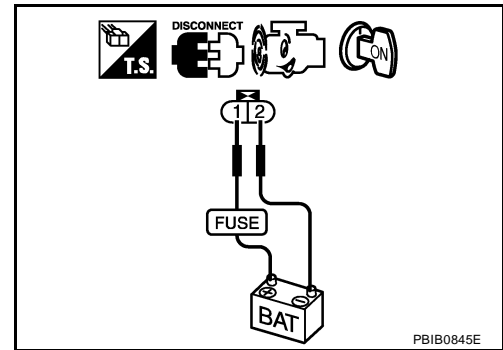
- OK >> Repair or replace power valve actuator.
- NG >> GO TO 4.

3. CHECK VACUUM EXISTENCE

Without CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Disconnect VIAS control solenoid valve harness connector.
3. Start engine and let it idle.
4. Apply 12V of direct current between VIAS control solenoid valve terminals 1 and 2.
5. Check vacuum existence under the following conditions.

Condition	Vacuum
12V direct current supply	Should exist.
No supply	Should not exist.



OK or NG

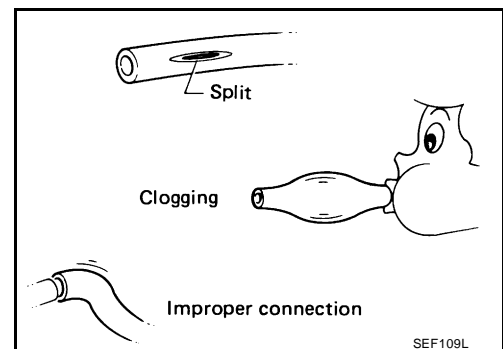
- OK >> Repair or replace power valve actuator.
- NG >> GO TO 4.

4. CHECK VACUUM HOSE

1. Stop engine.
2. Check hoses and tubes between intake manifold and power valve actuator for crack, clogging, improper connection or disconnection. Refer to [EC-29, "Vacuum Hose Drawing"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Repair hoses or tubes.



5. CHECK VACUUM TANK

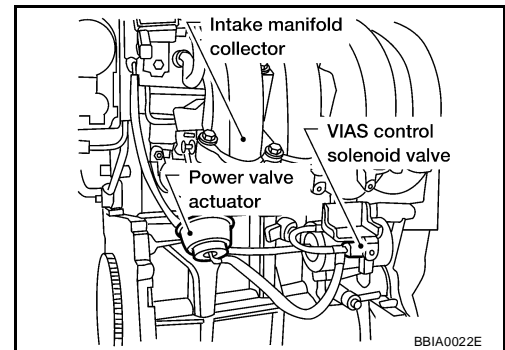
Refer to [EC-572, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
 NG >> Replace vacuum tank.

6. CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Disconnect VIAS control solenoid valve harness connector.
3. Turn ignition switch "ON".

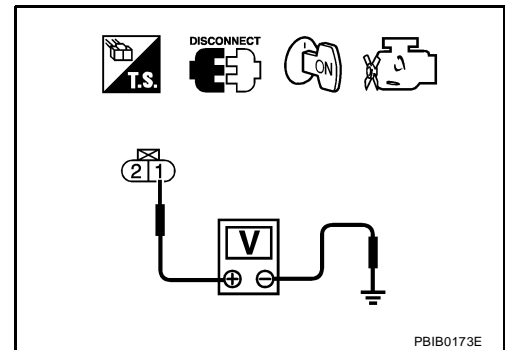


4. Check voltage between terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
 NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- IPDM E/R connector E124
- 10A fuse
- Harness continuity between fuse and VIAS control solenoid valve

>> Repair harness or connectors.

8. CHECK VIAS 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 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 9.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK VIAS CONTROL SOLENOID VALVE

Refer to [EC-572, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace VIAS control solenoid valve.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection
VIAS CONTROL SOLENOID VALVE**

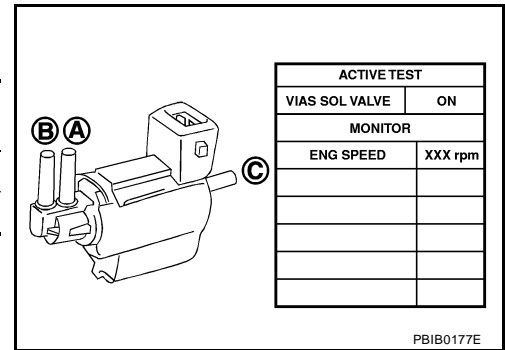
UBS00335

ⓐ With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch ON.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.

Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.

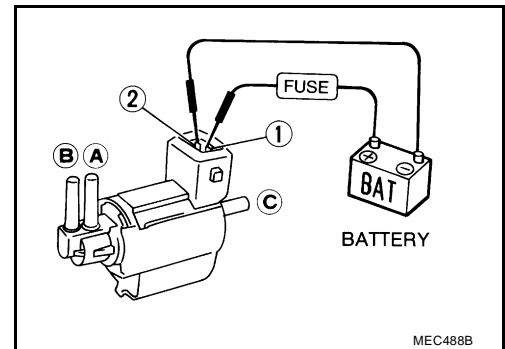


ⓑ With GST

Check air passage continuity and operation delay time under the following conditions.

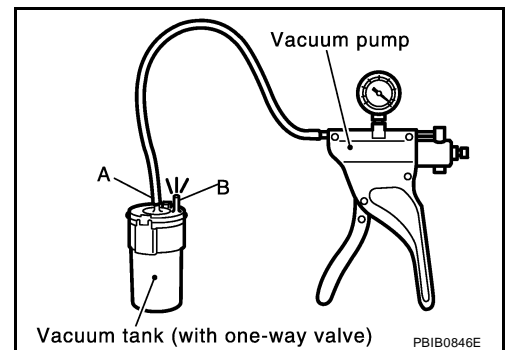
Condition	Air passage continuity between A and B	Air passage continuity between A and C
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

Operation takes less than 1 second.



VACUUM TANK

1. Disconnect vacuum hose connected to vacuum tank.
2. Connect a vacuum pump to the port **A** of vacuum pump.
3. Apply vacuum and make sure that vacuum exists at the port **B** .



Removal and Installation
VIAS CONTROL SOLENOID VALVE

Refer to [EM-16, "INTAKE MANIFOLD"](#) .

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INJECTOR CIRCUIT

[QR]

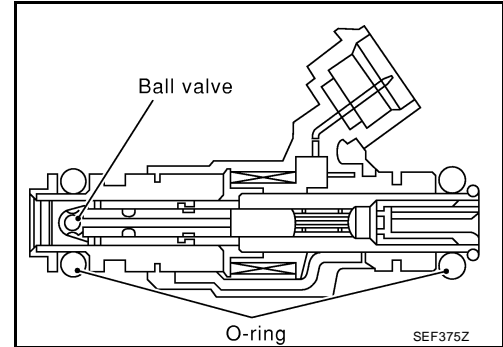
PF16600

INJECTOR CIRCUIT

Component Description

UBS00337

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



CONSULT-II Reference Value in Data Monitor Mode

UBS00338

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
B/FUEL SCHDL	<ul style="list-style-type: none">● Engine: After warming up● Shift lever: N● Air conditioner switch: OFF● No-load	Idle	2.5 - 3.5 msec
		2,000 rpm	2.5 - 3.5 msec
INJ PULSE-B1	<ul style="list-style-type: none">● Engine: After warming up● Shift lever: N● Air conditioner switch: OFF● No-load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec

INJECTOR CIRCUIT

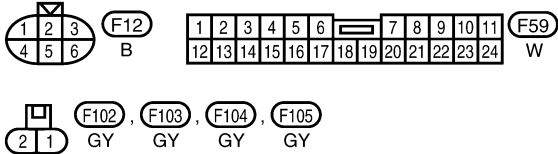
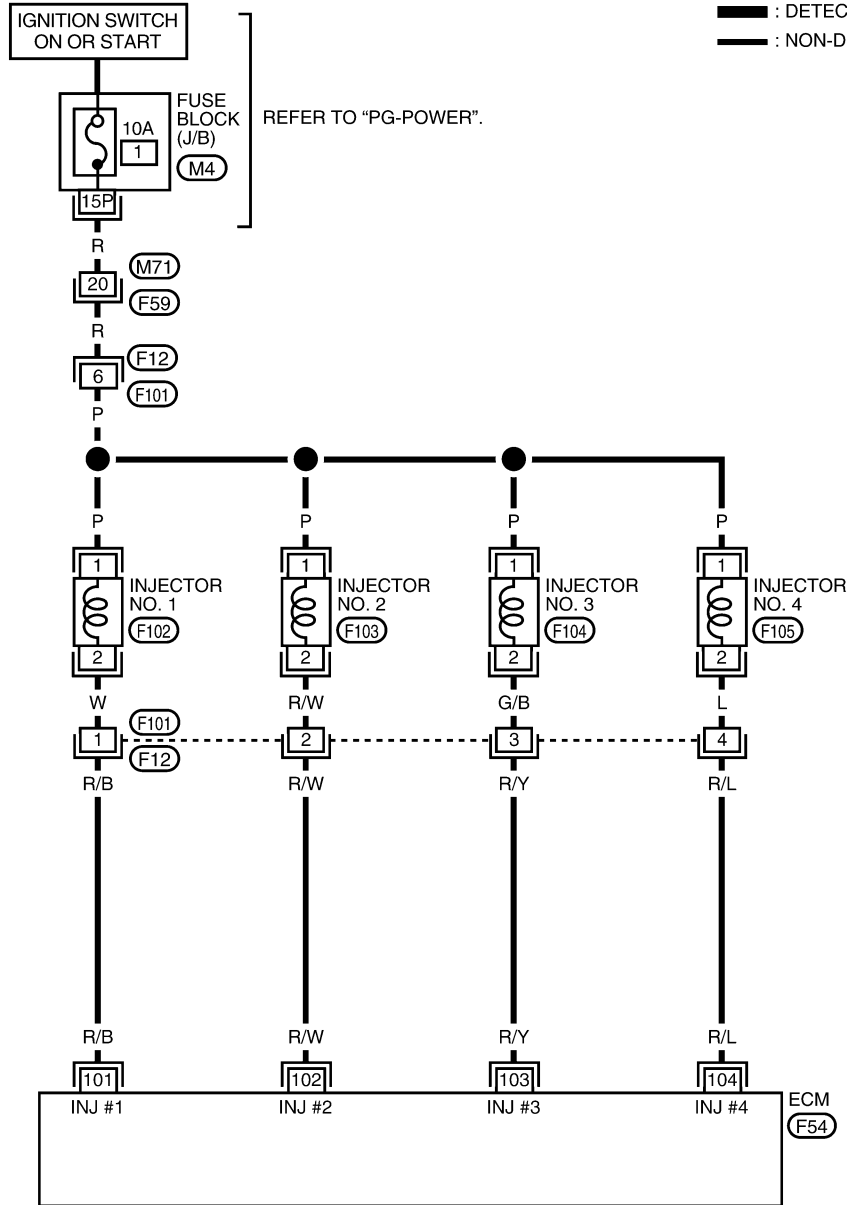
[QR]

Wiring Diagram

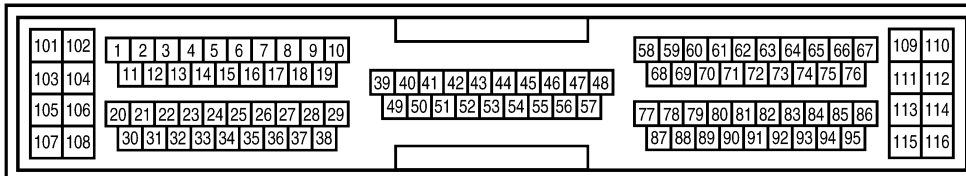
UBS00339

EC-INJECT-01

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REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0035E

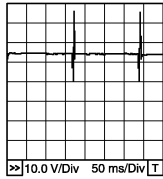
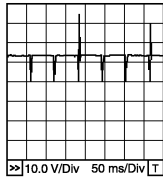
INJECTOR CIRCUIT

[QR]

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

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101 102 103 104	R/B R/W R/Y R/L	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>PBIB0529E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>PBIB0530E</p>

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

Diagnostic Procedure

UBS0033A

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

④ With CONSULT-II

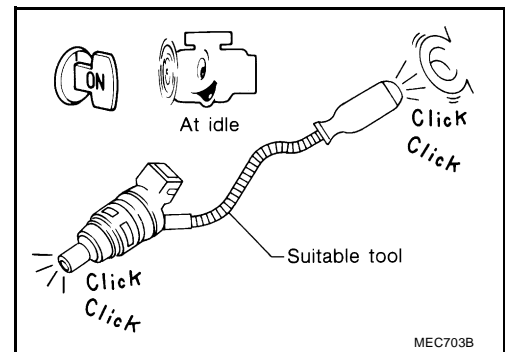
1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

⊗ Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.
Clicking noise should be heard.



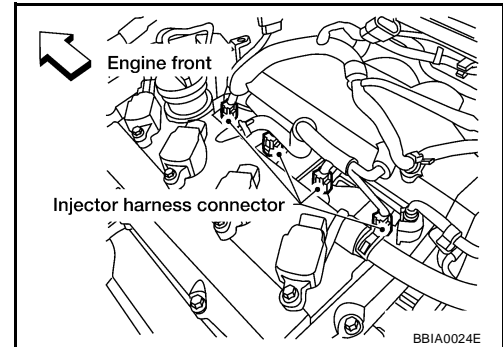
OK or NG

- OK >> **INSPECTION END**
 NG >> **GO TO 3.**

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3. CHECK INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect injector harness connector.
3. Turn ignition switch "ON".

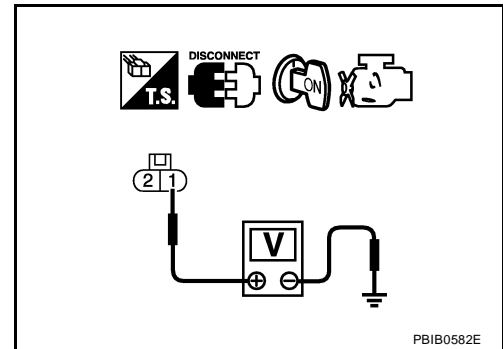


4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, F59
- Harness connectors F12, F101
- Fuse block (J/B) connector M4
- 10A fuse
- Harness for open or short between injector and fuse

>> Repair harness or connectors.

5. CHECK INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between injector terminal 2 and ECM terminals 101, 102, 103, 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 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F12, F101
- Harness for open or short between injector and ECM

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

7. CHECK INJECTOR

Refer to [EC-579, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace injector.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

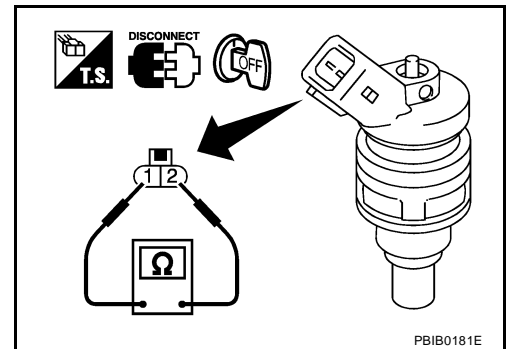
>> INSPECTION END

Component Inspection INJECTOR

UBS0033B

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 12.1 - 12.9Ω [at 20°C (68°F)]



UBS0033C

Removal and Installation INJECTOR

Refer to [EM-29, "FUEL INJECTOR AND FUEL TUBE"](#) .

START SIGNAL

[QR]

START SIGNAL

PF:48750

CONSULT-II Reference Value in Data Monitor Mode

UBS0033D

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
START SIGNAL	● Ignition switch: ON → START → ON	OFF → ON → OFF

START SIGNAL

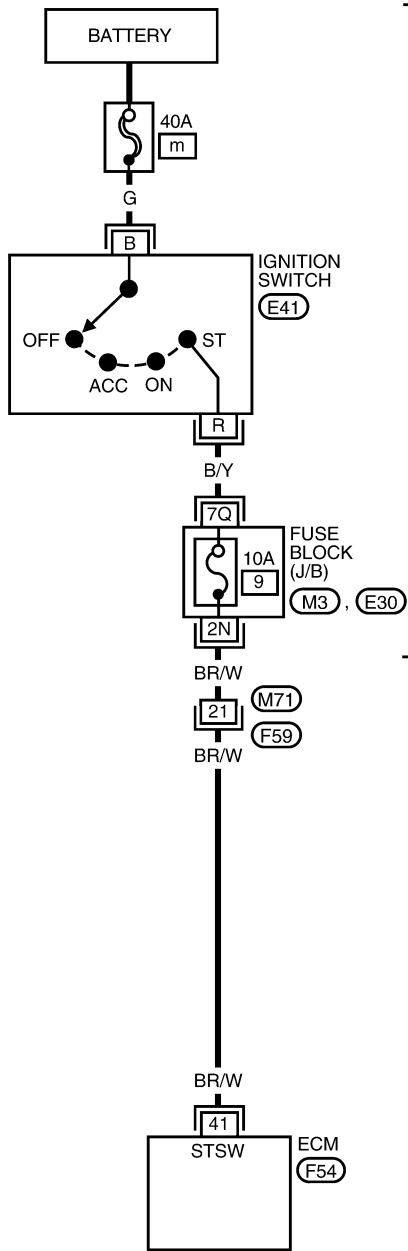
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Wiring Diagram

UBS0033E

EC-S/SIG-01

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

REFER TO "PG-POWER".

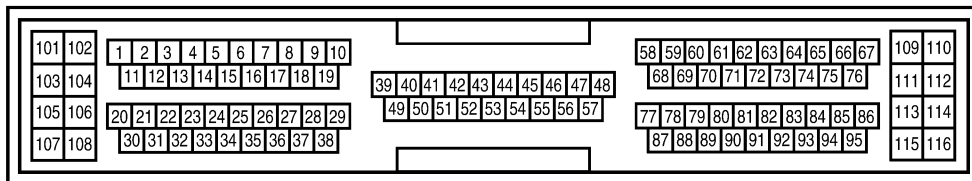
IG1	ST	B	(E41)
IG2	ACC	R	

W

1	2	3	4	5	6	7	8	9	10	11	(F59)	
12	13	14	15	16	17	18	19	20	21	22		23

W

REFER TO THE FOLLOWING.
 (M3), (E30) - FUSE BLOCK
 - JUNCTION BOX (J/B)



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

START SIGNAL

[QR]

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)
41	BR/W	Start signal	[Ignition switch "ON"]	Approximately 0V
			[Ignition switch "START"]	9 - 14V

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

Diagnostic Procedure

UBS0033F

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

2. CHECK OVERALL FUNCTION

Ⓜ With CONSULT-II

- Turn ignition switch "ON".
- Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	START SIGNAL
Ignition switch "ON"	OFF
Ignition switch "START"	ON

DATA MONITOR	
MONITOR	NO DTC
START SIGNAL	OFF
CLSD THL POS	ON
AIR COND SIG	OFF
P/N POSI SW	ON

PBIB0182E

OK or NG

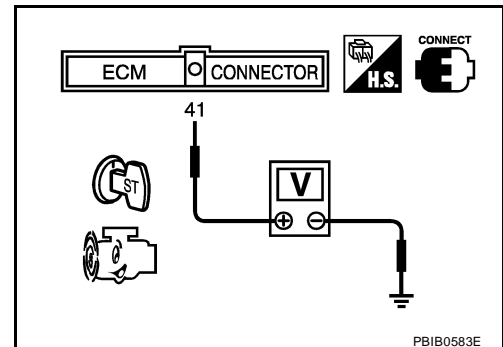
- OK >> **INSPECTION END**
- NG >> GO TO 4.

3. CHECK OVERALL FUNCTION

ⓧ Without CONSULT-II

Check voltage between ECM terminal 41 and ground under the following conditions.

Condition	Voltage
Ignition switch "START"	Battery voltage
Other positions	Approximately 0V



OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 4.

4. CHECK STARTING SYSTEM

Turn ignition switch "OFF", then turn it to "START".

Does starter motor operate?

Yes or No

- Yes >> GO TO 5.
- No >> Refer to [SC-9, "STARTING SYSTEM"](#).

5. CHECK FUSE

1. Turn ignition switch "OFF".
2. Disconnect 10A fuse.
3. Check if 10A fuse is OK.

OK or NG

- OK >> GO TO 6.
 NG >> Replace 10A fuse.

6. CHECK START SIGNAL INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Disconnect ignition switch harness connector.
3. Check harness continuity between ECM terminal 41 and fuse block (J/B), ignition switch and fuse block (J/B). 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
- Fuse block (J/B) connectors M3, E30
- Harness for open or short between ignition switch and fuse block (J/B)
- Harness for open or short between ECM and fuse block (J/B)

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

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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FUEL PUMP CIRCUIT

[QR]

PF17042

FUEL PUMP CIRCUIT

Description SYSTEM DESCRIPTION

UBS0033G

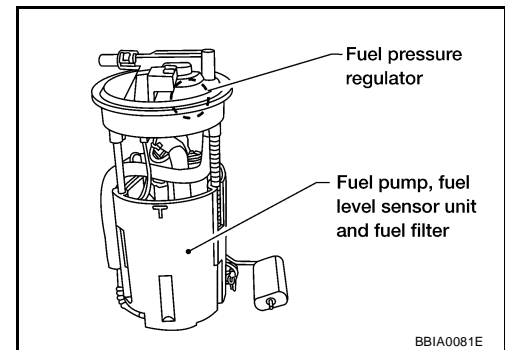
Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Fuel pump control	Fuel pump relay
Ignition switch	Start signal		

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 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.
When engine is 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.



BBIA0081E

CONSULT-II Reference Value in Data Monitor Mode

UBS0033H

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	● For 1 seconds after turning ignition switch ON	ON
	● Engine running or cranking	
	● Except above conditions	OFF

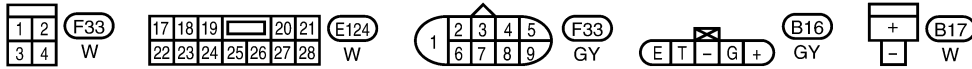
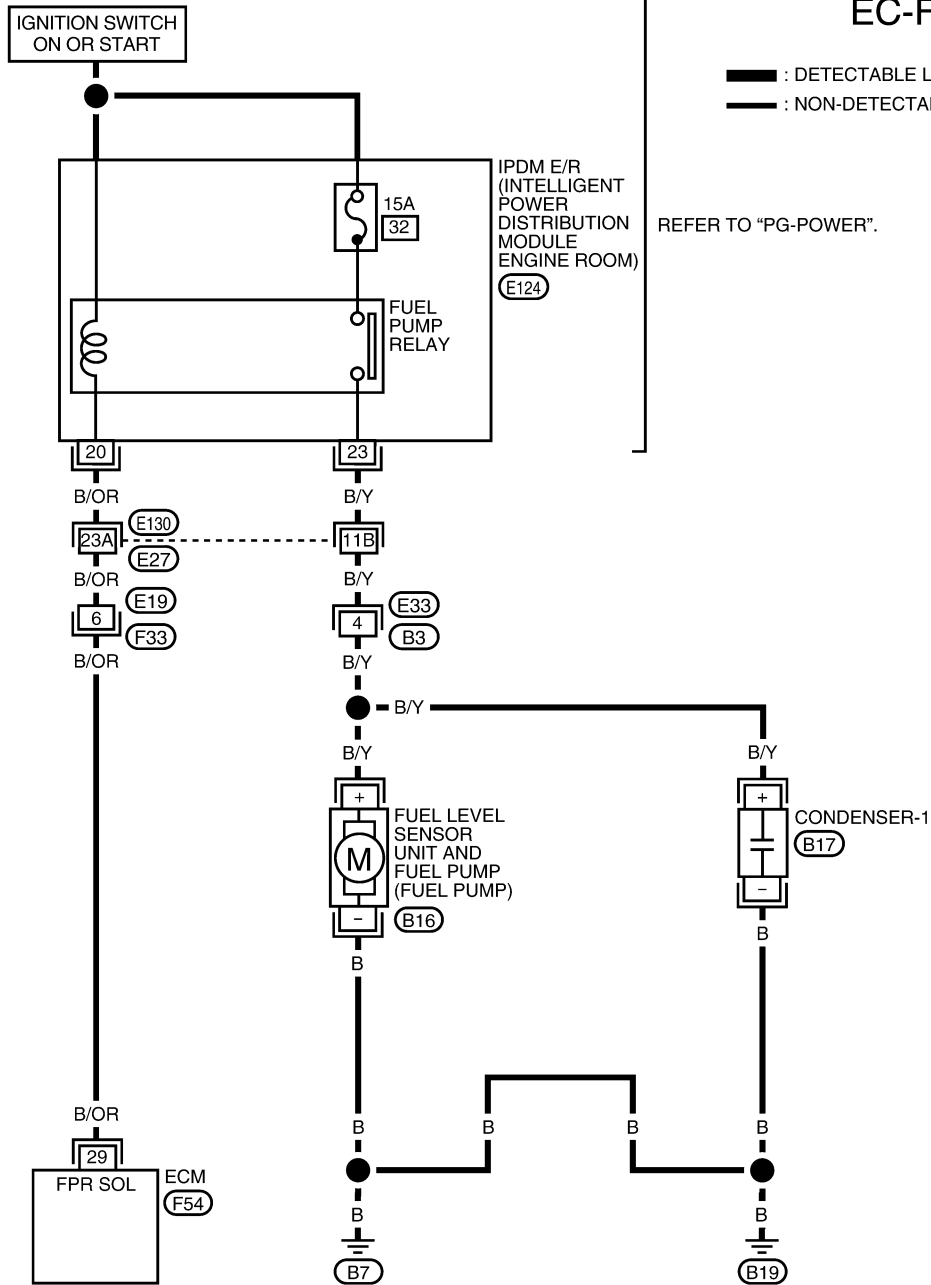
FUEL PUMP CIRCUIT

[QR]

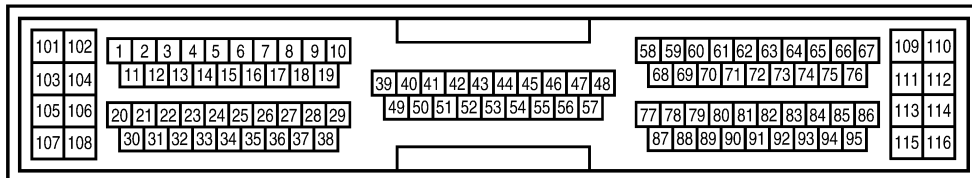
UBS00331

Wiring Diagram

EC-F/PUMP-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0037E

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

FUEL PUMP CIRCUIT

[QR]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
29	B/OR	Fuel pump relay	[Ignition switch "ON"] ● For 1 seconds after turning ignition switch "ON"	0 - 1.0V
			[Engine is running] [Ignition switch "ON"] ● More than 1 seconds after turning ignition switch "ON".	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

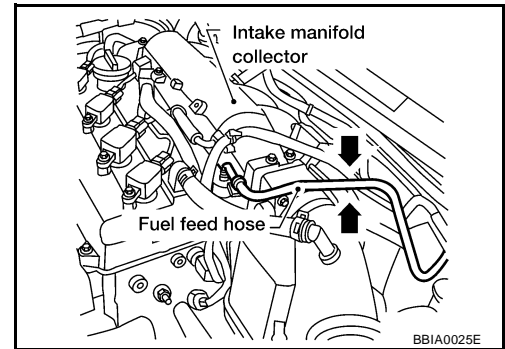
UBS0033J

1. CHECK OVERALL FUNCTION

- Turn ignition switch "ON".
- Pinch fuel feed hose with two fingers.
Fuel pressure pulsation should be felt on the fuel hose for 1 second after ignition switch is turned "ON".

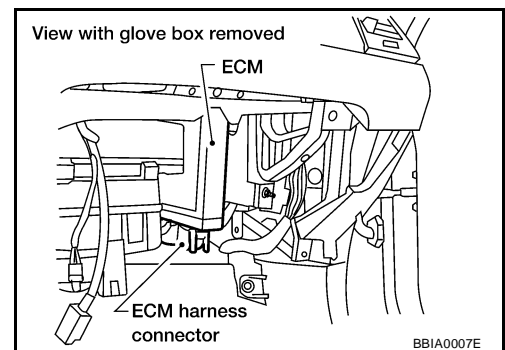
OK or NG

- 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".

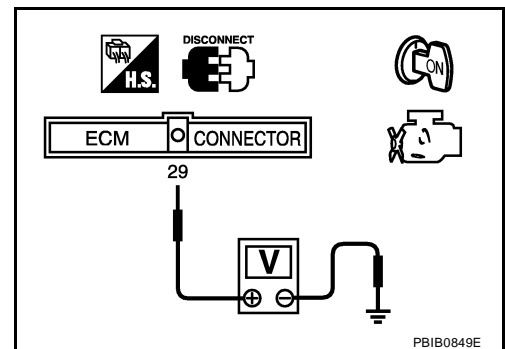


- Check voltage between ECM terminal 29 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 3.



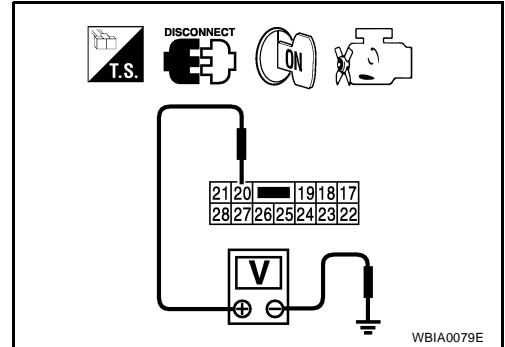
3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

1. Turn ignition switch "OFF".
2. Disconnect IPDM E/R harness connector E124.
3. Turn ignition switch "ON".
4. Check voltage between IPDM E/R terminal 20 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 13.



4. DETECT MALFUNCTIONING PART

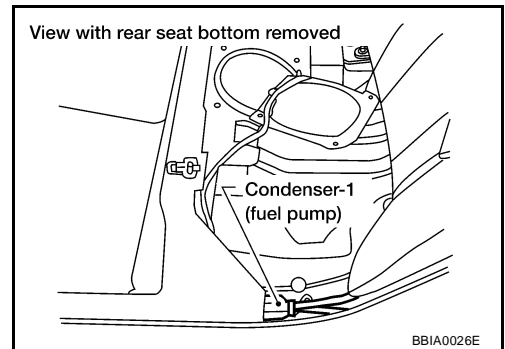
Check the following.

- Harness connectors E130, E27
- Harness or connectors E19, F33
- Harness for open or short between IPDM E/R and ECM

>> Repair harness or connectors.

5. CHECK CONDENSER POWER SUPPLY CIRCUIT-I

1. Turn ignition switch "OFF".
2. Reconnect all harness connectors disconnected.
3. Disconnect condenser harness connector.
4. Turn ignition switch "ON".

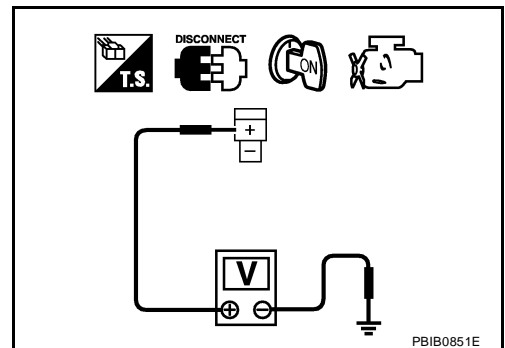


5. Check voltage between condenser terminal + and ground with CONSULT-II or tester.

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.
3. Check 15A fuse.

OK or NG

- OK >> GO TO 7.
NG >> Replace fuse.

7. CHECK CONDENSER POWER SUPPLY CIRCUIT-II

1. Disconnect IPDM E/R harness connector E124.
2. Check harness continuity between IPDM E/R terminal 23 and condenser terminal + .
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 13.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness or connectors E33, B3
- Harness for open or short between IPDM E/R and condenser

>> Repair harness or connectors.

9. CHECK CONDENSER GROUND CIRCUIT

1. Check harness continuity between condenser terminal - and body 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 CONDENSER

Refer to [EC-589, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> Replace condenser.

11. CHECK FUEL PUMP POWER SUPPLY AND GROUND CIRCUIT FOR OPEN AND SHORT

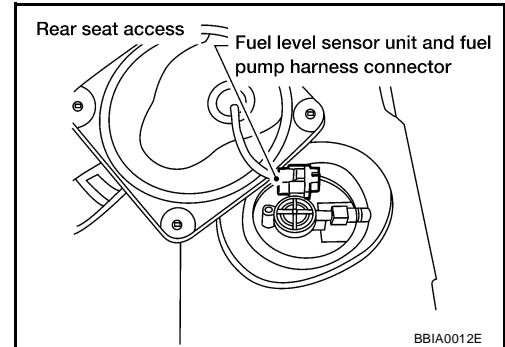
1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check harness continuity between fuel pump terminal + and harness connector B3 terminal 4, fuel pump terminal - and body ground. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 12.
 NG >> Repair or replace harness or connectors.



12. CHECK FUEL PUMP

Refer to [EC-589, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 13.
 NG >> Replace fuel pump.

13. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

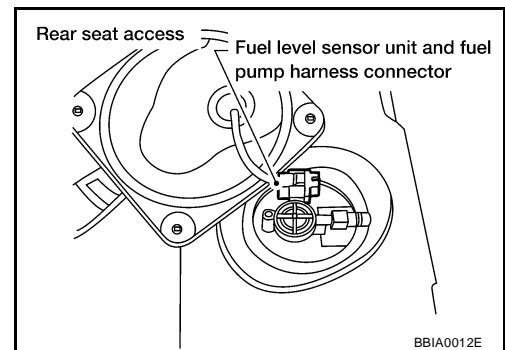
OK or NG

- OK >> Replace IPDM E/R.
 NG >> Repair or replace harness or connectors.

Component Inspection FUEL PUMP

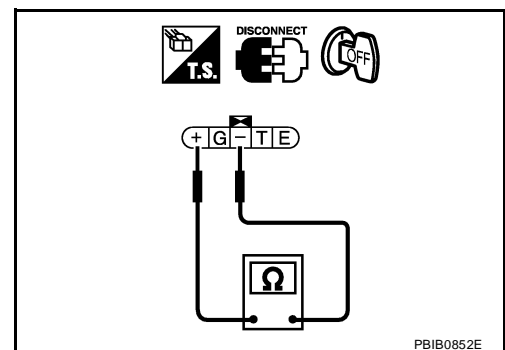
UBS0033K

1. Disconnect fuel level sensor unit and fuel pump harness connector.



2. Check resistance between fuel level sensor unit and fuel pump terminals + and - .

Resistance: Approximately 1.0Ω [at 25°C (77°F)]



CONDENSER

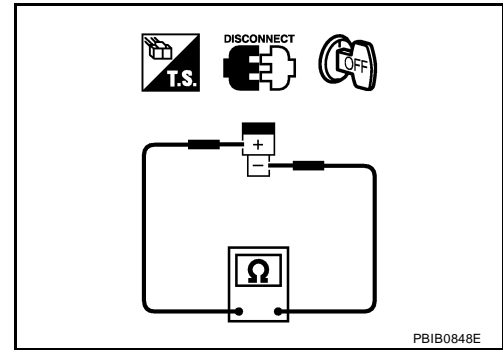
1. Turn ignition switch "OFF".

FUEL PUMP CIRCUIT

[QR]

2. Disconnect condenser harness connector.
3. Check resistance between condenser terminals + and - .

Resistance: Above 1M Ω [at 25°C (77°F)]



UBS0033L

Removal and Installation FUEL PUMP

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

POWER STEERING OIL PRESSURE SWITCH

[QR]

POWER STEERING OIL PRESSURE SWITCH

PFP:49761

Component Description

UBS0033M

The power steering oil pressure switch is attached to the power steering high-pressure tube and detects a power steering load. When a power steering load is detected, it signals the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.

CONSULT-II Reference Value in Data Monitor Mode

UBS0033N

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel in neutral position (forward direction)	OFF
		The steering wheel is fully turned	ON

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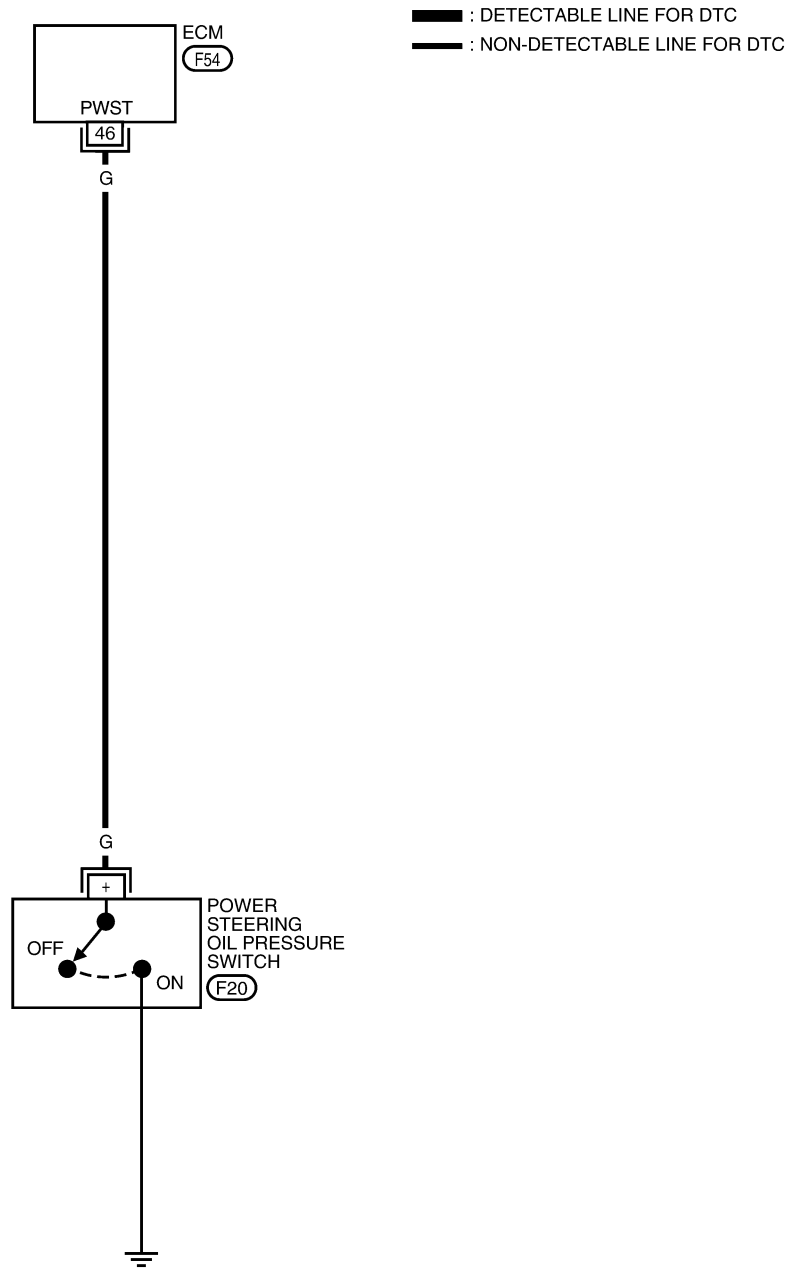
POWER STEERING OIL PRESSURE SWITCH

[QR]

Wiring Diagram

UBS00330

EC-PST/SW-01



F20
 GY

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

F54
 GY
 H.S.

BBWA0038E

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

POWER STEERING OIL PRESSURE SWITCH

[QR]

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
46	G	Power steering oil pressure switch	[Engine is running] <ul style="list-style-type: none"> ● Steering wheel is being turned 	Approximately 0V
			[Engine is running] <ul style="list-style-type: none"> ● Steering wheel is not being turned 	BATTERY VOLTAGE (11 - 14V)

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Diagnostic Procedure

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

2. CHECK OVERALL FUNCTION

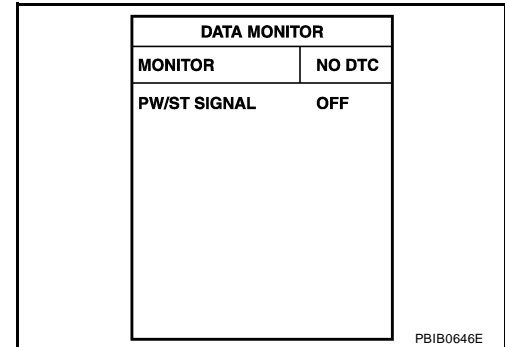
With CONSULT-II

1. Start engine.
2. Check "PW/ST SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Steering in neutral position	OFF
Steering is turned	ON

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 4.



3. CHECK OVERALL FUNCTION

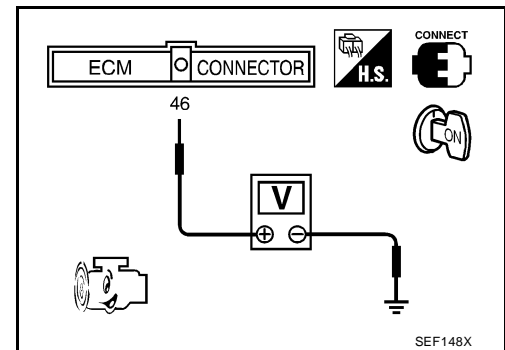
Without CONSULT-II

1. Start engine.
2. Check voltage between ECM terminal 46 and ground under the following conditions.

Condition	Voltage
When steering wheel is turned quickly	Approximately 0V
Except above	Approximately 5V

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 4.



4. CHECK INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 46 and power steering oil pressure switch terminal + . Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the harness for open or short between ECM and power steering oil pressure switch.

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

6. CHECK POWER STEERING OIL PRESSURE SWITCH

Refer to [EC-595, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace power steering oil pressure switch.

7. CHECK INTERMITTENT INCIDENT

Perform [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
POWER STEERING OIL PRESSURE SWITCH**

UBS0033Q

1. Turn ignition switch "OFF".
2. Disconnect power steering oil pressure switch harness connector.
3. Start engine.
4. Check continuity between power steering oil pressure switch terminal + and body ground.

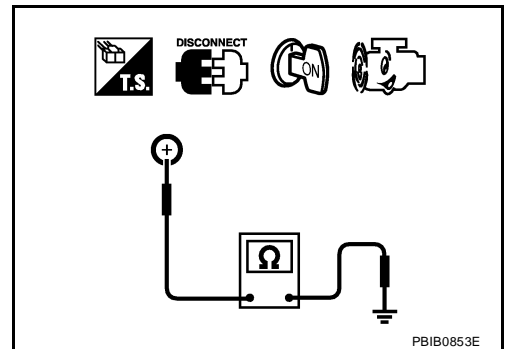
Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

If NG, replace power steering oil pressure switch.

**Removal and Installation
POWER STEERING OIL PRESSURE SWITCH**

UBS0033R

Refer to [PS-20, "POWER STEERING OIL PUMP"](#) .



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REFRIGERANT PRESSURE SENSOR

[QR]

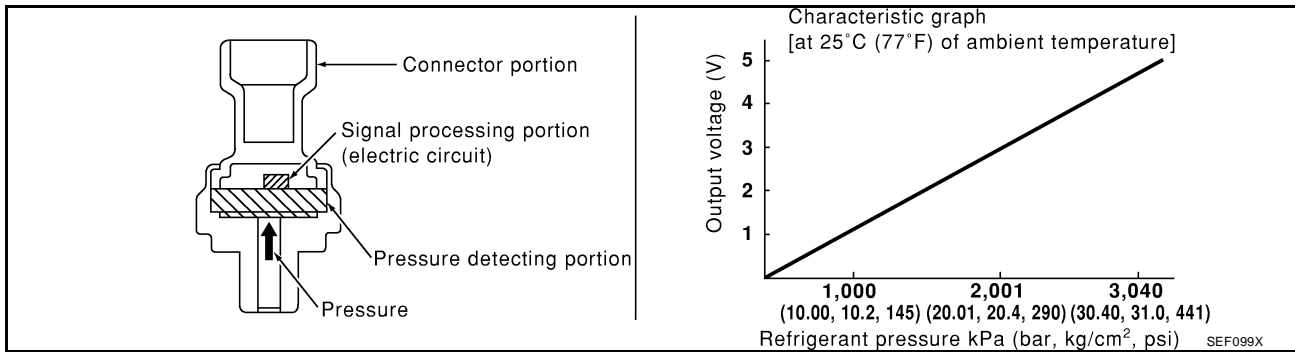
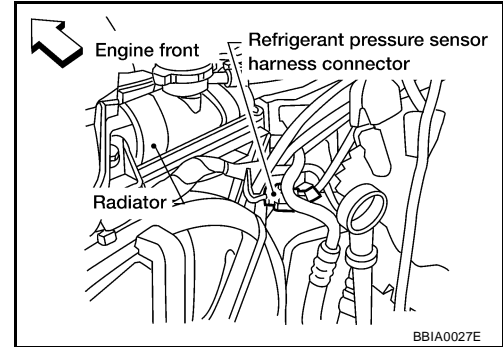
REFRIGERANT PRESSURE SENSOR

PFP:92136

Component Description

UBS0033S

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



REFRIGERANT PRESSURE SENSOR

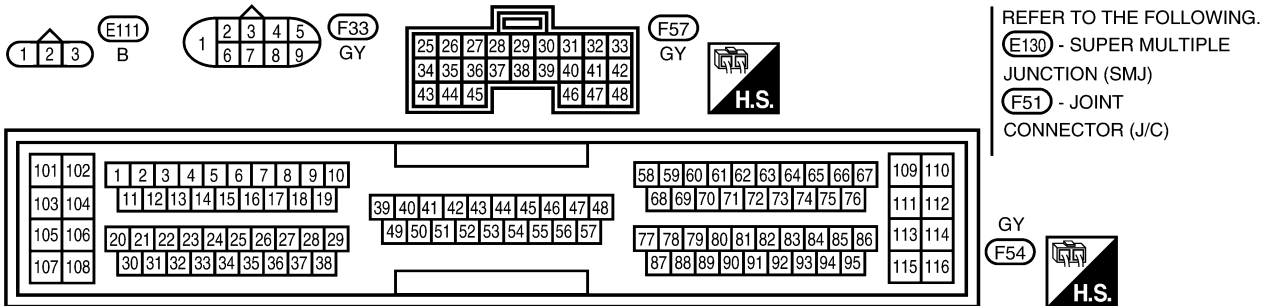
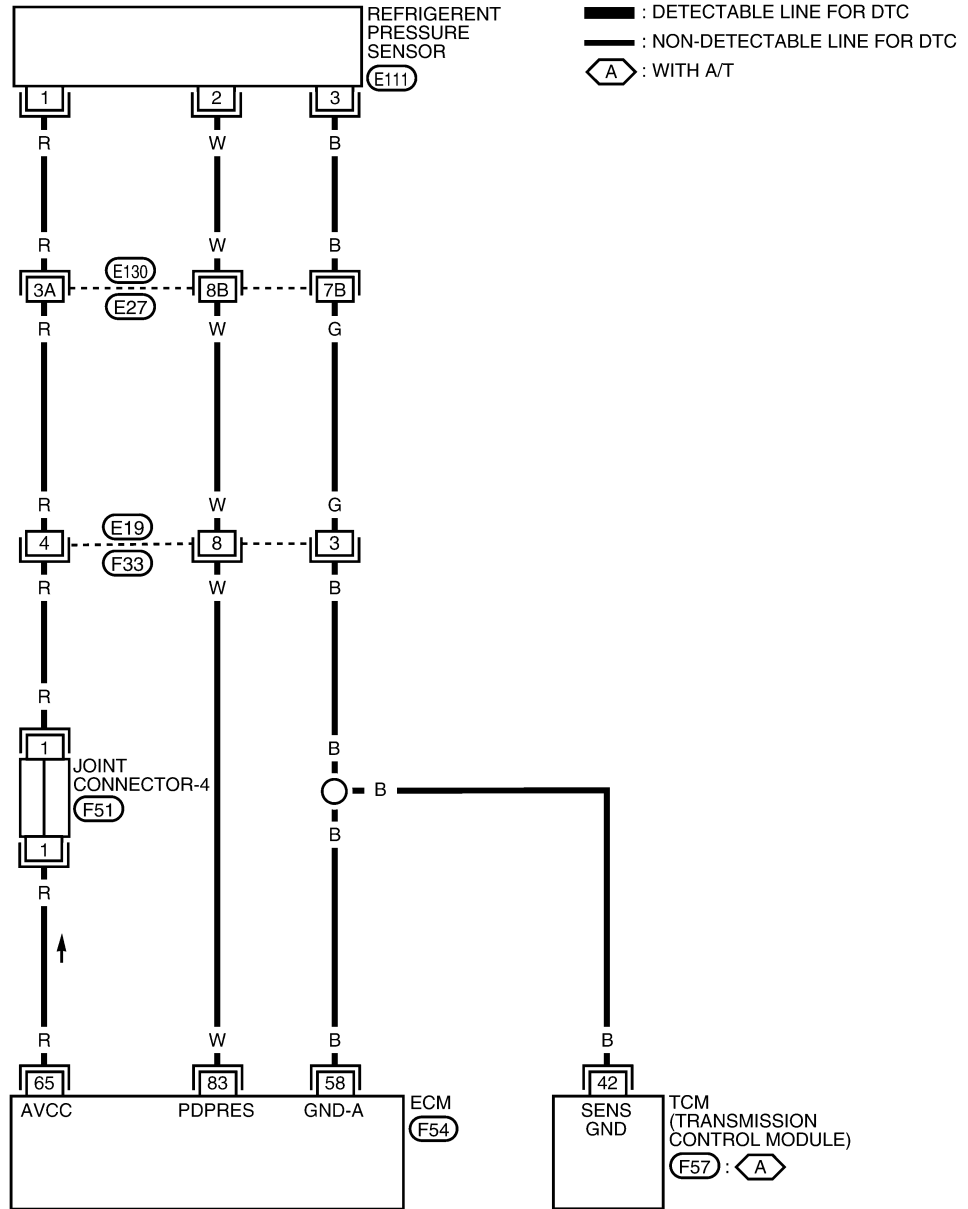
[QR]

UBS0033T

Wiring Diagram

EC-RP/SEN-01

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

REFRIGERANT PRESSURE SENSOR

[QR]

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)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
83	W	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch are "ON". (Compressor operates.)	1.0 - 4.0V

Diagnostic Procedure

UBS0033U

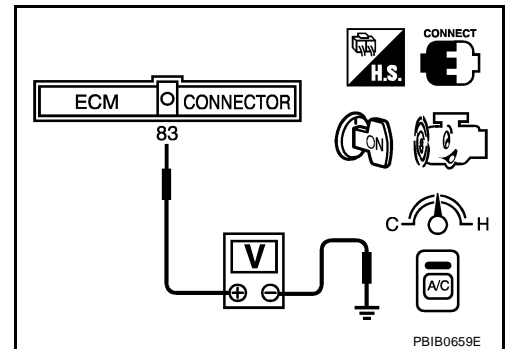
1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower switch "ON".
3. Check voltage between ECM terminal 83 and ground with CONSULT-II or tester.

Voltage: 1.0 - 4.0V

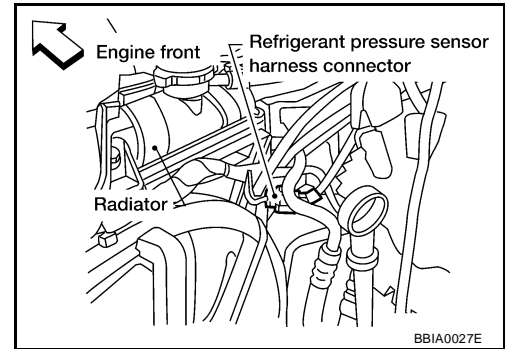
OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 2.



2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn A/C switch and blower switch "OFF".
2. Stop engine.
3. Disconnect refrigerant pressure sensor harness connector.
4. Turn ignition switch "ON".

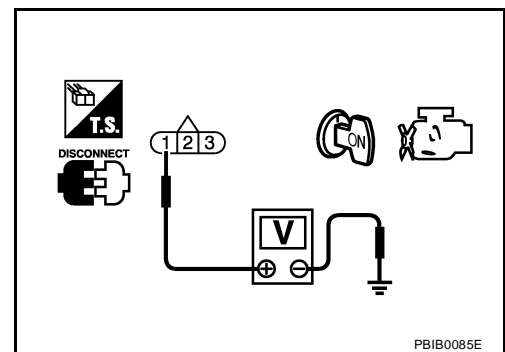


5. Check voltage between refrigerant pressure sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E19, F33
- Harness connectors E130, E27
- Joint connector-4
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair harness or connectors.

4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between refrigerant pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E19, F33
- Harness connectors E130, E27
- Harness for open or short between ECM and refrigerant pressure sensor
- Harness for open or short between TCM and refrigerant pressure sensor

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

6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 83 and refrigerant pressure 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 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E19, F33
- Harness connectors E130, E27
- Harness for open or short between ECM and refrigerant pressure sensor

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

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace refrigerant pressure sensor.
- NG >> Repair or replace.

Removal and Installation REFRIGERANT PRESSURE SENSOR

UBS0033V

Refer to [MTC-88, "Removal and Installation for Refrigerant Pressure Sensor"](#) .

ELECTRICAL LOAD SIGNAL

PFP:25350

Description

UBS0033W

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

Diagnostic Procedure

UBS0033X

1. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch "ON".
2. Connect CONSULT-II or GST and select "DATA MONITOR" mode.
3. Select "LOAD SIGNAL" and check indication under the following conditions.

Condition	Indication
Rear window defogger switch "ON"	ON
Rear window defogger switch "OFF"	OFF

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

OK or NG

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

2. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

Check "LOAD SIGNAL" indication under the following conditions.

Condition	Indication
Lighting switch "ON" at 2nd position	ON
Lighting switch "OFF"	OFF

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 4.

3. CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to [GW-41, "REAR WINDOW DEFOGGER"](#) .

>> **INSPECTION END**

4. CHECK HEADLAMP SYSTEM

Refer to [LT-5, "HEADLAMP \(FOR USA\)"](#) or [LT-28, "HEADLAMP \(FOR CANADA\) - DAYTIME LIGHT SYSTEM -"](#) .

>> **INSPECTION END**

ASCD BRAKE SWITCH

[QR]

PF2:25320

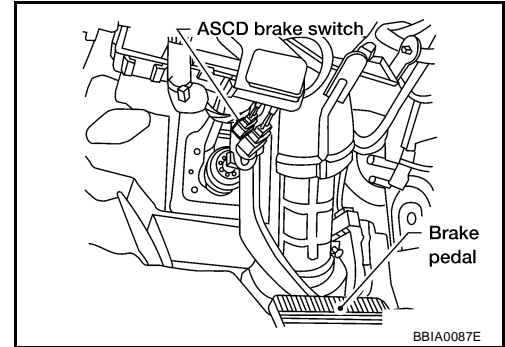
ASCD BRAKE SWITCH

UBS0033Y

Component Description

When depress on the brake pedal, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal)

Refer to [EC-628, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

UBS0033Z

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal fully released	ON
		● Brake pedal depressed	OFF
BRAKE SW2 (stop lamp switch)	● Ignition switch: ON	● Brake pedal fully released	OFF
		● Brake pedal depressed	ON

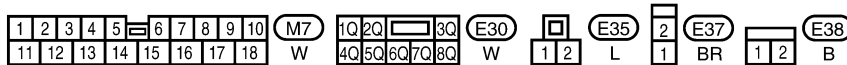
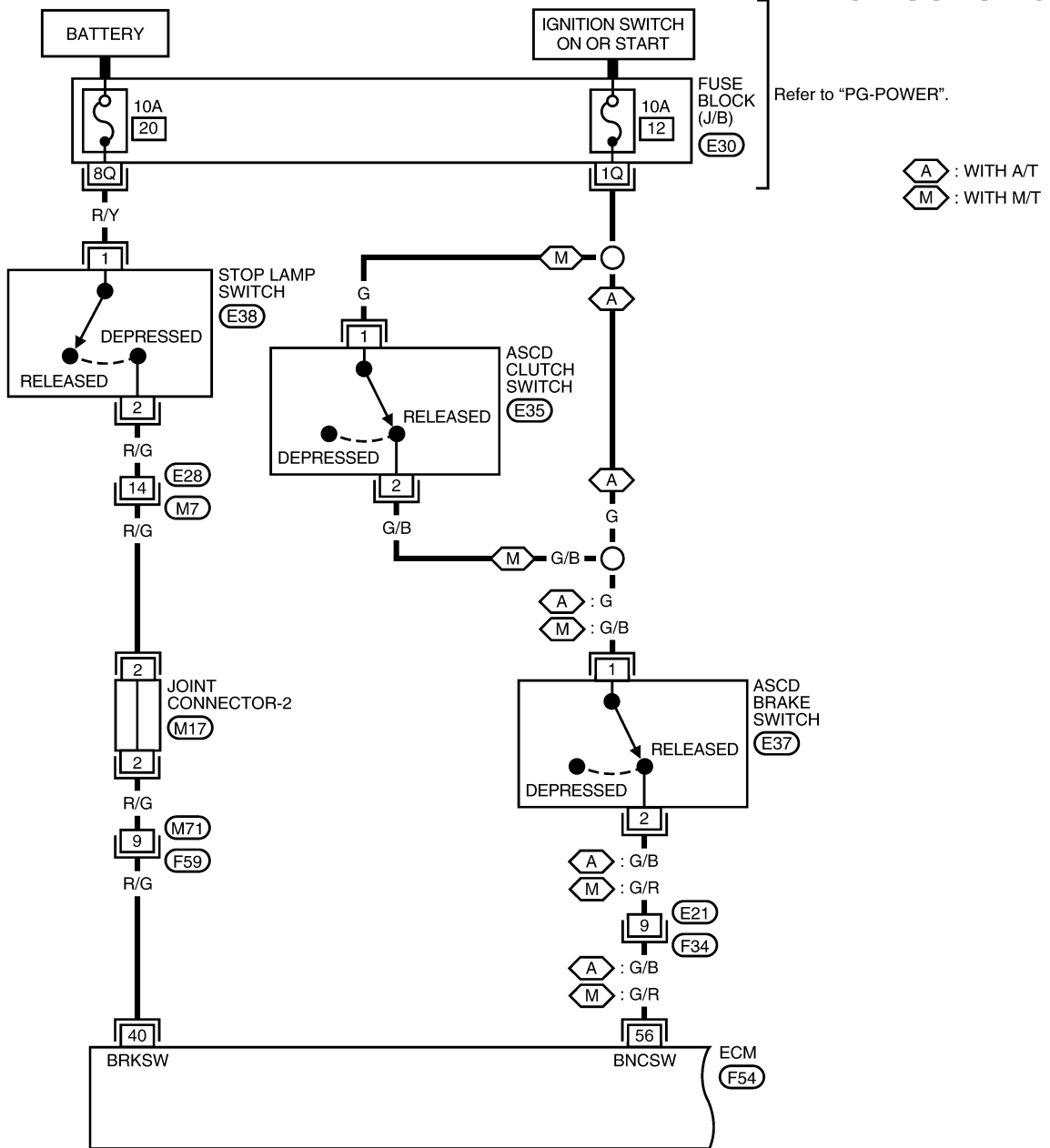
ASCD BRAKE SWITCH

[QR]

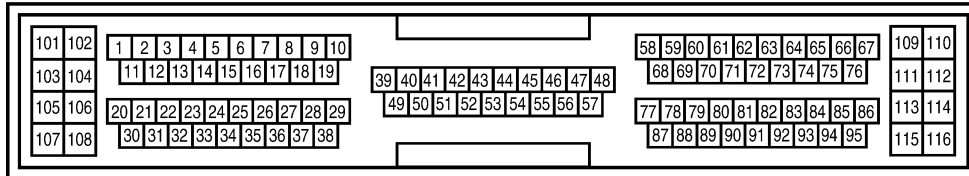
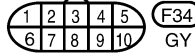
UBS00340

Wiring Diagram

EC-ASCBOF-01



REFER TO THE FOLLOWING.
M17 - JOINT CONNECTOR (J/C)



BBWA0187E

ASCD BRAKE SWITCH

[QR]

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

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
40	R/G	Stop lamp switch	[Engine is running] ● Brake pedal fully released	Approximately 0V
			[Engine is running] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
56	G/B (A/T) G/R (M/T)	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00341

1. CHECK OVERALL FUNCTION-I

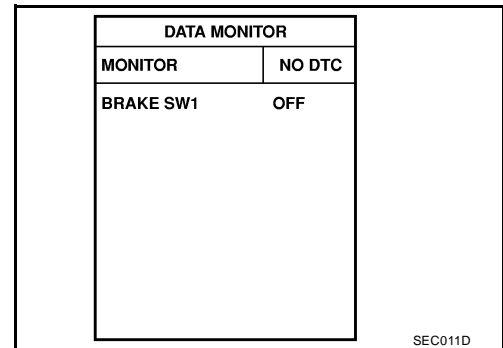
Ⓜ With CONSULT-II

- Turn ignition switch "ON".
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
- Check "BRAKE SW1" indication under the following conditions.
M/T models

CONDITION	INDICATION
When clutch pedal or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON

A/T models

CONDITION	INDICATION
When brake pedal is depress	OFF
When brake pedal is fully released	ON



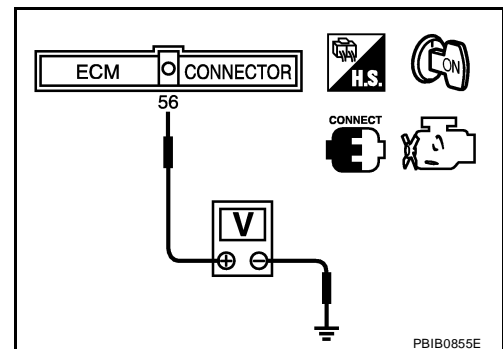
⊗ Without CONSULT-II

- Turn ignition switch "ON".
- Check voltage between ECM terminal 56 and ground under the following conditions.
A/T models

CONDITION	VOLTAGE
When brake pedal is depress	Approximately 0V
When brake pedal is fully released	Battery voltage

M/T models

CONDITION	VOLTAGE
When clutch pedal or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage



OK or NG

OK >> GO TO 2.

NG (M/T models) >>>GO TO 3.

NG (A/T models) >>>GO TO 8.

ASCD BRAKE SWITCH

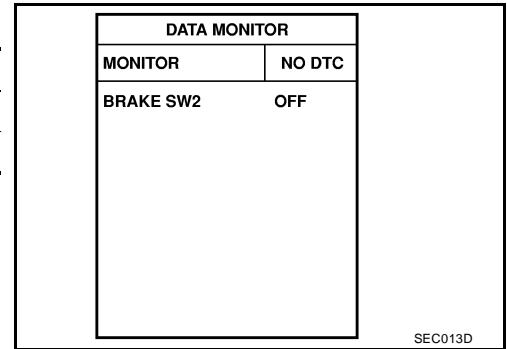
[QR]

2. CHECK OVERALL FUNCTION-II

With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

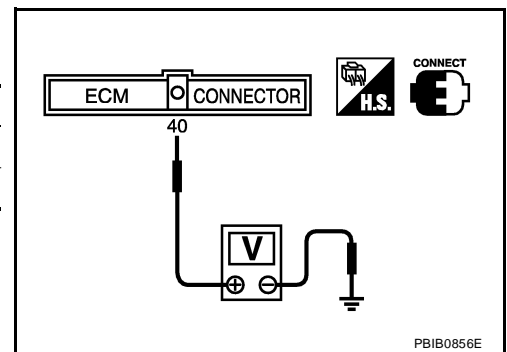
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



Without CONSULT-II

Check voltage between ECM terminal 40 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

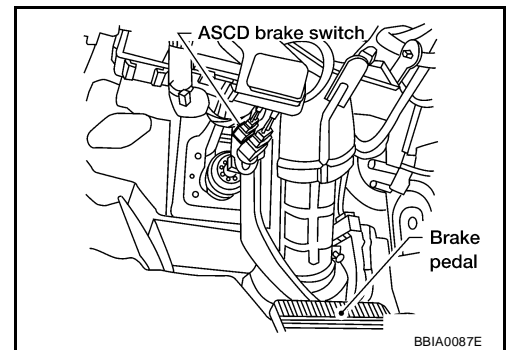


OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 13.

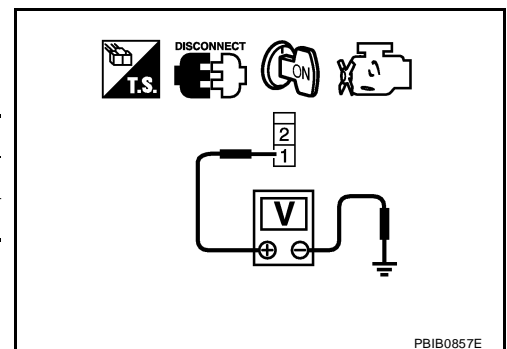
3. CHECK ASCD CLUTCH SWITCH CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".



4. Check voltage between ASCD brake switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When clutch pedal is released	Battery voltage
When clutch pedal is depressed	Approx. 0V

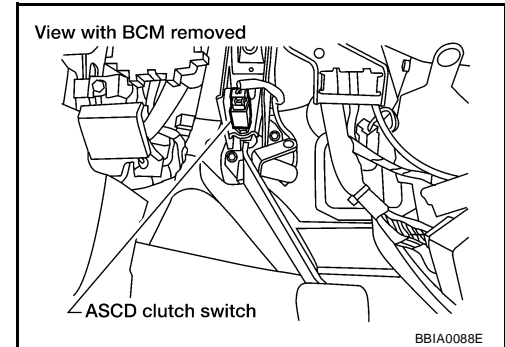


OK or NG

- OK >> GO TO 10.
- NG >> GO TO 4.

4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".

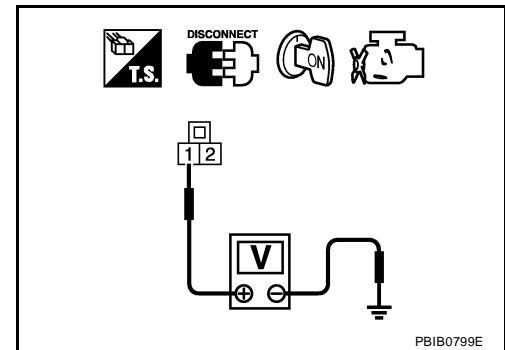


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 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. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD clutch switch terminal 2 and ASCD brake switch 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 7.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH

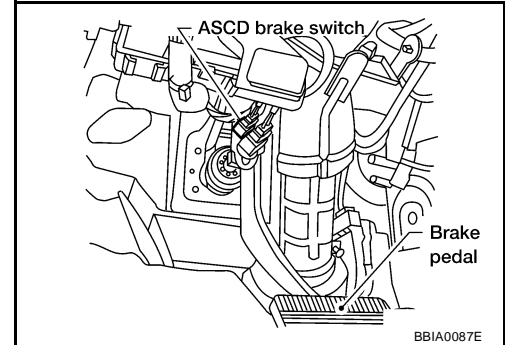
Refer to [EC-541, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.
- NG >> Replace ASCD clutch switch.

8. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

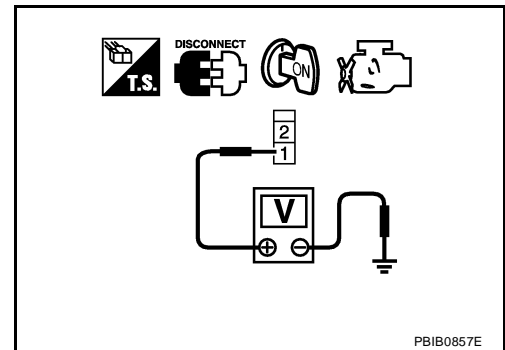


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 9.



9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 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.

10. 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 56 and ASCD brake switch terminal 2. 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 12.
- NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and ASCD brake switch

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

12. CHECK ASCD BRAKE SWITCH

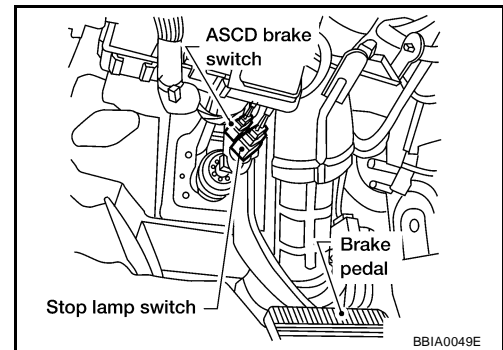
Refer to [EC-541, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.
- NG >> Replace ASCD brake switch.

13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.

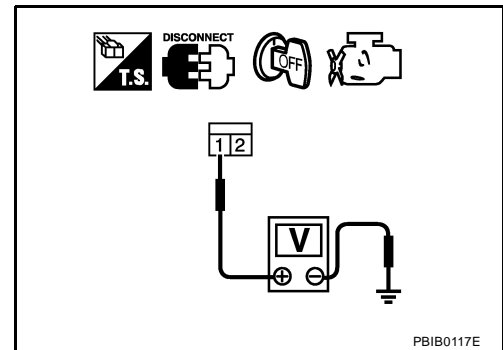


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.



14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

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

15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 40 and stop lamp 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 17.
- NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E28, M7
- Harness connectors M71, F59
- Joint connector-2
- Harness for open or short between ECM and stop lamp switch

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

17. CHECK STOP LAMP SWITCH

Refer to [EC-541, "Component Inspection"](#)

OK or NG

OK >> GO TO 18.

NG >> Replace stop lamp switch.

18. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

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ASC D INDICATOR

Component Description

UBS00342

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 CRUISE 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 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-628, "AUTOMATIC SPEED CONTROL DEVICE \(ASC D\)"](#) for the ASC D function.

CONSULT-II Reference Value in Data Monitor Mode

UBS00343

Specification data are reference value.

MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	<ul style="list-style-type: none"> ● Ignition switch: ON 	<ul style="list-style-type: none"> ● CRUISE switch pressed 	ON
		<ul style="list-style-type: none"> ● CRUISE switch released 	OFF
SET LAMP	<ul style="list-style-type: none"> ● CRUISE switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH) 	<ul style="list-style-type: none"> ● SET switch pressed 	ON
		<ul style="list-style-type: none"> ● SET switch released 	OFF




ASC INDICATOR

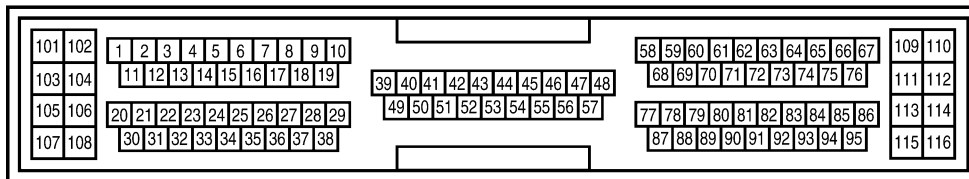
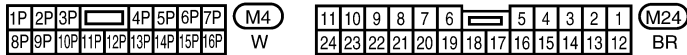
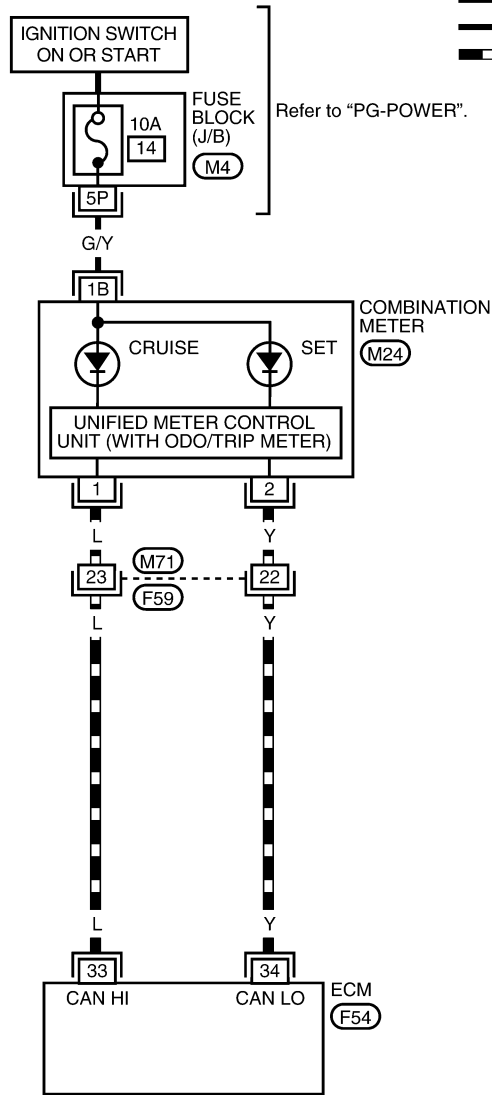
[QR]

Wiring Diagram

UBS00344

EC-ASCIND-01

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



WBWA0004E

Diagnostic Procedure

1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION	SPECIFICATION	
CRUISE LAMP	● Ignition switch: ON	● CRUISE switch pressed	ON
		● CRUISE switch released	OFF
SET LAMP	● CRUISE switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	● SET switch pressed	ON
		● SET switch released	OFF

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 2.

2. CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC U1000, U1001, refer to [EC-138, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

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-4, "COMBINATION METERS"](#).

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-130, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

DATA LINK CONNECTOR

[QR]

DATA LINK CONNECTOR

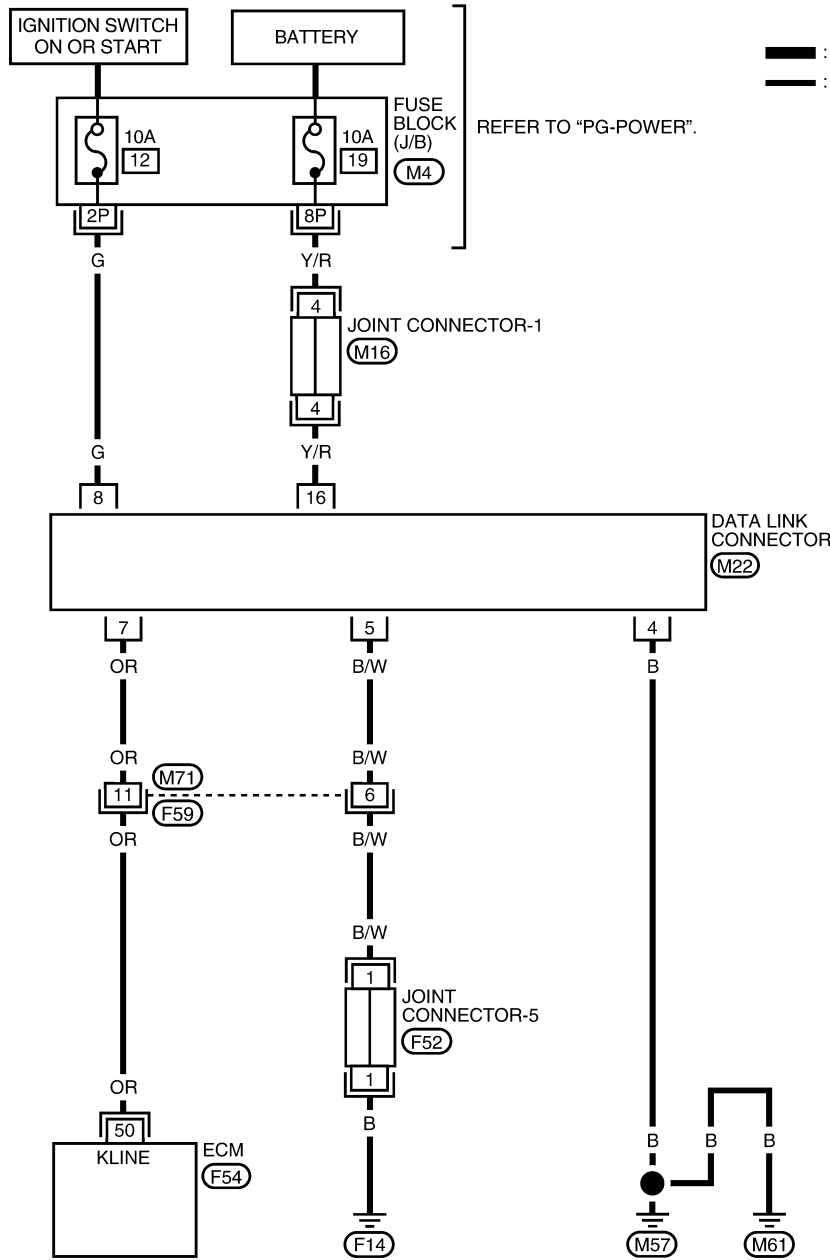
PFP:24814

Wiring Diagram

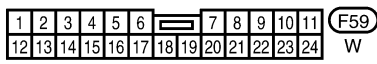
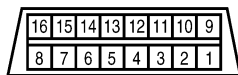
UBS00346

EC-DLC-01

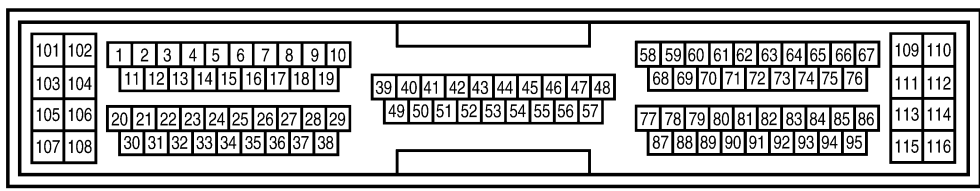
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— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)
 (M16), (F52) - JOINT CONNECTOR (J/C)



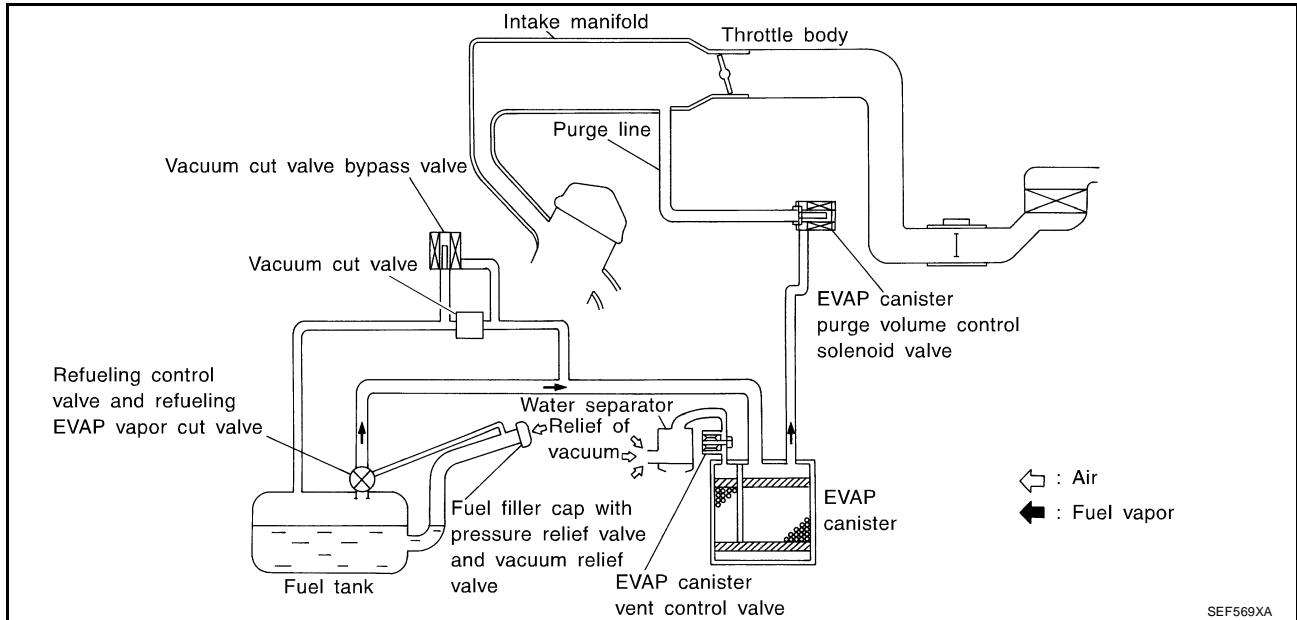
BBWA0046E

EVAPORATIVE EMISSION SYSTEM

PFP:14950

Description SYSTEM DESCRIPTION

UBS00347

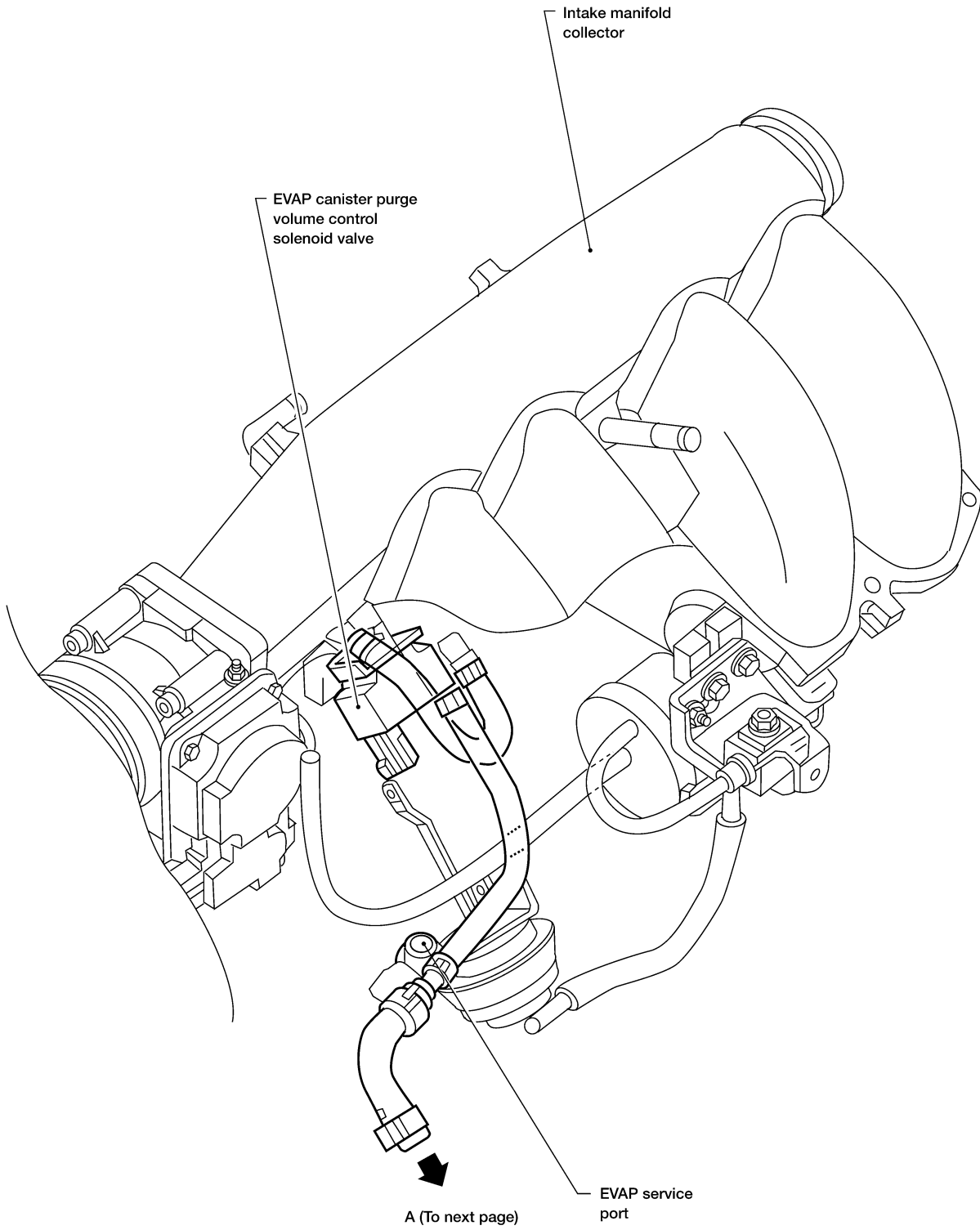


The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon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

[QR]

EVAPORATIVE EMISSION LINE DRAWING



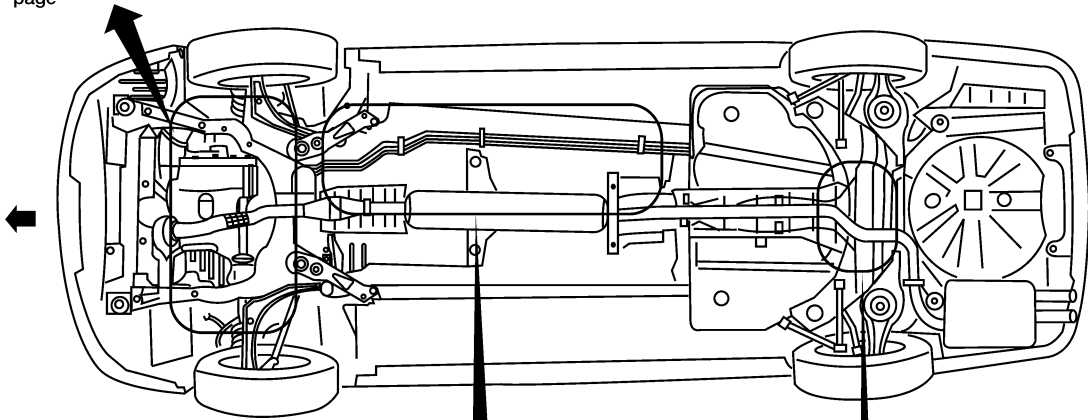
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EVAPORATIVE EMISSION SYSTEM

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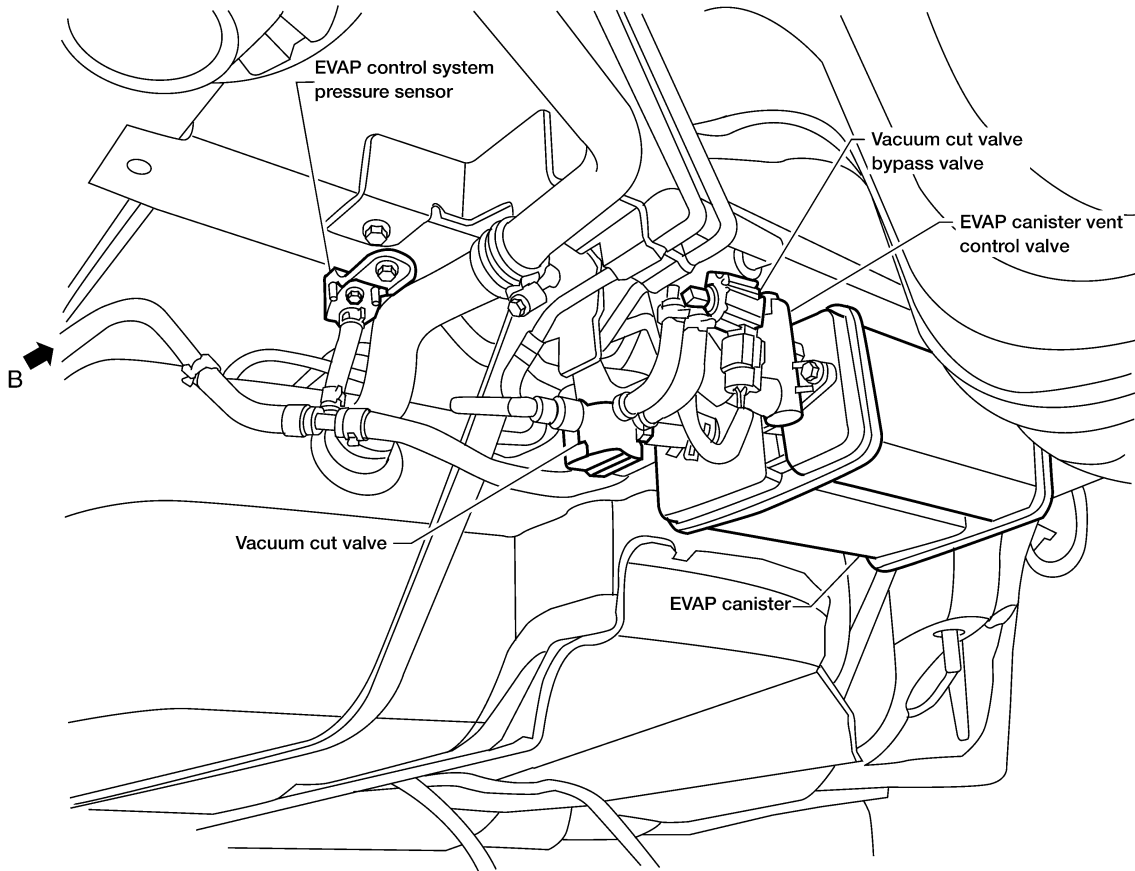
Refer to
previous
page



A →
Previous

EVAP vapor
purge line

→ B



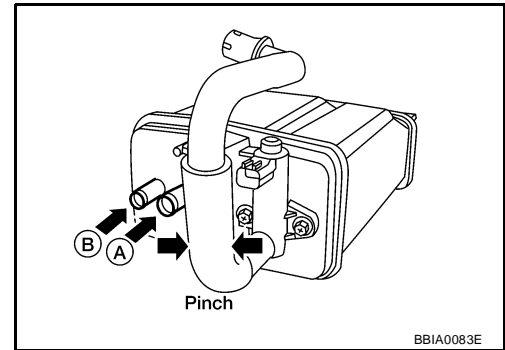
B →

BBIA0052E

Component Inspection EVAP CANISTER

Check EVAP canister as follows:

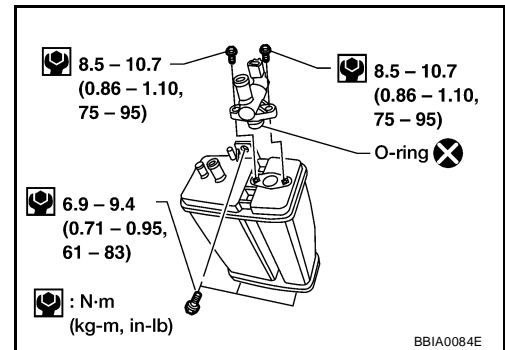
1. Pinch the fresh air hose.
2. Blow air into port **A** and check that it flows freely out of port **B**.



Tightening Torque

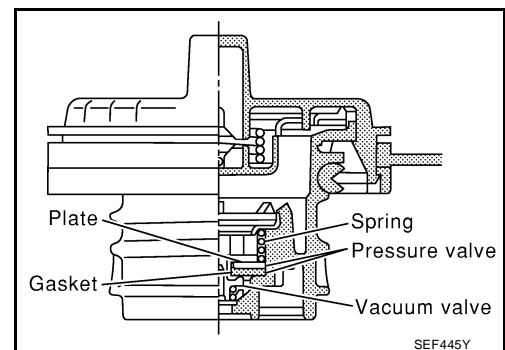
Tighten EVAP canister as shown in the figure.

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



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

1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

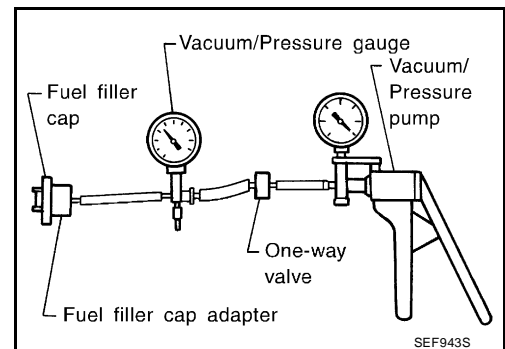
Pressure: 15.3 - 20.0 kPa
(0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

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.



VACUUM CUT VALVE AND VACUUM CUT VALVE BYPASS VALVE

Refer to [EC-515](#).

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

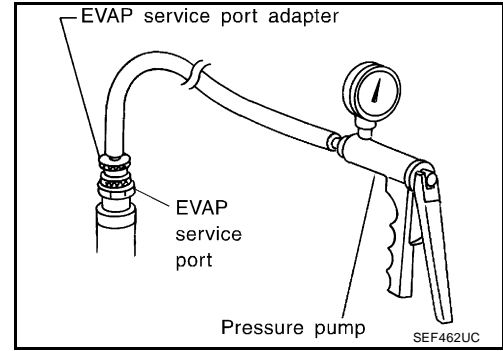
Refer to [EC-320](#).

FUEL TANK TEMPERATURE SENSOR

Refer to [EC-233](#).

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.



UBS00349

How to Detect Fuel Vapor Leakage

CAUTION:

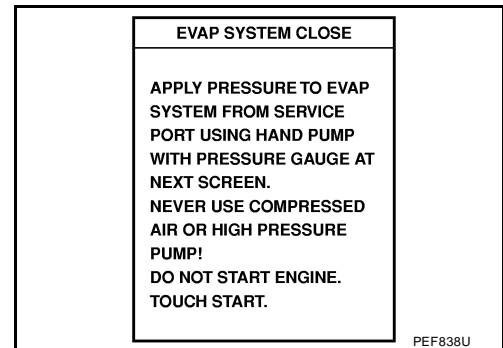
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

NOTE:

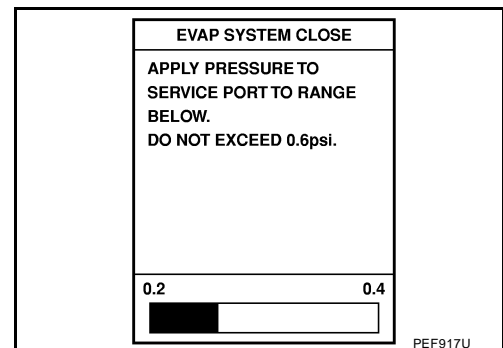
- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

Ⓜ WITH CONSULT-II

1. Attach the EVAP service port adapter securely to the EVAP service port.
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-II.
5. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.



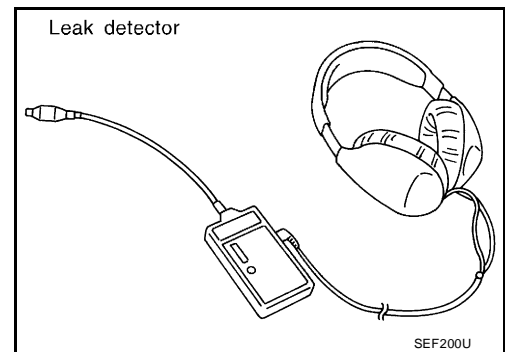
6. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7. Remove EVAP service port adapter and hose with pressure pump.



EVAPORATIVE EMISSION SYSTEM

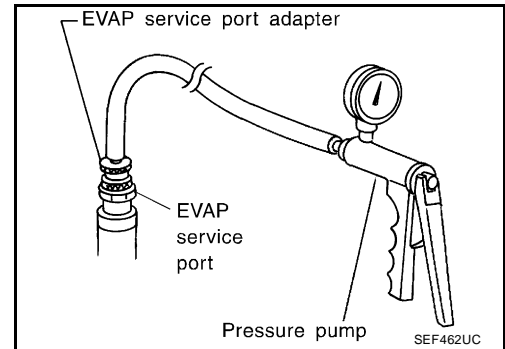
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8. Locate the leak using a leak detector. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

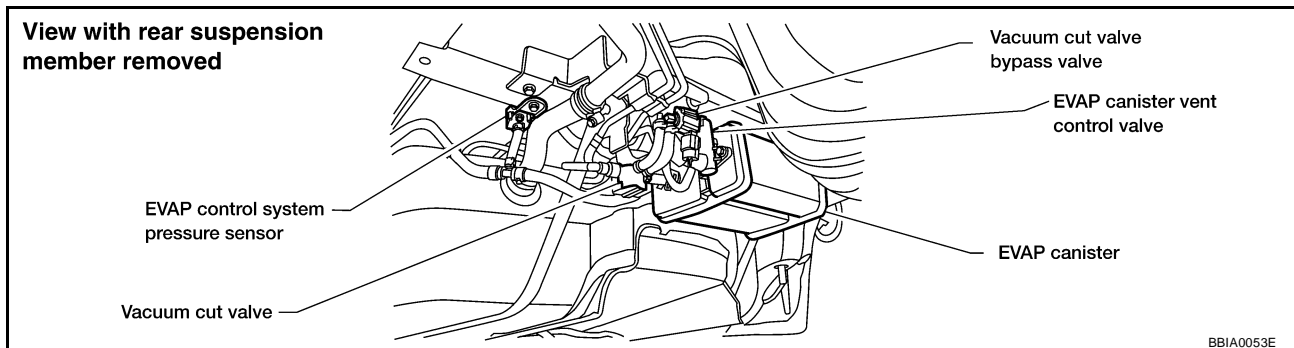


⊗ **WITHOUT CONSULT-II**

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 between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.



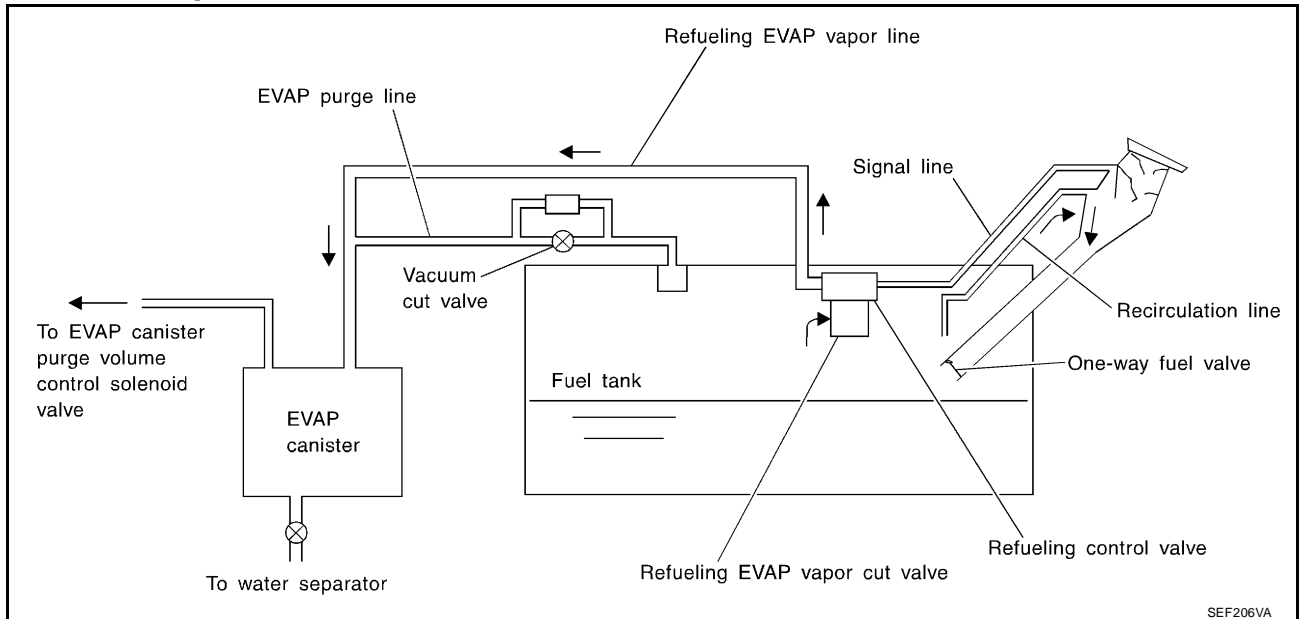
4. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm² , 0.2 to 0.4 psi).
5. Remove EVAP service port adapter and hose with pressure pump.
6. Locate the leak using a leak detector. Refer to [EC-615, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

PFP:00032

System Description

UBS0034A



From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and refueling vapor line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

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

WARNING:

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

- Put a “CAUTION: INFLAMMABLE” sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a 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-51, "FUEL PRESSURE RELEASE"](#) .
 - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

Diagnostic Procedure

SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

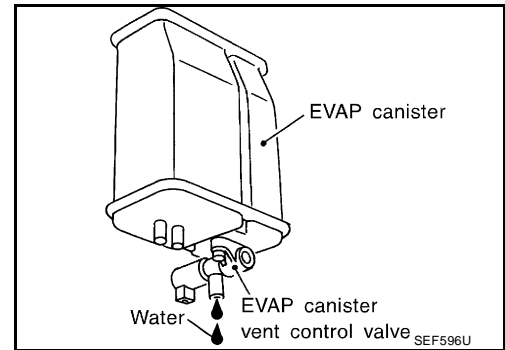
- OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 WATER SEPARATOR

Refer to [EC-623, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
NG >> Replace water separator.

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.

>> Repair or replace EVAP hose.

6. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-623, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
NG >> Replace refueling EVAP vapor cut valve with fuel tank.

7. CHECK REFUELING CONTROL VALVE

Refer to [EC-623, "Component Inspection"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> Replace refueling control 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 attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

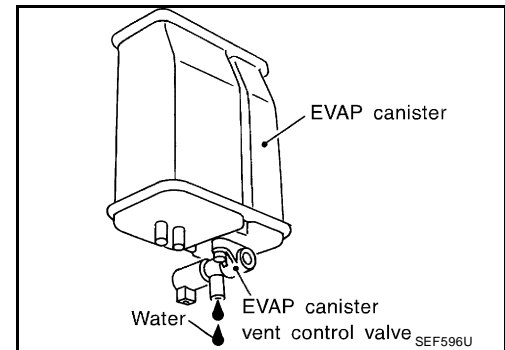
- OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 WATER SEPARATOR

Refer to [EC-623, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace water separator.

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and water separator 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 control 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 signal line and recirculation line for clogging, dents and cracks.

OK or NG

- OK >> GO TO 8.
NG >> Replace filler neck tube.

8. CHECK REFUELING CONTROL VALVE

Refer to [EC-623, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace refueling control valve with fuel tank.

9. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-623, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank.

10. 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 11.
- NG >> Replace fuel filler tube.

11. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

OK or NG

- OK >> GO TO 12.
- NG >> Repair or replace one-way fuel valve with fuel tank.

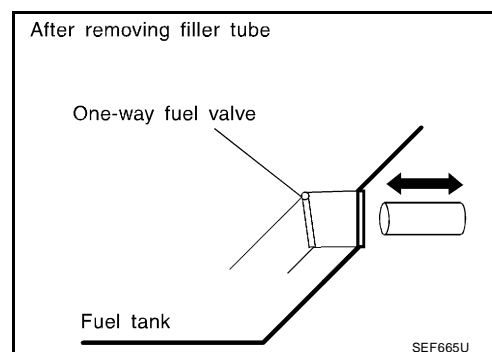
12. CHECK ONE-WAY FUEL VALVE-II

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.



Component Inspection WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.

UBS0034C

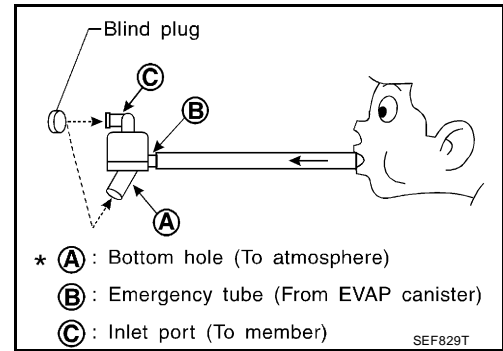
ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR]

4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

NOTE:

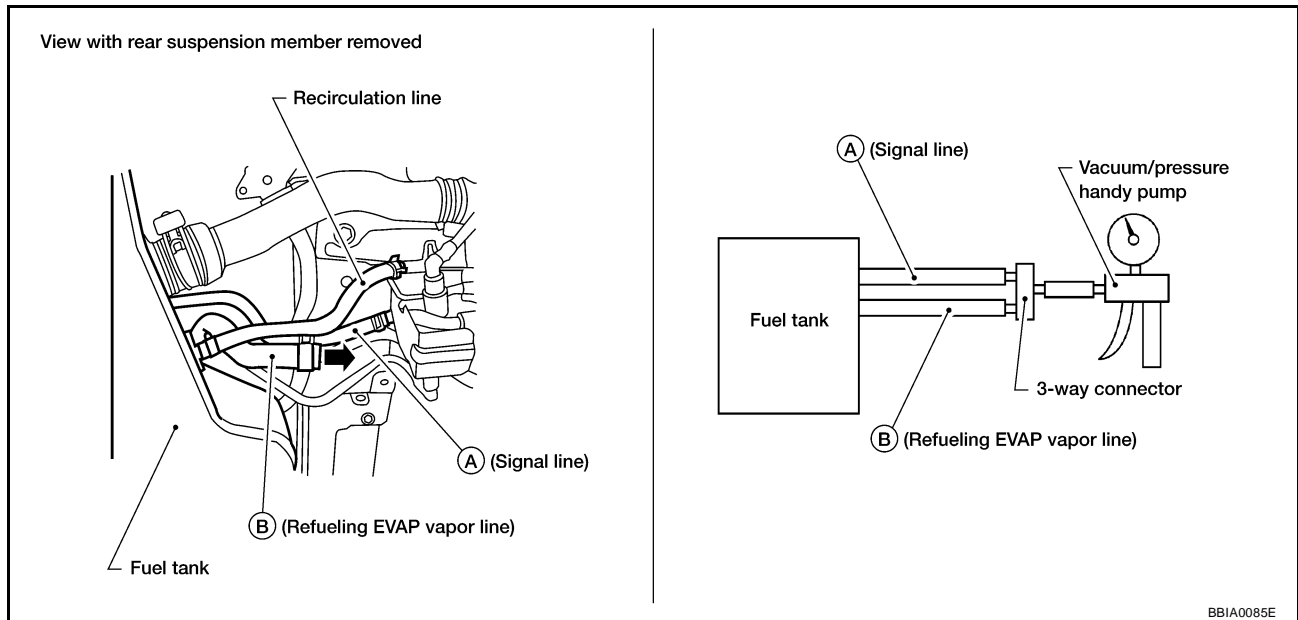
- Do not disassemble water separator.



REFUELING EVAP VAPOR CUT VALVE

With CONSULT-II

1. Remove fuel tank. Refer to [FL-8, "FUEL TANK"](#).
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-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows. Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel gauge retainer with fuel gauge unit. **Always replace O-ring with new one.**
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



With GST

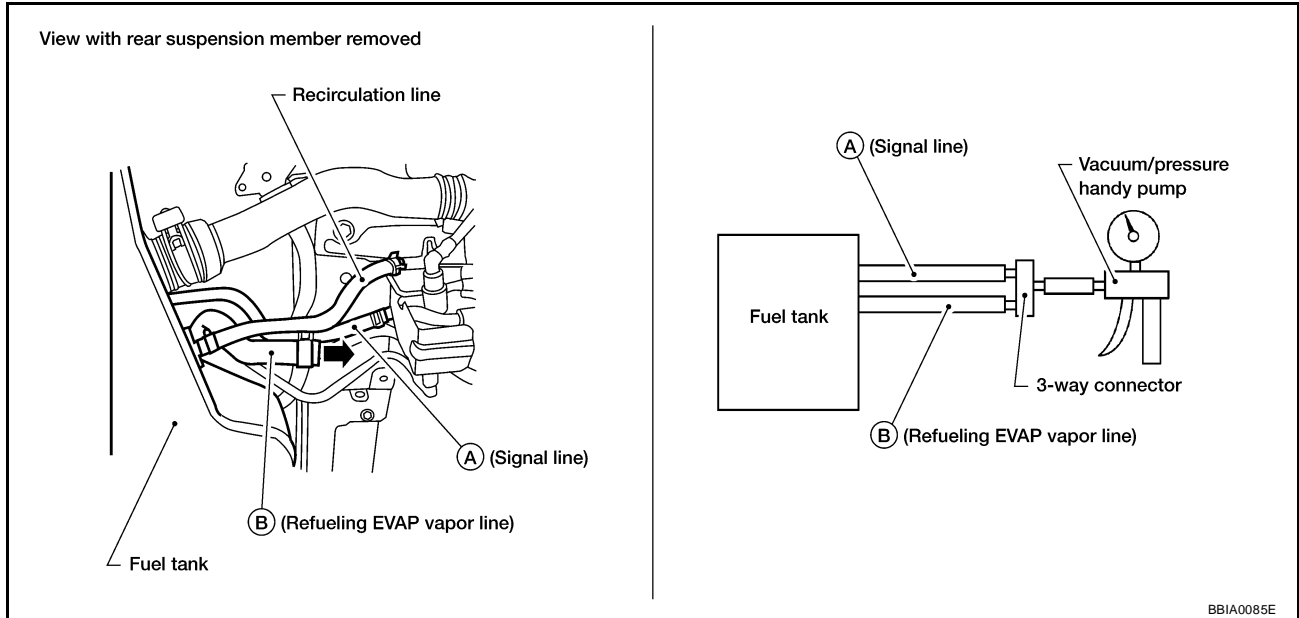
1. Remove fuel tank. Refer to [FL-8, "FUEL TANK"](#).
2. Drain fuel from the tank as follows:
 - a. Remove fuel gauge retainer.
 - b. Drain fuel from the tank using a hand pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR]

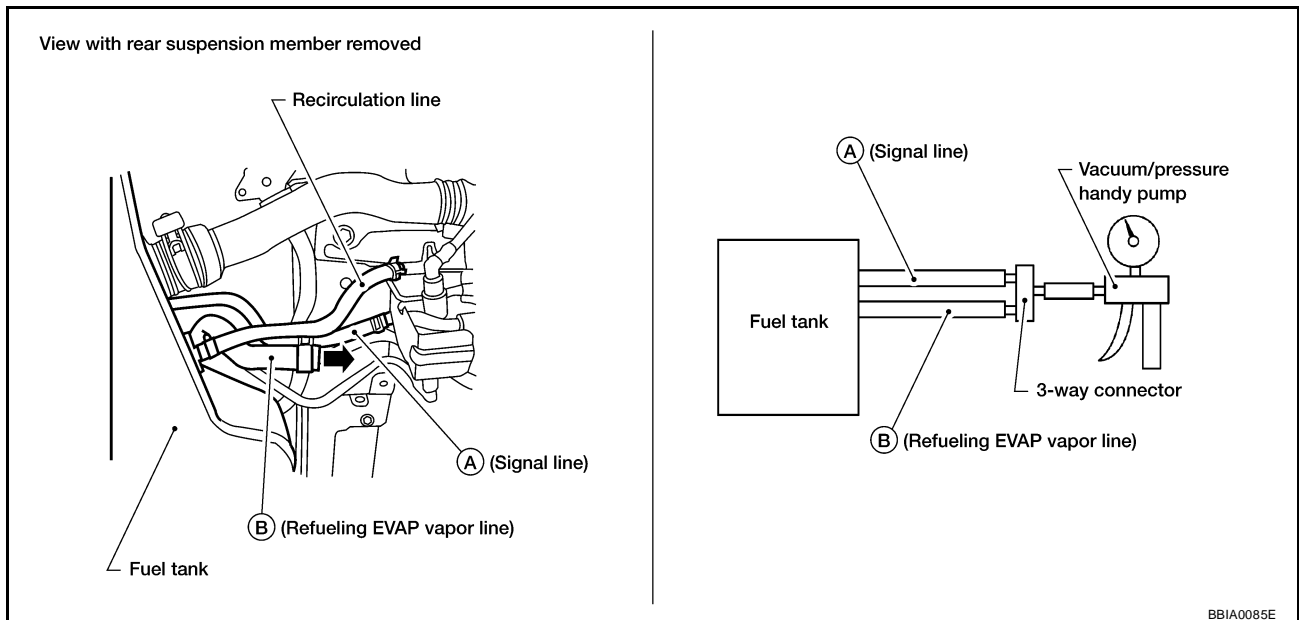
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.

4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air continuity between hose ends A and B.
Blow air into the hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.

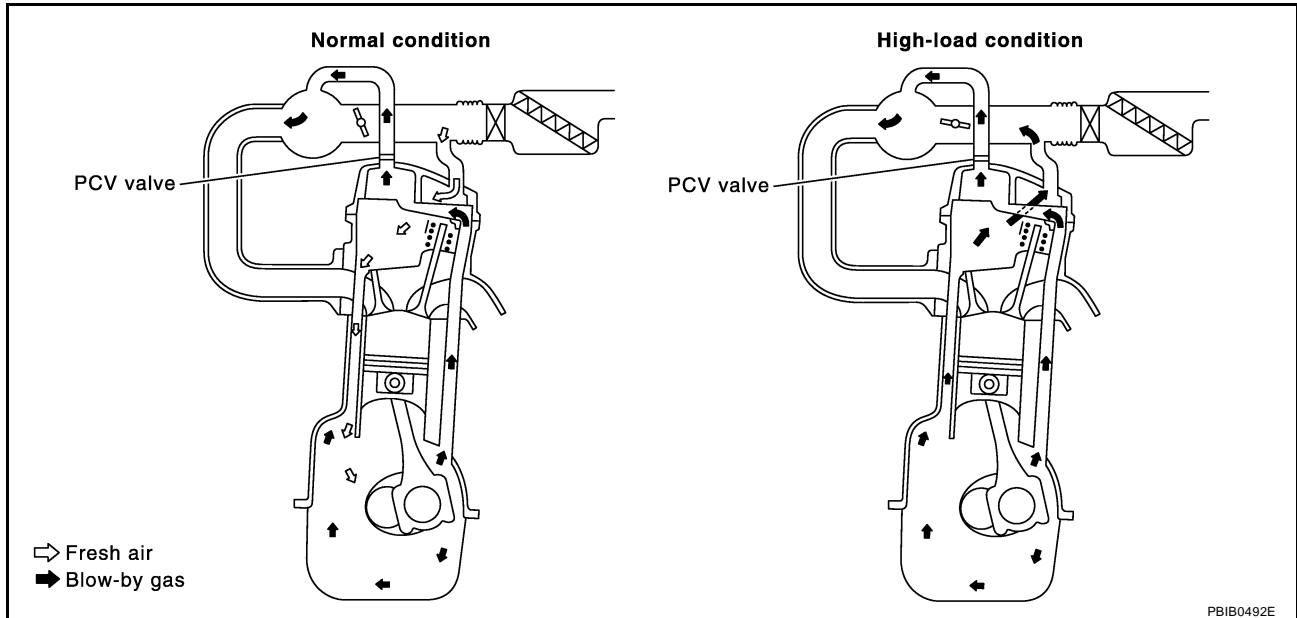


POSITIVE CRANKCASE VENTILATION

PF1:11810

Description
SYSTEM DESCRIPTION

UBS0034D

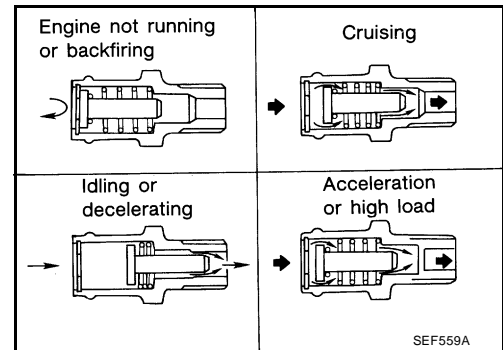


PBIB0492E

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.

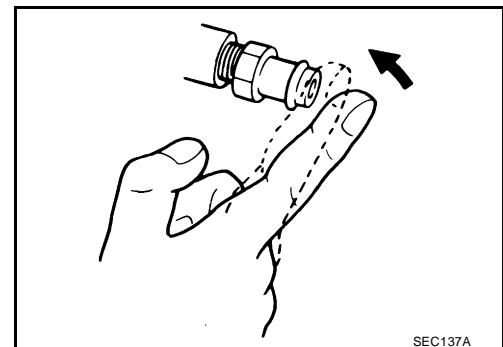


SEF559A

UBS0034E

Component Inspection
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.



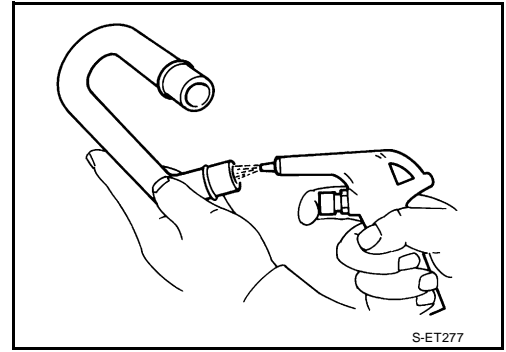
SEC137A

POSITIVE CRANKCASE VENTILATION

[QR]

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.



A

EC

C

D

E

F

G

H

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J

K

L

M

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[QR]

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PF1:18930

System Description INPUT/OUTPUT SIGNAL CHART

UBS0034F

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 (A/T models)	Gear position		
Combination meter	Vehicle speed		
TCM	Powertrain revolution		

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.

SET OPERATION

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

ACCEL OPERATION

If the RESUME/ACCEL 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 depressed
- Brake pedal is depressed
- Clutch pedal is depressed (M/T models)
- A/T selector lever is shifted to P or N position (A/T models)

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

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.

RESUME OPERATION

When the RESUME/ACCEL 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.

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

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[QR]

UBS0034G

Component Description

ASCD STEERING SWITCH

Refer to [EC-526](#) .

ASCD BRAKE SWITCH

Refer to [EC-533](#) .

ASCD CLUTCH SWITCH

Refer to [EC-533](#) .

STOP LAMP SWITCH

Refer to [EC-533](#) .

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EC-397](#) .

ASCD INDICATOR

Refer to [EC-610](#) .

A

EC

C

D

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H

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K

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M

SERVICE DATA AND SPECIFICATIONS (SDS)

[QR]

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Fuel Pressure

UBS0034H

Fuel pressure at idle	Approximately 350 kPa (3.7kg/cm ² , 51psi)
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Idle Speed and Ignition Timing

UBS0034I

Target idle speed	No-load*1 (in "P" or N" position)	700±50 rpm
Air conditioner: ON	In "P" or N" position	800 rpm or more
Ignition timing	In "P" or N" position	15°±5° BTDC

*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

UBS0034J

	Calculated load value % (Using CONSULT-II or GST)
At idle	10 - 35
At 2,500 rpm	10 - 35

Mass Air Flow Sensor

UBS0034K

Supply voltage	Battery voltage (11 - 14V)
Output voltage at idle	1.0 - 1.5*V
Mass air flow (Using CONSULT-II or GST)	1.4 - 4.0 g-m/sec at idle* 4.0 - 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

UBS0034L

Temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1
80 (176)	0.31 - 0.37

Engine Coolant Temperature Sensor

UBS0034M

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

Heated Oxygen Sensor 1 Heater

UBS0034N

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω
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Heated Oxygen sensor 2 Heater

UBS0034O

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω
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Crankshaft Position Sensor (POS)

UBS0034P

Refer to [EC-289, "Component Inspection"](#) .

Camshaft Position Sensor (PHASE)

UBS0034Q

Refer to [EC-295, "Component Inspection"](#) .

Throttle Control Motor

UBS0034R

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω
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SERVICE DATA AND SPECIFICATIONS (SDS)

[QR]

Injector

UBS0034S

Resistance [at 20°C (68°F)]	12.1 - 12.9Ω
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A

Fuel Pump

UBS0034T

Resistance [at 25°C (77°F)]	Approximately 1.0Ω
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EC

C

D

E

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G

H

I

J

K

L

M

INDEX FOR DTC

Alphabetical Index

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-763, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
Unable to access ECM	—	—	EC-703
A/T 1ST GR FNCTN	P0731	0731	AT-124
A/T 2ND GR FNCTN	P0732	0732	AT-129
A/T 3RD GR FNCTN	P0733	0733	AT-134
A/T 4TH GR FNCTN	P0734	0734	AT-139
A/T TCC S/V FNCTN	P0744	0744	AT-151
ABSL PRES SEN/CIRC	P0107	0107	EC-804
ABSL PRES SEN/CIRC	P0108	0108	EC-804
APP SEN 1/CIRC*5	P0227	0227	EC-922
APP SEN 1/CIRC*5	P0228	0228	EC-934
APP SEN 2/CIRC*5	P1227	1227	EC-1125
APP SEN 2/CIRC*5	P1228	1228	EC-1125
APP SENSOR*5	P0226	0226	EC-915
ASCD BRAKE SW	P1572	1572	EC-1181
ASCD SW	P1564	1564	EC-1174
ASCD VHL SPD SEN	P1574	1574	EC-1192
ATF TEMP SEN/CIRC	P0710	0710	AT-109
BRAKE SW/CIRCUIT	P1805	1805	EC-1205
CAN COMM CIRCUIT	U1000	1000*6	EC-763
CAN COMM CIRCUIT	U1001	1001*6	EC-763
CKP SEN/CIRCUIT	P0335	0335	EC-938
CLOSED LOOP-B1	P1148	1148	EC-1099
CLOSED LOOP-B2	P1168	1168	EC-1099
CMP SEN/CIRC-B1	P0340	0340	EC-945
CMP SEN/CIRC-B2	P0345	0345	EC-945
CTP LEARNING	P1225	1225	EC-1121
CTP LEARNING	P1226	1226	EC-1123
CYL 1 MISFIRE	P0301	0301	EC-928
CYL 2 MISFIRE	P0302	0302	EC-928
CYL 3 MISFIRE	P0303	0303	EC-928
CYL 4 MISFIRE	P0304	0304	EC-928
CYL 5 MISFIRE	P0305	0305	EC-928
CYL 6 MISFIRE	P0306	0306	EC-928
ECM	P0605	0605	EC-1030
ECM BACK UP/CIRC	P1065	1065	EC-1037
ECT SEN/CIRCUIT*5	P0117	0117	EC-811

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[VQ]

Items (CONSULT-II screen terms)	DTC*1		Reference page	
	CONSULT-II GST*2	ECM*3		
ECT SEN/CIRCUIT*5	P0118	0118	EC-811	EC
ECT SENSOR	P0125	0125	EC-816	
ENG OVER TEMP	P1217	1217	EC-1103	C
ENGINE SPEED SIG	P0725	0725	AT-120	
ETC ACTR*5	P1121	1121	EC-1047	D
ETC FUNCTION/CIRC*5	P1122	1122	EC-1049	
ETC MOT*5	P1128	1128	EC-1061	E
ETC MOT PWR	P1124	1124	EC-1056	
ETC MOT PWR*5	P1126	1126	EC-1056	F
EVAP PURG FLOW/MON	P0441	0441	EC-957	
EVAP SMALL LEAK	P0442	0442	EC-963	G
EVAP SYS PRES SEN	P0452	0452	EC-985	
EVAP SYS PRES SEN	P0453	0453	EC-991	H
EVAP VERY SML LEAK	P0456	0456	EC-998	
FTT SEN/CIRCUIT	P0182	0182	EC-897	I
FTT SEN/CIRCUIT	P0183	0183	EC-897	
FTT SENSOR	P0181	0181	EC-892	J
FUEL LEV SEN SLOSH	P0460	0460	EC-1007	
FUEL LEVEL SEN/CIRC	P1464	1464	EC-1157	K
FUEL LEVEL SENSOR	P0461	0461	EC-1012	
FUEL LEVL SEN/CIRC	P0462	0462	EC-1014	L
FUEL LEVL SEN/CIRC	P0463	0463	EC-1014	
FUEL SYS-LEAN-B1	P0171	0171	EC-877	M
FUEL SYS-LEAN-B2	P0174	0174	EC-877	
FUEL SYS-RICH-B1	P0172	0172	EC-885	
FUEL SYS-RICH-B2	P0175	0175	EC-885	
HO2S1 (B1)	P0132	0132	EC-827	
HO2S1 (B1)	P0133	0133	EC-836	
HO2S1 (B1)	P0134	0134	EC-847	
HO2S1 (B1)	P1143	1143	EC-1066	
HO2S1 (B1)	P1144	1144	EC-1072	
HO2S1 (B2)	P0152	0152	EC-827	
HO2S1 (B2)	P0153	0153	EC-836	
HO2S1 (B2)	P0154	0154	EC-847	
HO2S1 (B2)	P1163	1163	EC-1066	
HO2S1 (B2)	P1164	1164	EC-1072	
HO2S1 HTR (B1)	P0031	0031	EC-774	
HO2S1 HTR (B1)	P0032	0032	EC-774	
HO2S1 HTR (B2)	P0051	0051	EC-774	
HO2S1 HTR (B2)	P0052	0052	EC-774	
HO2S2 HTR (B2)	P0057	0057	EC-782	
HO2S2 HTR (B2)	P0058	0058	EC-782	

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Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
HO2S2 (B1)	P0138	0138	EC-857
HO2S2 (B1)	P0139	0139	EC-867
HO2S2 (B1)	P1146	1146	EC-1079
HO2S2 (B1)	P1147	1147	EC-1089
HO2S2 (B2)	P0158	0158	EC-857
HO2S2 (B2)	P0159	0159	EC-867
HO2S2 (B2)	P1166	1166	EC-1079
HO2S2 (B2)	P1167	1167	EC-1089
HO2S2 HTR (B1)	P0037	0037	EC-782
HO2S2 HTR (B1)	P0038	0038	EC-782
IAT SEN/CIRCUIT	P0112	0112	EC-806
IAT SEN/CIRCUIT	P0113	0113	EC-806
IAT SENSOR	P0127	0127	EC-820
INT/V TIM CONT-B1	P0011	0011	EC-766
INT/V TIM CONT-B2	P0021	0021	EC-766
ISC SYSTEM	P0506	0506	EC-1021
ISC SYSTEM	P0507	0507	EC-1023
KNOCK SEN/CIRC-B1	P0327	0327	EC-934
KNOCK SEN/CIRC-B1	P0328	0328	EC-934
L/PRESS SOL/CIRC	P0745	0745	AT-159
MAF SEN/CIRCUIT	P0101	0101	EC-790
MAF SEN/CIRCUIT*5	P0102	0102	EC-798
MAF SEN/CIRCUIT*5	P0103	0103	EC-798
MAF SENSOR*5	P1102	1102	EC-1041
MIL/CIRC	P0650	0650	EC-1033
MULTI CYL MISFIRE	P0300	0300	EC-928
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	EC-689
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	No DTC	Flashing*4	EC-690
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—
O/R CLTCH SOL/CIRC	P1760	1760	AT-180
P-N POS SW/CIRCUIT	P1706	1706	EC-1194
PNP SW/CIRC	P0705	0705	AT-103
PURG VOLUME CONT/V	P0444	0444	EC-972
PURG VOLUME CONT/V	P0445	0445	EC-972
PURG VOLUME CONT/V	P1444	1444	EC-1135
PW ST P SEN/CIRC	P0550	0550	EC-1025
SENSOR POWER/CIRC*5	P1229	1229	EC-1131
SFT SOL A/CIRC	P0750	0750	AT-165
SFT SOL B/CIRC	P0755	0755	AT-170

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Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
TCC SOLENOID/CIRC	P0740	0740	AT-146
TCS C/U FUNCTN	P1211	1211	EC-1101
TCS/CIRC	P1212	1212	EC-1102
THERMSTAT FNCTN	P0128	0128	EC-825
TP SEN 1/CIRC*5	P0222	0222	EC-908
TP SEN 1/CIRC*5	P0223	0223	EC-908
TP SEN 2/CIRC*5	P1223	1223	EC-1114
TP SEN 2/CIRC*5	P1224	1224	EC-1114
TP SENSOR*5	P0221	0221	EC-901
TPV SEN/CIRC A/T	P1705	1705	AT-175
TW CATALYST SYS-B1	P0420	0420	EC-953
TW CATALYST SYS-B2	P0430	0430	EC-953
VC CUT/V BYPASS/V	P1491	1491	EC-1166
VC/V BYPASS/V	P1490	1490	EC-1160
VEH SPD SEN/CIR AT*7	P0720	0720	AT-115
VEH SPEED SEN/CIRC*7	P0500	0500	EC-1019
VENT CONTROL VALVE	P0447	0447	EC-978
VENT CONTROL VALVE	P1446	1446	EC-1143
VENT CONTROL VALVE	P1448	1448	EC-1149
VIAS S/V CIRC	P1800	1800	EC-1199

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

*2: These numbers are prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

*4: When engine is running.

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

*6: The troubleshooting for this DTC needs CONSULT-II.

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

NOTE:

Regarding L31 models, "B1" indicates bank 1, "B2" indicates bank 2.

DTC No. Index

UBS0034V

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-763](#), "DTC U1000, U1001 CAN COMMUNICATION LINE" .

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
—	—	Unable to access ECM	EC-703
No DTC	Flashing*4	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	EC-690
U1000	1000*6	CAN COMM CIRCUIT	EC-763
U1001	1001*6	CAN COMM CIRCUIT	EC-763

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[VQ]

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—
P0011	0011	INT/V TIM CONT-B1	EC-766
P0021	0021	INT/V TIM CONT-B2	EC-766
P0031	0031	HO2S1 HTR (B1)	EC-774
P0032	0032	HO2S1 HTR (B1)	EC-774
P0037	0037	HO2S2 HTR (B1)	EC-782
P0038	0038	HO2S2 HTR (B1)	EC-782
P0051	0051	HO2S1 HTR (B2)	EC-774
P0052	0052	HO2S1 HTR (B2)	EC-774
P0057	0057	HO2S2 HTR (B2)	EC-782
P0058	0058	HO2S2 HTR (B2)	EC-782
P0101	0101	MAF SEN/CIRCUIT	EC-790
P0102	0102	MAF SEN/CIRCUIT*5	EC-798
P0103	0103	MAF SEN/CIRCUIT*5	EC-798
P0107	0107	ABSL PRES SEN/CIRC	EC-804
P0108	0108	ABSL PRES SEN/CIRC	EC-804
P0112	0112	IAT SEN/CIRCUIT	EC-806
P0113	0113	IAT SEN/CIRCUIT	EC-806
P0117	0117	ECT SEN/CIRCUIT*5	EC-811
P0118	0118	ECT SEN/CIRCUIT*5	EC-811
P0125	0125	ECT SENSOR	EC-816
P0127	0127	IAT SENSOR	EC-820
P0128	0128	THERMSTAT FNCTN	EC-825
P0132	0132	HO2S1 (B1)	EC-827
P0133	0133	HO2S1 (B1)	EC-836
P0134	0134	HO2S1 (B1)	EC-847
P0138	0138	HO2S2 (B1)	EC-857
P0139	0139	HO2S2 (B1)	EC-867
P0152	0152	HO2S1 (B2)	EC-827
P0153	0153	HO2S1 (B2)	EC-836
P0154	0154	HO2S1 (B2)	EC-847
P0158	0158	HO2S2 (B2)	EC-857
P0159	0159	HO2S2 (B2)	EC-867
P0171	0171	FUEL SYS-LEAN-B1	EC-877
P0172	0172	FUEL SYS-RICH-B1	EC-885
P0174	0174	FUEL SYS-LEAN-B2	EC-877
P0175	0175	FUEL SYS-RICH-B2	EC-885
P0181	0181	FTT SENSOR	EC-892
P0182	0182	FTT SEN/CIRCUIT	EC-897
P0183	0183	FTT SEN/CIRCUIT	EC-897

INDEX FOR DTC

[VQ]

DTC*1		Items (CONSULT-II screen terms)	Reference page	
CONSULT-II GST*2	ECM*3			
P0221	0221	TP SENSOR*5	EC-901	A
P0222	0222	TP SEN 1/CIRC*5	EC-908	EC
P0223	0223	TP SEN 1/CIRC*5	EC-908	C
P0226	0226	APP SENSOR*5	EC-915	
P0227	0227	APP SEN 1/CIRC*5	EC-922	D
P0228	0228	APP SEN 1/CIRC*5	EC-922	
P0300	0300	MULTI CYL MISFIRE	EC-928	E
P0301	0301	CYL 1 MISFIRE	EC-928	
P0302	0302	CYL 2 MISFIRE	EC-928	F
P0303	0303	CYL 3 MISFIRE	EC-928	
P0304	0304	CYL 4 MISFIRE	EC-928	G
P0305	0305	CYL 5 MISFIRE	EC-928	
P0306	0306	CYL 6 MISFIRE	EC-928	H
P0327	0327	KNOCK SEN/CIRC-B1	EC-934	
P0328	0328	KNOCK SEN/CIRC-B1	EC-934	I
P0335	0335	CKP SEN/CIRCUIT	EC-938	J
P0340	0340	CMP SEN/CIRC-B1	EC-945	
P0345	0345	CMP SEN/CIRC-B2	EC-945	K
P0420	0420	TW CATALYST SYS-B1	EC-953	
P0430	0430	TW CATALYST SYS-B2	EC-953	L
P0441	0441	EVAP PURG FLOW/MON	EC-957	
P0442	0442	EVAP SMALL LEAK	EC-963	M
P0444	0444	PURG VOLUME CONT/V	EC-972	
P0445	0445	PURG VOLUME CONT/V	EC-972	
P0447	0447	VENT CONTROL VALVE	EC-978	
P0452	0452	EVAP SYS PRES SEN	EC-985	
P0453	0453	EVAP SYS PRES SEN	EC-991	
P0456	0456	EVAP VERY SML LEAK	EC-998	
P0460	0460	FUEL LEV SEN SLOSH	EC-1007	
P0461	0461	FUEL LEVEL SENSOR	EC-1012	
P0462	0462	FUEL LEVL SEN/CIRC	EC-1014	
P0463	0463	FUEL LEVL SEN/CIRC	EC-1014	
P0500	0500	VEH SPEED SEN/CIRC*7	EC-1019	
P0506	0506	ISC SYSTEM	EC-1021	
P0507	0507	ISC SYSTEM	EC-1023	
P0550	0550	PW ST P SEN/CIRC	EC-1025	
P0605	0605	ECM	EC-1030	
P0650	0650	MIL/CIRC	EC-1033	
P0705	0705	PNP SW/CIRC	AT-103	
P0710	0710	ATF TEMP SEN/CIRC	AT-109	
P0720	0720	VEH SPD SEN/CIR AT*7	AT-115	

INDEX FOR DTC

[VQ]

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0725	0725	ENGINE SPEED SIG	AT-120
P0731	0731	A/T 1ST GR FNCTN	AT-124
P0732	0732	A/T 2ND GR FNCTN	AT-129
P0733	0733	A/T 3RD GR FNCTN	AT-134
P0734	0734	A/T 4TH GR FNCTN	AT-139
P0740	0740	TCC SOLENOID/CIRC	AT-146
P0744	0744	A/T TCC S/V FNCTN	AT-151
P0745	0745	L/PRESS SOL/CIRC	AT-159
P0750	0750	SFT SOL A/CIRC	AT-165
P0755	0755	SFT SOL B/CIRC	AT-170
P1065	1065	ECM BACK UP/CIRC	EC-1037
P1102	1102	MAF SENSOR*5	EC-1041
P1121	1121	ETC ACTR*5	EC-1047
P1122	1122	ETC FUNCTION/CIRC*5	EC-1049
P1124	1124	ETC MOT PWR	EC-1056
P1126	1126	ETC MOT PWR*5	EC-1056
P1128	1128	ETC MOT*5	EC-1061
P1143	1143	HO2S1 (B1)	EC-1066
P1144	1144	HO2S1 (B1)	EC-1072
P1146	1146	HO2S2 (B1)	EC-1079
P1147	1147	HO2S2 (B1)	EC-1089
P1148	1148	CLOSED LOOP-B1	EC-1099
P1163	1163	HO2S1 (B2)	EC-1066
P1164	1164	HO2S1 (B2)	EC-1072
P1166	1166	HO2S2 (B2)	EC-1079
P1167	1167	HO2S2 (B2)	EC-1089
P1168	1168	CLOSED LOOP-B2	EC-1099
P1211	1211	TCS C/U FUNCTN	EC-1101
P1212	1212	TCS/CIRC	EC-1102
P1217	1217	ENG OVER TEMP	EC-1103
P1223	1223	TP SEN 2/CIRC*5	EC-1114
P1224	1224	TP SEN 2/CIRC*5	EC-1114
P1225	1225	CTP LEARNING	EC-1121
P1226	1226	CTP LEARNING	EC-1123
P1227	1227	APP SEN 2/CIRC*5	EC-1125
P1228	1228	APP SEN 2/CIRC*5	EC-1125
P1229	1229	SENSOR POWER/CIRC*5	EC-1131
P1444	1444	PURG VOLUME CONT/V	EC-1135
P1446	1446	VENT CONTROL VALVE	EC-1143
P1448	1448	VENT CONTROL VALVE	EC-1149
P1464	1464	FUEL LEVEL SEN/CIRC	EC-1157

INDEX FOR DTC

[VQ]

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P1490	1490	VC/V BYPASS/V	EC-1160
P1491	1491	VC CUT/V BYPASS/V	EC-1166
P1564	1564	ASCD SW	EC-1174
P1572	1572	ASCD BRAKE SW	EC-1181
P1574	1574	ASCD VHL SPD SEN	EC-1192
P1610 - P1615	1610 - 1615	NATS MALFUNCTION	EC-689
P1705	1705	TPV SEN/CIRC A/T	AT-175
P1706	1706	P-N POS SW/CIRCUIT	EC-1194
P1760	1760	O/R CLTCH SOL/CIRC	AT-180
P1800	1800	VIAS S/V CIRC	EC-1199
P1805	1805	BRAKE SW/CIRCUIT	EC-1205

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

*2: These numbers are prescribed by SAE J2012.

*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

*4: When engine is running.

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

*6: The troubleshooting for this DTC needs CONSULT-II.

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

NOTE:

Regarding L31 models, "B1" indicates bank 1, "B2" indicates bank 2.

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PRECAUTIONS

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

UBS0034W

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. 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 harness connectors.

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

UBS0034X

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

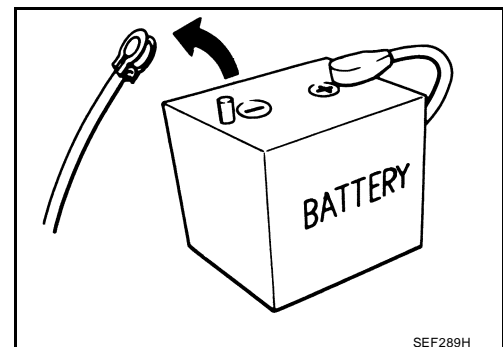
CAUTION:

- Be sure to turn the ignition switch OFF and disconnect the negative battery terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to [PG-64, "HARNESS CONNECTOR"](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the 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.

Precaution

UBS0034Y

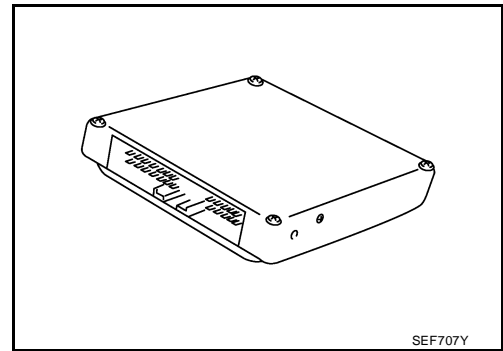
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the ECM because battery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



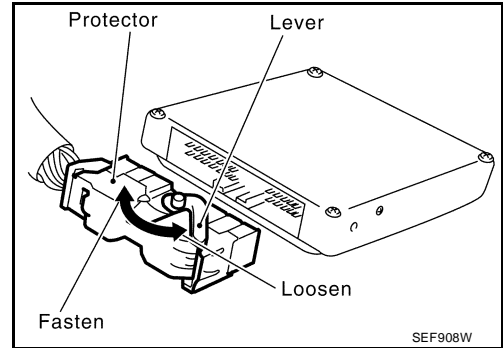
PRECAUTIONS

[VQ]

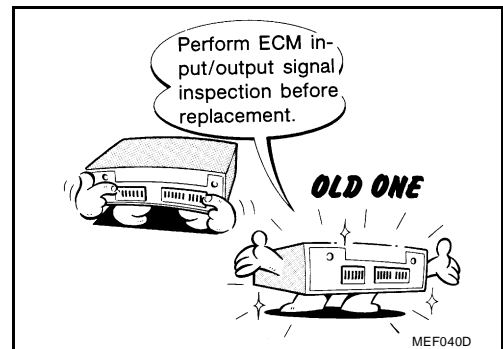
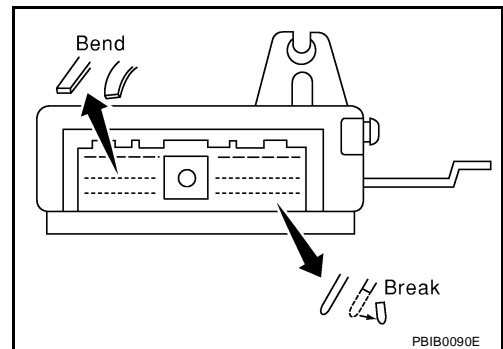
- Do not disassemble ECM.
- If a battery terminal is disconnected, the memory will return to the ECM value.
The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a problem. Do not replace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



- When connecting ECM harness connector, fasten it securely with a lever as far as it will go as shown at right.



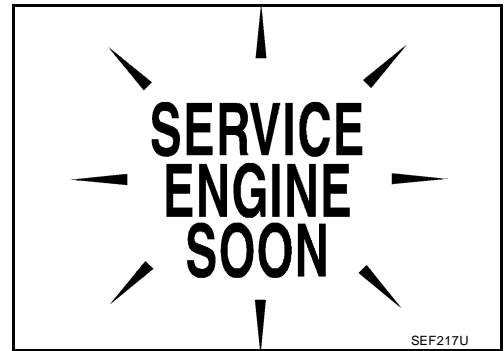
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).
Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- Securely connect ECM harness connectors.
A poor connection can cause an extremely 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.
- Before replacing ECM, perform “ECM Terminals and Reference Value” inspection and make sure ECM functions properly. Refer to [EC-722](#).
- 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 problems.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).



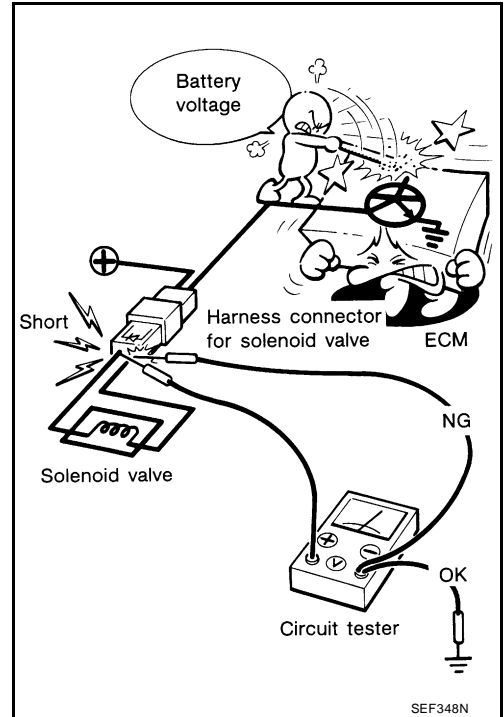
PRECAUTIONS

[VQ]

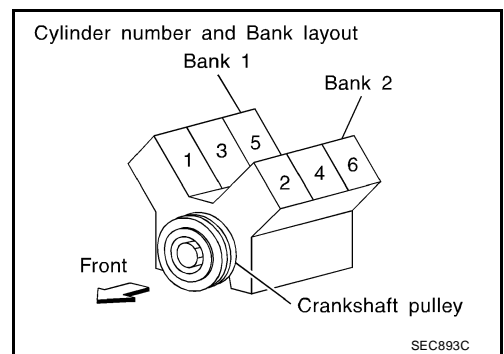
- After performing each TROUBLE DIAGNOSIS, perform “DTC Confirmation Procedure” or “Overall Function Check”.
The DTC should not be displayed in the “DTC Confirmation Procedure” if the repair is completed. The “Overall Function Check” should be a good result if the repair is completed.



- 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 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.



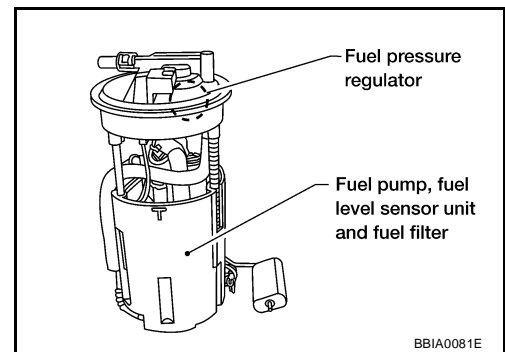
- Regarding model L31, “B1” indicates the bank 1, “B2” indicates the bank 2 as shown in the figure.



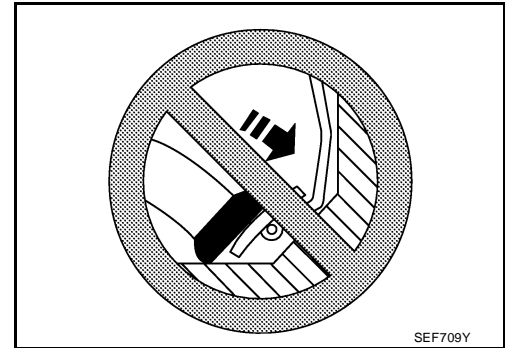
PRECAUTIONS

[VQ]

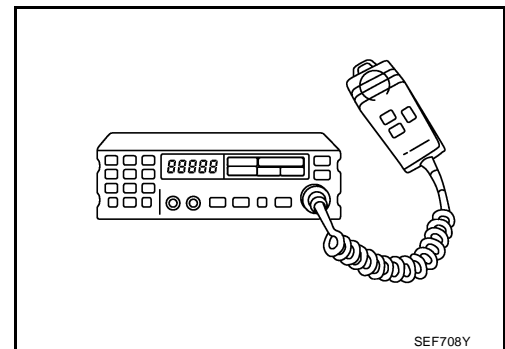
- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.



- 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.



Wiring Diagrams and Trouble Diagnosis

UBS0034Z

When you read wiring diagrams, refer to the following:

- [GI-12, "How to Read Wiring Diagrams"](#)
- [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#) for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- [GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#)
- [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#)

PREPARATION

[VQ]

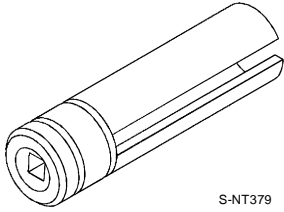
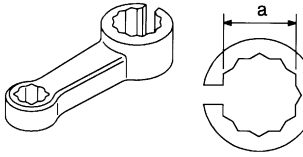
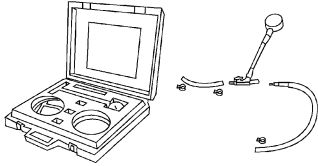
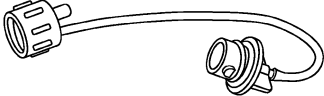
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PREPARATION


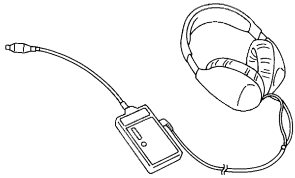
Special Service Tools

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

Tool number Tool name	Description	
KV10117100 Heated oxygen sensor wrench	 S-NT379	Loosening or tightening heated oxygen sensors with 22 mm (0.87 in) hexagon nut
KV10114400 Heated oxygen sensor wrench	 S-NT636	Loosening or tightening heated oxygen sensors a: 22 mm (0.87 in)
Fuel pressure gauge kit (J44321)	 LEC642	Checking fuel pressure
Fuel filler cap adapter (J45356)	 S-NT815	Checking fuel tank vacuum relief valve opening pressure

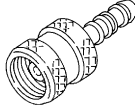
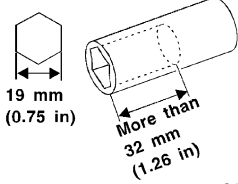
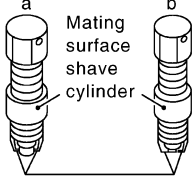
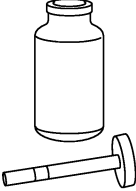
Commercial Service Tools

UBS00351

Tool name (Kent-Moore No.)	Description	
Quick connector re-lease	 PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Part No. 16441 6N210)
Leak detector i.e.: (J41416)	 S-NT703	Locating the EVAP leak

PREPARATION

[VQ]

Tool name (Kent-Moore No.)	Description	
EVAP service port adapter i.e.: (J41413-OBDD)	 <p style="text-align: center;">S-NT704</p>	Applying positive pressure through EVAP service port
Socket wrench	 <p style="text-align: center;">S-NT705</p>	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner	 <p style="text-align: center;">S-NT778</p>	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
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 <p style="text-align: center;">S-NT779</p>	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

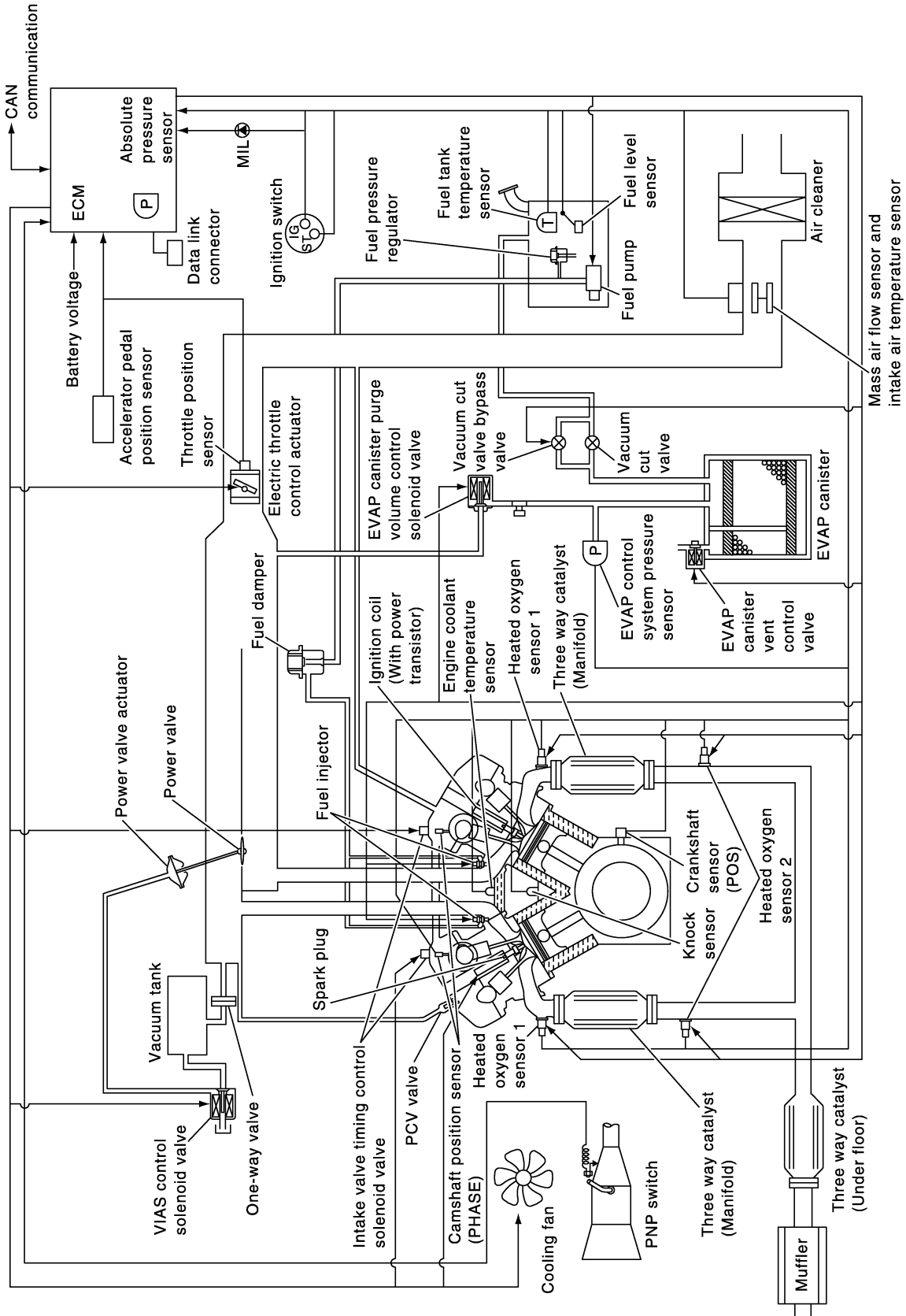
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ENGINE CONTROL SYSTEM

PFP:23710

System Diagram

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SEC894C

Vacuum Hose Drawing

UBS00353

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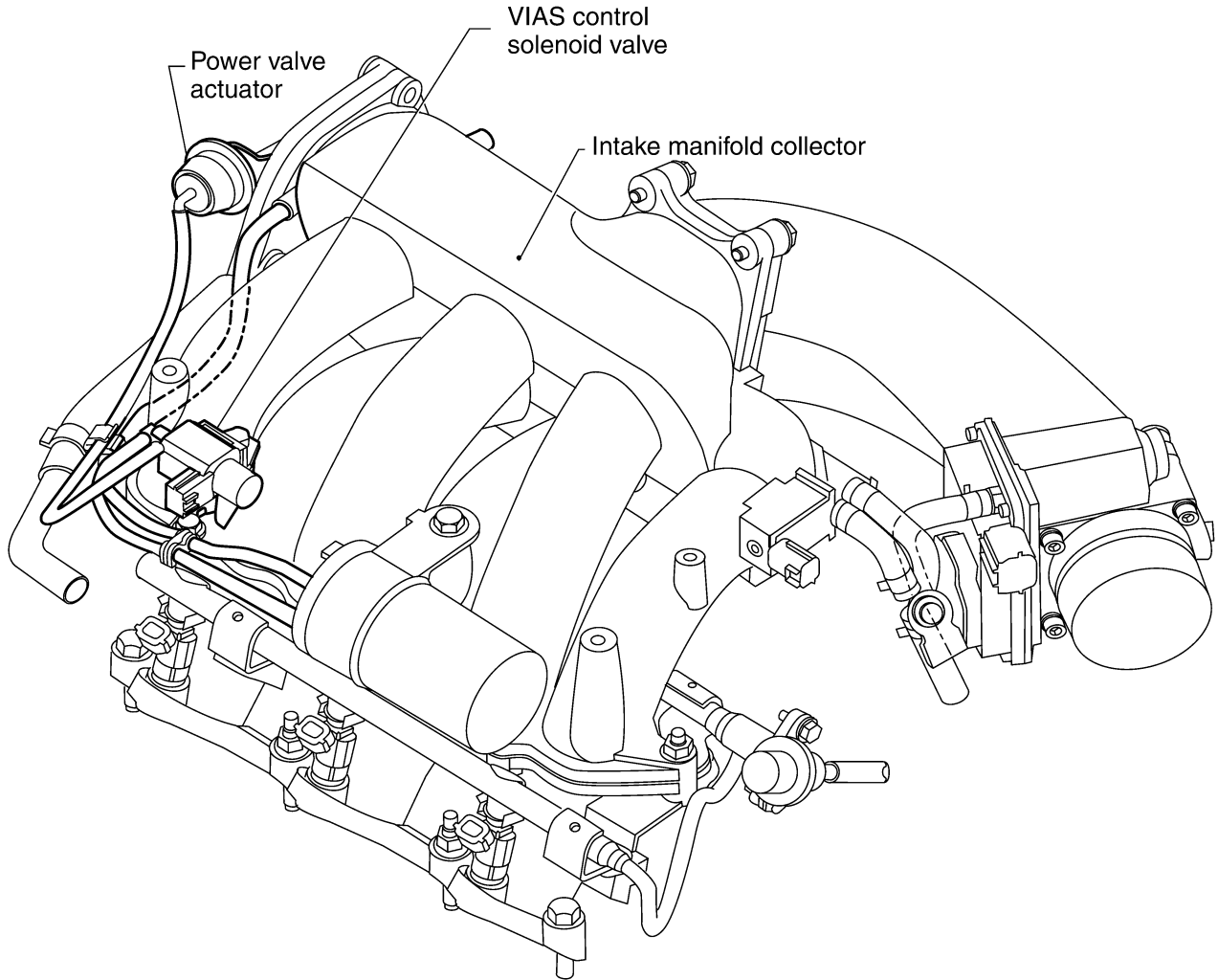
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Refer to [EC-646. "System Diagram"](#) for Vacuum Control System.

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ENGINE CONTROL SYSTEM

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System Chart

Input (Sensor)	ECM Function	Output (Actuator)	
<ul style="list-style-type: none"> ● Camshaft position sensor (PHASE) ● Crankshaft position sensor (POS) ● Mass air flow sensor ● Engine coolant temperature sensor ● Heated oxygen sensor 1 ● Throttle position sensor ● Accelerator pedal position sensor ● Park/neutral position (PNP) switch ● Intake air temperature sensor ● Absolute pressure sensor ● Power steering pressure sensor ● Ignition switch ● Battery voltage ● Knock sensor ● Refrigerant pressure sensor ● Stop lamp switch ● ASCD steering switch ● ASCD brake switch ● ASCD clutch switch ● Fuel level sensor*1 ● EVAP control system pressure sensor*1 ● Fuel tank temperature sensor*1 ● Heated oxygen sensor 2 *2 ● TCM (Transmission control module) *3 ● ABS actuator and electric unit (control unit) *3 ● Air conditioner switch*3 ● Vehicle speed sensor*3 ● Electrical load signal*3 	Fuel injection & mixture ratio control	Fuel injectors	
	Electronic ignition system	Power transistor	
	Fuel pump control	Fuel pump relay*4	
	ASCD vehicle speed control	Electric throttle control actuator	
	On board diagnostic system	MIL (On the instrument panel)	
	Power valve control	VIAS control solenoid valve	
	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater	
	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater	
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve	
	Air conditioning cut control	Air conditioner relay*4	
	Cooling fan control	Cooling fan relays*4	
		ON BOARD DIAGNOSIS for EVAP system	<ul style="list-style-type: none"> ● EVAP canister vent control valve ● Vacuum cut valve bypass valve

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

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

*3: The signals are sent to the ECM through CAN communication line.

*4: These relays are built into IPDM E/R.

Multiport Fuel Injection (MFI) System INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed Piston position	Fuel injection & mixture ratio control	Fuel injectors
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen 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	Gear position		
Ignition switch	Start signal		
Knock sensor	Engine knocking condition		
Battery	Battery voltage		
Power steering pressure sensor	Power steering operation		
Heated oxygen sensor 2 *1	Density of oxygen in exhaust gas		
ABS actuator and electric unit (control unit) *2	ABS/TCS operation command		
Air conditioner switch*2	Air conditioner operation		
Vehicle speed sensor*2	Vehicle speed		

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

*2: Signals are sent to the ECM through CAN communication line.

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 both the crankshaft position sensor 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.

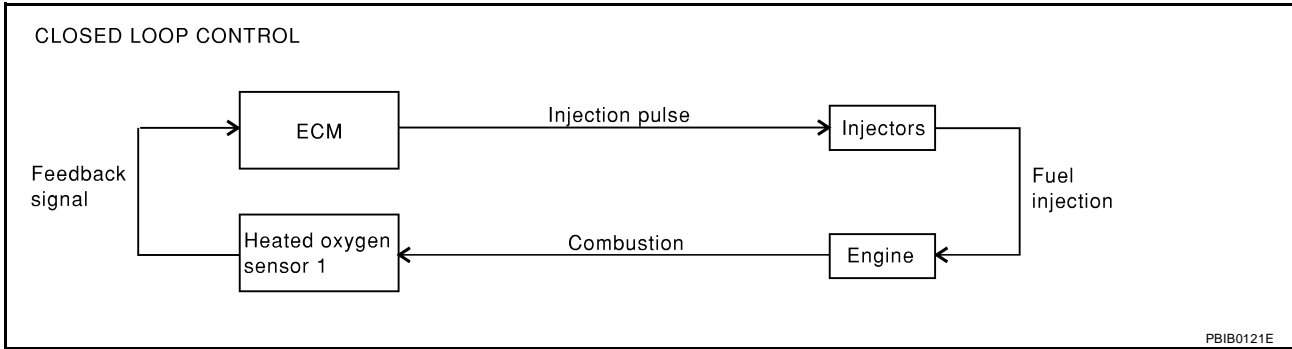
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D"
- 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 driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to [EC-827](#). 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 heated oxygen 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 heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from “N” to “D”
- When starting the engine

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen 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 film) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

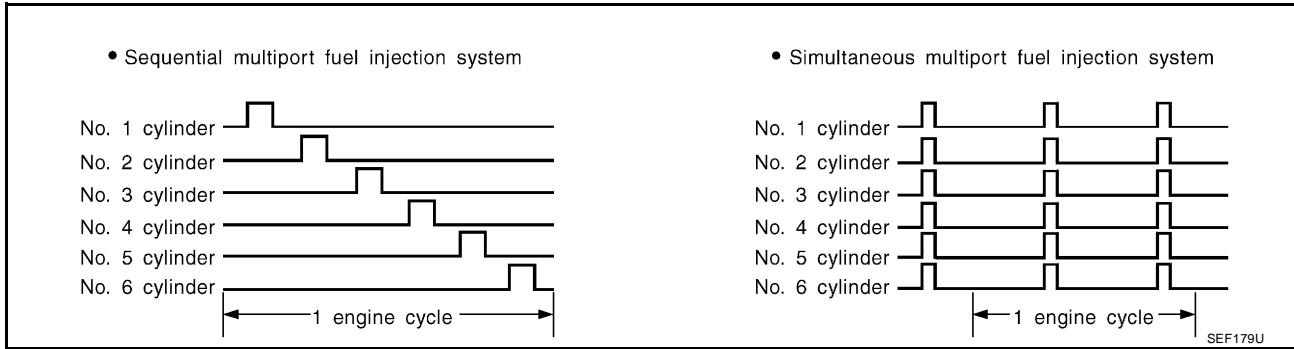
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.

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

“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen 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 six cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

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

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

FUEL SHUT-OFF

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

Electronic Ignition (EI) System INPUT/OUTPUT SIGNAL CHART

UBS00356

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed 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		
Ignition switch	Start signal		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage		
Vehicle speed sensor*1	Vehicle speed		

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

SYSTEM DESCRIPTION

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

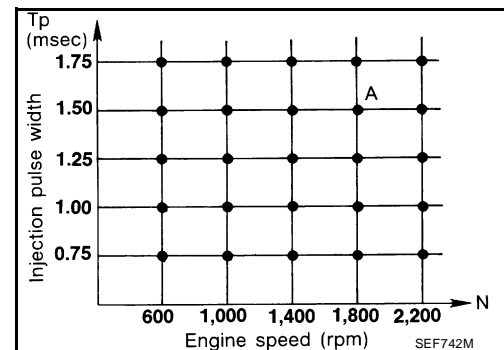
The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.

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

A °BTDC

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

- At starting
- During warm-up



- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Air Conditioning Cut Control INPUT/OUTPUT SIGNAL CHART

UBS00357

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch*1	Air conditioner "ON" signal	Air conditioner cut control	Air conditioner relay
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		
Power steering pressure sensor	Power steering operation		
Vehicle speed sensor*1	Vehicle speed		

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

SYSTEM DESCRIPTION

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

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- 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.

Fuel Cut Control (at No Load and High Engine Speed) INPUT/OUTPUT SIGNAL CHART

UBS00358

Sensor	Input Signal to ECM	ECM function	Actuator
Park/neutral position (PNP) switch	Neutral position	Fuel cut control	Fuel injectors
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Vehicle speed sensor*1	Vehicle speed		

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

SYSTEM DESCRIPTION

If the engine speed is above 1,800 rpm with no load (for example, in neutral and engine speed 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 operate until the engine speed reaches 1,500 rpm, then fuel cut is cancelled.

NOTE:

This function is different from deceleration control listed under “Multiport Fuel Injection (MFI) System”, [EC-649](#)

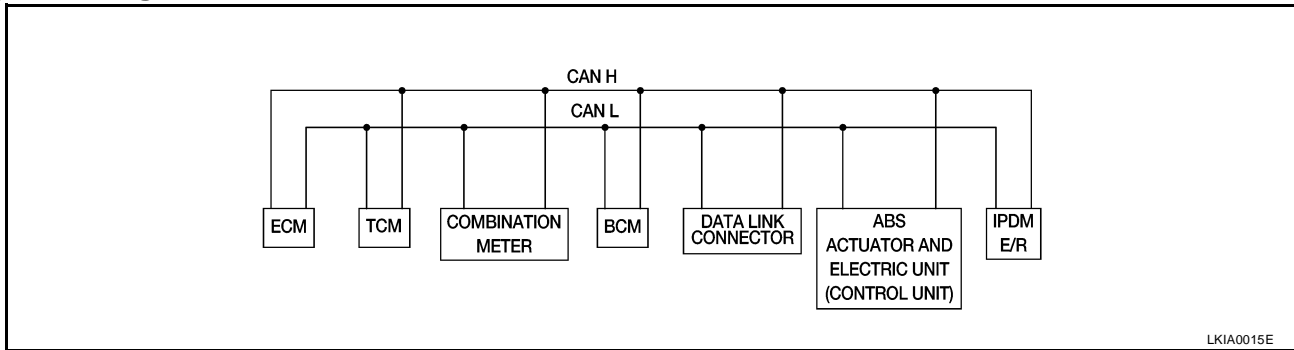
CAN communication SYSTEM DESCRIPTION

UBS00359

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.

FOR MODELS WITH TCS

System diagram



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	TCM	COMBINATION METER	BCM	ABS/TCS control unit	IPDM E/R
Engine speed signal	T	R	R			R
Engine coolant temperature signal	T	R	R			
Accelerator pedal position signal	T	R				
Fuel consumption monitor signal	T		R			
A/T warning lamp signal		T	R			
A/T position indicator signal	R	T	R	R ^(R range only)	R	
ABS operation signal	R				T	
TCS operation signal	R				T	
Air conditioner switch signal	R			T		
Air conditioner compressor signal	R					T
A/C compressor request signal	T					R
Cooling fan motor operation signal	R					T
Cooling Fan Speed Request signal	T					R
Position Lights Request			R	T		R
Position Lights Status				R		T
Low Beam Request				T		R
Low Beam Status	R			R		T
High Beam Request			R	T		R
High Beam Status	R			R		T
Front Fog Lights Request				T		R
Front Fog Light Status				R		T
OD cancel switch signal		R	T			R

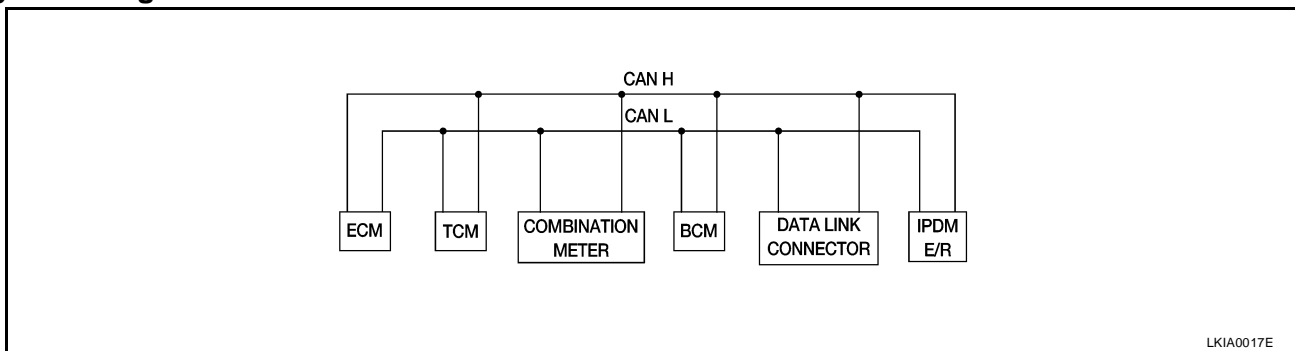
ENGINE CONTROL SYSTEM

[VQ]

Signals	ECM	TCM	COMBINATION METER	BCM	ABS/TCS control unit	IPDM E/R
Brake switch signal		R	T			
Vehicle speed signal	R		T			
	R		T	R		
Oil Pressure Switch			R			T
Sleep Request1			R	T		
Sleep Request2				T		R
N range switch signal		R	T			
P range switch signal		R	T			
Seat belt buckle switch signal			T	R		
Door switch signal			R	T		R
Tail lamp request			R	T		R
Turn indicator signal			R	T		
Buzzer output signal			R	T		
Trunk switch signal			R	T		
ASCD main switch signal	T		R			
ASCD cruise signal	T		R			
Wiper operation				R		T
Wiper stop position signal				R		T
Rear window defogger switch signal				T		R
Rear window defogger control signal	R					T

FOR A/T MODELS WITHOUT TCS

System diagram



LKIA0017E

Input/output signal chart

T: Transmit R: Receive

Signals	ECM	TCM	COMBINATION METER	BCM	IPDM E/R
Engine speed signal	T	R	R		R
Engine coolant temperature signal	T	R	R		
Accelerator pedal position signal	T	R			R
Fuel consumption monitor signal	T		R		
A/T warning lamp signal		T	R		
A/T position indicator signal	R	T	R	R (R range only)	
Air conditioner switch signal	R			T	
Air conditioner compressor signal	R				T

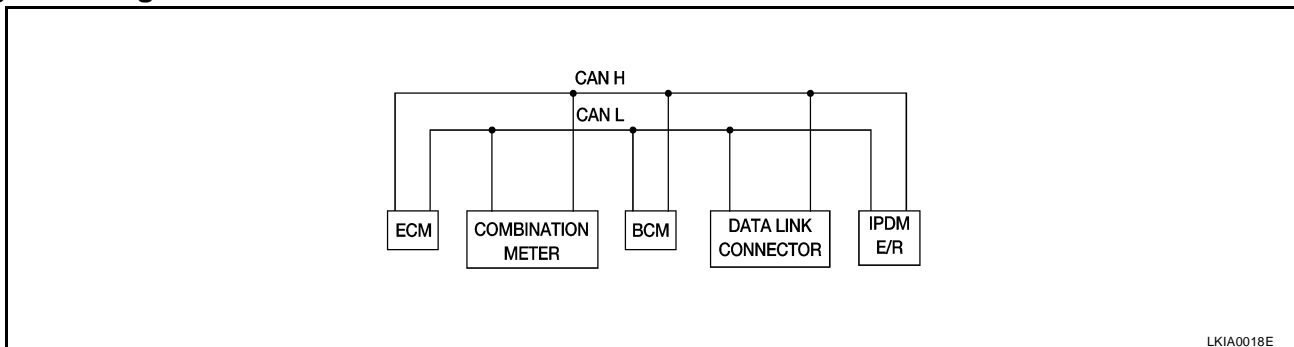
ENGINE CONTROL SYSTEM

[VQ]

Signals	ECM	TCM	COMBINATION METER	BCM	IPDM E/R
A/C compressor request signal	T				R
Blower fan switch signal	R ^(QR25DE)			T	
Cooling fan motor operation signal	R			T	
Cooling Fan Speed Request signal	T				R
Position Lights Request			R	T	R
Position Lights Status				R	T
Low Beam Request				T	R
Low Beam Status	R			R	T
High Beam Request			R	T	R
High Beam Status	R			R	T
Front Fog Lights Request				T	R
Front Fog Light Status				R	T
OD cancel switch signal		R	T		R
Brake switch signal		R	T		
Vehicle speed signal	R		T		
	R		T	R	
Oil Pressure Switch			R		T
Sleep Request1			R	T	
Sleep Request2				T	R
N range switch signal		R	T		
P range switch signal		R	T		
Seat belt buckle switch signal			T	R	
Door switch signal			R	T	R
Tail lamp request			R	T	R
Turn indicator signal			R	T	
Buzzer output signal			R	T	
Trunk switch signal			R	T	
ASCD main switch signal	T		R		
ASCD cruise signal	T		R		
Wiper operation				R	T
Wiper stop position signal				R	T
Rear window defogger switch signal				T	R
Rear window defogger control signal	R				T

FOR M/T MODELS WITHOUT TCS

System diagram



LKIA0018E

ENGINE CONTROL SYSTEM

[VQ]

Input/output signal chart

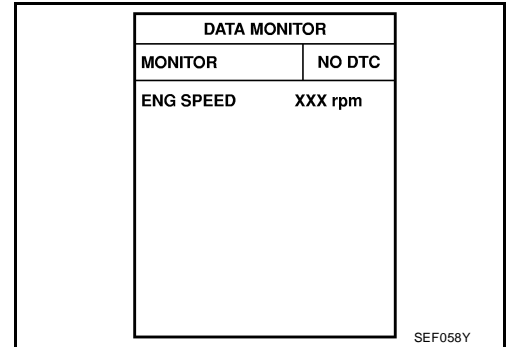
T: Transmit R: Receive

Signals	ECM	COMBINATION METER	BCM	IPDM E/R
Engine speed signal	T	R		R
Engine coolant temperature signal	T	R		
Fuel consumption monitor signal	T	R		
Air conditioner switch signal	R		T	
Air conditioner compressor signal	R			T
A/C compressor request signal	T			R
Blower fan switch signal	R ^(QR25DE)		T	
Cooling fan motor operation signal	R			T
Cooling Fan Speed Request signal	T			R
Position Lights Request		R	T	R
Position Lights Status			R	T
Low Beam Request			T	R
Low Beam Status	R		R	T
High Beam Request		R	T	R
High Beam Status	R		R	T
Front Fog Lights Request			T	R
Front Fog Light Status			R	T
Vehicle speed signal	R	T		
Oil Pressure Switch		R		T
Sleep Request1		R	T	
Sleep Request2			T	R
Seat belt buckle switch signal		T	R	
Door switch signal		R	T	R
Tail lamp request		R	T	R
Turn indicator signal		R	T	
Buzzer output signal		R	T	
Trunk switch signal		R	T	
ASCD main switch signal	T	R		
ASCD cruise signal	T	R		
Wiper operation			R	T
Wiper stop position signal			R	T
Rear window defogger switch signal			T	R
Rear window defogger control signal	R			T

BASIC SERVICE PROCEDURE

Idle Speed and Ignition Timing Check IDLE SPEED

- **Using CONSULT-II**
Check idle speed in "DATA MONITOR" mode with CONSULT-II.

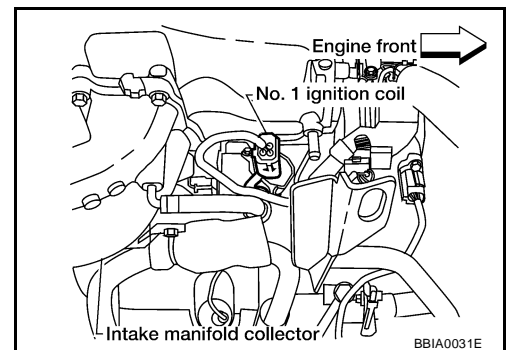


IGNITION TIMING

Any of following two methods may be used.

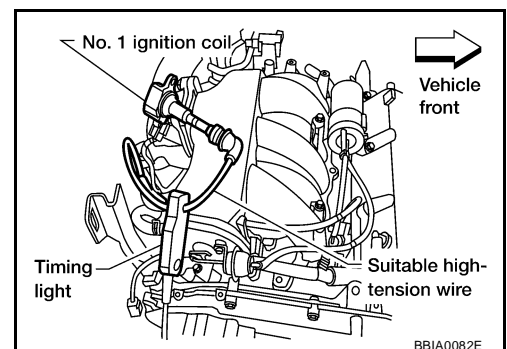
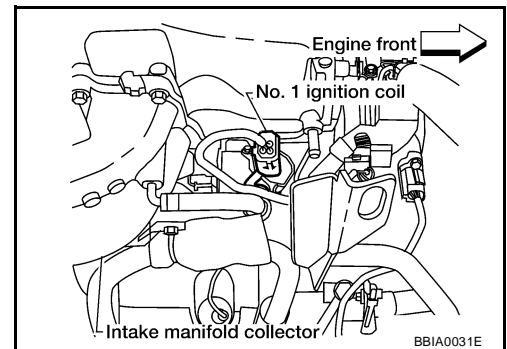
Method A

1. Remove the engine cover (if equipped)
2. Slide the harness protector of ignition coil No. 1 to access the wires.
3. Attach timing light to the wires.
4. Check ignition timing.

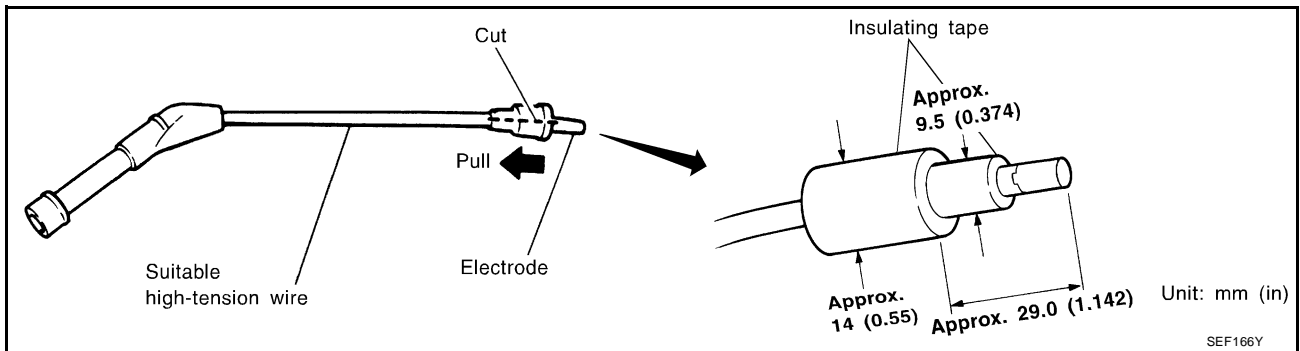


Method B

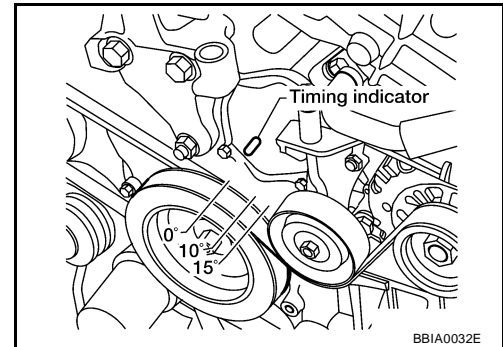
1. Remove No. 1 ignition coil.
2. Connect No. 1 ignition coil and No. 1 spark plug with suitable high-tension wire as shown, and attach timing light clamp to this wire.



A
EC
C
D
E
F
G
H
I
J
K
L
M



3. Check ignition timing.



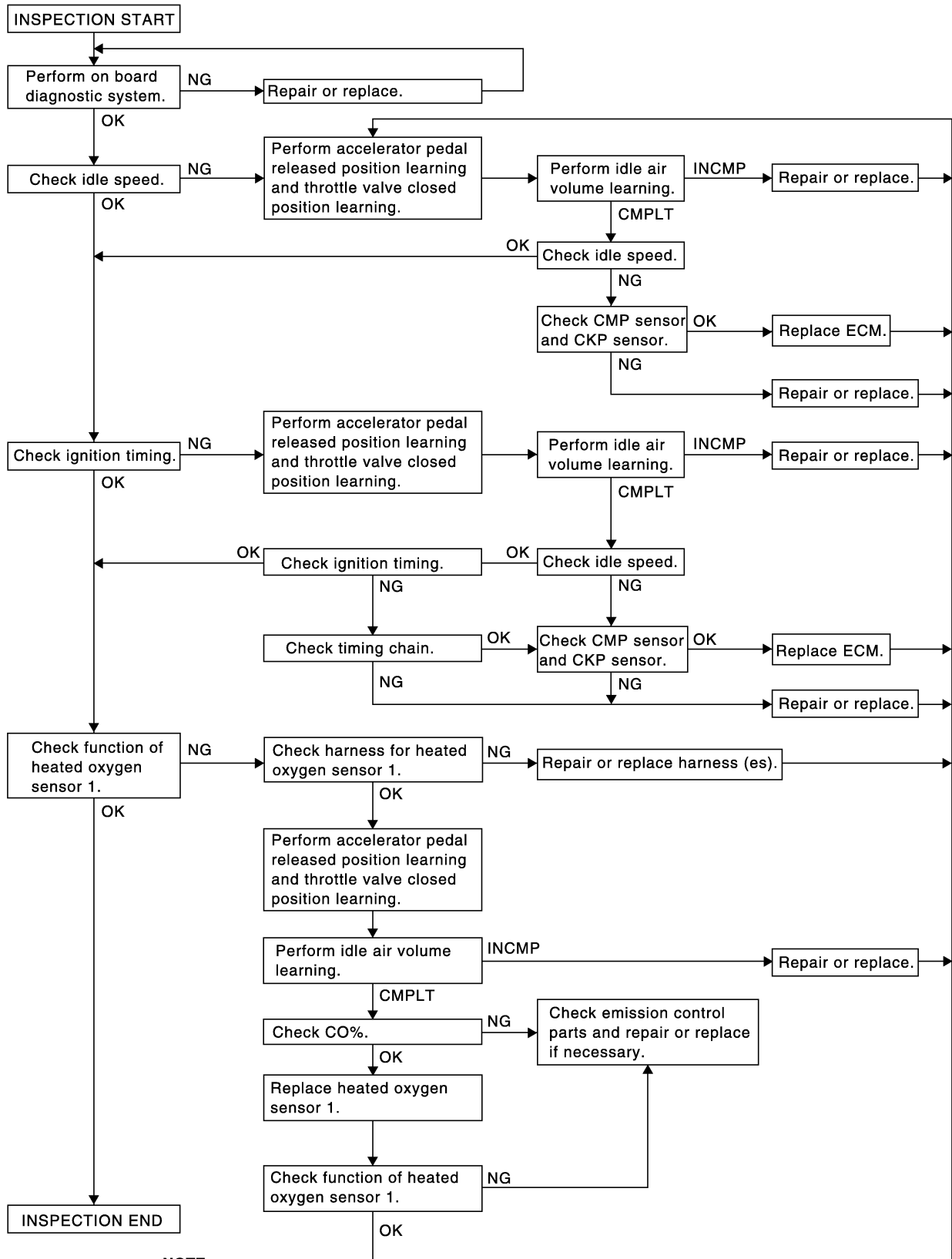
Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

UBS0035B

PREPARATION

1. Make sure that the following parts are in good order.
 - Battery
 - Ignition system
 - Engine oil and coolant levels
 - Fuses
 - ECM harness connector
 - Vacuum hoses
 - Air intake system
(Oil filler cap, oil level gauge, etc.)
 - Fuel pressure
 - Engine compression
 - Throttle valve
 - Evaporative emission system
2. On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".
3. On automatic transmission equipped models, when checking idle rpm, ignition timing and mixture ratio, checks should be carried out while shift lever is in "N" position.
4. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
5. Turn off headlamp, heater blower, rear window defogger.
6. Keep front wheels pointed straight ahead.

OVERALL INSPECTION SEQUENCE



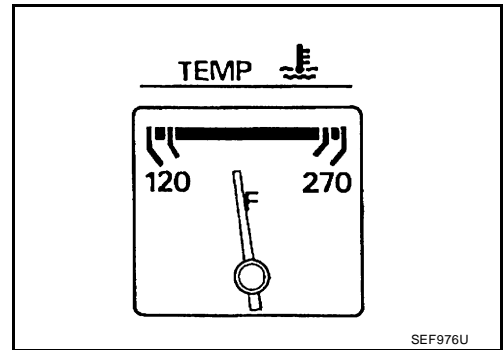
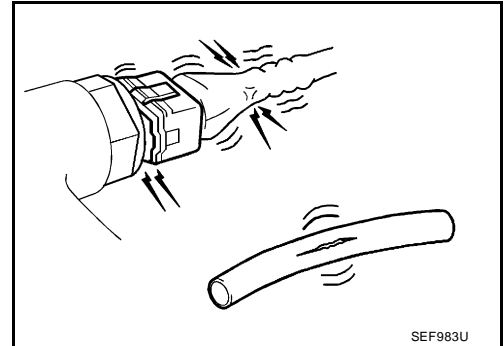
NOTE:
 If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

SEC154D

INSPECTION PROCEDURE

1. INSPECTION START

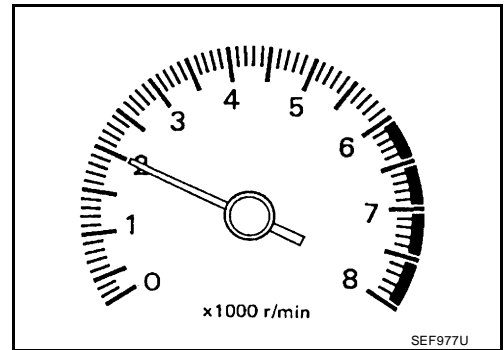
1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses for 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-II or GST.

OK or NG

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



2. REPAIR OR REPLACE

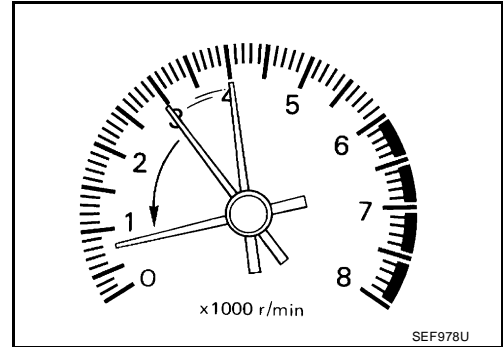
Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

>> GO TO 3

3. CHECK TARGET IDLE SPEED

With CONSULT-II

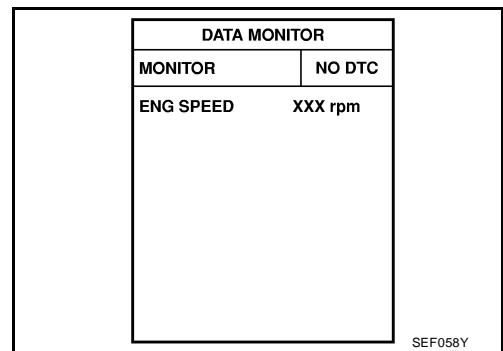
1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)



Without CONSULT-II

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

M/T: 700 ± 50 rpm

A/T: 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

1. Stop engine.
2. Perform [EC-668, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-669, "Throttle Valve Closed Position Learning"](#).

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-669, "Idle Air Volume Learning"](#) .

Which is the result CMPLT or INCMP?

CMPLT or INCMP

CMPLT >> GO TO 7.

INCMP >> 1. Follow the construction of "Idle Air Volume Learning".

2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

Ⓟ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 700 ± 50 rpm

A/T: 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 camshaft position sensor (PHASE) and circuit. Refer to [EC-945](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-938](#) .

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 a problem, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-689, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.

M/T: 15 ± 5° BTDC

A/T: 15 ± 5° BTDC (in "P" or "N" position)

OK or NG

OK (With CONSULT-II)>>GO TO 19.

OK (Without CONSULT-II)>>GO TO 20.

NG >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-668, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-669, "Idle Air Volume Learning"](#) .

Which is the result CMPLT or INCMP?

CMPLT or INCMP

CMPLT >> GO TO 14.

INCMP >> 1. Follow the construction of "Idle Air Volume Learning".

2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 700 ± 50 rpm

A/T: 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.

M/T: 15 ± 5° BTDC

A/T: 15 ± 5° BTDC (in "P" or "N" position)

OK or NG

- OK (With CONSULT-II)>>GO TO 19.
 OK (Without CONSULT-II)>>GO TO 20.
 NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-146, "TIMING CHAIN"](#) .

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 camshaft position sensor (PHASE) and circuit. Refer to [EC-945](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-938](#) .

OK or NG

- OK >> GO TO 18.
 NG >> 1. Repair or replace.
 2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-689, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

19. CHECK HEATED OXYGEN SENSOR 1 (BANK 1) SIGNAL

 **With CONSULT-II**

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time: RICH → LEAN → RICH

2 times: RICH → LEAN → RICH → LEAN → RICH

OK or NG

- OK >> GO TO 21.
 NG (Monitor does not fluctuate.)>>GO TO 23.
 NG (Monitor fluctuates less than 5 times.)>>GO TO 31.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	RICH

PBIB0120E

20. CHECK HEATED OXYGEN SENSOR 1 (BANK 1) SIGNAL

⊗ Without CONSULT-II

1. Stop engine and set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to [EC-690, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#).
2. Start engine and run it at about 2,000 rpm for about 2 minutes under no-load.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

- OK >> GO TO 22.
- NG (MIL does not come on)>>GO TO 23.
- NG (MIL comes on less than 5 times)>>GO TO 31.

21. CHECK HEATED OXYGEN SENSOR 1 (BANK 2) SIGNAL

Ⓜ With CONSULT-II

1. See "HO2S1 MNTR (B2)" in "DATA MONITOR" mode.
2. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

- 1 time: RICH → LEAN → RICH
- 2 times: RICH → LEAN → RICH → LEAN → RICH

OK or NG

- OK >> **INSPECTION END**
- NG (Monitor does not fluctuate.)>>GO TO 24.
- NG (Monitor fluctuates less than 5 times.)>>GO TO 31.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	RICH

PBIB0120E

22. CHECK HEATED OXYGEN SENSOR 1 (BANK 2) SIGNAL

⊗ Without CONSULT-II

1. Switch the monitored sensor from bank 1 to bank 2. Refer to [EC-691, "How to Switch Monitored Sensor From Bank 1 to Bank 2 or Vice Versa"](#).
2. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

- OK >> **INSPECTION END**
- NG (MIL does not come on)>>GO TO 24.
- NG (MIL comes on less than 5 times)>>GO TO 31.

23. CHECK HEATED OXYGEN SENSOR 1 (BANK 1) HARNESS

1. Turn ignition switch "OFF" and disconnect battery ground cable.
2. Disconnect ECM harness connector.
3. Disconnect heated oxygen sensor 1 (bank 1) harness connector.
4. Check harness continuity between ECM terminal 91 and heated oxygen sensor 1 (bank 1) terminal 2. Refer to Wiring Diagram, [EC-829, "BANK 1"](#).

Continuity should exist.

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

OK or NG

- OK >> GO TO 25.
- NG >> 1. Repair or replace harness between ECM and heated oxygen sensor 1 (bank 1).
- 2. GO TO 4.

24. CHECK HEATED OXYGEN SENSOR 1 (BANK 2) HARNESS

1. Turn ignition switch "OFF" and disconnect battery ground cable.
2. Disconnect ECM harness connector.
3. Disconnect heated oxygen sensor 1 (bank 2) harness connector.
4. Check harness continuity between ECM terminal 92 and heated oxygen sensor 1 (bank 2) terminal 2. Refer to Wiring Diagram, [EC-831, "BANK 2"](#) .

Continuity should exist.

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

OK or NG

OK >> GO TO 25.

NG >> 1. Repair or replace harness between ECM and heated oxygen sensor 1 (bank 2).
2. GO TO 4.

25. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Reconnect ECM harness connector.
2. Perform [EC-668, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 26.

26. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 27.

27. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-669, "Idle Air Volume Learning"](#) .

Which is the result CMPLT or INCMP?

CMPLT or INCMP

CMPLT (With CONSULT-II)>>GO TO 28.

CMPLT (Without CONSULT-II)>>GO TO 29.

INCMP >> 1. Follow the construction of "Idle Air Volume Learning".

2. GO TO 4.

28. CHECK "CO" %

Ⓢ **With CONSULT-II**

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO"%.

Idle CO: 0.7 – 9.9 % and engine runs smoothly.

OK or NG

OK >> GO TO 31.

NG >> GO TO 30.

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

SEF172Y

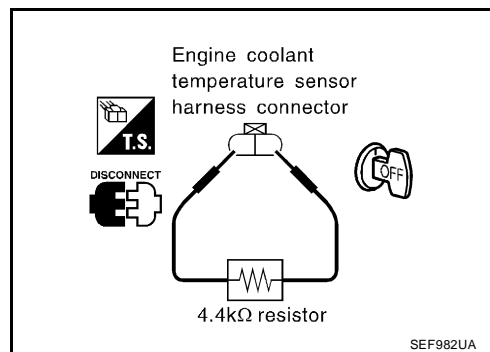
29. CHECK "CO" %

⊗ Without CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.
2. Turn ignition switch "OFF".
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO" %.

Idle CO: 0.7 – 9.9 % and engine runs smoothly.

7. After checking "CO" %, turn ignition switch "OFF", disconnect the resistor from the terminals of engine coolant temperature sensor harness connector, and then connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.



OK or NG

- OK >> GO TO 31.
- NG >> GO TO 30.

30. RECONNECT HEATED OXYGEN SENSOR 1 HARNESS CONNECTOR

1. Turn ignition switch "OFF".
2. Reconnect heated oxygen sensor 1 harness connector.

>> GO TO 34.

31. REPLACE HEATED OXYGEN SENSOR 1

1. Stop engine.
2. Replace heated oxygen sensor 1 on the malfunctioning bank.

With CONSULT-II>>GO TO 32.

Without CONSULT-II>>GO TO 33.

32. CHECK HEATED OXYGEN SENSOR 1 (BANK 1)/(BANK 2) SIGNAL

Ⓜ With CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. See "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time: RICH → LEAN → RICH

2 times: RICH → LEAN → RICH → LEAN → RICH

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 34.

33. CHECK HEATED OXYGEN SENSOR 1 (BANK 1)/(BANK 2) SIGNAL

⊗ Without CONSULT-II

1. Set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to [EC-690, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .
2. Switch the monitored sensor to the malfunctioning bank. Refer to [EC-691, "How to Switch Monitored Sensor From Bank 1 to Bank 2 or Vice Versa"](#) .
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

- OK >> GO TO 4.
NG >> GO TO 34.

34. DETECT MALFUNCTIONING PART

Check the following.

- Check fuel pressure regulator and repair or replace if necessary. Refer to [EC-671, "Fuel Pressure Check"](#) .
- Check mass air flow sensor and its circuit, and repair or replace if necessary. Refer to [EC-790](#) , [EC-798](#) and [EC-1041](#) .
- Check injector and its circuit, and repair or replace if necessary. Refer to [EC-1230](#) .
- Check engine coolant temperature sensor and its circuit, and repair or replace if necessary. Refer to [EC-811](#) and [EC-816](#) .

OK or NG

- OK >> GO TO 36.
NG >> 1. Repair or replace.
2. GO TO 35.

35. ERASE UNNECESSARY DTC

After this inspection, unnecessary DTC might be displayed.

Erase the stored memory in ECM and TCM. Refer to [EC-687, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) and [AT-38, "HOW TO ERASE DTC"](#) .

>> GO TO 4.

36. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-689, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

Accelerator Pedal Released Position Learning DESCRIPTION

UBS0035C

"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" wait at least 10 seconds.
4. Turn ignition switch "ON" and wait at least 2 seconds.

5. Turn ignition switch "OFF" wait at least 10 seconds.

Throttle Valve Closed Position Learning DESCRIPTION

UBS0035D

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

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch "ON".
3. Turn ignition switch "OFF" wait at least 10 seconds.
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

Idle Air Volume Learning DESCRIPTION

UBS0035E

"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

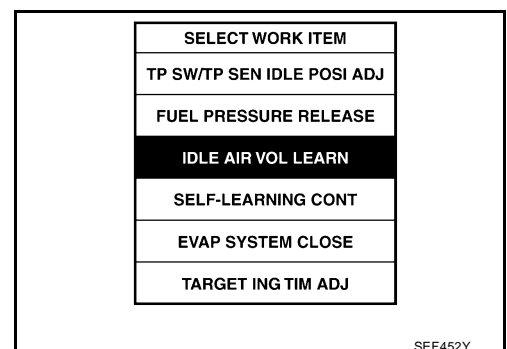
Before performing "Idle Air Volume Learning", make sure that all of the following conditions are satisfied. Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- PNP switch: ON
- Electric load switch: OFF
(Air conditioner, headlamp, rear window defogger)
On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
For A/T models with CONSULT-II, drive vehicle until "FLUID TEMP SE" in "DATA MONITOR" mode of "A/T" system indicates less than 0.9V.
For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes.

OPERATION PROCEDURE

Ⓜ With CONSULT-II

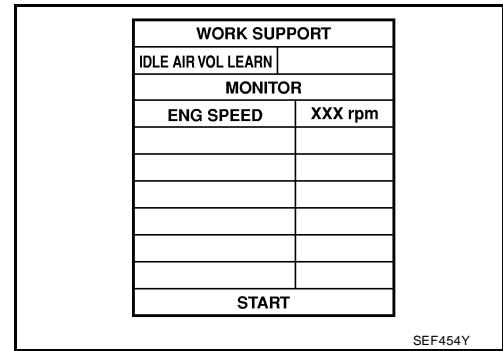
1. Perform [EC-668, "Accelerator Pedal Released Position Learning"](#) .
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic "PRE-CONDITIONING" (previously mentioned) are in good order.
5. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.



BASIC SERVICE PROCEDURE

[VQ]

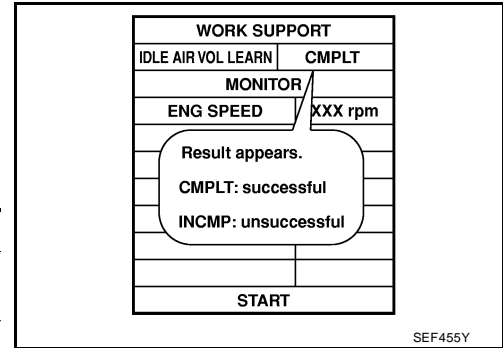
6. Touch "START" and wait 20 seconds.



7. Make sure that "CMPLT" is displayed on CONSULT-II screen. If "INCMP" is displayed, "Idle Air Volume Learning" will not be carried out successfully. In this case, find the cause of the problem by referring to the "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.

ITEM	SPECIFICATION
Idle speed	M/T: 700±50 rpm A/T: 700±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 15±5° BTDC A/T: 15±5° BTDC (in "P" or "N" position)

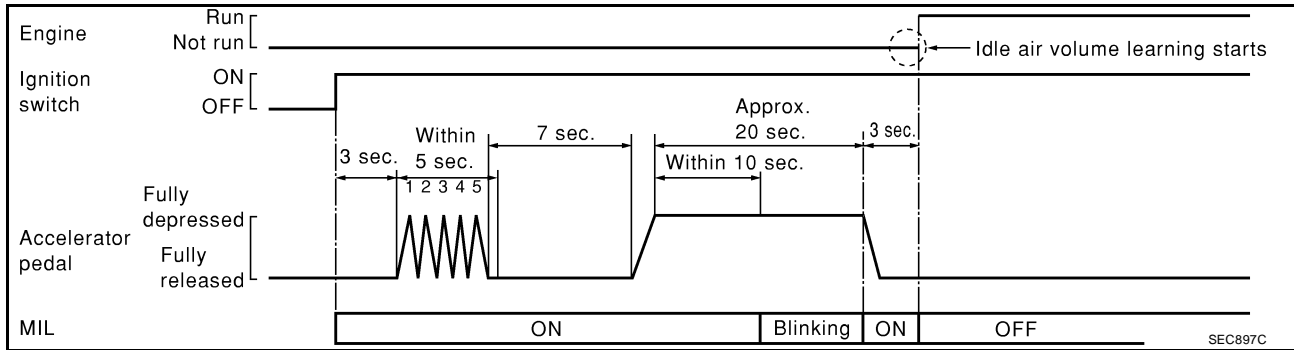


⊗ Without CONSULT-II

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-668, "Accelerator Pedal Released Position Learning"](#) .
 2. Perform [EC-669, "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 "PRE-CONDITIONING" (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 goes off.
 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.

ITEM	SPECIFICATION
Idle speed	M/T: 700±50 rpm A/T: 700±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 15±5° BTDC A/T: 15±5° BTDC (in "P" or "N" position)

13. If idle speed and ignition timing are not within the specification, the result will be incomplete. In this case, find the cause of the problem 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 problem.
It is useful to perform [EC-752, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#).
5. If any of the following conditions occur after the engine has started, eliminate the cause of the problem and perform "Idle air volume learning" all over again:
 - Engine stalls.
 - Erroneous idle.

Fuel Pressure Check

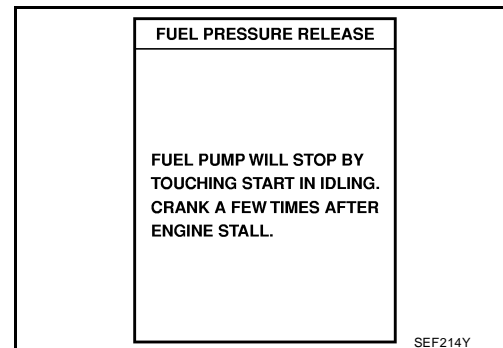
FUEL PRESSURE RELEASE

UBS0035F

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

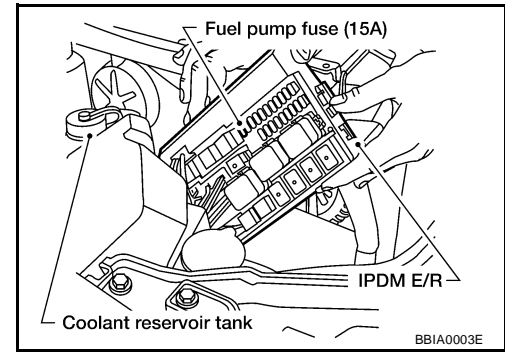
Ⓟ With CONSULT-II

1. Turn ignition switch "ON".
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
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-II**

1. Remove fuel pump fuse located in fuse box.
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

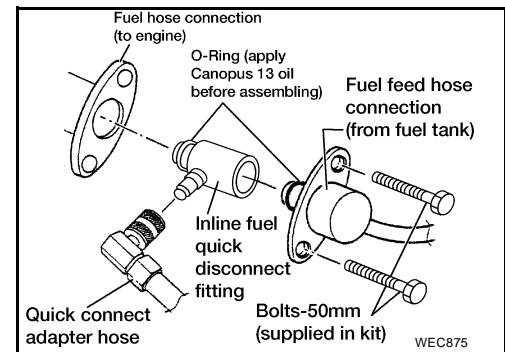
NOTE:

- Use Fuel Pressure Gauge Kit (J-44321) to check fuel pressure.
- Do not perform fuel pressure check with electrical system operating (i.e. lights, rear defogger, A/C, etc.). Fuel pressure gauge may indicate false readings due to varying engine loads and changes in manifold vacuum.

1. Release fuel pressure to zero. Refer to [EC-671, "FUEL PRESSURE RELEASE"](#).
2. Install the inline fuel quick disconnect fitting between the connection of the fuel feed hose (from tank) and the fuel hose (to engine).
3. Connect the fuel pressure test gauge (quick connect adapter hose) to the quick disconnect fitting.
4. Turn ignition switch ON and check for fuel leakage.
5. Start engine and check for fuel leakage.
6. Read the indication of fuel pressure gauge.

At idling: Approximately 350 kPa (3.7 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 clogging
 If OK, replace fuel pressure regulator.
 If NG, repair or replace.



ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

Introduction

UBS0035G

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

Emission-related diagnostic information	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979
Calibration ID	Mode 9 of SAE J1979

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	Test value
CONSULT-II	×	×	×	×	×	—
GST	×	×*1	×	—	×	×
ECM	×	×*2	—	—	—	—

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

*2: 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-703](#).)

Two Trip Detection Logic

UBS0035H

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 - P0306 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0306 is being detected	—	—	×	—	—	×	—	—
Throttle control motor — DTC P1128	—	×	—	—	×	—	—	—
Closed loop control — DTC: P1148, P1168	—	×	—	—	×	—	—	—
Fail-safe items (Refer to EC-703 .)	—	×	—	—	×*1	—	×*1	—
Except above	—	—	—	×	—	×	×	—

*1: Except “ECM”

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[VQ]

UBS00351

Emission-related Diagnostic Information EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
CAN COMM CIRCUIT	U1000	1000*6	—	—	×	EC-763
CAN COMM CIRCUIT	U1001	1001*6	—	—	×	EC-763
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—	—	—	—
INT/ TIM CONT-B1	P0011	0011	—	—	×	EC-766
INT/ TIM CONT-B2	P0021	0021	—	—	×	EC-766
HO2S1 HTR (B1)	P0031	0031	×	×	×*5	EC-774
HO2S1 HTR (B1)	P0032	0032	×	×	×*5	EC-774
HO2S2 HTR (B1)	P0037	0037	×	×	×*5	EC-782
HO2S2 HTR (B1)	P0038	0038	×	×	×*5	EC-782
HO2S1 HTR (B2)	P0051	0051	×	×	×*5	EC-774
HO2S1 HTR (B2)	P0052	0052	×	×	×*5	EC-774
HO2S2 HTR (B2)	P0057	0057	×	×	×*5	EC-782
HO2S2 HTR (B2)	P0058	0058	×	×	×*5	EC-782
MAF SEN/CIRCUIT	P0101	0101	—	—	×	EC-790
MAF SEN/CIRCUIT*3	P0102	0102	—	—	—	EC-798
MAF SEN/CIRCUIT*3	P0103	0103	—	—	—	EC-798
ABSL PRES SEN/CIRC	P0107	0107	—	—	×	EC-804
ABSL PRES SEN/CIRC	P0108	0108	—	—	×	EC-804
IAT SEN/CIRCUIT	P0112	0112	—	—	×	EC-806
IAT SEN/CIRCUIT	P0113	0113	—	—	×	EC-806
ECT SEN/CIRCUIT*3	P0117	0117	—	—	—	EC-811
ECT SEN/CIRCUIT*3	P0118	0118	—	—	—	EC-811
ECT SENSOR	P0125	0125	—	—	×	EC-816
IAT SENSOR	P0127	0127	—	—	×	EC-820
THERMSTAT FNCTN	P0128	0128	—	—	×	EC-825
HO2S1 (B1)	P0132	0132	×	×	×*5	EC-827
HO2S1 (B1)	P0133	0133	×	×	×*5	EC-836
HO2S1 (B1)	P0134	0134	×	×	×*5	EC-847
HO2S2 (B1)	P0138	0138	×	×	×*5	EC-857
HO2S2 (B1)	P0139	0139	×	×	×*5	EC-867
HO2S1 (B2)	P0152	0152	×	×	×*5	EC-827
HO2S1 (B2)	P0153	0153	×	×	×*5	EC-836
HO2S1 (B2)	P0154	0154	×	×	×*5	EC-847
HO2S2 (B2)	P0158	0158	×	×	×*5	EC-857
HO2S2 (B2)	P0159	0159	×	×	×*5	EC-867
FUEL SYS-LEAN-B1	P0171	0171	—	—	×	EC-877

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[VQ]

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
FUEL SYS-RICH-B1	P0172	0172	—	—	×	EC-885
FUEL SYS-LEAN-B2	P0174	0174	—	—	×	EC-877
FUEL SYS-RICH-B2	P0175	0175	—	—	×	EC-885
FTT SENSOR	P0181	0181	—	—	×	EC-892
FTT SEN/CIRCUIT	P0182	0182	—	—	×	EC-897
FTT SEN/CIRCUIT	P0183	0183	—	—	×	EC-897
TP SENSOR*3	P0221	0221	—	—	—	EC-901
TP SEN 1/CIRC*3	P0222	0222	—	—	—	EC-908
TP SEN 1/CIRC*3	P0223	0223	—	—	—	EC-908
APP SENSOR*3	P0226	0226	—	—	—	EC-915
APP SEN 1/CIRC*3	P0227	0227	—	—	—	EC-922
APP SEN 1/CIRC*3	P0228	0228	—	—	—	EC-922
MULTI CYL MISFIRE	P0300	0300	—	—	×	EC-928
CYL 1 MISFIRE	P0301	0301	—	—	×	EC-928
CYL 2 MISFIRE	P0302	0302	—	—	×	EC-928
CYL 3 MISFIRE	P0303	0303	—	—	×	EC-928
CYL 4 MISFIRE	P0304	0304	—	—	×	EC-928
CYL 5 MISFIRE	P0305	0305	—	—	×	EC-928
CYL 6 MISFIRE	P0306	0306	—	—	×	EC-928
KNOCK SEN/CIRC-B1	P0327	0327	—	—	×	EC-934
KNOCK SEN/CIRC-B1	P0328	0328	—	—	×	EC-934
CKP SEN/CIRCUIT	P0335	0335	—	—	×	EC-938
CMP SEN/CIRC-B1	P0340	0340	—	—	×	EC-945
CMP SEN/CIRC-B2	P0345	0345	—	—	×	EC-945
TW CATALYST SYS-B1	P0420	0420	×	×	×*5	EC-953
TW CATALYST SYS-B2	P0430	0430	×	×	×*5	EC-953
EVAP PURG FLOW/MON	P0441	0441	×	×	×*5	EC-957
EVAP SMALL LEAK	P0442	0442	×	×	×*5	EC-963
PURG VOLUME CONT/V	P0444	0444	—	—	×	EC-972
PURG VOLUME CONT/V	P0445	0445	—	—	×	EC-972
VENT CONTROL VALVE	P0447	0447	—	—	×	EC-978
EVAP SYS PRES SEN	P0452	0452	—	—	×	EC-985
EVAP SYS PRES SEN	P0453	0453	—	—	×	EC-991
EVAP VERY SML LEAK	P0456	0456	×*4	×	×*5	EC-998
FUEL LEV SEN SLOSH	P0460	0460	—	—	×	EC-1007
FUEL LEVEL SENSOR	P0461	0461	—	—	×	EC-1012
FUEL LEVL SEN/CIRC	P0462	0462	—	—	×	EC-1014
FUEL LEVL SEN/CIRC	P0463	0463	—	—	×	EC-1014
VEH SPEED SEN/CIRC*6	P0500	0500	—	—	×	EC-1019
ISC SYSTEM	P0506	0506	—	—	×	EC-1021
ISC SYSTEM	P0507	0507	—	—	×	EC-1023

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Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
PW ST P SEN/CIRC	P0550	0550	—	—	×	EC-1025
ECM	P0605	0605	—	—	×	EC-1030
MIL/CIRC	P0650	0650	—	—	×	EC-1033
PNP SW/CIRC	P0705	0705	—	—	×	AT-103
ATF TEMP SEN/CIRC	P0710	0710	—	—	×	AT-109
VEH SPD SEN/CIR AT*6	P0720	0720	—	—	×	AT-115
ENGINE SPEED SIG	P0725	0725	—	—	×	AT-120
A/T 1ST GR FNCTN	P0731	0731	—	—	×	AT-124
A/T 2ND GR FNCTN	P0732	0732	—	—	×	AT-129
A/T 3RD GR FNCTN	P0733	0733	—	—	×	AT-134
A/T 4TH GR FNCTN	P0734	0734	—	—	×	AT-139
TCC SOLENOID/CIRC	P0740	0740	—	—	×	AT-146
A/T TCC S/V FNCTN	P0744	0744	—	—	×	AT-151
L/PRESS SOL/CIRC	P0745	0745	—	—	×	AT-159
SFT SOL A/CIRC	P0750	0750	—	—	×	AT-165
SFT SOL B/CIRC	P0755	0755	—	—	×	AT-170
ECM BACK UP/CIRC	P1065	1065	—	—	×	EC-1037
MAF SENSOR	P1102	1102	—	—	×	EC-1041
ETC ACTR*3	P1121	1121	—	—	—	EC-1047
ETC FUNCTION/CIRC*3	P1122	1122	—	—	—	EC-1049
ETC MOT PWR	P1124	1124	—	—	×	EC-1056
ETC MOT PWR*3	P1126	1126	—	—	—	EC-1056
ETC MOT	P1128	1128	—	—	—	EC-1061
HO2S1 (B1)	P1143	1143	×	×	×*5	EC-1066
HO2S1 (B1)	P1144	1144	×	×	×*5	EC-1072
HO2S2 (B1)	P1146	1146	×	×	×*5	EC-1079
HO2S2 (B1)	P1147	1147	×	×	×*5	EC-1089
CLOSED LOOP-B1	P1148	1148	—	—	—	EC-1099
HO2S1 (B2)	P1163	1163	×	×	×*5	EC-1066
HO2S1 (B2)	P1164	1164	×	×	×*5	EC-1072
HO2S2 (B2)	P1166	1166	×	×	×*5	EC-1079
HO2S2 (B2)	P1167	1167	×	×	×*5	EC-1089
CLOSED LOOP-B2	P1168	1168	—	—	—	EC-1099
TCS C/U FUNCTN	P1211	1211	—	—	×	EC-1101
TCS/CIRC	P1212	1212	—	—	×	EC-1102
ENG OVER TEMP	P1217	1217	—	—	×	EC-1103
TP SEN 2/CIRC*3	P1223	1223	—	—	—	EC-1114
TP SEN 2/CIRC*3	P1224	1224	—	—	—	EC-1114
CTP LEARNING	P1225	1225	—	—	×	EC-1121
CTP LEARNING	P1226	1226	—	—	×	EC-1123

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Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
APP SEN 2/CIRC*3	P1227	1227	—	—	—	EC-1125
APP SEN 2/CIRC+3	P1228	1228	—	—	—	EC-1125
SENSOR POWER/CIRC*3	P1229	1229	—	—	—	EC-1131
PURG VOLUME CONT/V	P1444	1444	—	—	×	EC-1135
VENT CONTROL VALVE	P1446	1446	—	—	×	EC-1143
VENT CONTROL VALVE	P1448	1448	—	—	×	EC-1149
FUEL LEVEL SEN/CIRC	P1464	1464	—	—	×	EC-1157
VC/V BYPASS/V	P1490	1490	—	—	×	EC-1160
VC CUT/V BYPASS/V	P1491	1491	—	—	×	EC-1166
ASCD SW	P1564	1564	—	—	×	EC-1174
ASCD BRAKE SW	P1572	1572	—	—	×	EC-1181
ASCD VHL SPD SEN	P1574	1574	—	—	×	EC-1192
TPV SEN/CIRC A/T	P1705	1705	—	—	×	AT-175
P-N POS SW/CIRCUIT	P1706	1706	—	—	×	EC-1194
O/R CLTCH SOL/CIRC	P1760	1760	—	—	×	AT-180
VIAS S/V CIRC	P1800	1800	—	—	×	EC-1199
BRAKE SW/CIRCUIT	P1805	1805	—	—	×	EC-1205

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

*2: These numbers are prescribed by SAE J2012.

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

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

*5: These are not displayed with GST.

*6: When the fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.

NOTE:

Regarding L31 models, "B1" indicates bank 1, "B2" indicates bank 2.

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 [EC-687, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).

For malfunctions in which 1st trip DTCs are displayed, refer to [EC-674, "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-II.

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

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in "Work Flow" procedure Step II, refer to [EC-699, "WORK FLOW"](#). Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the problem. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

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

 **With CONSULT-II**

 **With GST**

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1148, P1706, etc.
These DTCs are prescribed by SAE J2012.

(CONSULT-II 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, 1148, 1706, 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-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

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

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

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

DTC display	SELF DIAG RESULTS		1st trip DTC display	SELF DIAG RESULTS	
	DTC RESULTS			DTC RESULTS	
	MAF SEN/CIRCUIT [P0101]	0		MAF SEN/CIRCUIT [P0101]	1t
				SEC745C	

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, 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-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see [EC-734, "Freeze Frame Data and 1st Trip Freeze Frame Data"](#).

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

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

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

trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in [EC-674, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS"](#).

SYSTEM READINESS TEST (SRT) CODE

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

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

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

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

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

NOTE:

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

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

NOTE:

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

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SRT Item

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

SRT item (CONSULT-II indication)	Performance Priority*1	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420, P0430
EVAP SYSTEM	1	EVAP control system	P0442
	2	EVAP control system	P0456
	2	EVAP control system purge flow monitoring	P0441
HO2S	2	Heated oxygen sensor 1	P0132, P0152
		Heated oxygen sensor 1	P0133, P0153
		Heated oxygen sensor 1	P0134, P0154
		Heated oxygen sensor 1	P1143, P1163
		Heated oxygen sensor 1	P1144, P1164
		Heated oxygen sensor 2	P0138, P0158
		Heated oxygen sensor 2	P0139, P0159
		Heated oxygen sensor 2	P1146, P1166
		Heated oxygen sensor 2	P1147, P1167
HO2S HTR	2	Heated oxygen sensor 1 heater	P0031, P0032, P0051, P0052
		Heated oxygen sensor 2 heater	P0037, P0038, P0057, P0058

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

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.

—: 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”.

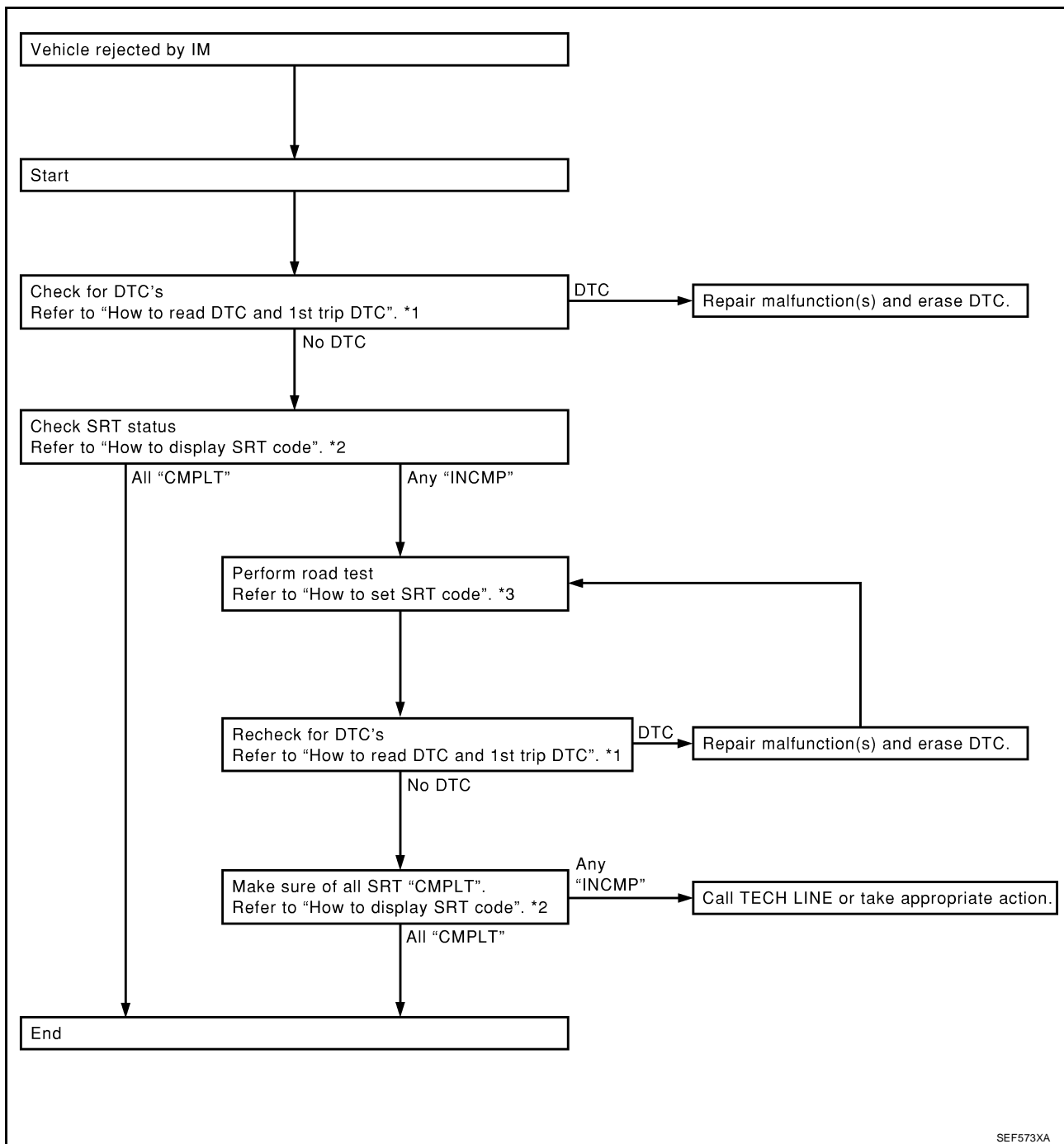
NOTE:

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 on the next page.

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*1 [EC-678](#)

*2 [EC-682](#)

*3 [EC-683](#)

How to Display SRT Code

WITH CONSULT-II

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

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

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

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

"CMPLT" means the self-diagnosis is complete and SRT is set.

WITH GST

Selecting Mode 1 with GST (Generic Scan Tool)

SRT STATUS	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	CMPLT

SEF935Z

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-II

Perform corresponding DTC Confirmation Procedure one by one based on "Performance Priority" in the table on [EC-680, "SRT Item"](#).

WITHOUT CONSULT-II

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

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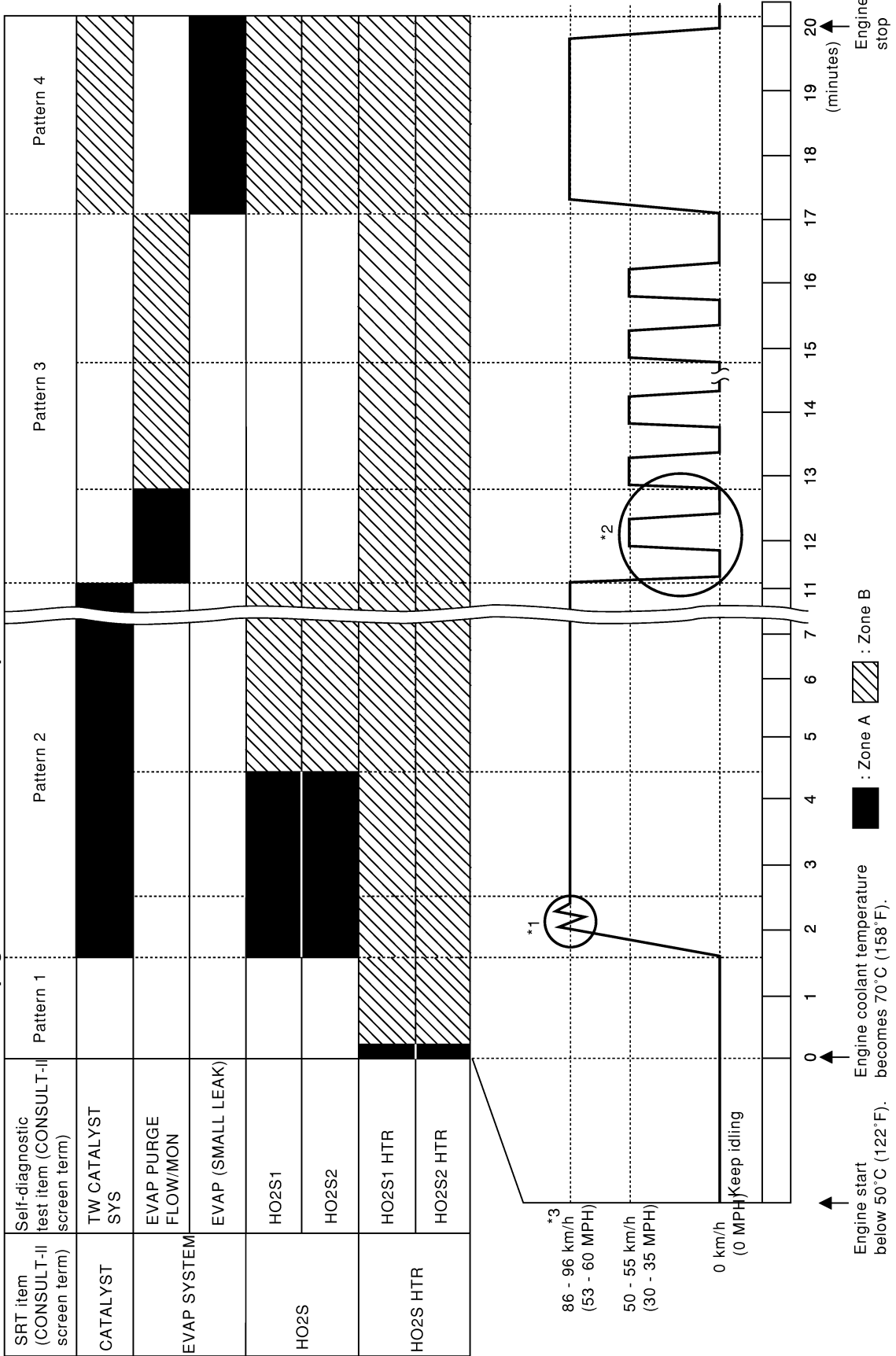
L

M

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

*: Normal conditions refer to the following:

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

Pattern 1:

- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 93 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 93 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 75 and ground is less than 4.1V).**

Pattern 2:

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

Pattern 3:

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

Pattern 4:

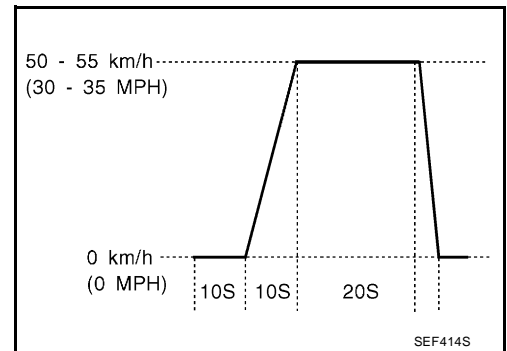
- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

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

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

1. Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
2. Repeat driving pattern shown at right at least 10 times.
- **During acceleration, hold the accelerator pedal as steady as possible.**

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



Suggested Transmission Gear Position for A/T Models

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

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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Gear change	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:		For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]:
	ACCEL shift point km/h (MPH)	CRUISE shift point km/h (MPH)	km/h (MPH)
1st to 2nd	21 (13)	21 (13)	24 (15)
2nd to 3rd	37 (23)	26 (16)	40 (25)
3rd to 4th	53 (33)	44 (27)	64 (40)
4th to 5th	63 (39)	58 (36)	72 (45)

Suggested Maximum Speed in Each Gear

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

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

Gear	km/h (MPH)
1st	65 (40)
2nd	105 (65)
3rd	—
4th	—
5th	—

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

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

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

Items for which these data (test value and test limit) are displayed are the same as SRT code items (30 test items).

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

×: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function (Bank1)	01H	01H	Max.	×
		02H	81H	Min.	×
	Three way catalyst function (Bank2)	03H	02H	Max.	×
		04H	82H	Min.	×
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	×
	EVAP control system purge flow monitoring	06H	83H	Min.	×
	EVAP control system (Very small leak)	07H	03H	Max.	×

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SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
HO2S	Heated oxygen sensor 1 (Bank 1)	09H	04H	Max.	×
		0AH	84H	Min.	×
		0BH	04H	Max.	×
		0CH	04H	Max.	×
		0DH	04H	Max.	×
	Heated oxygen sensor 1 (Bank 2)	11H	05H	Max.	×
		12H	85H	Min.	×
		13H	05H	Max.	×
		14H	05H	Max.	×
		15H	05H	Max.	×
	Heated oxygen sensor 2 (Bank 1)	19H	86H	Min.	×
		1AH	86H	Min.	×
		1BH	06H	Max.	×
		1CH	06H	Max.	×
	Heated oxygen sensor 2 (Bank 2)	21H	87H	Min.	×
		22H	87H	Min.	×
23H		07H	Max.	×	
24H		07H	Max.	×	
HO2S HTR	Heated oxygen sensor 1 heater (Bank 1)	29H	08H	Max.	×
		2AH	88H	Min.	×
	Heated oxygen sensor 1 heater (Bank 2)	2BH	09H	Max.	×
		2CH	89H	Min.	×
	Heated oxygen sensor 2 heater (Bank 1)	2DH	0AH	Max.	×
		2EH	8AH	Min.	×
	Heated oxygen sensor 2 heater (Bank 2)	2FH	0BH	Max.	×
		30H	8BH	Min.	×

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

🔧 How to Erase DTC (With CONSULT-II)

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

If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).

NOTE:

If the DTC is not for A/T related items (see [EC-632](#)), skip steps 2 through 4.

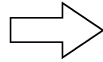
1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 10 seconds and then turn it “ON” (engine stopped) again.
2. Turn CONSULT-II “ON” and touch “A/T”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. [The DTC in the TCM (Transmission control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

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

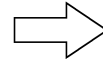
How to erase DTC (With CONSULT-II)

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.

SELECT SYSTEM	
ENGINE	
A/T	



SELECT DIAG MODE	
SELF-DIAG RESULTS	
DATA MONITOR	
DTC WORK SUPPORT	
TCM PART NUMBER	

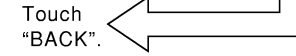
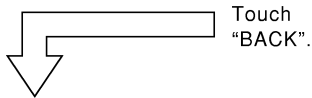


SELF-DIAG RESULTS	
DTC RESULTS	TIME
SHIFT SOLENOID/V A	

2. Turn CONSULT-II "ON", and touch "A/T".

3. Touch "SELF-DIAG RESULTS".

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



SELECT SYSTEM	
ENGINE	
A/T	

SELECT DIAG MODE	
WORK SUPPORT	
SELF-DIAG RESULTS	
DATA MONITOR	
ACTIVE TEST	
DTC & SRT CONFIRMATION	
ECM PART NUMBER	

SELF-DIAG RESULTS	
DTC RESULTS	TIME
SFT SOL A/CIRC [P0750]	0

5. Touch "ENGINE".

6. Touch "SELF-DIAG RESULTS".

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

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How to Erase DTC (With GST)

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

NOTE:

If the DTC is not for A/T related items (see [EC-632](#)), skip step 2.

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

How to Erase DTC (No Tools)

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once.
2. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal. Refer to [EC-690, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .

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

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

1. Diagnostic trouble codes
2. 1st trip diagnostic trouble codes
3. Freeze frame data
4. 1st trip freeze frame data

5. System readiness test (SRT) codes
6. Test values
7. Others

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

NVIS (Nissan Vehicle Immobilizer System — NATS)

UBS0035J

- If the security indicator lights up with the ignition switch in the “ON” position or “NATS MALFUNCTION” is displayed on “SELF-DIAG RESULTS” screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to [BL-116, "NVIS\(NISSAN Vehicle Immobilizer System-NATS\)"](#) .
- Confirm no self-diagnostic results of NVIS (NATS) is displayed before touching “ERASE” in “SELF-DIAG RESULTS” mode with CONSULT-II.
- When replacing ECM, initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card.

SELF DIAG RESULTS	
DTC RESULTS	TIME
NATS MALFUNCTION [P1610]	0

SEF543X

Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, IVIS/NVIS.

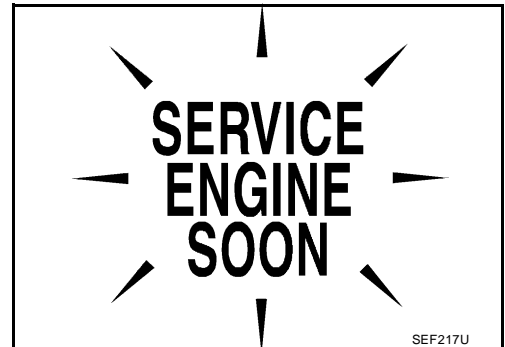
Malfunction Indicator Lamp (MIL)

UBS0035K

DESCRIPTION

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
If the MIL does not light up, refer to [DI-22, "WARNING LAMPS"](#) , or see [EC-1033](#) .
2. When the engine is started, the MIL should go off.
If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.









ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following four functions.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[VQ]

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)" • "Throttle control motor" • "Closed loop control" • Fail-safe mode
Mode II	Ignition switch in "ON" position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running 	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

MIL Flashing Without DTC

If the ECM is in Diagnostic Test Mode II, MIL may flash when engine is running. In this case, check ECM diagnostic test mode. [EC-690, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .

How to switch the diagnostic test (function) modes, and details of the above functions are described later. [EC-690, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .

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

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

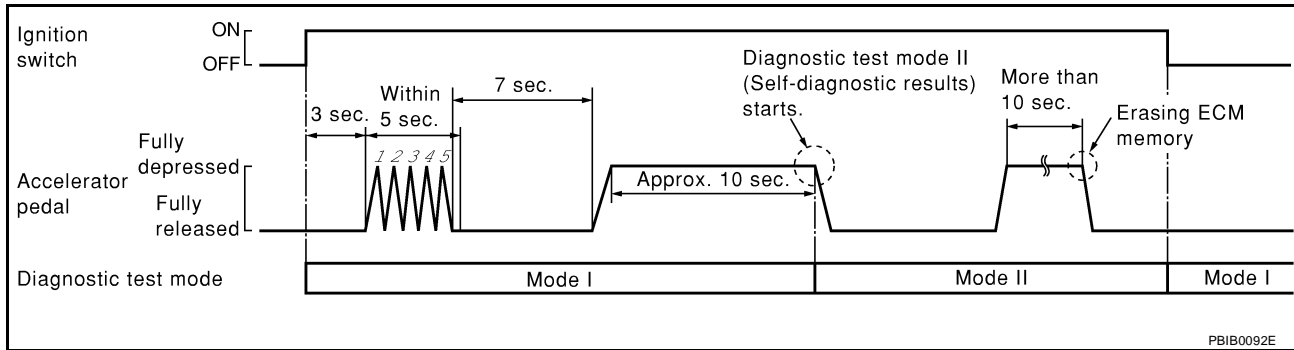
HOW TO SWITCH DIAGNOSTIC TEST MODE

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

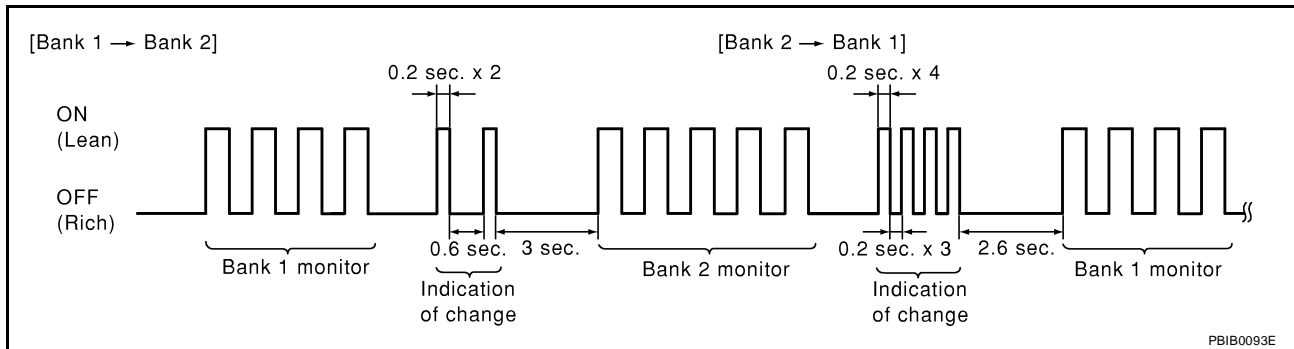


How to Set Diagnostic Test Mode II (Heated Oxygen Sensor 1 Monitor)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-691, "How to Set Diagnostic Test Mode II \(Self-diagnostic Results\)"](#).
2. Start Engine.
ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).
ECM will start heated oxygen sensor 1 monitoring from the bank 1 sensor.

How to Switch Monitored Sensor From Bank 1 to Bank 2 or Vice Versa

1. Fully depress the accelerator pedal quickly and then release it immediately.
2. Make sure that monitoring sensor has changed by MIL blinking as follows.



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

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-691, "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-22, "WARNING LAMPS"](#) or see [EC-1033](#).

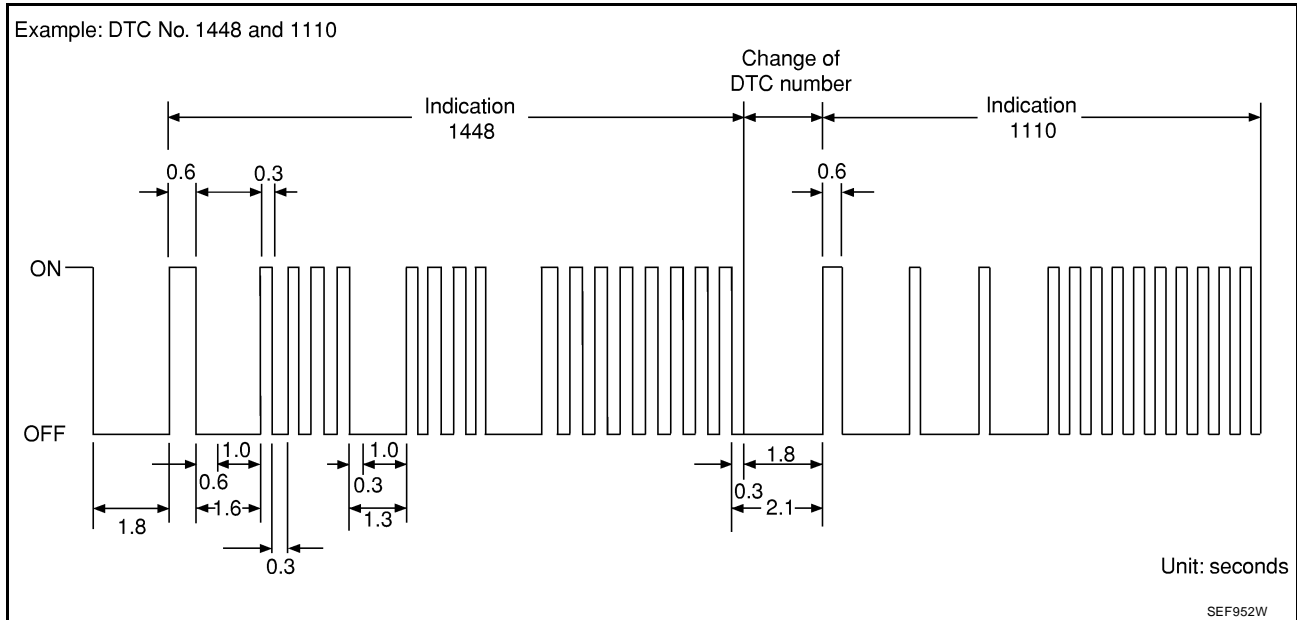
DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
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 unidentified codes can be identified by using the CONSULT-II 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 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-632, "INDEX FOR DTC"](#))

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 [EC-691, "How to Erase Diagnostic Test Mode II \(Self-diagnostic Results\)"](#) .

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

DIAGNOSTIC TEST MODE II — HEATED OXYGEN SENSOR 1 MONITOR

In this mode, the MIL displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MIL	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.

Next run engine at about 2,000 rpm for about 2 minutes under no-load conditions. Then make sure that the MIL comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no-load.

OBD System Operation Chart

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-673. "Two Trip Detection Logic"](#).
- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT-II will count the number of times the vehicle is driven.
- 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)

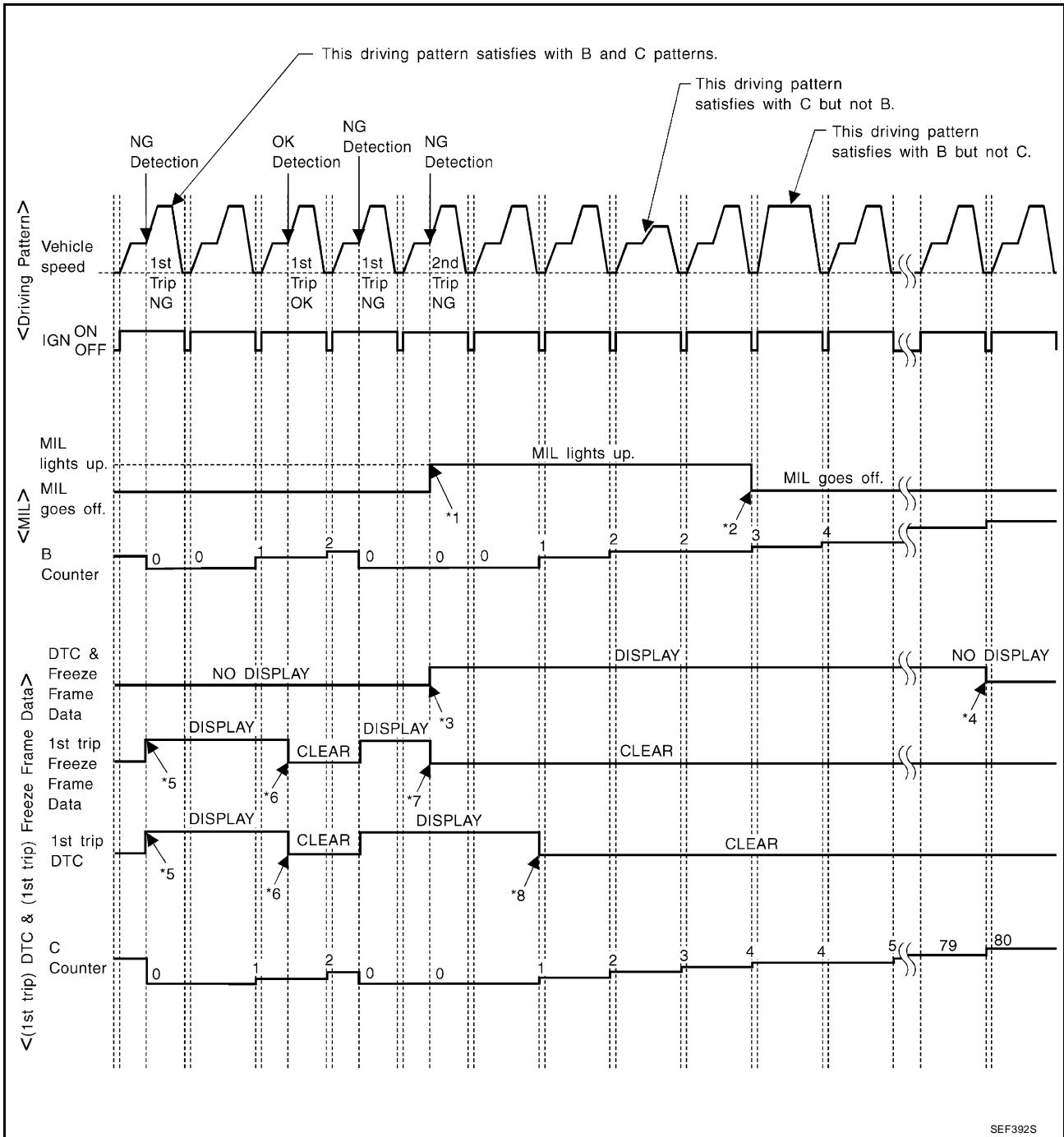
For details about patterns "B" and "C" under "Fuel Injection System" and "Misfire", see [EC-695](#).

For details about patterns "A" and "B" under "Other", see [EC-697](#).

*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"



- *1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- *2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.
- *3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.
- *4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- *5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.
- *6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.
- *7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.
- *8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

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

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

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

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

<Driving Pattern C>

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

A

EC

C

D

E

F

G

H

I

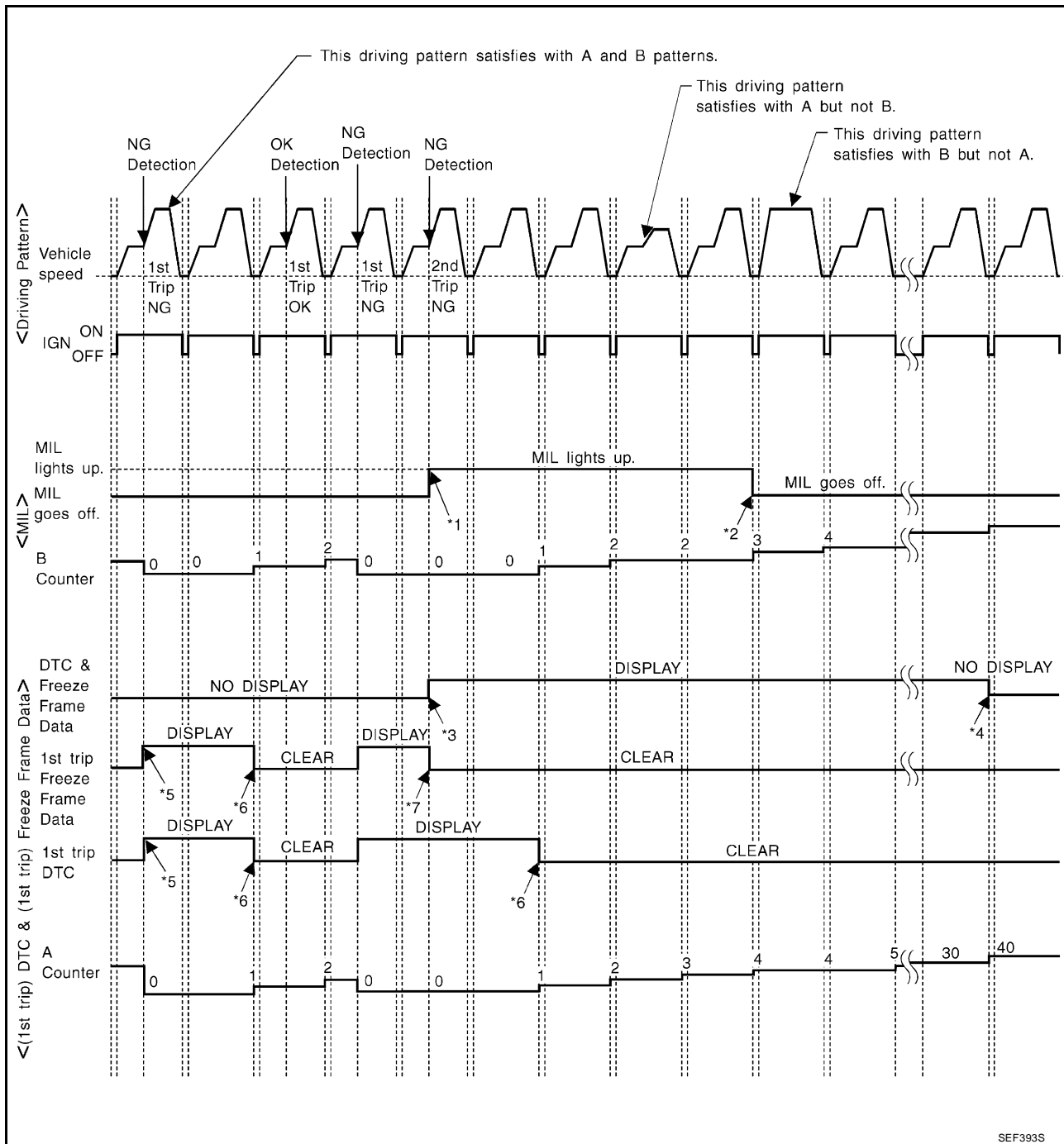
J

K

L

M

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

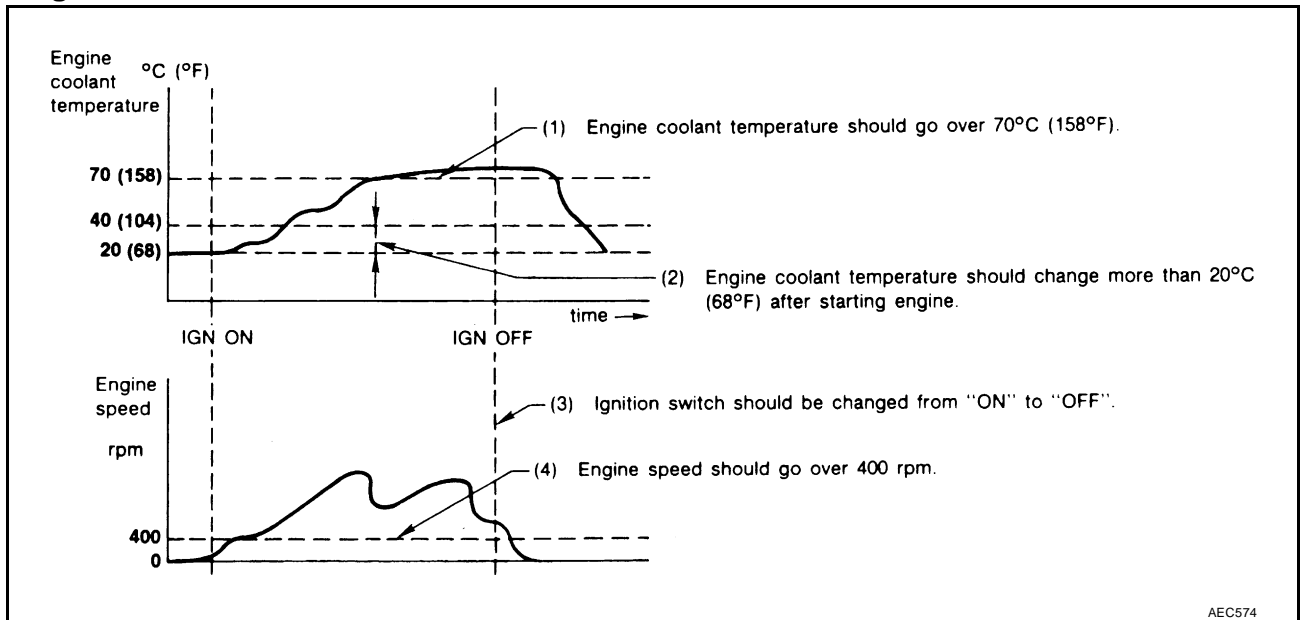


SEF393S

- *1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- *2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.
- *3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.
- *4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- *5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.
- *6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.
- *7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

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:

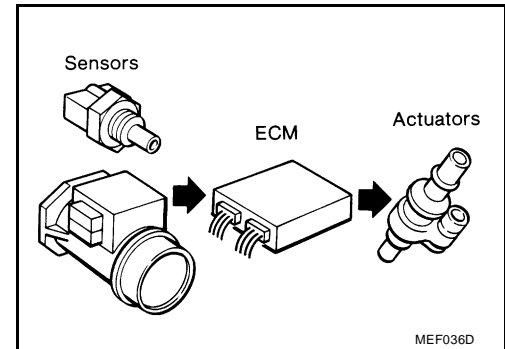
All components and systems should be monitored at least once by the OBD system.

- 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”).

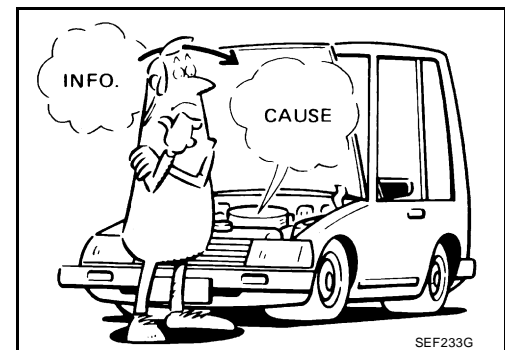
TROUBLE DIAGNOSIS

Trouble Diagnosis Introduction 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 problems such as vacuum leaks, fouled spark plugs, or other problems with the engine.



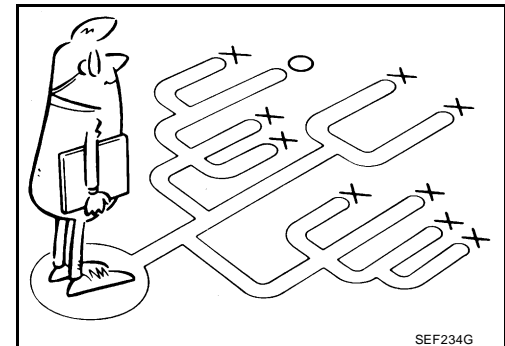
It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



A visual check only may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on [EC-699](#).

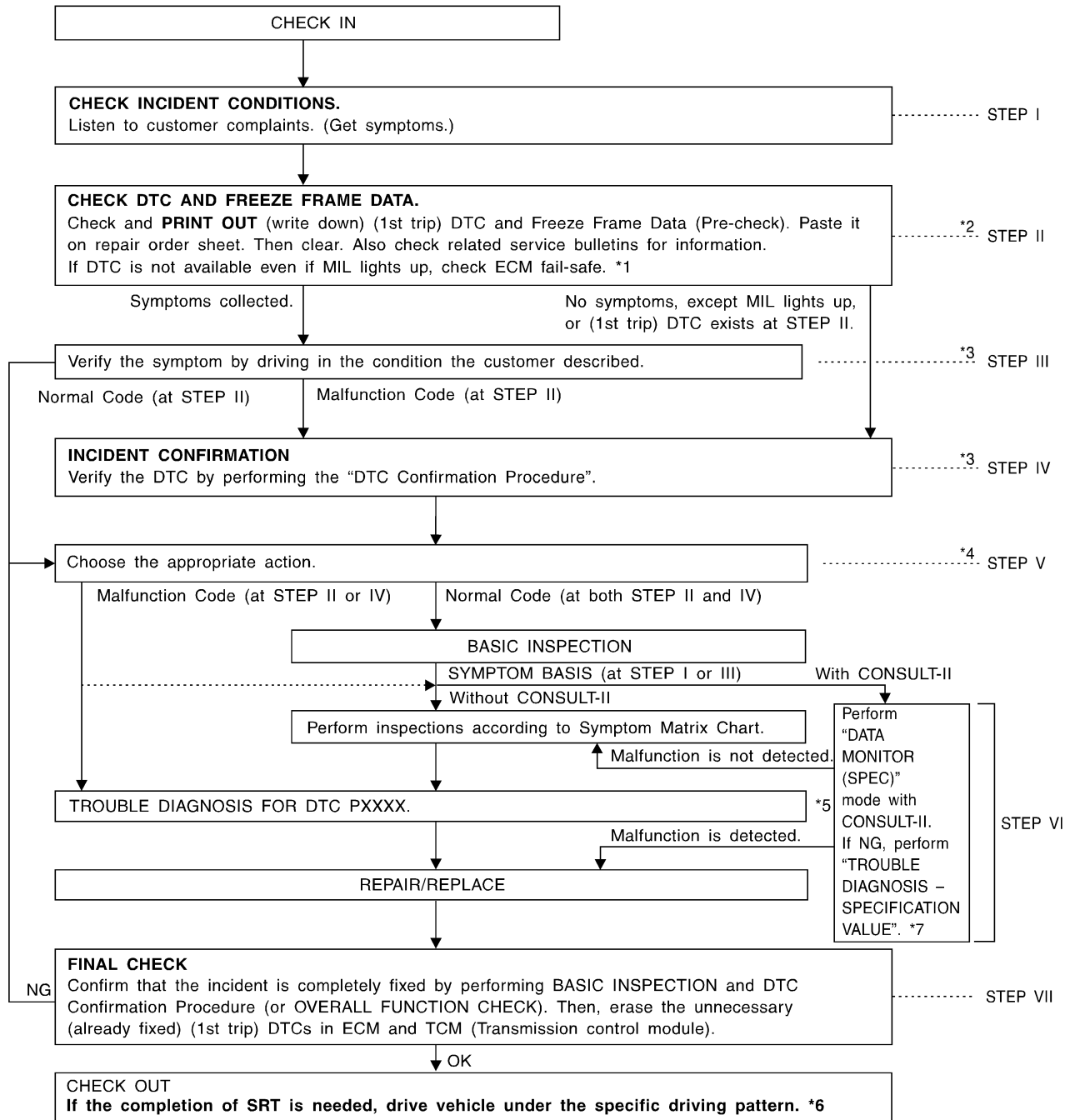
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example on [EC-701](#) should be used.

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



WORK FLOW

Flow Chart



*1 [EC-703](#)

*2 If time data of "SELF-DIAG RESULTS" is other than "0" or "[1t]", perform [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

*3 If the incident cannot be verified, perform [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

*4 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to [EC-757, "POWER SUPPLY CIRCUIT FOR ECM"](#) .

*5 If malfunctioning part cannot be detected, perform [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

*6 [EC-684](#)

*7 [EC-752](#)

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TROUBLE DIAGNOSIS

[VQ]

Description for Work Flow

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", EC-700 .
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or GST) the (1st trip) DTC and the (1st trip) freeze frame data, then erase the DTC and the data. (Refer to EC-687 .) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. If the incident cannot be verified, perform EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See EC-710 .) Also check related service bulletins for information.
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The "DIAGNOSTIC WORK SHEET" and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . If the malfunction code is detected, skip STEP IV and perform STEP V.
STEP IV	Try to detect the (1st trip) DTC by driving in (or performing) the "DTC Confirmation Procedure". Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or GST. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . In case the "DTC Confirmation Procedure" is not available, perform the "Overall Function Check" instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified "check" is an effective alternative. The "NG" result of the "Overall Function Check" is the same as the (1st trip) DTC detection.
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-705 .) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-710 .)
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-722 , EC-746 . The "Diagnostic Procedure" in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to "Circuit Inspection" in GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident" . Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the "DTC Confirmation Procedure" and confirm the normal code [DTC No. P0000] is detected. If the incident is still detected in the final check, perform STEP VI by using a method different from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to EC-687, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" and AT-38, "HOW TO ERASE DTC" .)

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 a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

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

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

- Vehicle ran out of fuel, which caused the engine to misfire.

KEY POINTS

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

SEF907L

TROUBLE DIAGNOSIS

[VQ]

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> ● U1000 U1001 CAN communication line ● P0101 P0102 P0103 P1102 Mass air flow sensor ● P0112 P0113 P0127 Intake air temperature sensor ● P0117 P0118 P0125 Engine coolant temperature sensor ● P0128 Thermoatat function ● P0221 P0222 P0223 P1223 P1224 P1225 P1226 P1229 Throttle position sensor ● P0226 P0227 P0228 P1227 P1228 Accelerator pedal position sensor ● P0181 P0182 P0183 Fuel tank temperature sensor ● P0327 P0328 Knock sensor ● P0335 Crankshaft position sensor (POS) ● P0340 P0345 Camshaft position sensor (PHASE) ● P0460 P0461 P0462 P0463 P1464 Fuel level sensor ● P0500 Vehicle speed sensor ● P0605 ECM ● P0705 Park/Neutral position (PNP) switch ● P1706 Park/Neutral position (PNP) switch
2	<ul style="list-style-type: none"> ● P0031P0032 P0051 P0052 Heated oxygen sensor 1 heater ● P0037 P0038 P0057 P0058 Heated oxygen sensor 2 heater ● P0107 P0108 Absolute pressure sensor ● P0132-P0134, P0152-P0154 P1143 P1144 P1163 P1164 Heated oxygen sensor 1 ● P0138 P0139 P0158 P0159 P1146 P1147 P1166 P1167 Heated oxygen sensor 2 ● P0441 EVAP control system purge flow monitoring ● P0444 P0445 P1444 EVAP canister purge volume control solenoid valve ● P0447 P1446 P1448 EVAP canister vent control valve ● P0452 P0453 EVAP control system pressure sensor ● P0550 Power steering pressure sensor ● P0650 MIL ● P0710-0725 P0740 P0745-P0755 P1705 P1760 A/T related sensors, solenoid valves and switches ● P1065 ECM power supply ● P1122 Electric throttle control function ● P1217 Engine over temperature (OVERHEAT) ● P1490 P1491 Vacuum cut valve bypass valve ● P1800 VIAS control solenoid valve ● P1805 Brake switch
3	<ul style="list-style-type: none"> ● P0011 P0021 Intake valve timing control ● P0171 P0172 P0174 P0175 Fuel injection system function ● P0300 - P0306 Misfire ● P0420 P0430 Three way catalyst function ● P0442 P0456 EVAP control system ● P0506 P0507 Idle speed control system ● P0731-P0734 P0744 A/T function ● P1121 Electric throttle control actuator ● P1124 P1126 P1128 Electric throttle control actuator ● P1148 P1168 Closed loop control ● P1211 ABS/TCS control unit ● P1212 ABS/TCS communication line ● P1564 ASCD steering switch ● P1572 ASCD brake switch ● P1574 ASCD vehicle speed sensor

TROUBLE DIAGNOSIS

[VQ]

UBS00350

Fail-safe Chart

The ECM enters fail-safe mode, if any of the following malfunctions is detected.
When the ECM enters the fail-safe mode, the MIL illuminates.

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0102 P0103 P1102	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	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
		Condition	Engine coolant temperature decided (CONSULT-II display)
		Just as ignition switch is turned ON or Start	40°C (104°F)
		More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	
P0221 P0222 P0223 P1223 P1224	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.	
P0226 P0227 P0228 P1227 P1228	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.	
P1121	Electric throttle control actuator (ECM detect 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" position, and engine speed will not exceed 1,000 rpm or more.	
P1122	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.	
P1126	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.	
P1229	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.	

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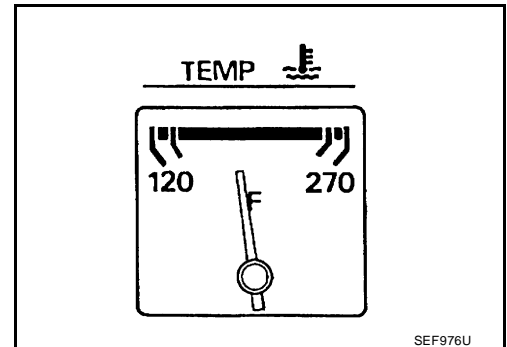
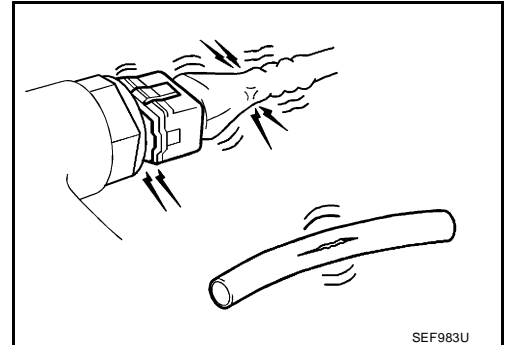
TROUBLE DIAGNOSIS

[VQ]

DTC No.	Detected items	Engine operating condition in fail-safe mode	
Unable to access ECM	ECM	<p>ECM fail-safe activating condition The computing function of the ECM was judged to be malfunctioning. When the fail-safe system activates (i.e., if the ECM detects a malfunction condition in the CPU of ECM), the MIL on the instrument panel lights to warn the driver. However it is not possible to access ECM and DTC cannot be confirmed.</p> <p>Engine control with fail-safe When ECM fail-safe is operating, fuel injection, ignition timing, fuel pump operation and cooling fan operation are controlled under certain limitations.</p>	
		ECM fail-safe operation	
		Engine speed	Engine speed will not rise more than 3,000 rpm
		Fuel injection	Simultaneous multiport fuel injection system
		Ignition timing	Ignition timing is fixed at the preset valve
		Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls
		Cooling fan	Cooling fan relays are "ON" (High speed condition) when engine is running and "OFF" when engine stalls
		Replace ECM, if ECM fail-safe condition is confirmed.	

Basic Inspection**1. INSPECTION START**

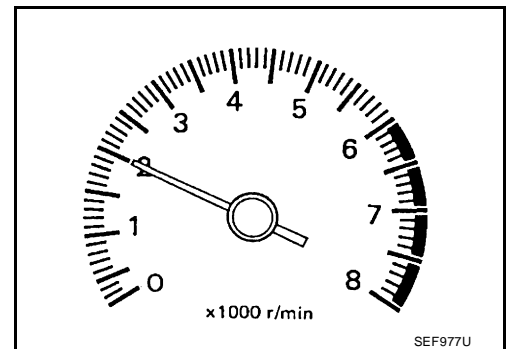
1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses for 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-II or GST.

OK or NG

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

**2. REPAIR OR REPLACE**

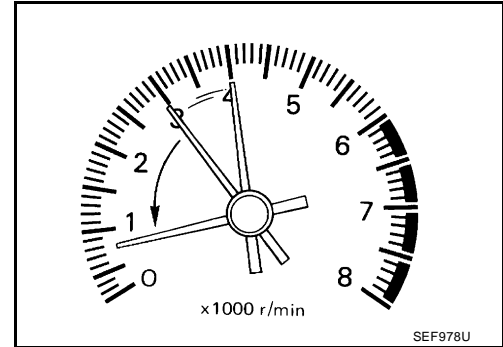
Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

>> GO TO 3.

3. CHECK TARGET IDLE SPEED

With CONSULT-II

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



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

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Without CONSULT-II

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

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

OK or NG

- OK >> GO TO 9.
 NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-668, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-669, "Idle Air Volume Learning"](#) .

Which is the result CMPLT or INCMP

CMPLT or INCMP

CMPLT >> GO TO 7.

INCMP >> 1. Follow the construction of "Idle Air Volume Learning".
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 700 ± 50 rpm

A/T: 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 camshaft position sensor (PHASE) and circuit. Refer to [EC-945](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-938](#) .

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 a problem, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-689, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

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10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.

M/T: $15 \pm 5^\circ$ BTDC

A/T: $15 \pm 5^\circ$ BTDC (in "P" or "N" position)

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-668, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-669, "Idle Air Volume Learning"](#) .

**Which is the result CMPLT or
INCMP**

CMPLT or INCMP

- CMPLT >> GO TO 14.
 INCMP >> 1. Follow the construction of "Idle Air Volume Learning".
 2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

Ⓟ **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

M/T: 700 ± 50 rpm

A/T: 700 ± 50 rpm (in "P" or "N" position)

ⓧ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 700 ± 50 rpm

A/T: 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.

M/T: $15 \pm 5^\circ$ BTDC

A/T: $15 \pm 5^\circ$ BTDC (in "P" or "N" position)

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-146, "TIMING CHAIN"](#) .

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 camshaft position sensor (PHASE) and circuit. Refer to [EC-945](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-938](#) .

OK or NG

- OK >> GO TO 18.
 NG >> 1. Repair or replace.
 2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-689, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

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TROUBLE DIAGNOSIS

[VQ]

UBS00350

Symptom Matrix Chart 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-1240
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-671
	Injector circuit	1	1	2	3	2		2	2			2			EC-1230
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-1272
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-1284
	Incorrect idle speed adjustment						1	1	1	1		1			EC-658
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-1047 , EC-1049
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-658
	Ignition circuit	1	1	2	2	2		2	2			2			EC-1210
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-757
Mass air flow sensor circuit		1			2										EC-798 , EC-1041
Engine coolant temperature sensor circuit							3			3					EC-811
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			EC-827 , EC-836 , EC-847 , EC-1066 , EC-1072
Throttle position sensor circuit							2			2					EC-901
Accelerator pedal position sensor circuit				3	2	1				2					EC-915
Knock sensor circuit				2								3			EC-934
Crankshaft position sensor (POS) circuit		2	2												EC-938
Camshaft position sensor (PHASE) circuit		3	2												EC-945
Vehicle speed signal circuit			2	3		3						3			EC-1019
Power steering pressure sensor circuit			2					3	3						EC-1025
ECM		2	2	3	3	3	3	3	3	3	3	3			EC-1030 , EC-1037
Intake valve timing control solenoid valve circuit			3	2		1	3	2	2	3		3			EC-766
PNP switch circuit				3		3		3	3			3			EC-1194
Start signal circuit		2													EC-1236

TROUBLE DIAGNOSIS

[VQ]

	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	
Refrigerant pressure sensor circuit		2				3			3		4			EC-1252
Electrical load signal circuit							3							EC-1257
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	MTC-28 (with manual A/C) or ATC-31 (with auto A/C)
ABS actuator and electric unit (control unit)			4											

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

SYSTEM — ENGINE MECHANICAL & OTHER

		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 tank	5	5												FL-8	
	Fuel piping			5	5	5		5	5			5			EC-1116	
	Vapor lock															—
	Valve deposit															—
	Poor fuel (Heavy weight gasoline, Low octane)	5		5	5	5		5	5			5			—	

TROUBLE DIAGNOSIS

[VQ]

		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	
Air	Air duct														EM-110
	Air cleaner														EM-110
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)		5	5		5		5	5			5			EM-110
	Electric throttle control actuator	5			5		5			5					EM-112
	Air leakage from intake manifold/ Collector/Gasket														EM-112
Cranking	Battery	1	1	1		1		1	1					1	SC-4
	Generator circuit														SC-25
	Starter circuit	3													SC-9
	Signal plate	6										1			EM-186
	PNP switch	4													MT-12 (M/T) or AT-103 (A/T)
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-164
	Cylinder head gasket										4		3		
	Cylinder block														
	Piston												4		
	Piston ring														
	Connecting rod	6	6	6	6	6		6	6			6			EM-186
	Bearing														
	Crankshaft														
Valve mechanism	Timing chain														EM-146
	Camshaft														EM-134
	C-VTC	5	5	5	5	5		5	5			5			
	Intake valve														
	Exhaust valve												3		EM-164
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			EX-6
	Three way catalyst														

TROUBLE DIAGNOSIS

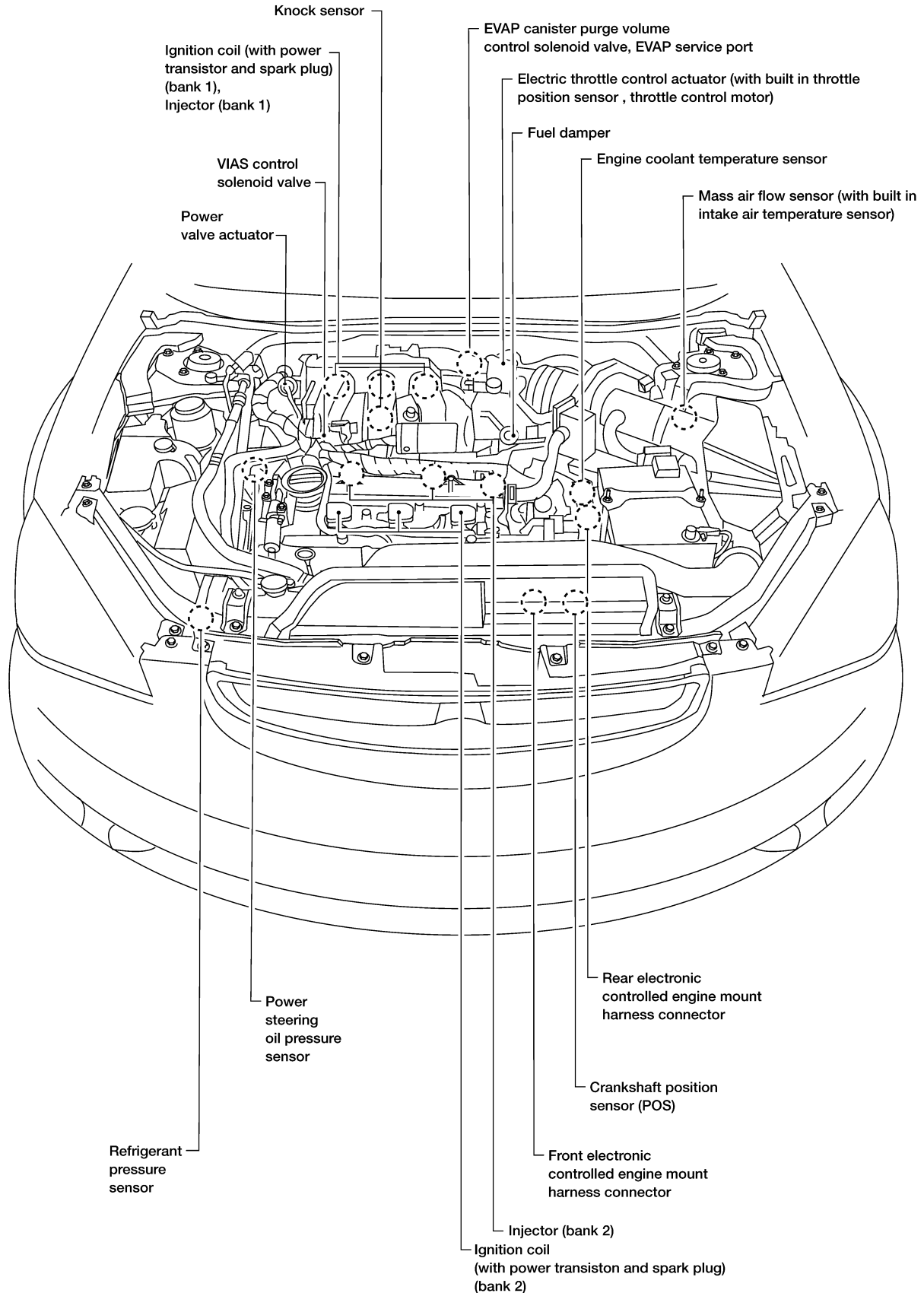
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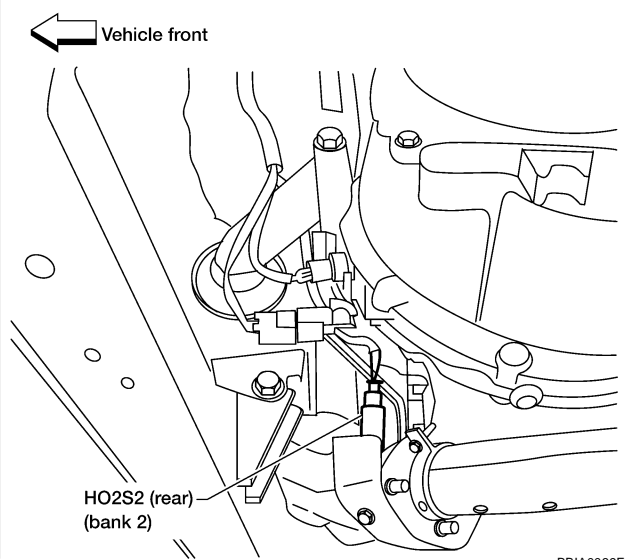
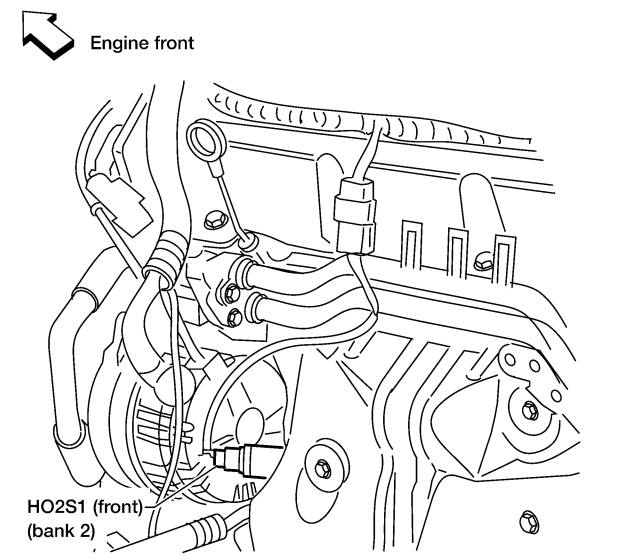
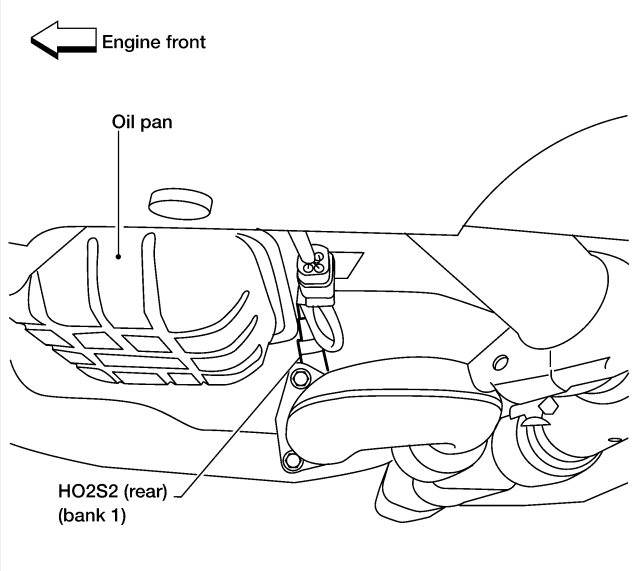
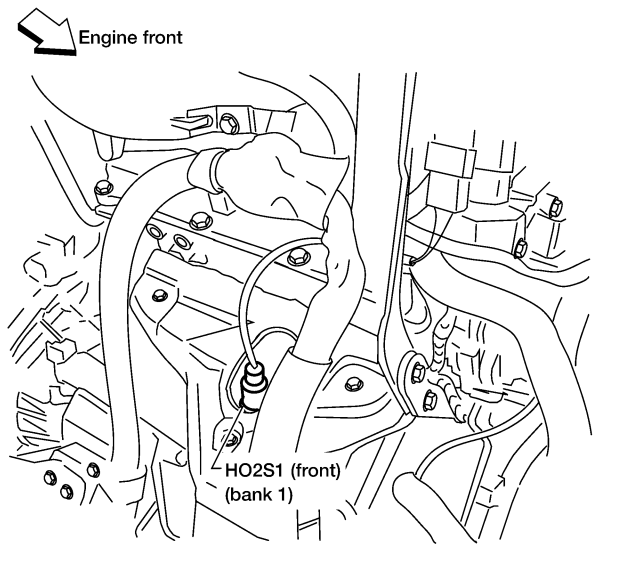
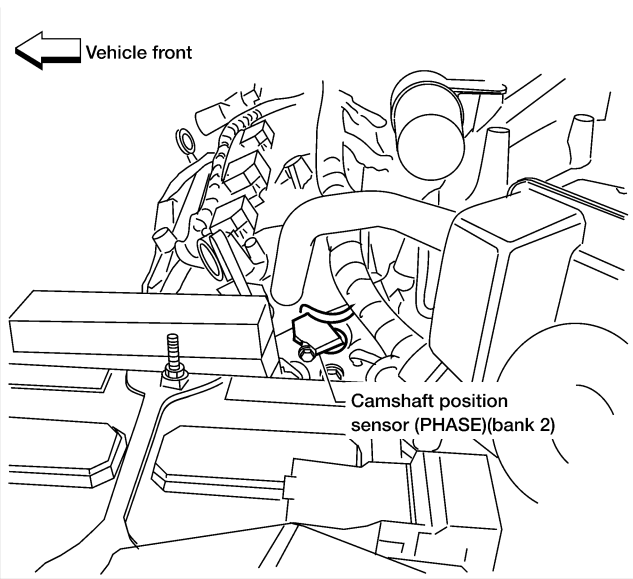
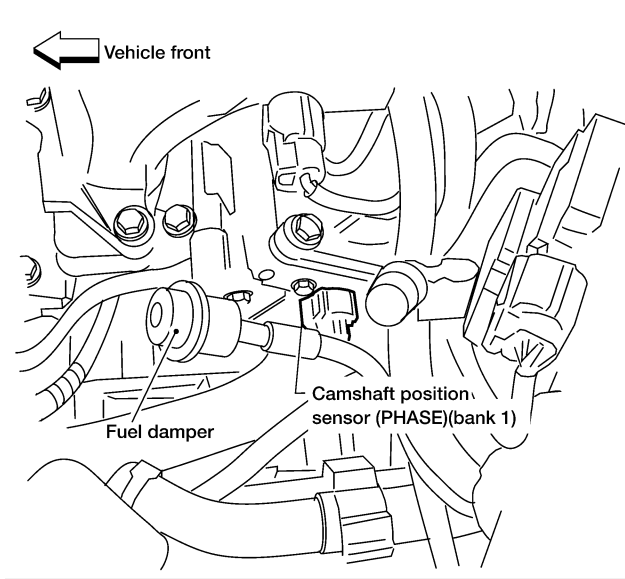
		SYMPTOM												Reference page		
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Lubrica- tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			EM-120 , LU-19 , LU-20 , LU-23 , LU-23	
	Oil level (Low)/Filthy oil														LU-17	
Cooling	Radiator/Hose/Radiator filler cap														CO-34	
	Thermostat									5					CO-45	
	Water pump														CO-41	
	Water gallery	5	5	5	5	5		5	5		4	5			CO-31	
	Coolant level (Low)/Contaminated coolant									5						CO-34
	Coolant level (low)/Contaminated coolant															CO-32
NVIS (NISSAN Vehicle Immobilizer System — NATS)		1	1												EC-689 or BL-116	

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

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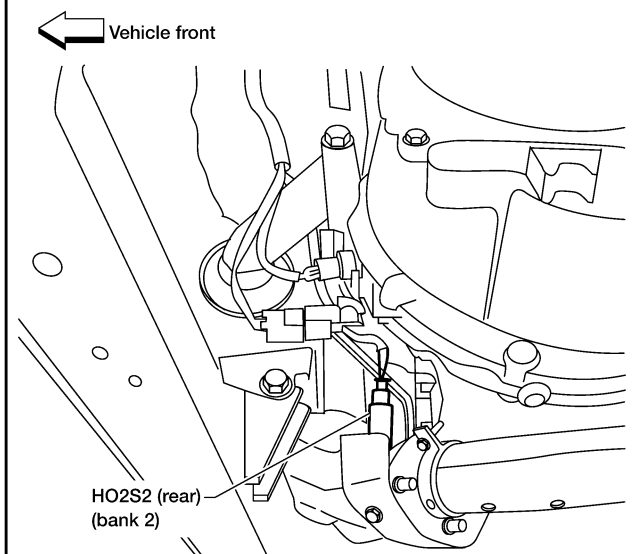
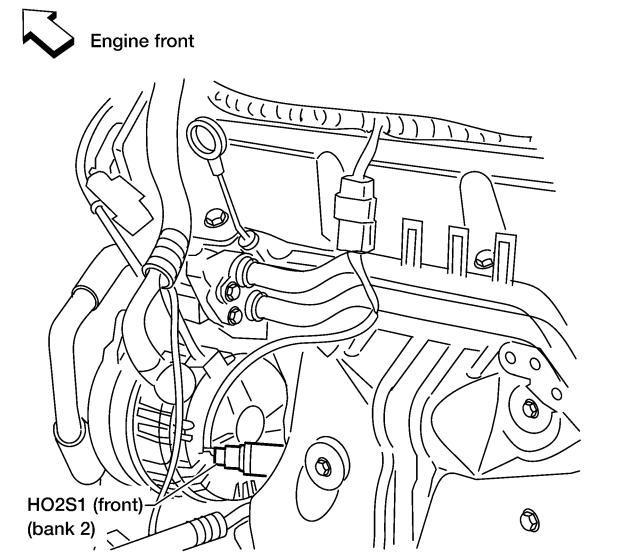
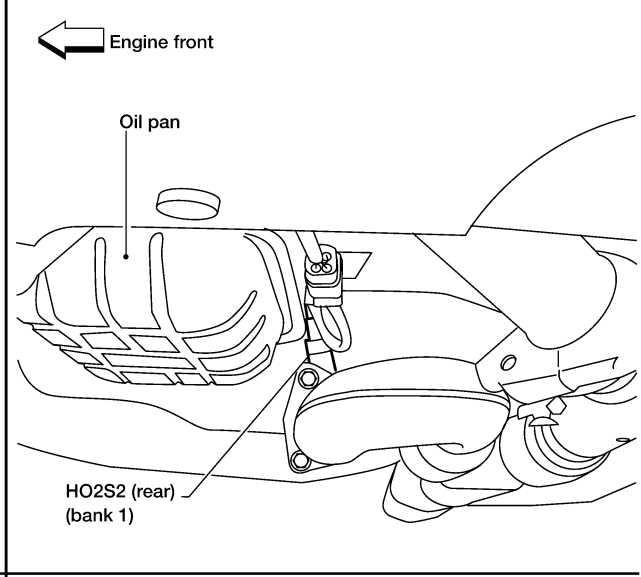
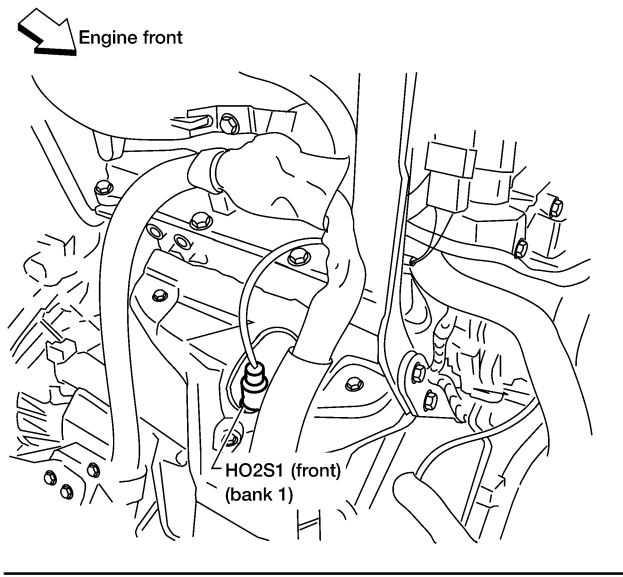
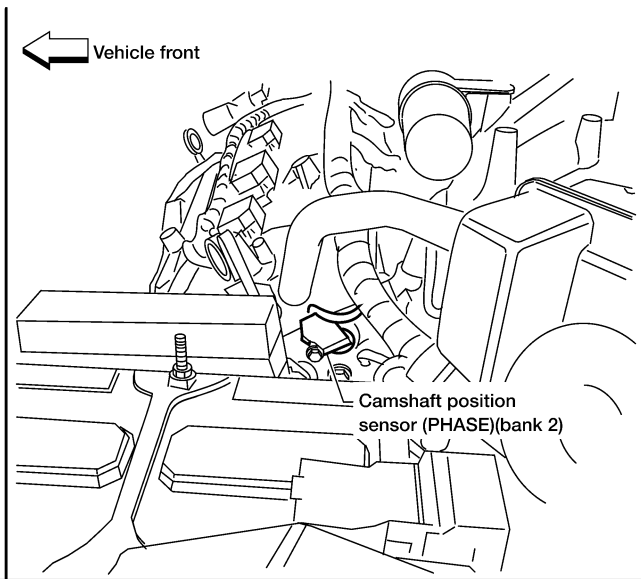
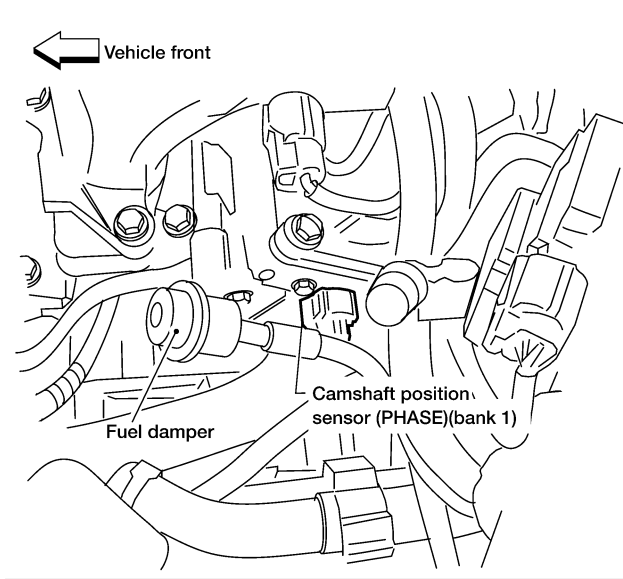
Engine Control Component Parts Location





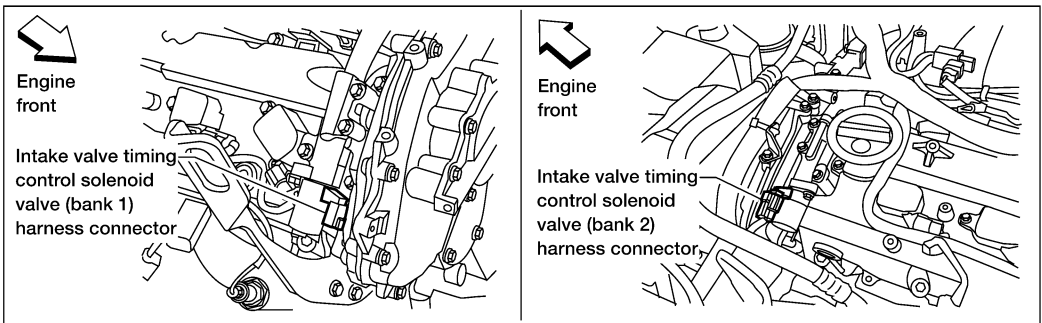
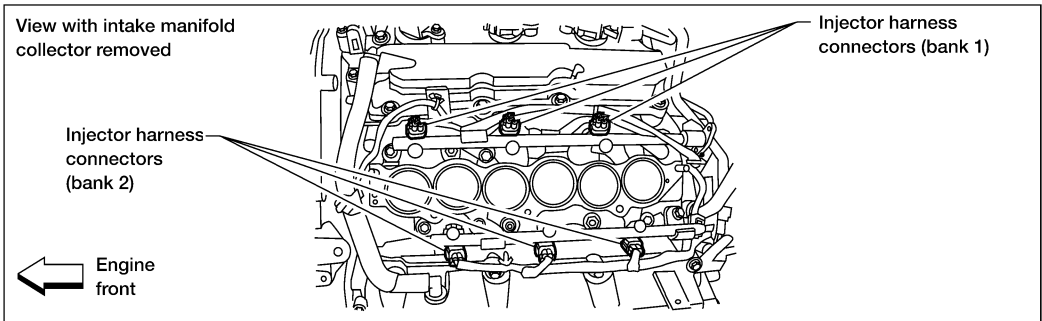
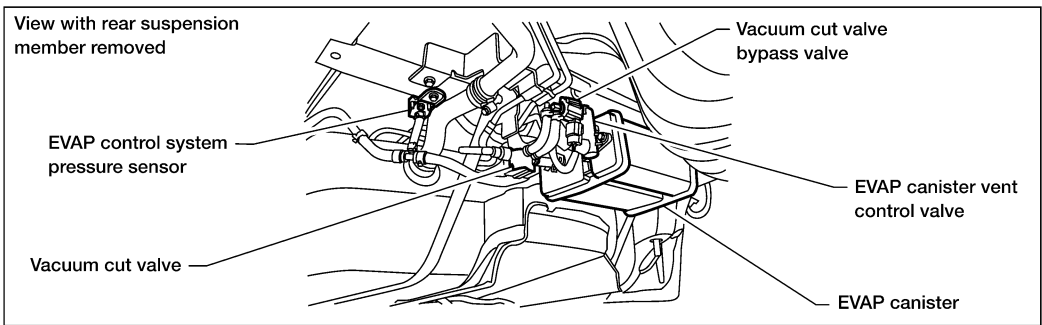
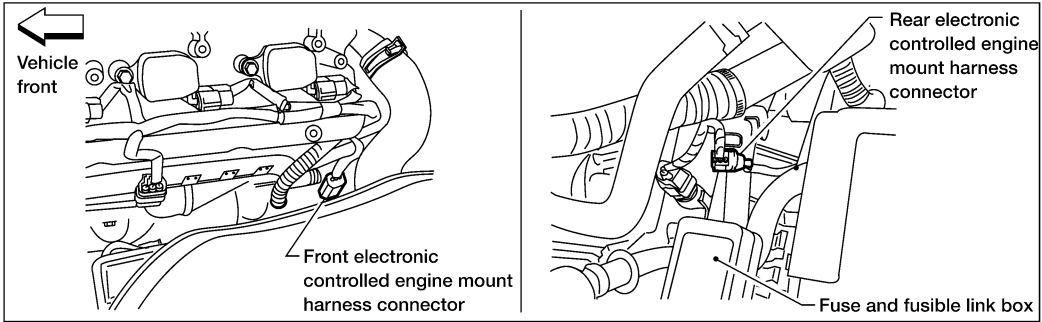
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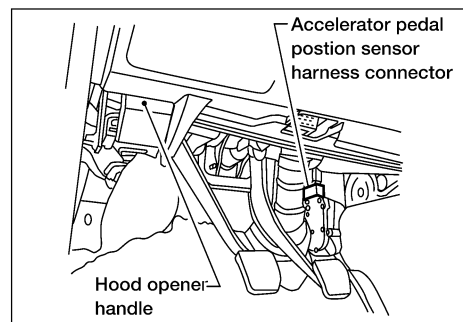
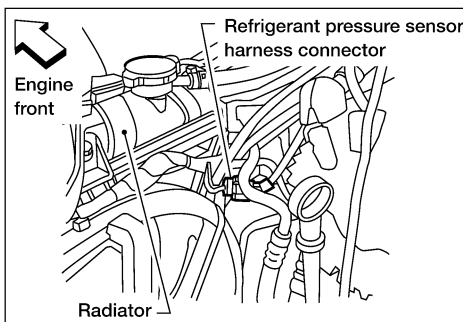
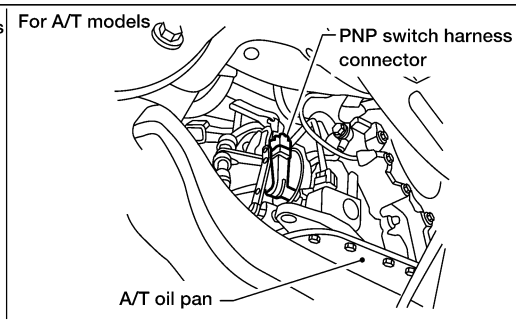
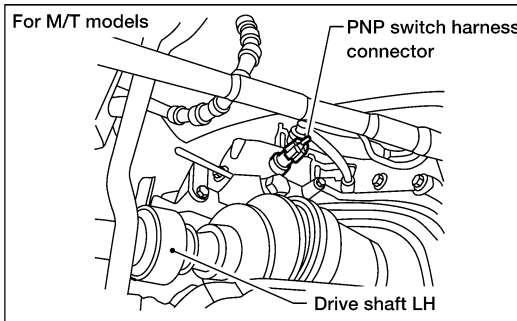
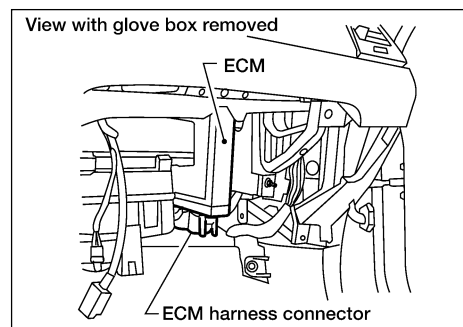
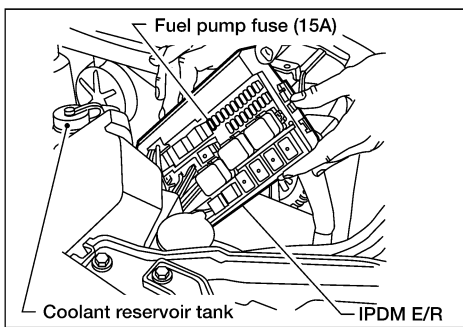
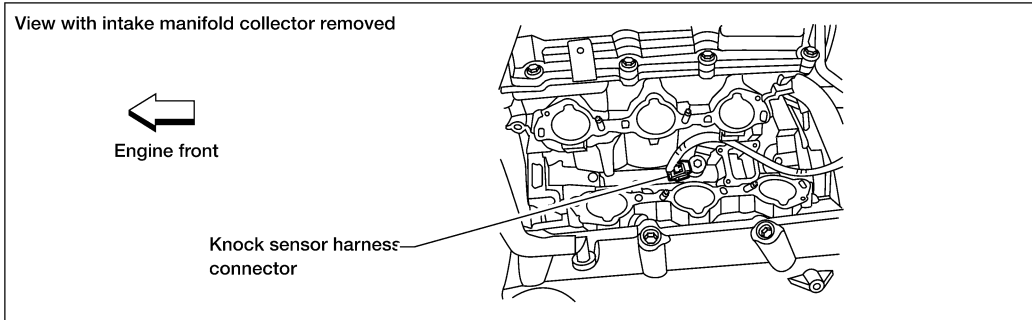
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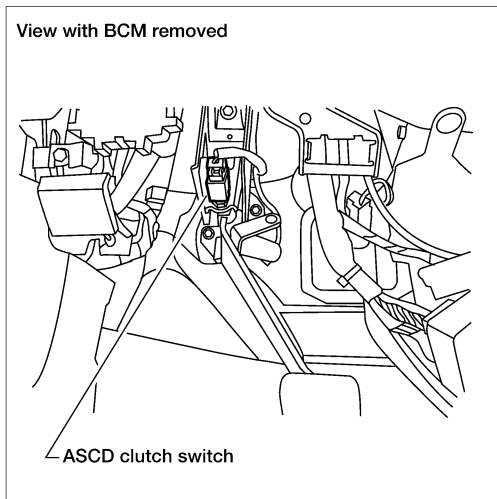
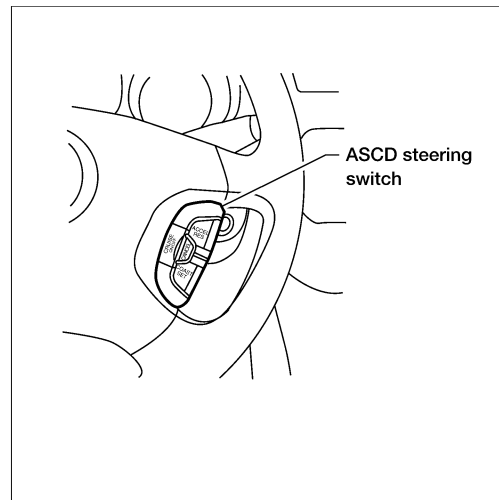
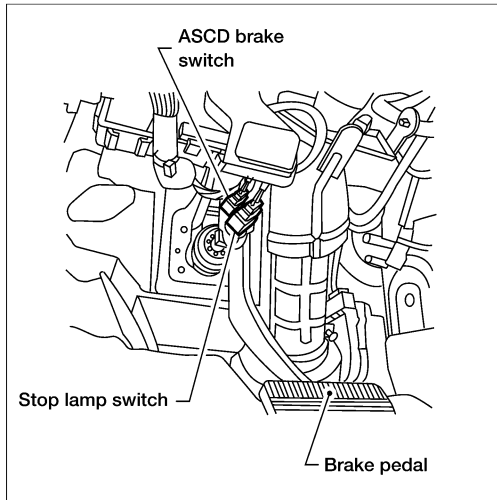
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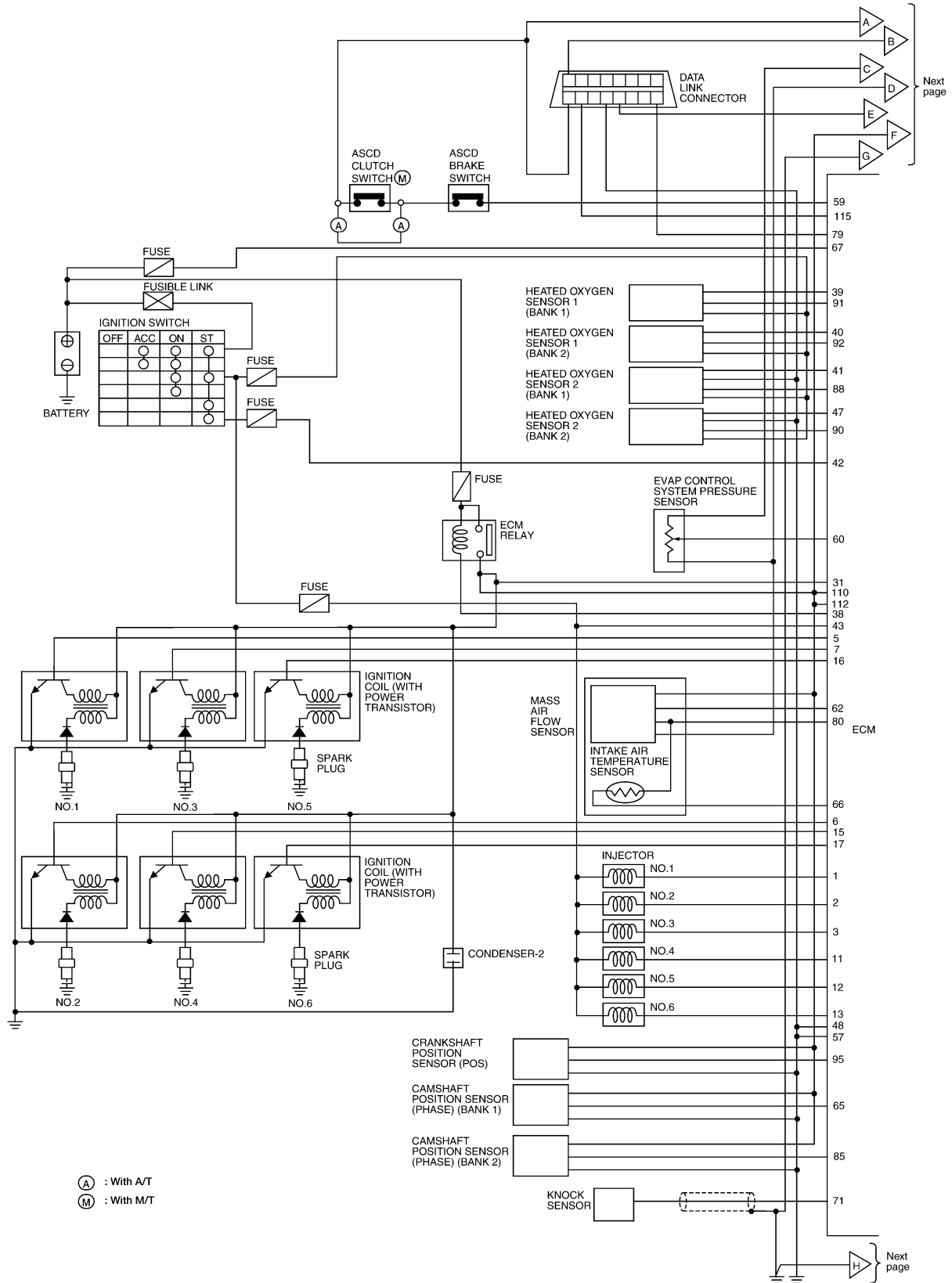


TROUBLE DIAGNOSIS

[VQ]

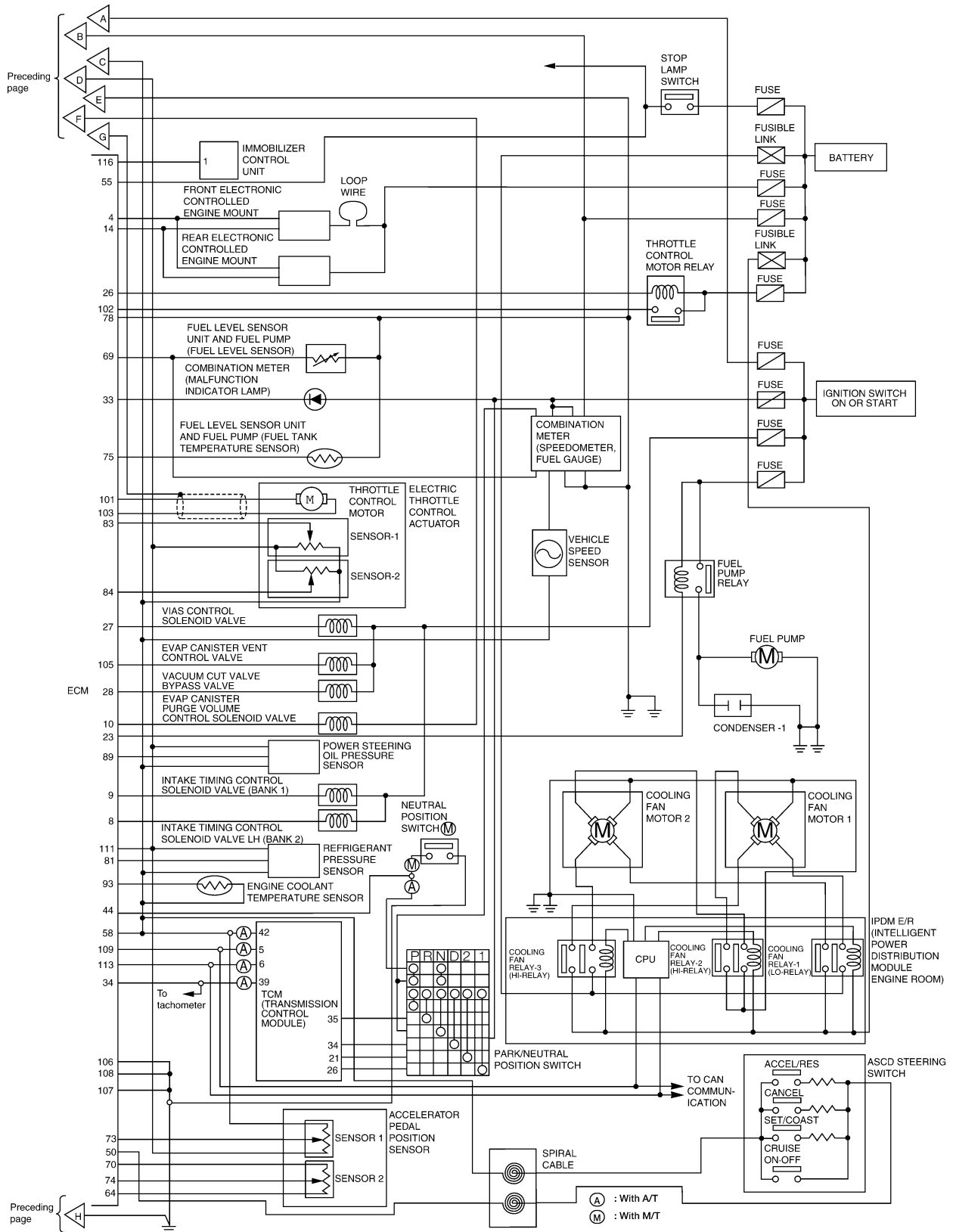
Circuit Diagram

UBS0035S



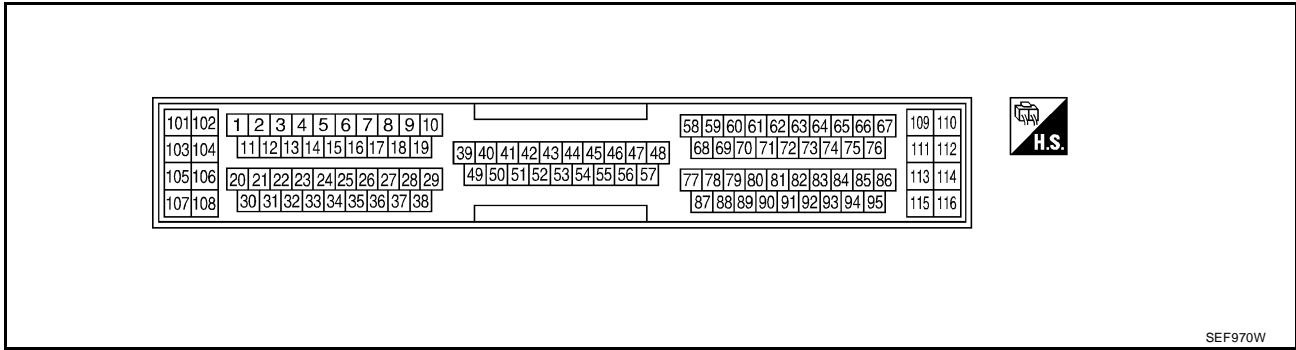
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ECM Harness Connector Terminal Layout

UBS0035T

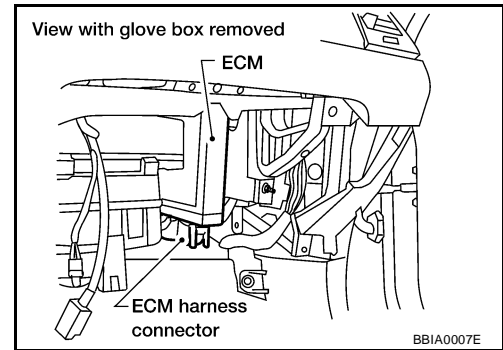


SEF970W

ECM Terminals and Reference Value

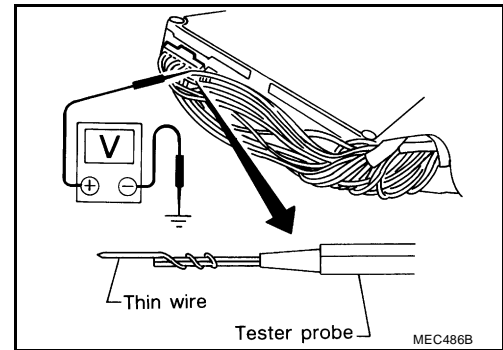
UBS0035U

1. ECM is located behind the glove box. For this inspection, remove glove box.
2. Remove ECM harness protector.



BBIA0007E

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



MEC486B

ECM INSPECTION TABLE

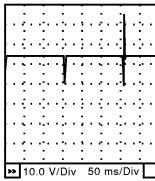
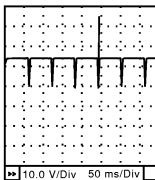

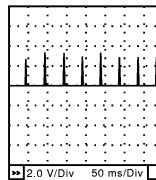
Specification data are reference values and are measured between each terminal and ground.

CAUTION:

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

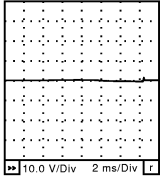
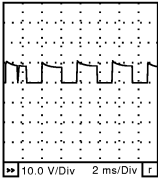
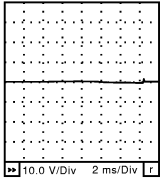
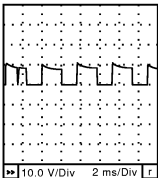
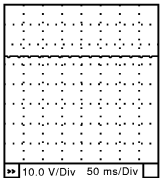
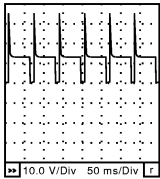
TROUBLE DIAGNOSIS

[VQ]

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
1 2 3 11 12 13	R/B R/W R/Y R/L L/W PU/R	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4 Injector No. 5 Injector No. 6	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	BATTERY VOLTAGE (11 - 14V)★  SEC984C	EC
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm 	BATTERY VOLTAGE (11 - 14V)★  SEC985C	C D E F
4	W	Electronic controlled engine mount-1	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0 - 1.0V	G
			[Engine is running] <ul style="list-style-type: none"> ● Except the above condition 	BATTERY VOLTAGE (11 - 14V)	H
5 6 7 15 16 17	Y/R G/R L/R GY PU/W GY/R	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 3 Ignition signal No. 4 Ignition signal No. 5 Ignition signal No. 6	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	0 - 0.2V★  SEC986C	I J
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,500 rpm. 	0.1 - 0.3V★  SEC987C	K L M

TROUBLE DIAGNOSIS

[VQ]

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	Y	Intake valve timing control solenoid valve (bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC988C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,500 rpm 	<p>7 - 12V★</p>  <p style="text-align: right; font-size: small;">SEC989C</p>
9	R/L	Intake valve timing control solenoid valve (bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC988C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,500 rpm 	<p>7 - 12V★</p>  <p style="text-align: right; font-size: small;">SEC989C</p>
10	PU/R	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC990C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine). 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC991C</p>

TROUBLE DIAGNOSIS

[VQ]

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	A
14	W/R	Electronic controlled engine mount-2	[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)	EC
			[Engine is running] ● Except the above condition	0 - 1.0V	
23	B/OR	Fuel pump relay	[Ignition switch "ON"] ● For 1 second after turning ignition switch "ON"	0 - 1.5V	C
			[Engine is running] [Ignition switch "ON"] ● More than 1 second after turning ignition switch "ON".	BATTERY VOLTAGE (11 - 14V)	D
26	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)	E
			[Ignition switch "ON"]	0 - 1.0V	F
27	Y/G	VIAS control solenoid valve	[Engine is running] ● Engine speed is 1,800 - 3,600 rpm	0 - 1.0V	G
			[Engine is running] ● Except the above condition	BATTERY VOLTAGE (11 - 14V)	
28	BR	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)	H
31	R	Counter current return	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)	I
33	LG/B	MIL	[Ignition switch "ON"]	0 - 1.0V	J
			[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)	
38	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For a few seconds after turning ignition switch "OFF"	0 - 1.5V	K
			[Ignition switch "OFF"] ● A few seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)	L
39	OR	Heated oxygen sensor 1 heater (bank 1)	[Engine is running] ● Engine speed is below 3,600 rpm.	0 - 1.0V	M
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)	
40	R/L	Heated oxygen sensor 1 heater (bank 2)	[Engine is running] ● Engine speed is below 3,600 rpm.	0 - 1.0V	M
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)	
41	P/B	Heated oxygen sensor 2 heater (bank 1)	[Engine is running] ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more.	0 - 1.0V	M
			[Ignition switch "ON"] ● Engine stopped [Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)	

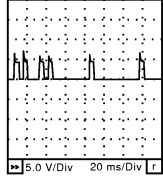
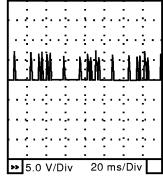
TROUBLE DIAGNOSIS

[VQ]

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
42	BR/W	Start signal	[Ignition switch "ON"]	Approximately 0V
			[Ignition switch "START"]	9 - 12V
43	R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
44	G/R (A/T) G/W (M/T)	PNP switch	[Ignition switch "ON"] ● Gear position is "P" or "N".	Approximately 0V
			[Ignition switch "ON"] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)
47	R/L	Heated oxygen sensor 2 heater (bank 2)	[Engine is running] ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more.	0 - 1.0V
			[Ignition switch "ON"] ● Engine stopped [Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
48 57	B B	ECM ground	[Engine is running] ● Idle speed	Engine ground
50	G/Y	ASCD steering switch	[Ignition switch "ON"] ● ASCD steering switch is "OFF".	Approximately 4.0V
			[Ignition switch "ON"] ● CRUISE switch is "ON".	Approximately 0V
			[Ignition switch "ON"] ● CANCEL switch is "ON".	Approximately 1V
			[Ignition switch "ON"] ● COAST/SET switch is "ON".	Approximately 2V
			[Ignition switch "ON"] ● ACCEL/RESUME switch is "ON".	Approximately 3V
55	R/G	Stop lamp switch	[Ignition switch "ON"] ● Brake pedal is fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
59	G/B (A/T) G/R (M/T)	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)
60	W	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 1.8 - 4.8V

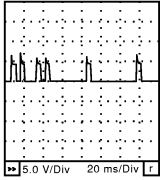
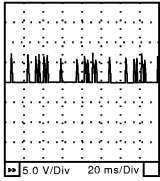
TROUBLE DIAGNOSIS

[VQ]

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
62	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V	EC
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.7 - 2.4V	C
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V	D
65	Y	Camshaft position sensor (PHASE) (bank 1)	[Engine is running] ● Warm-up condition ● Idle speed	1.0 - 4.0V★  SEC033D	E
			[Engine is running] ● Engine speed is 2,000 rpm.	1.0 - 4.0V★  SEC034D	F
66	Y/G	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with intake air temperature.	G
67	W/L	Power supply for ECM (Buck-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)	H
69	G/B	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.	I
70	G	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V	J
71	W	Knock sensor	[Engine is running] ● Idle speed	Approximately 2.5V	K
73	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] ● Accelerator pedal fully released	0.41 - 0.71V	L
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 4.2V	M
74	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] ● Accelerator pedal fully released	0.21 - 0.36V	
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 2.1V	
75	P/L	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.	
78	B/R	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V	

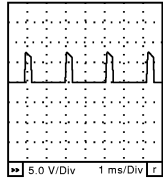
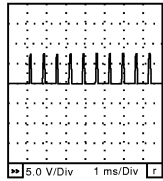
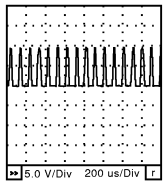
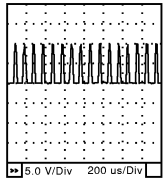
TROUBLE DIAGNOSIS

[VQ]

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
80	B	Mass air flow sensor ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
81	W	Refrigerant pressure sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Both A/C switch and blower switch are "ON". (Compressor operates.) 	1.0 - 4.0V
83	W	Throttle position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully released 	More than 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully depressed 	Less than 4.75V
84	L	Throttle position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully released 	Less than 4.75V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully depressed 	More than 0.36V
85	G	Camshaft position sensor (PHASE) (bank 2)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	1.0 - 4.0V★  <small>SEC033D</small>
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm. 	1.0 - 4.0V★  <small>SEC034D</small>
88	W	Heated oxygen sensor 2 (bank 1)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V
89	W	Power steering pressure sensor	[Engine is running] <ul style="list-style-type: none"> ● Steering wheel is being turned. 	0.5 - 4.0V
			[Engine is running] <ul style="list-style-type: none"> ● Steering wheel is not being turned. 	0.4 - 0.8V
90	W	Heated oxygen sensor 2 (bank 2)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V

TROUBLE DIAGNOSIS

[VQ]

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Heated oxygen sensor 1 (bank 1)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V (Periodically change)
92	W	Heated oxygen sensor 1 (bank 2)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V (Periodically change)
93	Y	Engine coolant temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.
95	W	Crankshaft position sensor (POS)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 2.4V★  SEC035D
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm. 	Approximately 2.3V★  SEC036D
101	Y	Throttle control motor (Open)	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever: "D" (A/T models) ● Shift lever: "1st" (M/T models) ● Accelerator pedal is depressing 	0 - 14V★  SEC037D
102	R	Throttle control motor relay power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
103	BR	Throttle control motor (Close)	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Shift lever: "D" (A/T models) ● Shift lever: "1st" (M/T models) ● Accelerator pedal is releasing 	0 - 14V★  SEC038D
105	OR	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
106 108	B B	ECM ground	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Engine ground
107	B	Throttle control motor ground	[Ignition switch "ON"]	Approximately 0V
109	L	CAN communication line	[Ignition switch "ON"]	Approximately 2.6 - 3.2V Output voltage varies with the communication status.

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TROUBLE DIAGNOSIS

[VQ]

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
110 112	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
111	R	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
113	Y	CAN communication line	[Ignition switch "ON"]	Approximately 1.7 - 2.3V Output voltage varies with the communication status.
115	OR	Data link connector	[Ignition switch "ON"] ● CONSULT-II or GST is disconnected.	BATTERY VOLTAGE (11 - 14V)

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

CONSULT-II Function FUNCTION

UBS0035V

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

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

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

TROUBLE DIAGNOSIS

[VQ]

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item		DIAGNOSTIC TEST MODE								
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION		
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT	
ENGINE CONTROL COMPONENT PARTS INPUT	Crankshaft position sensor (POS)		×	×	×	×			A	
	Camshaft position sensor (PHASE)		×		×	×			B	
	Mass air flow sensor		×		×	×			C	
	Engine coolant temperature sensor		×	×	×	×	×		D	
	Heated oxygen sensor 1		×		×	×		×	×	E
	Heated oxygen sensor 2		×		×	×		×	×	F
	Vehicle speed sensor		×	×	×	×				G
	Accelerator pedal position sensor		×		×	×				H
	Throttle position sensor		×		×	×				I
	Fuel tank temperature sensor		×		×	×	×			J
	EVAP control system pressure sensor		×		×	×				K
	Absolute pressure sensor		×		×	×				L
	Intake air temperature sensor		×		×	×				M
	Knock sensor		×							N
	Refrigerant pressure sensor				×	×				O
	Ignition switch (start signal)				×	×				P
	Closed throttle position switch (accelerator pedal position sensor signal)				×	×				Q
	Air conditioner switch				×	×				R
	Park/neutral position (PNP) switch		×		×	×				S
	Stop lamp switch		×		×	×				T
	Power steering pressure sensor		×		×	×				U
	Battery voltage				×	×				V
	Load signal				×	×				W
Fuel level sensor		×		×	×				X	
ASCD steering switch		×		×	×				Y	
ASCD brake switch		×		×	×				Z	

TROUBLE DIAGNOSIS

[VQ]

Item		DIAGNOSTIC TEST MODE							
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS OUTPUT	Injectors				×	×	×		
	Power transistor (Ignition timing)				×	×	×		
	Throttle control motor relay		×		×	×			
	Throttle control motor		×						
	EVAP canister purge volume control solenoid valve		×		×	×	×		×
	Air conditioner relay				×	×			
	Fuel pump relay	×			×	×	×		
	Cooling fan relay		×		×	×	×		
	Heated oxygen sensor 1 heater		×		×	×		×	
	Heated oxygen sensor 2 heater		×		×	×		×	
	EVAP canister vent control valve		×		×	×	×		
	Vacuum cut valve bypass valve		×		×	×	×		×
	Intake valve timing control solenoid valve		×		×	×	×		
	VIAS control solenoid valve		×		×	×	×		
	Electronic controlled engine mount				×	×	×		
Calculated load value			×	×	×				

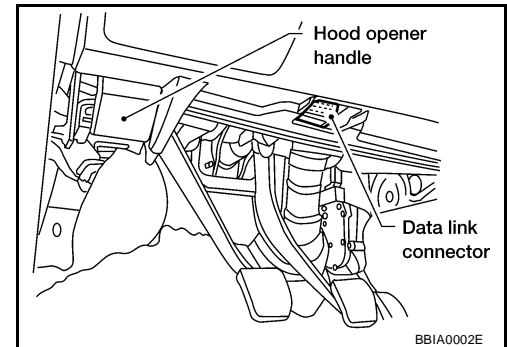
X: Applicable

*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to [EC-678](#).

CONSULT-II INSPECTION PROCEDURE

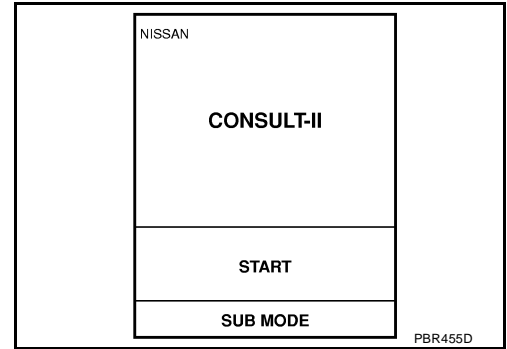
1. Turn ignition switch OFF.
2. Connect "CONSULT-II" to data link connector, which is located under LH dash panel near the fuse box cover.
3. Turn ignition switch ON.



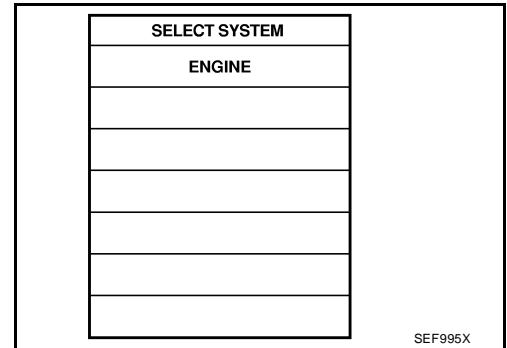
TROUBLE DIAGNOSIS

[VQ]

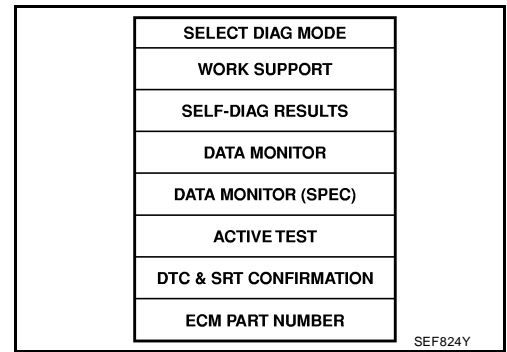
4. Touch "START".



5. Touch "ENGINE".



6. Perform each diagnostic test mode according to each service procedure.
For further information, see the CONSULT-II Operation Manual.



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 releasing fuel pressure from fuel line

TROUBLE DIAGNOSIS

[VQ]

WORK ITEM	CONDITION	USAGE
EVAP SYSTEM CLOSE	<p>OPEN THE VACUUM CUT VALVE BYPASS VALVE AND CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> ● 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-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-II 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 After adjustment, confirm target ignition timing with a timing light.

*: 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-632, "INDEX FOR DTC"](#) .)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*1	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-632, "INDEX FOR DTC" .)
FUEL SYS-B1*2	<ul style="list-style-type: none"> ● "Fuel injection system status" at the moment a malfunction is detected is displayed.
FUEL SYS-B2*2	<ul style="list-style-type: none"> ● One mode in the following is displayed. "MODE 2": Open loop due to detected system malfunction "MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment) "MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control "MODE 5": 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.
S-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> ● "Short-term fuel trim" at the moment a malfunction is detected is displayed.
S-FUEL TRIM-B2 [%]	<ul style="list-style-type: none"> ● The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
L-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> ● "Long-term fuel trim" at the moment a malfunction is detected is displayed.
L-FUEL TRIM-B2 [%]	<ul style="list-style-type: none"> ● The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> ● The engine speed at the moment a malfunction is detected is displayed.
VHCL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> ● The vehicle speed at the moment a malfunction is detected is displayed.

TROUBLE DIAGNOSIS

[VQ]

Freeze frame data item*1	Description
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.

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

*2: Regarding L31 model, "B1" indicates bank 1 and "B2" indicates bank 2.

DATA MONITOR MODE

Monitored Item

×: Applicable

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	CAN DIAG SUPPORT MNTR	Description	Remarks
ENG SPEED [rpm]	×	×		<ul style="list-style-type: none"> Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and CMPS (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.
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.
HO2S1 (B1) [V]	×	×		<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 1 is displayed. 	
HO2S1 (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]	×				
HO2S1 MNTR (B1) [RICH/LEAN]	×	×		<ul style="list-style-type: none"> Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH ... means the mixture became "rich", and control is being affected toward a leaner mixture. LEAN ... means the mixture became "lean", and control is being affected toward a rich mixture. 	<ul style="list-style-type: none"> After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins. When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S1 MNTR (B2) [RICH/LEAN]	×				
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 sent from combination meter 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. 	
ACCEL SEN 2 [V]	×				

TROUBLE DIAGNOSIS

[VQ]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	CAN DIAG SUP- PORT MNTR	Description	Remarks
THRTL SEN 1 [V]	×	×		● The throttle position sensor signal voltage is displayed.	
THRTL SEN 2 [V]	×				
FUEL T/TEMP SE [°C] or [°F]	×			● The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.	
INT/A TEMP SE [°C] or [°F]	×	×		● The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
EVAP SYS PRES [V]	×			● The signal voltage of EVAP control system pressure sensor is displayed.	
ABSOL PRES/SE [V]	×			● The signal of the absolute pressure sensor is displayed.	
FUEL LEVEL SE [V]	×			● The signal voltage of the fuel level sensor is displayed.	
START SIGNAL [ON/OFF]	×	×		● Indicates [ON/OFF] condition from the starter signal.	● After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS [ON/OFF]	×	×		● Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.	
AIR COND SIG [ON/OFF]	×	×		● Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW [ON/OFF]	×	×		● Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.	
PW/ST SIGNAL [ON/OFF]	×	×		● [ON/OFF] condition of the power steering system (determined by the signal voltage of the power steering pressure sensor signal) is indicated.	
LOAD SIGNAL [ON/OFF]	×	×		● 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.	
IGNITION SW [ON/OFF]	×	×		● Indicates [ON/OFF] condition from ignition switch signal.	
BRAKE SW [ON/OFF]				● Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1 [msec]		×		● Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	● When the engine is stopped, a certain computed value is indicated.
INJ PULSE-B2 [msec]					
B/FUEL SCHDL [msec]		×		● "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	
IGN TIMING [BTDC]		×		● Indicates the ignition timing computed by ECM according to the input signals.	● When the engine is stopped, a certain value is indicated.

TROUBLE DIAGNOSIS

[VQ]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	CAN DIAG SUP- PORT MNTR	Description	Remarks
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. ● This data also includes the data for the air-fuel ratio learning control.
A/F ALPHA-B2 [%]		×			
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·m/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 TIM (B2) [°CA]					
INT/V SOL (B1) [%]				<ul style="list-style-type: none"> ● The control condition of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. ON ... intake valve timing control is operating. OFF ... Intake valve timing control is not operating. 	
INT/V SOL (B2) [%]					
VIAS S/V [ON/OFF]				<ul style="list-style-type: none"> ● The control condition of the VIAS control solenoid valve (determined by ECM according to the input signals) is indicated. ON ... VIAS control solenoid valve is operating. OFF ... VIAS control solenoid valve is not operating. 	
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. 	
ENGINE MOUNT [IDLE/TRVL]				<ul style="list-style-type: none"> ● The control condition of the electronic controlled engine mount (determined by ECM according to the input signals) is indicated. IDLE ... Idle condition ON ... Driving condition 	
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. 	
VC/V BYPASS/V [ON/OFF]				<ul style="list-style-type: none"> ● The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signals) is indicated. ON ... Open OFF ... Closed 	

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TROUBLE DIAGNOSIS

[VQ]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	CAN DIAG SUP- PORT MNTR	Description	Remarks
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"> The control condition of the cooling fan (determined by ECM according to the input signals) is indicated. HI ... High speed operation LOW ... Low speed operation OFF ... Stop 	
HO2S1 HTR (B1) [ON/OFF]				<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals. 	
HO2S1 HTR (B2) [ON/OFF]					
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]					
IDL A/V LEARN [YET/CMPLT/ INCMP]				<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. INCMP ... Idle air volume learning has not been performed successfully. 	
TRVL AFTER MIL [km] or [mile]				<ul style="list-style-type: none"> Distance traveled while MIL is activated. 	
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 CRUISE 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 ACCEL/RES switch signal. 	
SET SW [ON/OFF]				<ul style="list-style-type: none"> Indicates [ON/OFF] condition from COAST/SET switch signal. 	
BRAKE SW1 SW [ON/OFF]				<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ASCD brake switch signal, and ASCD clutch switch signal (M/T models). 	
BRAKE SW2 SW [ON/OFF]				<ul style="list-style-type: none"> Indicates [ON/OFF] condition of stop lamp switch signal. 	

TROUBLE DIAGNOSIS

[VQ]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	CAN DIAG SUP- PORT MNTR	Description	Remarks
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 A/T O/D according to the input signal from the TCM. 	
AT OD CANCEL [ON/OFF]				<ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D cancel signal sent from the TCM. 	
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. 	
Voltage [V]				<ul style="list-style-type: none"> Voltage, frequency, duty cycle or pulse width measured by the probe. 	<ul style="list-style-type: none"> Only “#” is displayed if item is unable to be measured. Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency [msec], [Hz] or [%]					
DUTY-HI					
DUTY-LOW					
PLS WIDTH-HI					
PLS WIDTH-LOW					
CAN COMM [OK/NG]			×	<ul style="list-style-type: none"> Indicates the communication condition of CAN communication line. 	
CAN CIRC 1 [OK/UNKWN]			×		
CAN CIRC 2 [OK/UNKWN]			×		
CAN CIRC 3 [OK/UNKWN]			×		
CAN CIRC 4 [OK/UNKWN]			×		
CAN CIRC 5 [OK/UNKWN]			×		
CAN CIRC 6 [OK/UNKWN]			×		
CAN CIRC 7 [OK/UNKWN]			×		

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.
- Regarding L31 model, “B1” indicates bank 1 and “B2” indicates bank 2.

TROUBLE DIAGNOSIS

[VQ]

DATA MONITOR (SPEC) MODE

Monitored Item

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	×		<ul style="list-style-type: none"> Indicates the engine speed computed from the signal of the crankshaft position sensor (POS). 	
MAS A/F SE-B1 [V]	×	×	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor specification is displayed. 	<ul style="list-style-type: none"> When engine is running specification range is indicated.
B/FUEL SCHDL [msec]			<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.
A/F ALPHA-B1 [%] A/F ALPHA-B2 [%]		×	<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 engine is running specification range is indicated. This data also includes the data for the air-fuel ratio learning control.

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	JUDGEMENT	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-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Fuel injectors Heated oxygen 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-II. 	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 "N" Cut off each injector signal one at a time using CONSULT-II. 	Engine runs rough or dies.	<ul style="list-style-type: none"> Harness and connectors Compression Fuel injectors Power transistor Spark plugs Ignition coils
COOLING FAN	<ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan "HI", "LOW" and "OFF" using CONSULT-II. 	Cooling fan moves and stops.	<ul style="list-style-type: none"> Harness and connectors Cooling fan motor Cooling fan relay
ENG COOLANT TEMP	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Engine coolant temperature sensor Fuel injectors
FUEL PUMP RELAY	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> Harness and connectors Fuel pump relay
VIAS SOL VALVE	<ul style="list-style-type: none"> Ignition switch: ON Turn solenoid valve "ON" and "OFF" with CONSULT-II and listen for operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> Harness and connectors Solenoid valve

TROUBLE DIAGNOSIS

[VQ]

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
ENGINE MOUNTING	<ul style="list-style-type: none"> ● Engine: After warming up, run engine at idle speed. ● Gear position: "D" range (Vehicle stopped) ● Turn electronic controlled engine mount "IDLE" and "TRVL" with the CONSULT-II. 	Body vibration changes according to the electronic controlled engine mount condition.	<ul style="list-style-type: none"> ● Harness and connectors ● Electronic controlled engine mount
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-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> ● Harness and connectors ● Solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> ● Change the fuel tank temperature using CONSULT-II. 		
VENT CONTROL/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connectors ● Solenoid valve
VC/V BYPASS/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connectors ● Solenoid valve
V/T ASSIGN ANGLE	<ul style="list-style-type: none"> ● Engine: Return to the original trouble condition ● Change intake valve timing using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> ● Harness and connectors ● Intake valve timing control solenoid valve

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

For details, refer to [EC-679, "SYSTEM READINESS TEST \(SRT\) CODE"](#) .

SRT Work Support Mode

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

DTC Work Support Mode

Test mode	Test item	Condition	Reference page
EVAP SYSTEM	PURGE FLOW P0441	Refer to corresponding trouble diagnosis for DTC.	EC-957
	EVAP SML LEAK P0442/P1442		EC-963
	EVAP V/S SML LEAK P0456/P1456		EC-998
	PURG VOL CN/V P1444		EC-1135
	VC CUT/V BP/V P1491		EC-1166
HO2S1	HO2S1 (B1) P0133		EC-836
	HO2S1 (B1) P0134		EC-847
	HO2S1 (B1) P1143		EC-1066
	HO2S1 (B1) P1144		EC-1072
	HO2S1 (B2) P0153		EC-836
	HO2S1 (B2) P0154		EC-847
	HO2S1 (B2) P1163		EC-1066
	HO2S1 (B2) P1164		EC-1072
HO2S2	HO2S2 (B1) P0139		EC-867
	HO2S2 (B1) P1146		EC-1079
	HO2S2 (B1) P1147	EC-1089	
	HO2S2 (B2) P0159	EC-867	
	HO2S2 (B2) P1166	EC-1079	
	HO2S2 (B2) P1167	EC-1089	

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

Description

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

1. “AUTO TRIG” (Automatic trigger):

- The malfunction will be identified on the CONSULT-II screen in real time.

In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM.

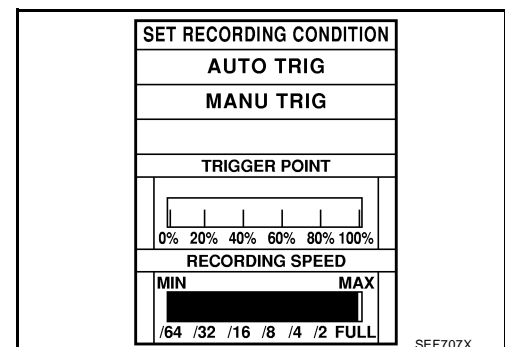
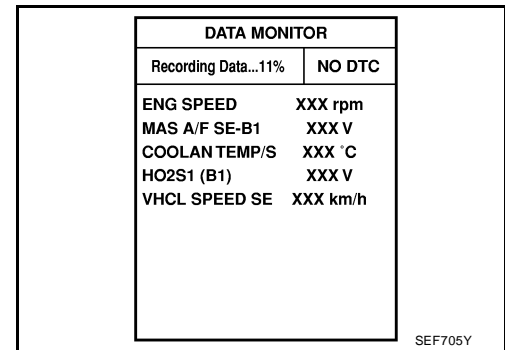
At the moment a malfunction is detected by ECM, “MONITOR” in “DATA MONITOR” screen is changed to “Recording Data ... xx%” as shown at right, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, “REAL-TIME DIAG” screen is displayed. If “STOP” is touched on the screen during “Recording Data ... xx%”, “REAL-TIME DIAG” screen is also displayed.

The recording time after the malfunction detection and the recording speed can be changed by “TRIGGER POINT” and “Recording Speed”. Refer to CONSULT-II OPERATION MANUAL.

2. “MANU TRIG” (Manual trigger):

- DTC/1st trip DTC and malfunction item will not be displayed automatically on CONSULT-II screen even though a malfunction is detected by ECM.

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



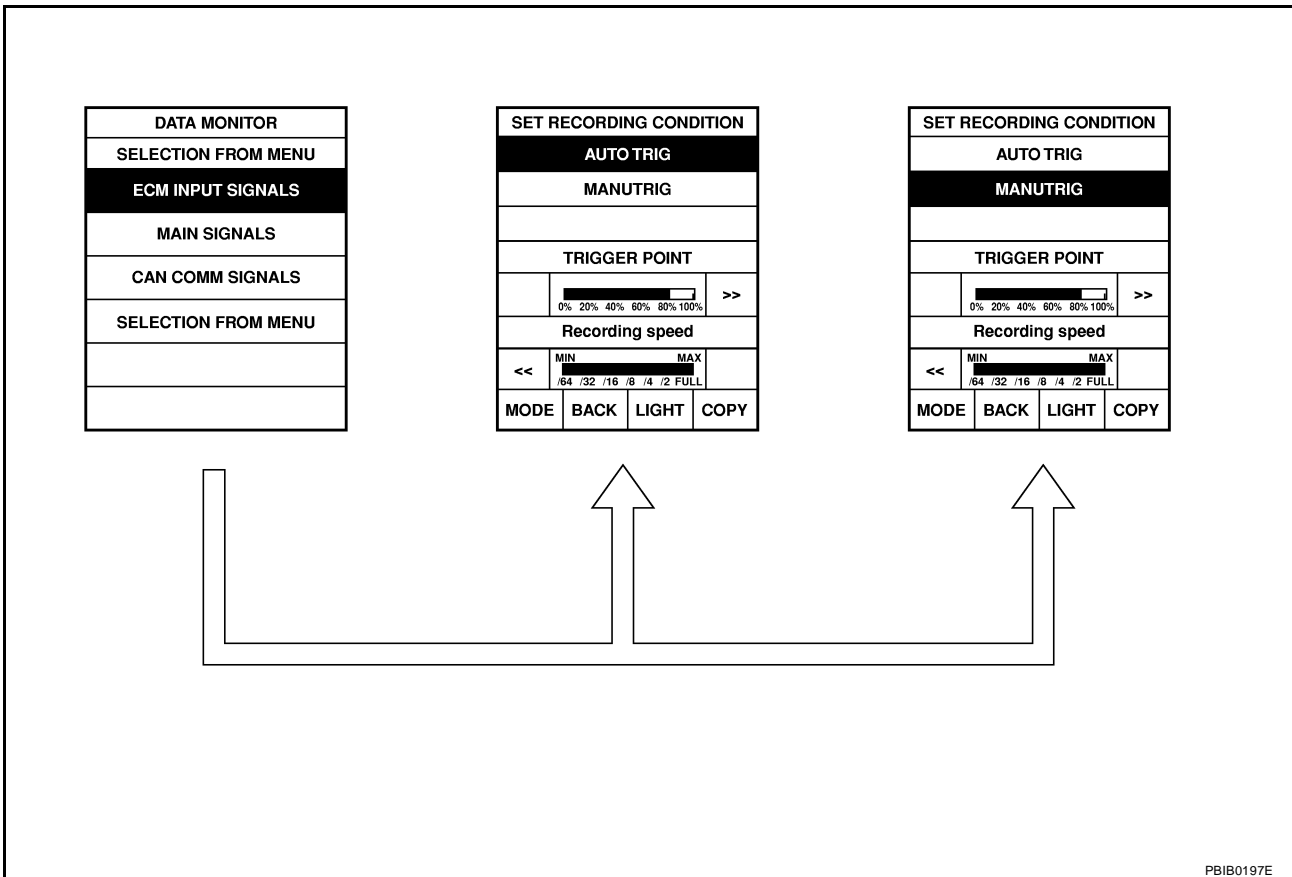
Operation

1. “AUTO TRIG”

TROUBLE DIAGNOSIS

[VQ]

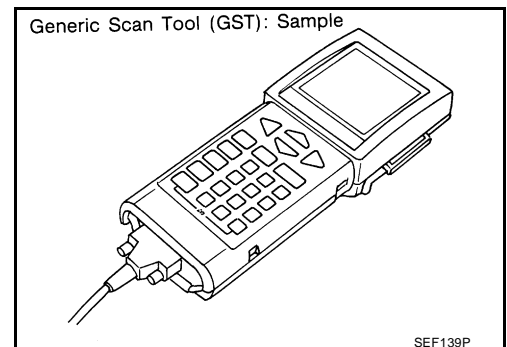
- While trying to detect the DTC/1st trip DTC by performing the “DTC Confirmation Procedure”, be sure to select to “DATA MONITOR (AUTO TRIG)” mode. You can confirm the malfunction at the moment it is detected.
 - While narrowing down the possible causes, CONSULT-II should be set in “DATA MONITOR (AUTO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



Generic Scan Tool (GST) Function DESCRIPTION

UBS0035W

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained below. ISO9141 is used as the protocol. The name “GST” or “Generic Scan Tool” is used in this service manual.



TROUBLE DIAGNOSIS

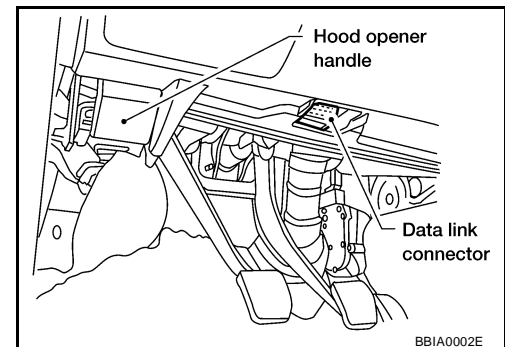
[VQ]

FUNCTION

Diagnostic test mode		Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-678, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA" .
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> ● Clear number of diagnostic trouble codes (MODE 1) ● Clear diagnostic trouble codes (MODE 3) ● Clear trouble code for freeze frame data (MODE 1) ● Clear freeze frame data (MODE 2) ● Reset status of system monitoring test (MODE 1) ● Clear on board monitoring test results (MODE 6 and 7)
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode can close EVAP system in ignition switch "ON" position (Engine stopped). When this mode is performed, the following parts can be opened or closed. <ul style="list-style-type: none"> ● EVAP canister vent control valve open ● Vacuum cut valve bypass valve closed In the following conditions, this mode 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
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

GST INSPECTION PROCEDURE

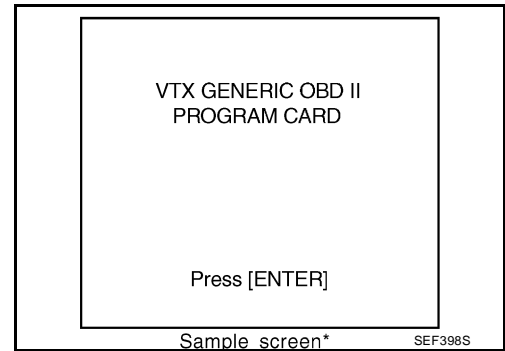
1. Turn ignition switch OFF.
2. Connect "GST" to data link connector, which is located under LH dash panel near the fuse box cover.



TROUBLE DIAGNOSIS

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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.)

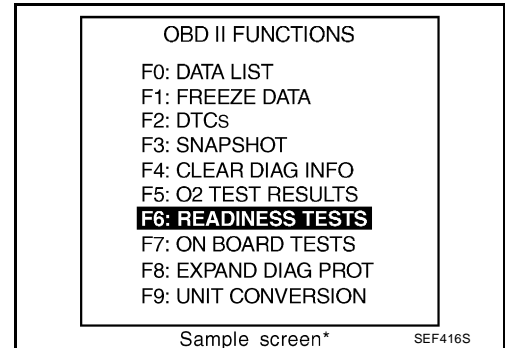


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5. Perform each diagnostic mode according to each service procedure.
For further information, see the GST Operation Manual of the tool maker.



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TROUBLE DIAGNOSIS

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UBS0035X

CONSULT-II Reference Value in Data Monitor

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	<ul style="list-style-type: none"> ● Tachometer: Connect ● Run engine and compare tachometer indication with the CONSULT-II value. 		Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load 	Idle	Approx. 1.1 - 1.5V
		2,500 rpm	Approx. 1.7 - 2.4V
COOLAN TEMP/S	<ul style="list-style-type: none"> ● Engine: After warming up 		More than 70°C (158°F)
HO2S1 (B1) HO2S1 (B2)	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> ● Engine: After warming up 	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	<ul style="list-style-type: none"> ● Engine: After warming up 	Revving engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH
VEH SPEED SE	<ul style="list-style-type: none"> ● Turn drive wheels and compare speedometer indication with the CONSULT-II value. 		Almost the same speed as the CONSULT-II value
BATTERY VOLT	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) 		11 - 14V
ACCEL SEN1 ACCEL SEN2	<ul style="list-style-type: none"> ● Ignition switch: ON (engine stopped) 	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
THRTL SEN1 THRTL SEN2	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T model) 1st (M/T model) 	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
EVAP SYS PRES	<ul style="list-style-type: none"> ● Ignition switch: ON 		Approx. 1.8 - 4.8V
ABSOL PRES/SE	<ul style="list-style-type: none"> ● Ignition switch: ON 		Approx. 4.4V
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	ON
		Shift lever: Except above	OFF
PW/ST SIGNAL	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON
LOAD SIGNAL	<ul style="list-style-type: none"> ● Ignition switch: ON 	Rear window defogger switch is ON and/or lighting switch is in 2nd.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF
IGNITION SW	<ul style="list-style-type: none"> ● Ignition switch: ON → OFF → ON 		ON → OFF → ON

TROUBLE DIAGNOSIS

[VQ]

MONITOR ITEM	CONDITION	SPECIFICATION	
HEATER FAN SW	● Engine: After warming up, idle the engine	Heater fan is operating.	ON
		Heater fan is not operating	OFF
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1 INJ PULSE-B2	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
B/FUEL SCHDL	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	2.3 - 2.9 msec
		2,000 rpm	2.3 - 2.9 msec
IGN TIMING	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	13° - 18° BTDC
		2,000 rpm	25° - 45° BTDC
A/F ALPHA-B1 A/F ALPHA-B2	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	54% - 155%
CAL/LD VALUE	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	2.0 - 6.0 g-m/s
		2,500 rpm	7.0 - 20.0 g-m/s
PURG VOL C/V	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	0%
		2,000 rpm	—
INT/V TIM (B1) INT/V TIM (B2)	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	-5° - 5°C
		2,000 rpm	Approx. 0° - 30°C
INT/V SOL (B1) INT/V SOL (B2)	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	0% - 2%
		2,000 rpm	Approx. 25% - 50%
VIAS S/V	● Engine: After warming up	1,800 - 3,600 rpm	ON
		Except above conditions	OFF
AIR COND RLY	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
ENGINE MOUNT	● Engine: Running	Idle	IDLE
		2,000 rpm	TRVL
FUEL PUMP RLY	● For 1 second after turning ignition switch ON ● Engine running or cranking		ON
		● Except above conditions	OFF

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TROUBLE DIAGNOSIS

[VQ]

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPAS S/V	● Ignition switch: ON	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 94°C (201°F) or less
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F)
		Engine coolant temperature is 100°C (212°F) or more
HO2S1 HTR (B1)	● Engine speed: Below 3,600 rpm	ON
HO2S1 HTR (B2)	● Engine speed: Above 3,600 rpm	OFF
HO2S2 HTR (B1)	● Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more]	ON
HO2S2 HTR (B2)	● 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.
AC PRESS SEN	● Ignition switch: ON (Engine stopped)	Approx. 0V
	<ul style="list-style-type: none"> ● Engine: Idle ● Air conditioner switch: OFF 	1.0 - 4.0V
VEH SPEED SE	● Turn drive wheels and compare speedometer indication with the CONSULT-II value.	Almost the same speed as the CONSULT-II value
SET VHCL SPD	● Engine: Running	ASCD: Operating.
MAIN SW	● Ignition switch: ON	CRUISE switch: Depressed
		CRUISE switch: Released
CANCEL SW	● Ignition switch: ON	CANCEL switch: Depressed
		CANCEL switch: Released
RESUME/ACC SW	● Ignition switch: ON	ACCEL/RES switch: Depressed
		ACCEL/RES switch: Released
SET SW	● Ignition switch: ON	COAST/SET switch: Depressed
		COAST/SET switch: Released
BRAKE SW1	● Ignition switch: ON	Brake pedal: Fully released
		Brake pedal: Slightly depressed
BRAKE SW2	● Ignition switch: ON	Brake pedal: Fully released
		Brake pedal: Slightly depressed
CRUISE LAMP	● Ignition switch: ON	CRUISE lamp: Illuminated
		CRUISE lamp: Not illuminated
SET LAMP	● Ignition switch: ON	SET lamp: Illuminated
		SET lamp: Not illuminated

TROUBLE DIAGNOSIS

[VQ]

MONITOR ITEM	CONDITION	SPECIFICATION
CAN COMM	● Ignition switch: ON	OK
CAN CIRC 1		OK
CAN CIRC 2		OK (Models with TCS) UNKWN (Models without TCS)
CAN CIRC 3		OK (A/T models) UNKWN (M/T models)
CAN CIRC 4		OK
CAN CIRC 5		UNKWN
CAN CIRC 6		OK
CAN CIRC 7		OK

Major Sensor Reference Graph in Data Monitor Mode

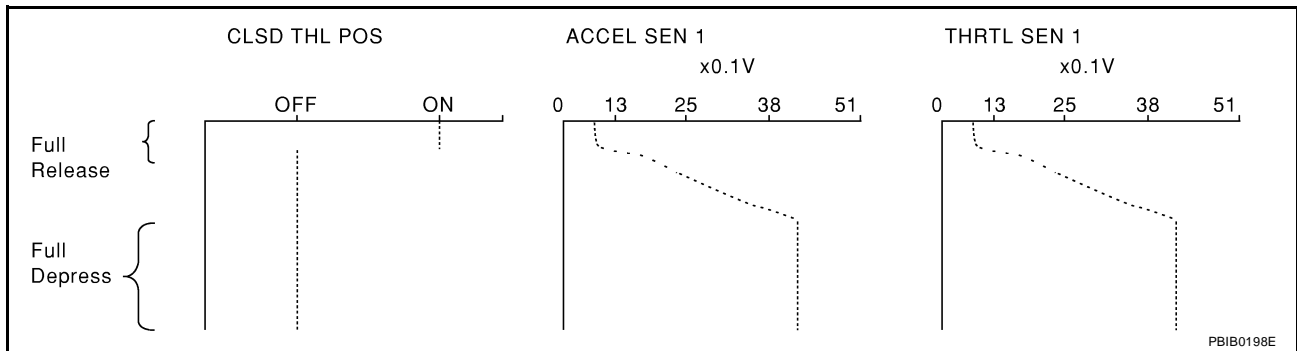
UBS0035Y

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

CLSD THL POS, ACCEL SEN 1, THRTL SEN 1

Below is the data for "CLSD THL POS", "ACCEL SEN 1" and "THRTL SEN 1" when depressing the accelerator pedal with the ignition switch "ON" and with selector lever in "D" position (A/T models) or with shift lever in "1st" position (M/T models).

The signal of "ACCEL SEN 1" and "THRTL SEN 1" should rise gradually without any intermittent drop or rise after "CLSD THL POS" is changed from "ON" to "OFF".



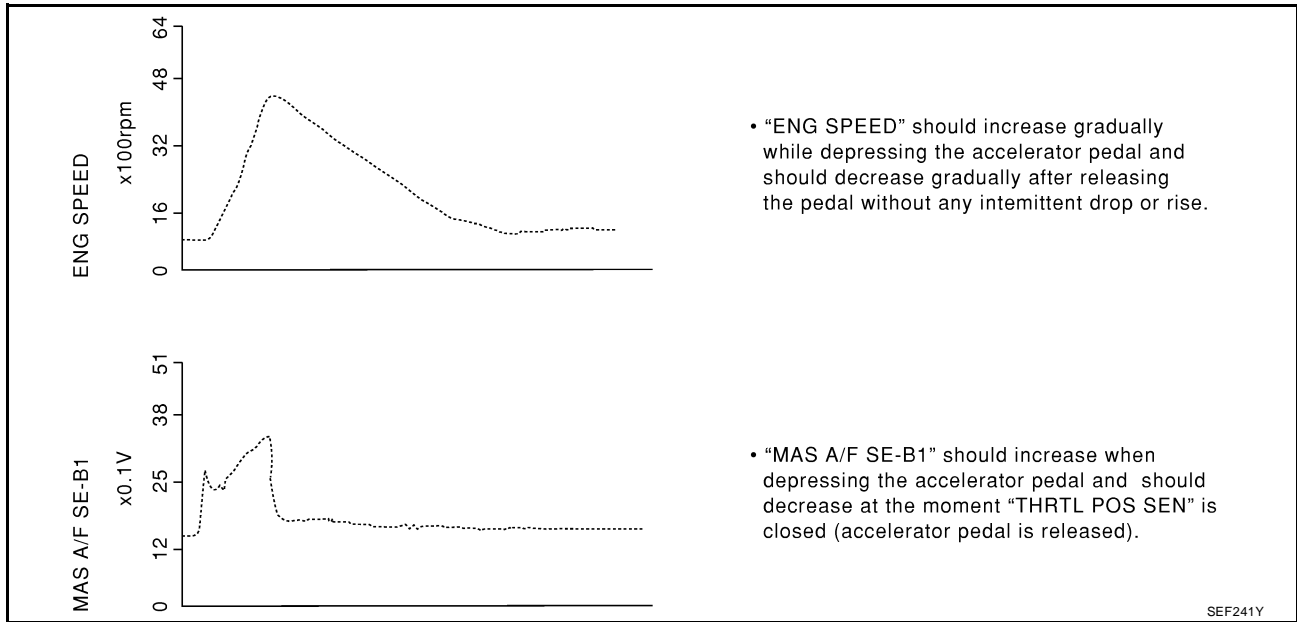
ENG SPEED, MAS A/F SE-B1, THRTL SEN 1, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1

Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL SEN 1", "HO2S2 (B1)", "HO2S1 (B1)" and "INJ PULSE-B1" when revving engine quickly up to 4,800 rpm under no load after warming up engine sufficiently.

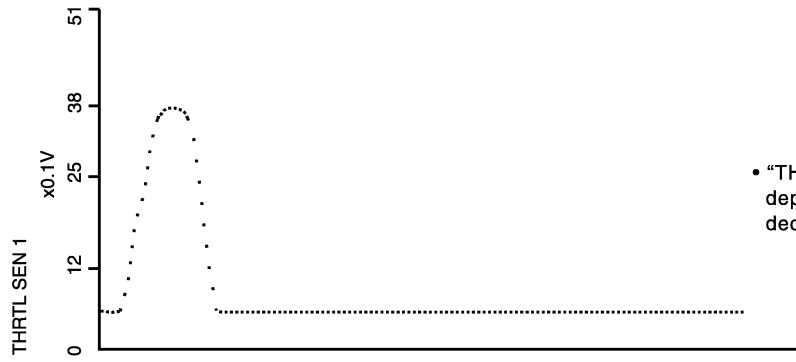
TROUBLE DIAGNOSIS

[VQ]

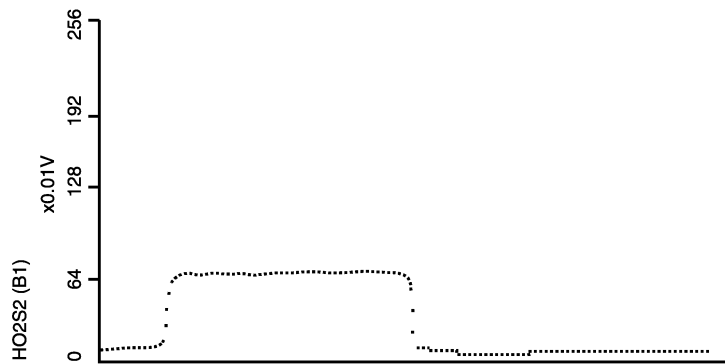
Each value is for reference, the exact value may vary.



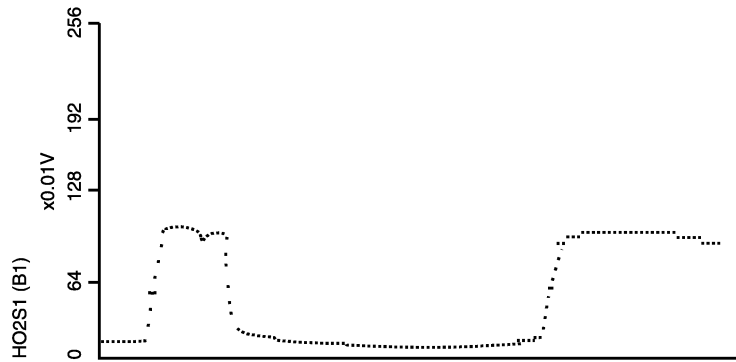
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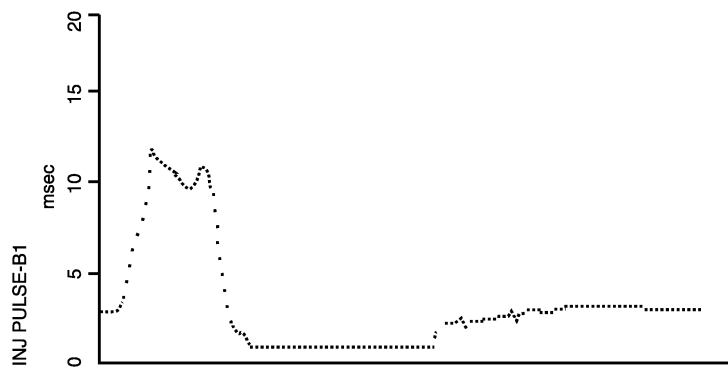
- "THRTL SEN 1" should increase while depressing the accelerator pedal and should decrease while releasing it.



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



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



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

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

PFP:00031

Description

UBS0035Z

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

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

UBS00360

- Vehicle driven distance: More than 5,000 km (3,017 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*1
- Electrical load: Not applied*2
- Engine speed: Idle

*1: For A/T models with CONSULT-II, after the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T fluid temperature sensor signal) indicates more than 60°C (140°F). For A/T models without CONSULT-II and M/T models, after the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.

*2: Rear window defogger switch, air conditioner switch, lighting switch are “OFF”. Steering wheel is straight ahead.

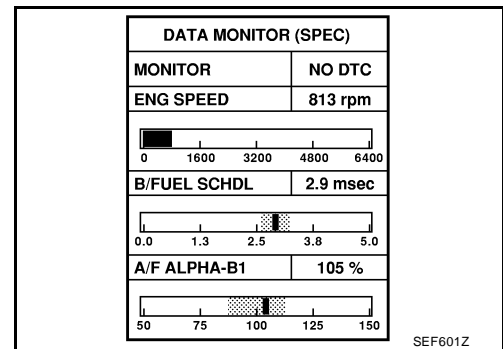
Inspection Procedure

UBS00361

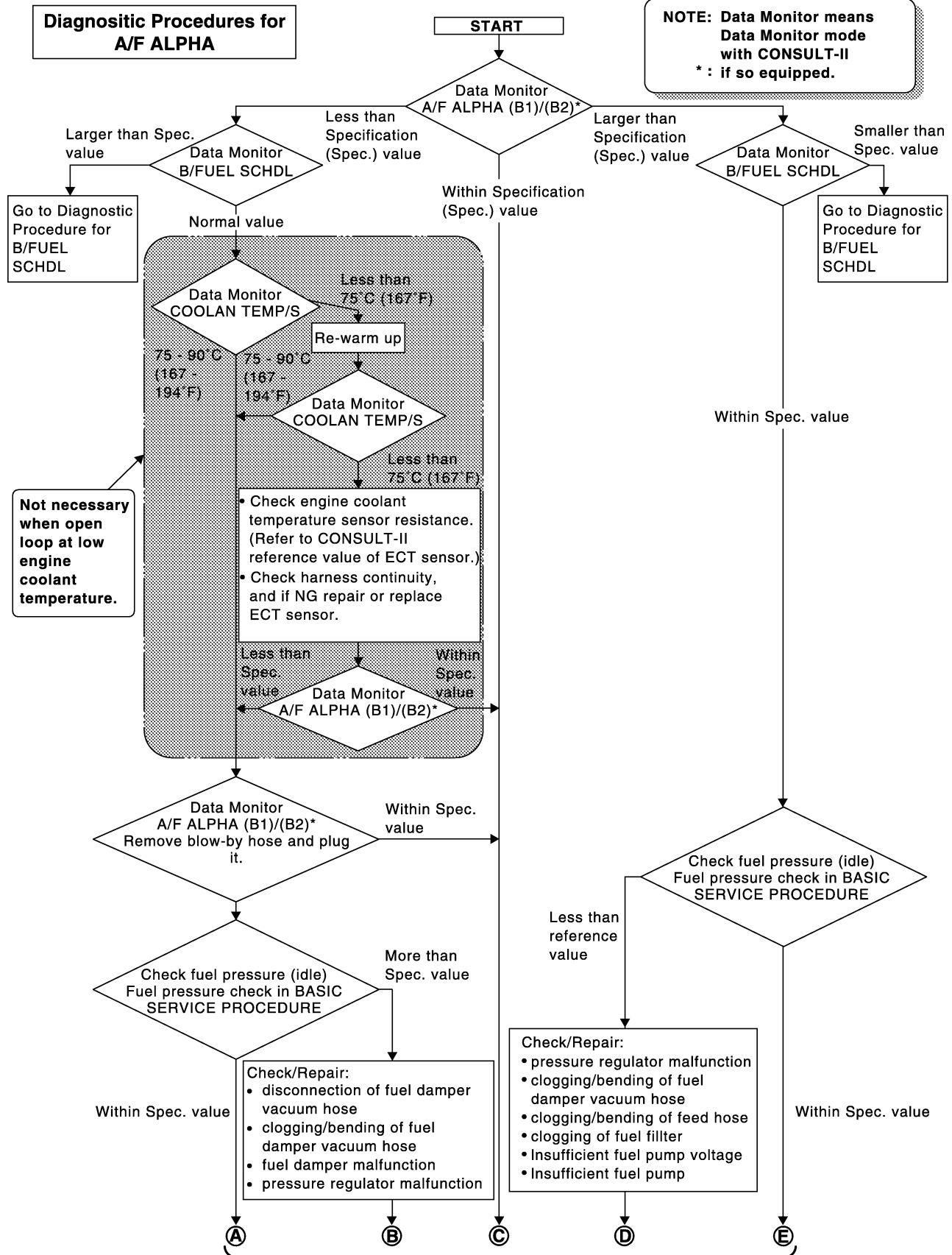
NOTE:

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

1. Perform [EC-705, "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 “DATA MONITOR (SPEC)” mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to [EC-753, "Diagnostic Procedure"](#) .



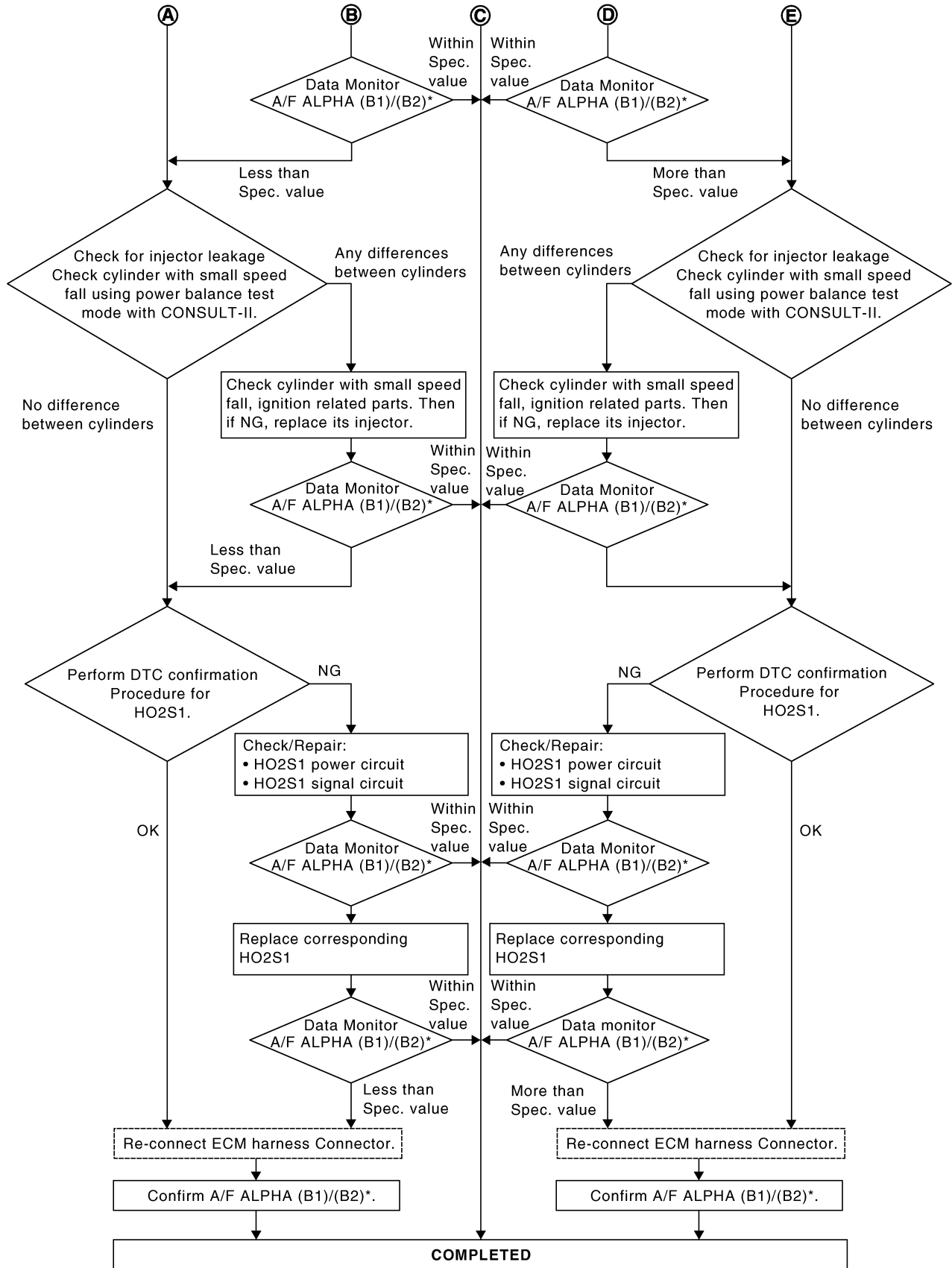
Diagnostic Procedure



(Go to next page.)

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

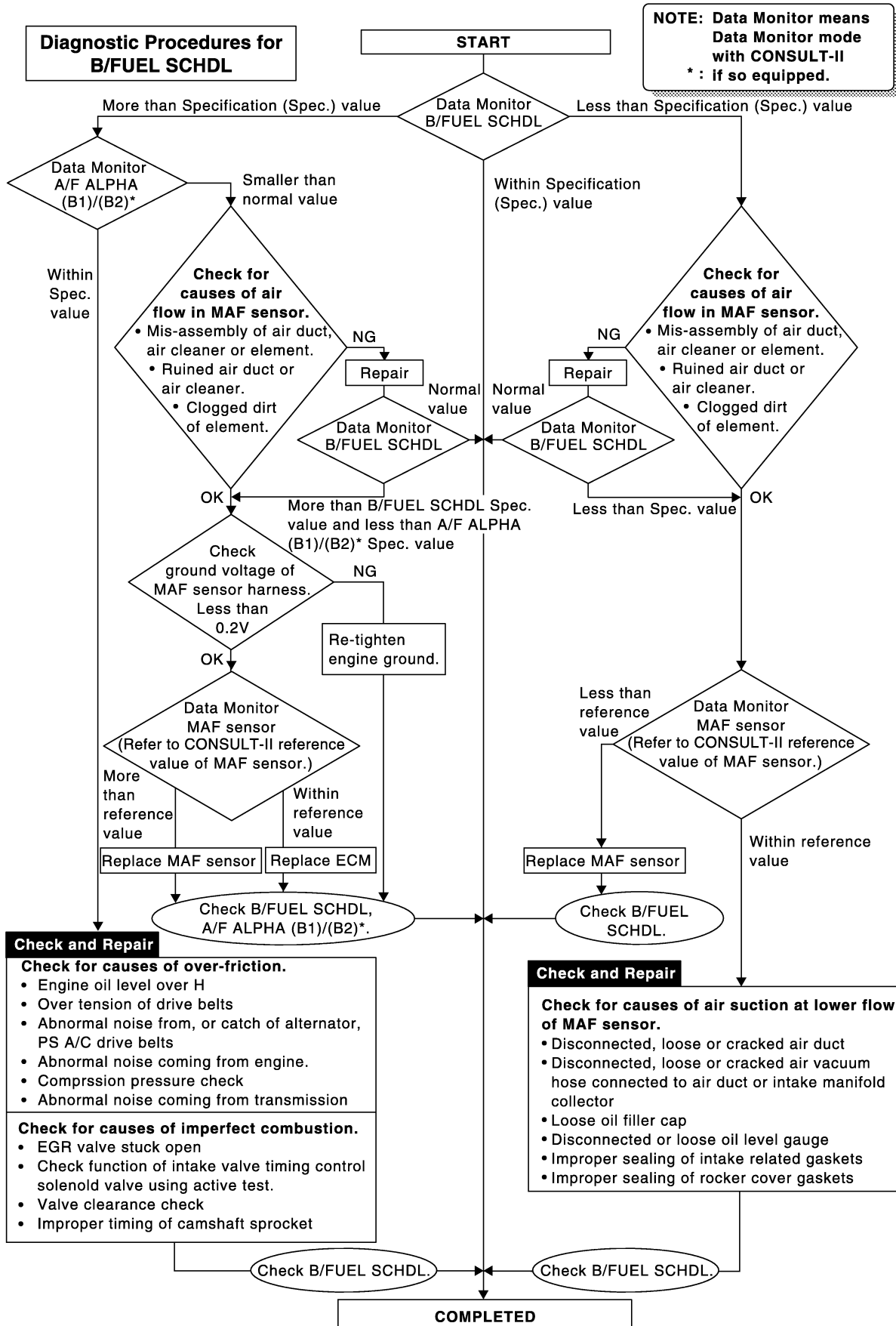
[VQ]



SEF768Z

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[VQ]



A
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SEF615ZA

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

Description

UBS00363

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

Common I/I Report Situations

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

Diagnostic Procedure

UBS00364

1. INSPECTION START

Erase (1st trip) DTCs. Refer to [EC-687, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

>> GO TO 2.

2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.

Refer to [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#) , "CIRCUIT INSPECTION", "Ground Inspection".

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3. SEARCH FOR ELECTRICAL INCIDENT

Perform [GI-25, "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-22, "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 CIRCUIT FOR ECM

[VQ]

POWER SUPPLY CIRCUIT FOR ECM

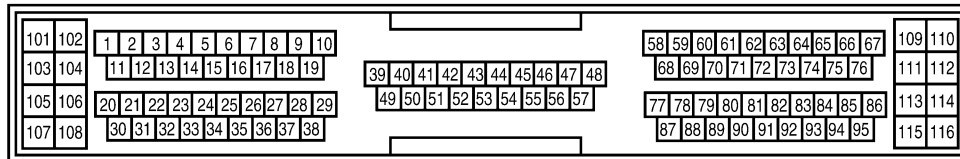
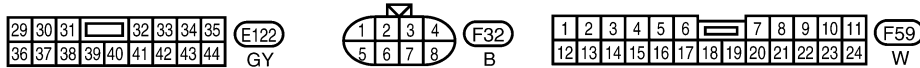
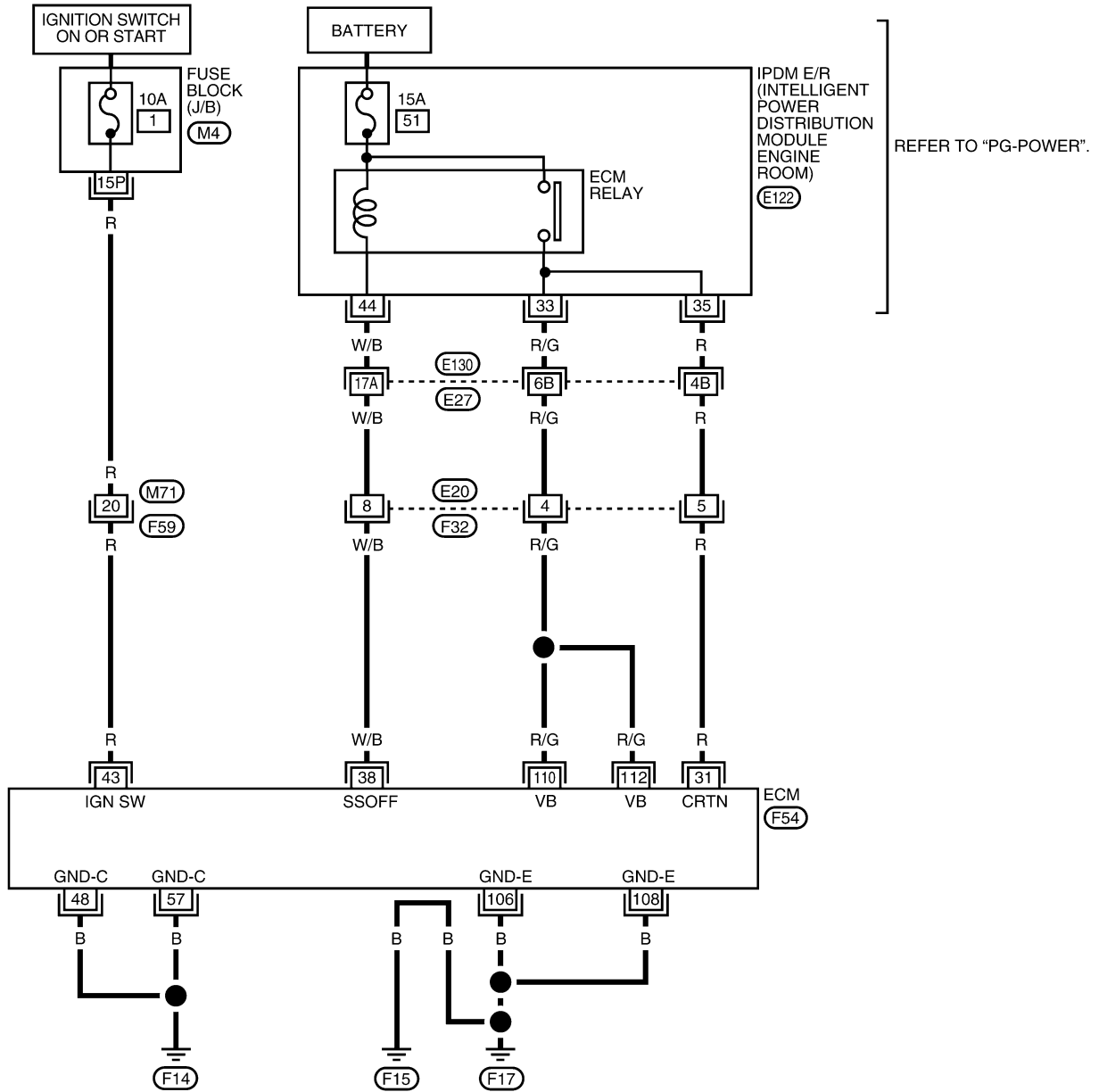
PPF:24110

Wiring Diagram

UBS00365

EC-MAIN-01

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



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (M4) - FUSE BLOCK - JUNCTION BOX (J/B)



POWER SUPPLY CIRCUIT FOR ECM

[VQ]

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
31	R	Counter current return	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
38	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For a few seconds after turning ignition switch "OFF"	0 - 1.5V
			[Ignition switch "OFF"] ● A few seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
43	R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
48 57 106 108	B B B B	ECM ground	[Engine is running] ● Idle speed	Engine ground
110 112	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00366

1. INSPECTION START

Start engine.

Is engine running?

Yes or No

Yes >> GO TO 6.

No >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

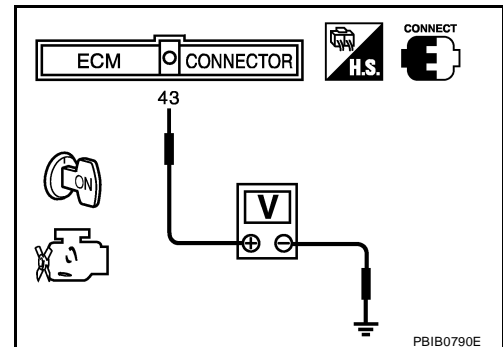
1. Turn ignition switch "OFF" and then "ON".
2. Check voltage between ECM terminal 43 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, F59
- Fuse block (J/B) connector M4
- 10A fuse
- Harness for open or short between ECM and fuse

>> Repair harness or connectors.

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

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

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

5. CHECK ECM POWER SUPPLY CIRCUIT-II

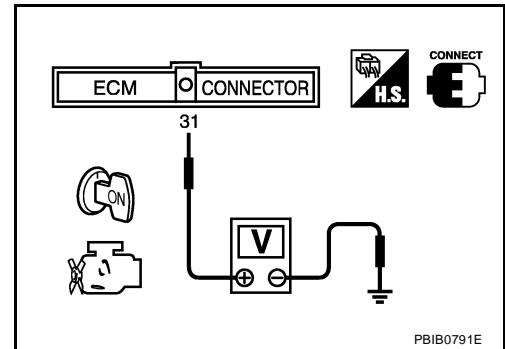
1. Reconnect ECM harness connector.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminal 31 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> Go to [EC-1210, "IGNITION SIGNAL"](#).

NG >> GO TO 6.



6. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch "ON" and then "OFF".
2. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester.

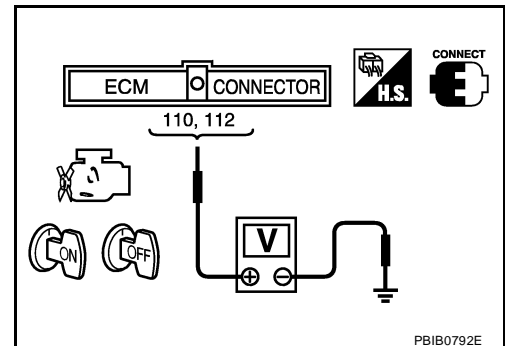
Voltage: After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop approximately 0V.

OK or NG

OK >> GO TO 7.

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

NG (Battery voltage exists for more than a few seconds.)>>GO TO 16.



7. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check harness continuity between ECM terminal 31 and IPDM E/R terminal 35. 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 16.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors E130, E27
- Harness or connectors E20, F32
- 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.

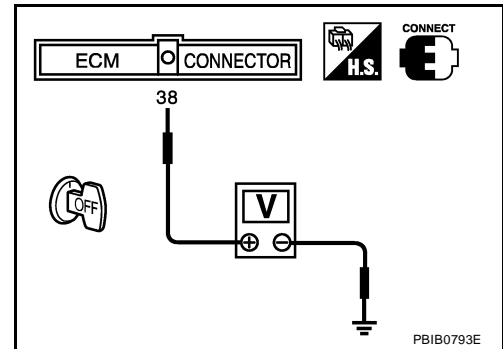
9. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Turn ignition switch "OFF".
2. Check voltage between ECM terminal 38 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



10. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check harness continuity between ECM terminals 110, 112 and IPDM E/R terminal 33. 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 >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors E130, E27
- Harness or connectors E20, F32
- 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.

12. CHECK ECM POWER SUPPLY CIRCUIT-VII

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check harness continuity between ECM terminal 38 and IPDM E/R terminal 44.
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 or connectors E130, E27
- Harness or connectors E20, F32
- 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.

14. CHECK 15A FUSE

1. Disconnect 15A fuse from IPDM E/R.
2. Check 15A fuse.

OK or NG

- OK >> GO TO 16.
NG >> Replace 15A fuse.

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

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 59, 60, 106, 108 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 16.
NG >> Repair open circuit or short to power in harness or connectors.

16. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R.

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

DTC U1000, U1001 CAN COMMUNICATION LINE

[VQ]

DTC U1000, U1001 CAN COMMUNICATION LINE

PDF:23710

Description

UBS00367

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

UBS00368

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000 1000	CAN communication line	● ECM cannot communicate to other control unit.	● Harness or connectors (CAN communication line is open or shorted)
U1001 1001		● ECM cannot communicate for more than the specified time.	

DTC Confirmation Procedure

UBS00369

1. Turn ignition switch "ON" and wait at least 3 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-765, "Diagnostic Procedure"](#).




DTC U1000, U1001 CAN COMMUNICATION LINE

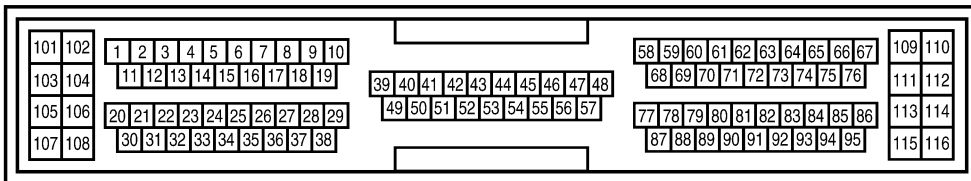
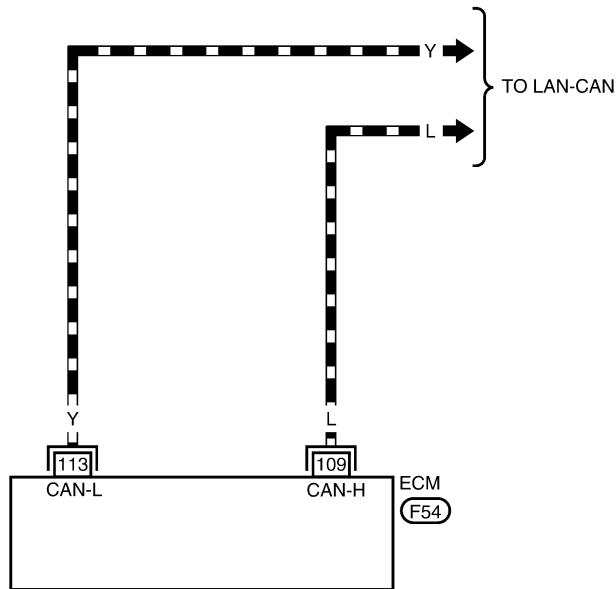
[VQ]

Wiring Diagram

UBS0036A

EC-CAN-01

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



BBWA0200E

Diagnostic Procedure

1. INSPECTION START

1. Turn ignition switch ON.
2. Select "CAN DIAG SUPPORT MNTR" in "DATA MONITOR" mode with CONSULT-II.
3. Print out the CONSULT-II screen.

Models with TCS

OK data	NG data																																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">DATA MONITOR</th> </tr> <tr> <th style="width: 50%;">MONITOR</th> <th style="width: 50%;">NO DTC</th> </tr> </thead> <tbody> <tr><td>CAN COMM</td><td>OK</td></tr> <tr><td>CAN CIRC 1</td><td>OK</td></tr> <tr><td>CAN CIRC 2</td><td>OK</td></tr> <tr><td>CAN CIRC 3</td><td>OK</td></tr> <tr><td>CAN CIRC 4</td><td>OK</td></tr> <tr><td>CAN CIRC 5</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 6</td><td>OK</td></tr> <tr><td>CAN CIRC 7</td><td>OK</td></tr> </tbody> </table>	DATA MONITOR		MONITOR	NO DTC	CAN COMM	OK	CAN CIRC 1	OK	CAN CIRC 2	OK	CAN CIRC 3	OK	CAN CIRC 4	OK	CAN CIRC 5	UNKWN	CAN CIRC 6	OK	CAN CIRC 7	OK	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">DATA MONITOR</th> </tr> <tr> <th style="width: 50%;">MONITOR</th> <th style="width: 50%;">NO DTC</th> </tr> </thead> <tbody> <tr><td>CAN COMM</td><td>OK</td></tr> <tr><td>CAN CIRC 1</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 2</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 3</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 4</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 5</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 6</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 7</td><td>UNKWN</td></tr> </tbody> </table>	DATA MONITOR		MONITOR	NO DTC	CAN COMM	OK	CAN CIRC 1	UNKWN	CAN CIRC 2	UNKWN	CAN CIRC 3	UNKWN	CAN CIRC 4	UNKWN	CAN CIRC 5	UNKWN	CAN CIRC 6	UNKWN	CAN CIRC 7	UNKWN
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A/T models without TCS

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PBIB0892E

M/T models without TCS

OK data	NG data																																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">DATA MONITOR</th> </tr> <tr> <th style="width: 50%;">MONITOR</th> <th style="width: 50%;">NO DTC</th> </tr> </thead> <tbody> <tr><td>CAN COMM</td><td>OK</td></tr> <tr><td>CAN CIRC 1</td><td>OK</td></tr> <tr><td>CAN CIRC 2</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 3</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 4</td><td>OK</td></tr> <tr><td>CAN CIRC 5</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 6</td><td>OK</td></tr> <tr><td>CAN CIRC 7</td><td>OK</td></tr> </tbody> </table>	DATA MONITOR		MONITOR	NO DTC	CAN COMM	OK	CAN CIRC 1	OK	CAN CIRC 2	UNKWN	CAN CIRC 3	UNKWN	CAN CIRC 4	OK	CAN CIRC 5	UNKWN	CAN CIRC 6	OK	CAN CIRC 7	OK	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">DATA MONITOR</th> </tr> <tr> <th style="width: 50%;">MONITOR</th> <th style="width: 50%;">NO DTC</th> </tr> </thead> <tbody> <tr><td>CAN COMM</td><td>OK</td></tr> <tr><td>CAN CIRC 1</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 2</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 3</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 4</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 5</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 6</td><td>UNKWN</td></tr> <tr><td>CAN CIRC 7</td><td>UNKWN</td></tr> </tbody> </table>	DATA MONITOR		MONITOR	NO DTC	CAN COMM	OK	CAN CIRC 1	UNKWN	CAN CIRC 2	UNKWN	CAN CIRC 3	UNKWN	CAN CIRC 4	UNKWN	CAN CIRC 5	UNKWN	CAN CIRC 6	UNKWN	CAN CIRC 7	UNKWN
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PBIB0893E

>> Go to [LAN-8, "CAN SYSTEM \(FOR TCS MODELS\)"](#) , [LAN-27, "CAN SYSTEM \(FOR A/T MODELS\)"](#) or [LAN-43, "CAN SYSTEM \(FOR M/T MODELS\)"](#) .

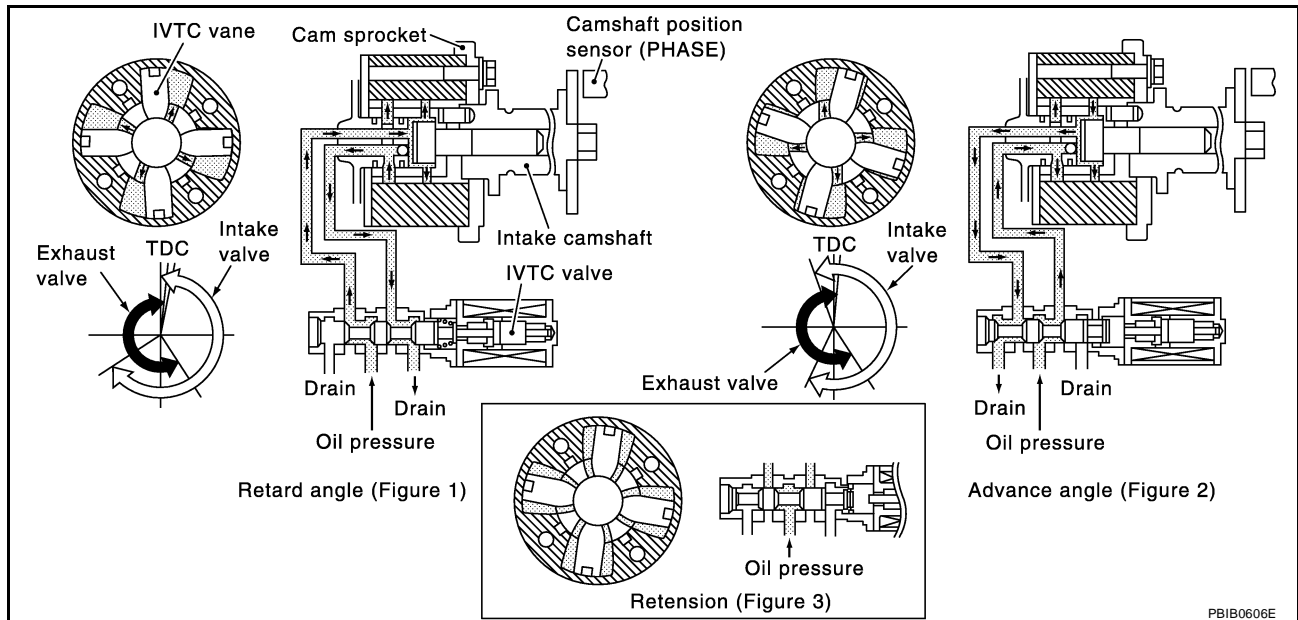
DTC P0011, P0021 IVT CONTROL

PFP:23796

Description
SYSTEM DESCRIPTION

UBS0036C

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



PBIB0606E

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.

COMPONENT DESCRIPTION

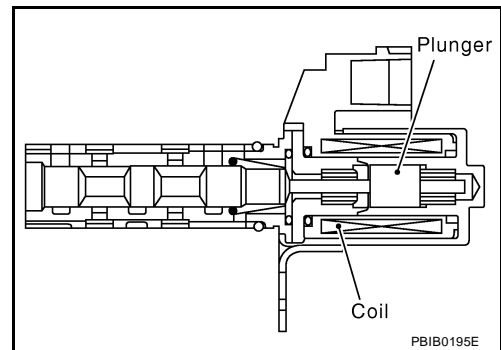
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

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.



PBIB0195E

CONSULT-II Reference Value in Data Monitor Mode

UBS0036D

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V TIM (B1) INT/V TIM (B2)	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle
		When revving engine up to 2,000 rpm quickly
		-5° - 5°C Approx. 0° - 30°C

DTC P0011, P0021 IVT CONTROL

[VQ]

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V SOL (B1) INT/V SOL (B2)	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load 	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly	Approx. 25% - 50%

On Board Diagnosis Logic

UBS0036E

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011 (Bank 1)	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	<ul style="list-style-type: none"> ● Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.)
P0021 0021 (Bank 2)			<ul style="list-style-type: none"> ● Intake valve timing control solenoid valve ● Crankshaft position sensor (POS) ● Camshaft position sensor (PHASE) ● Accumulation of debris to the signal pick-up portion of the camshaft

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode.

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

UBS0036F

CAUTION:

Always drive at a safe speed.

NOTE:

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

TESTING CONDITION:

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

Ⓟ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLANT TEMPS	70 - 105°C (176 - 194°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.)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLANTENP/S	XXX °C
VHCL SPEED SE	XXX km/h
INT/V TIM (B1)	XXX °CA
INT/V TIM (B2)	XXX °CA
INT/V SOL (B1)	XXX %
INT/V SOL (B2)	XXX %

SEF353Z

4. If the DTC is detected, go to [EC-771, "Diagnostic Procedure"](#).

Ⓟ WITH GST

Follow the procedure "WITH CONSULT-II" above.

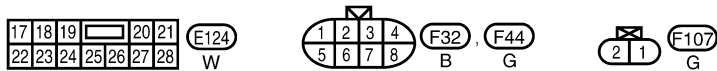
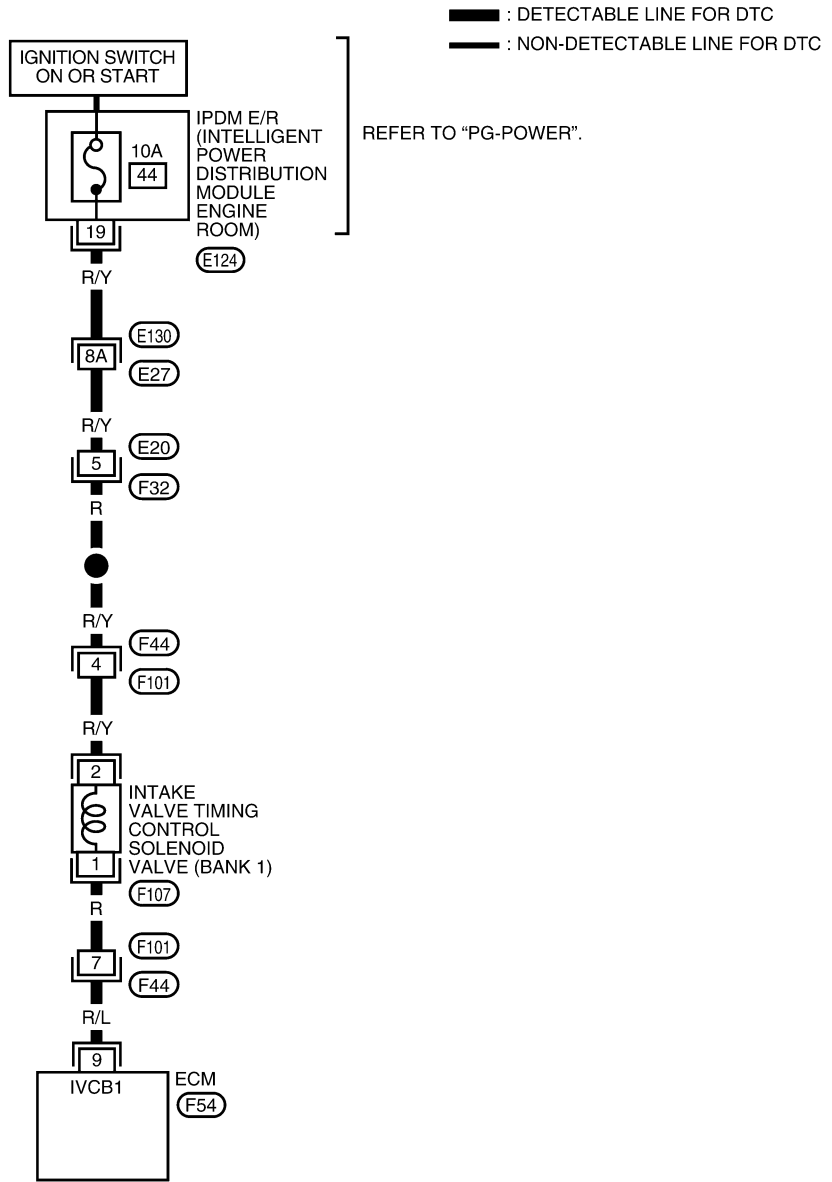
DTC P0011, P0021 IVT CONTROL

[VQ]

Wiring Diagram BANK 1

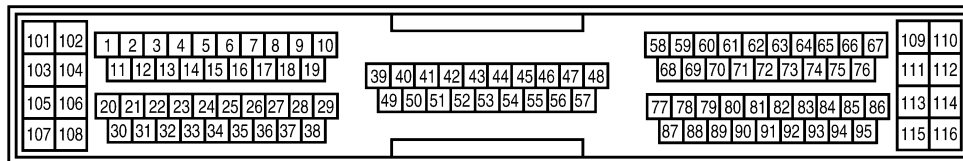
UBS0036G

EC-IVCB1-01



REFER TO THE FOLLOWING.

E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0077E

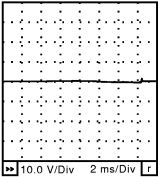
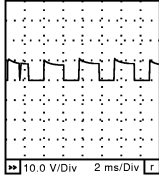
DTC P0011, P0021 IVT CONTROL

[VQ]

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
9	R/L	Intake valve timing control solenoid valve (bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC988C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,500 rpm 	<p>7 - 12V★</p>  <p style="text-align: right; font-size: small;">SEC989C</p>

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

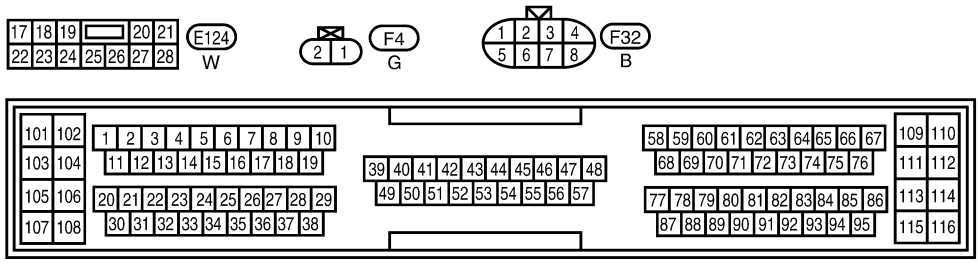
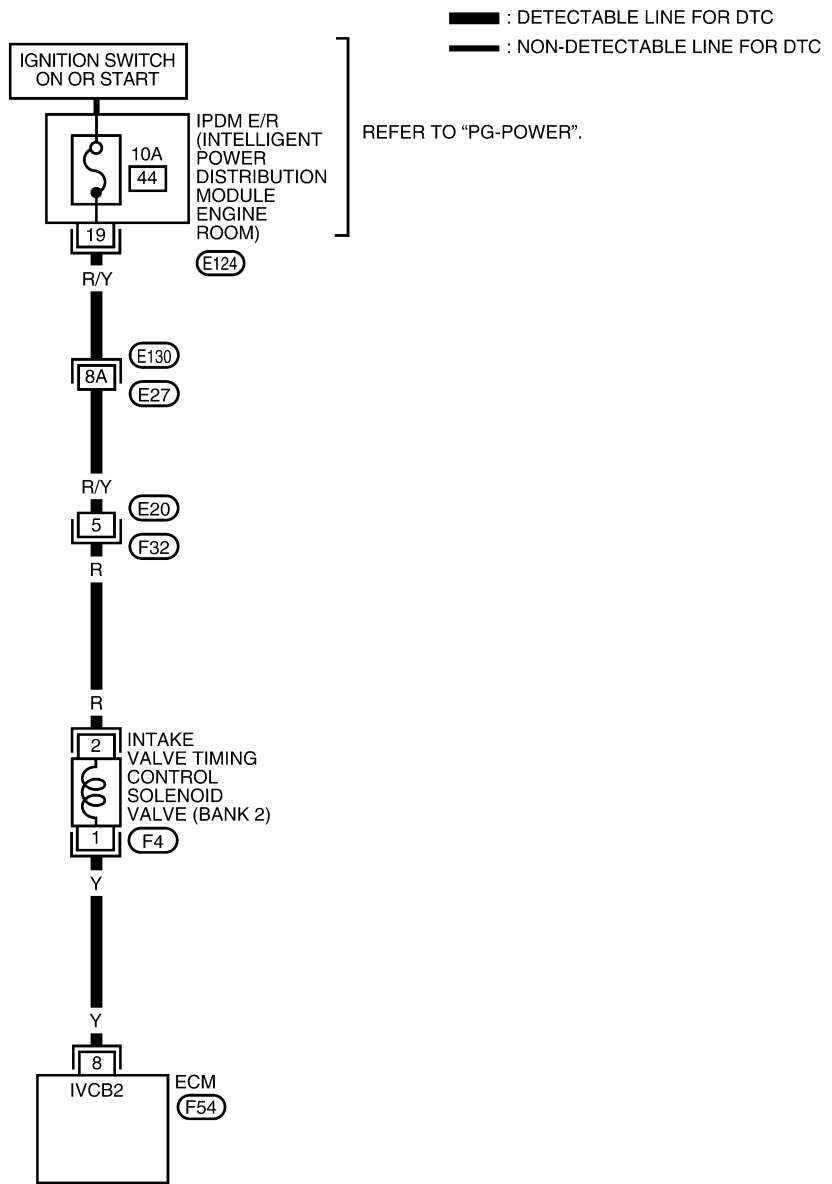
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DTC P0011, P0021 IVT CONTROL

[VQ]

BANK 2

EC-IVCB2-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0078E

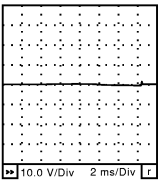
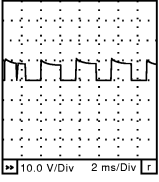
Specification data are reference values and are measured between each terminal and ground.

DTC P0011, P0021 IVT CONTROL

[VQ]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	Y	Intake valve timing control solenoid valve (bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>SEC988C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,500 rpm 	<p>7 - 12V★</p>  <p>SEC989C</p>

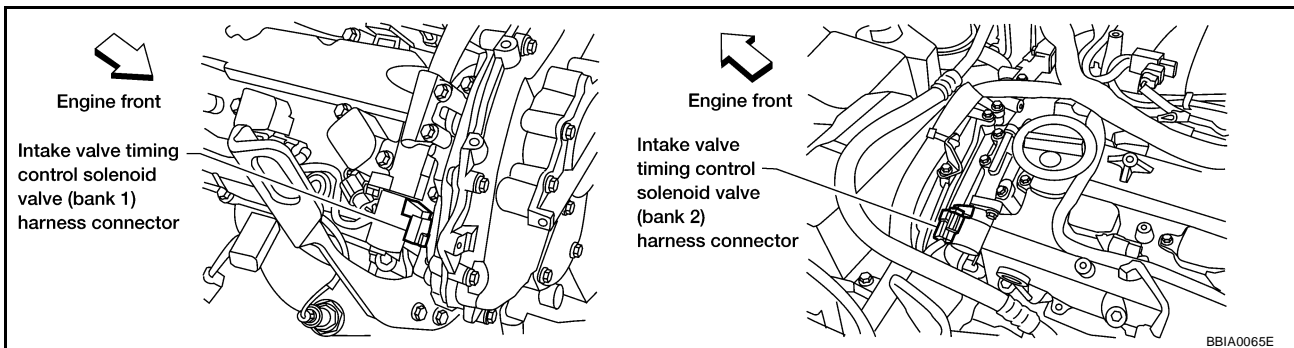
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS0036H

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

1. Turn ignition switch "OFF".
2. Disconnect intake valve timing control solenoid valve harness connector.

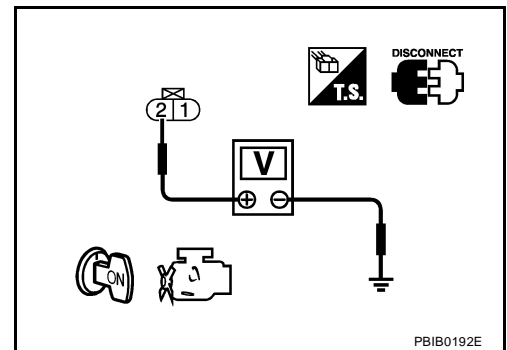


3. Turn ignition switch "ON".
4. Check voltage between intake valve timing control solenoid valve terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



PBIB0192E

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Harness connectors F44, F101
- IPDM E/R harness connector E124
- 10A fuse
- Harness for open or short between intake valve timing control solenoid valve and fuse

>> Repair 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 9 (bank 1) or 8 (bank 2) 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 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F44, F101
- Harness for open and short between ECM and intake valve timing control solenoid valve and fuse

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

5. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-773, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
NG >> Replace intake valve timing control solenoid valve.

6. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-943, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
NG >> Replace crankshaft position sensor (POS).

7. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-951, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
NG >> Replace camshaft position sensor (PHASE).

8. CHECK CAMSHAFT

Check accumulation of debris to the signal pick-up portion of the camshaft. Refer to [EM-134, "CAMSHAFT"](#) .
 OK or NG

- OK >> GO TO 9.
- NG >> Remove debris and clean the signal pick-up cutout of camshaft.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .
 For wiring diagram, refer to [EC-940](#) for CKP sensor (POS), and [EC-946](#) for CMP sensor (PHASE).

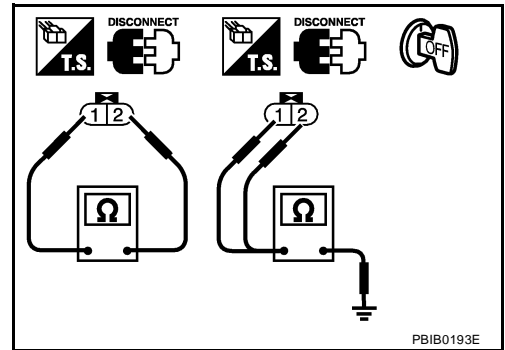
>> INSPECTION END

Component Inspection
INTAKE VALVE TIMING CONTROL SOLENOID VALVE

UBS0036I

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

Terminals	Resistance
1 and 2	7.0 - 7.5Ω at 20°C (68°F)
1 or 2 and ground	∞Ω (Continuity should not exist)



PBIB0193E

UBS0036J

Removal and Installation
INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EM-146, "TIMING CHAIN"](#) .

DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

[VQ]

DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

PFP:22690

Description SYSTEM DESCRIPTION

UBS0036K

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater

The ECM performs ON/OFF control of the heated oxygen sensor 1 heater corresponding to the engine speed.

OPERATION

Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

UBS0036L

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1) HO2S1 HTR (B2)	● Engine speed: Below 3,600 rpm	ON
	● Engine speed: Above 3,600 rpm	OFF

On Board Diagnosis Logic

UBS0036M

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031 (Bank 1)	Heated oxygen sensor 1 heater control circuit low	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	<ul style="list-style-type: none"> ● Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.) ● Heater oxygen sensor 1 heater
P0051 0051 (Bank 2)			
P0032 0032 (Bank 1)	Heated oxygen sensor 1 heater control circuit high	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	<ul style="list-style-type: none"> ● Harness or connectors (The heated oxygen sensor 1 heater circuit is shorted.) ● Heater oxygen sensor 1 heater
P0052 0052 (Bank 2)			

DTC Confirmation Procedure

UBS0036N

NOTE:

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

TESTING CONDITION:

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

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.

DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

[VQ]

3. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
4. Start engine and run it for at least 6 seconds at idle speed.
5. If 1st trip DTC is detected, go to [EC-779, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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 run it for at least 6 seconds at idle speed.
 4. Turn ignition switch "OFF" and wait at least 10 seconds.
 5. Start engine and run it for at least 6 seconds at idle speed.
 6. Select "MODE 3" with GST.
 7. If DTC is detected, go to [EC-779, "Diagnostic Procedure"](#).
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

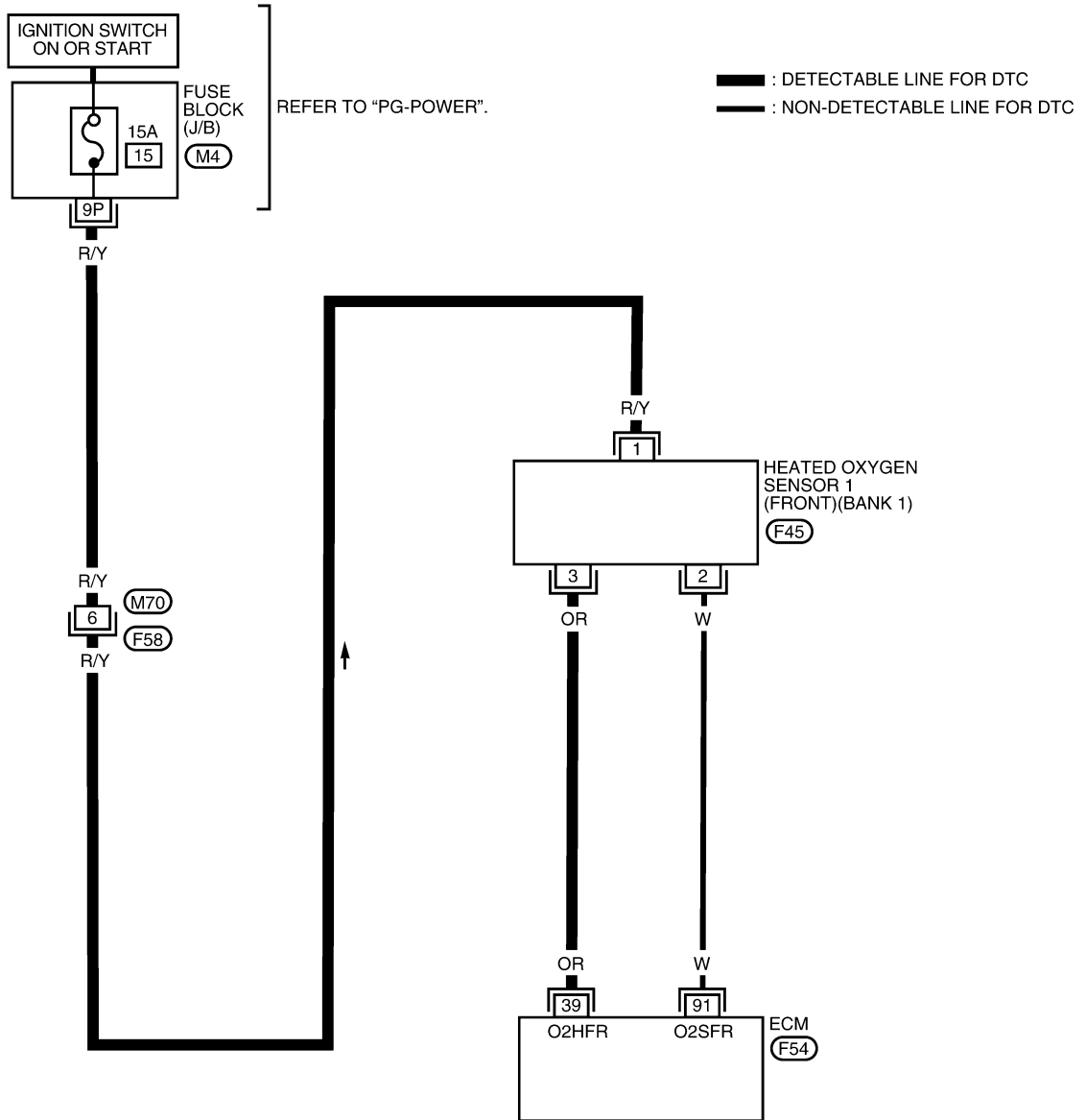
DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

[VQ]

UBS00360

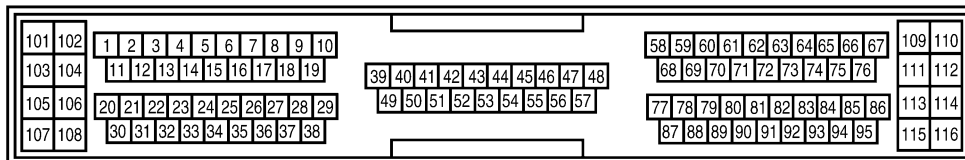
Wiring Diagram BANK 1

EC-O2H1B1-01



REFER TO THE FOLLOWING.

M4 - FUSE BLOCK
- JUNCTION BOX (J/B)



DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

[VQ]

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
39	OR	Heated oxygen sensor 1 heater (bank 1)	[Engine is running] ● Engine speed is below 3,600 rpm.	0 - 1.0V
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

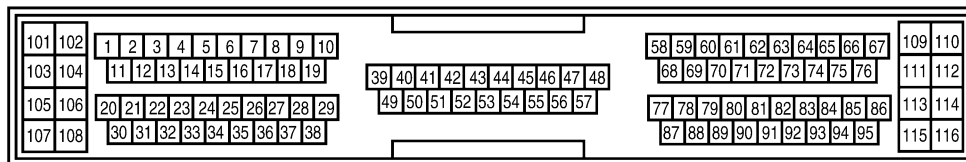
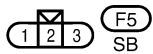
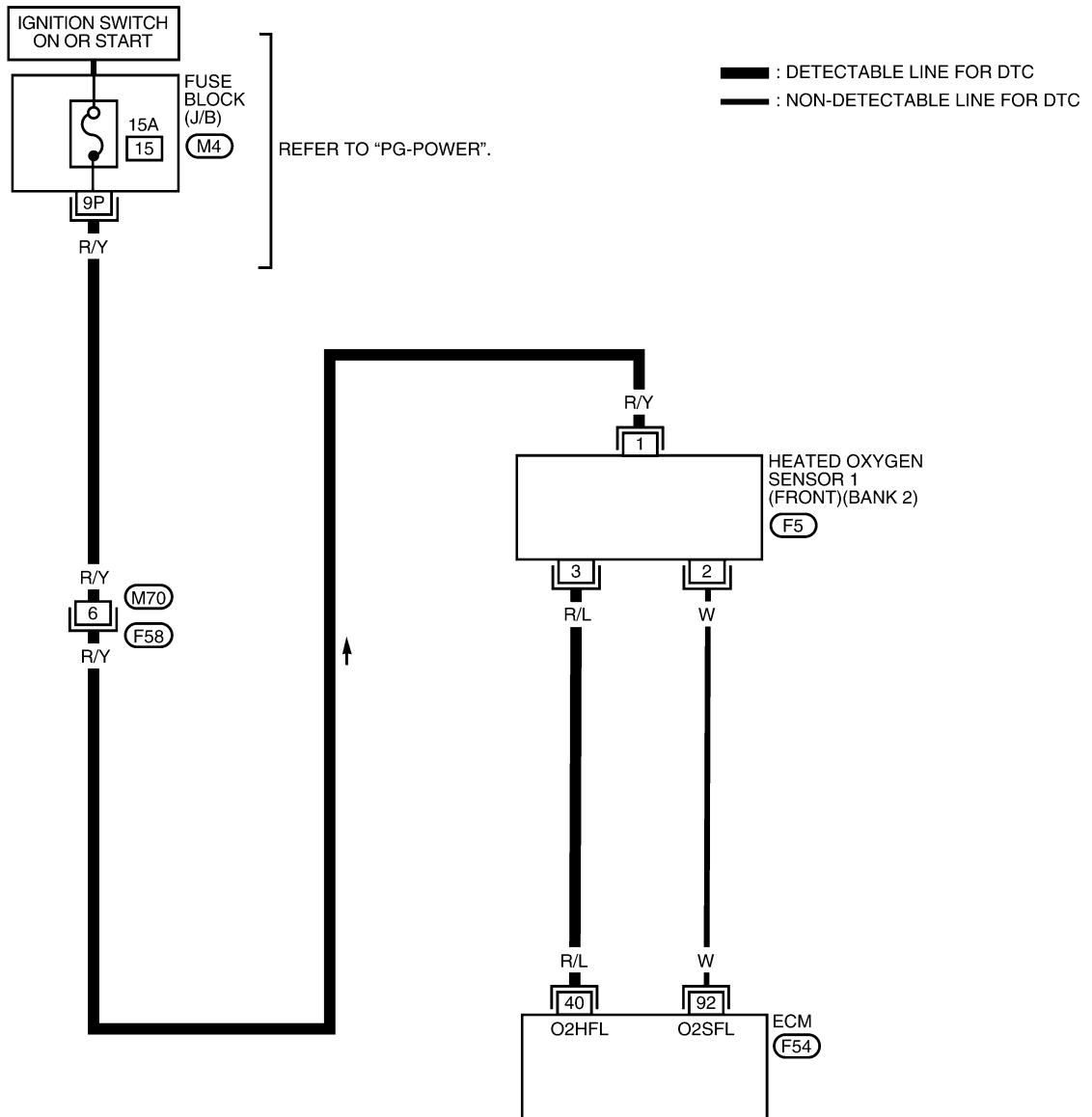
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DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

[VQ]

BANK 2

EC-O2H1B2-01



REFER TO THE FOLLOWING.
M4 - FUSE BLOCK
- JUNCTION BOX (J/B)



BBWA0057E

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
40	R/L	Heated oxygen sensor 1 heater (bank 2)	[Engine is running] ● Engine speed is below 3,600 rpm.	0 - 1.0V
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

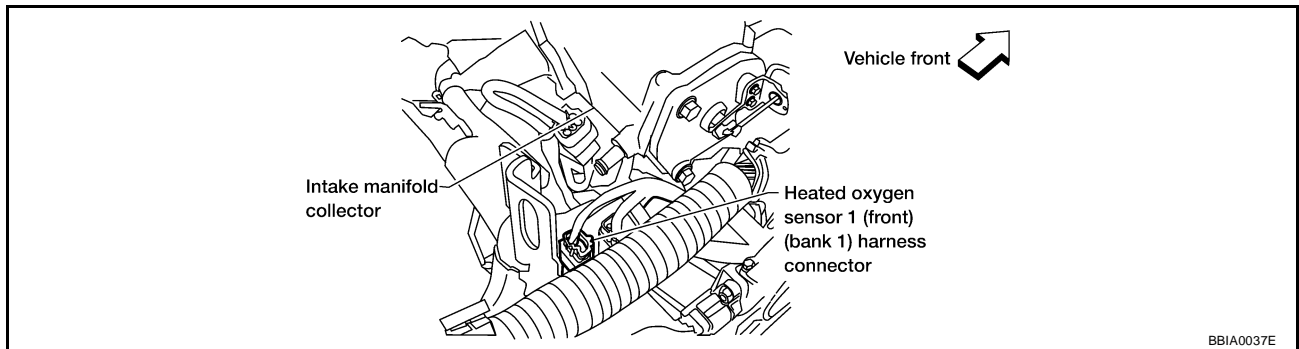
Diagnostic Procedure

UBS0036P

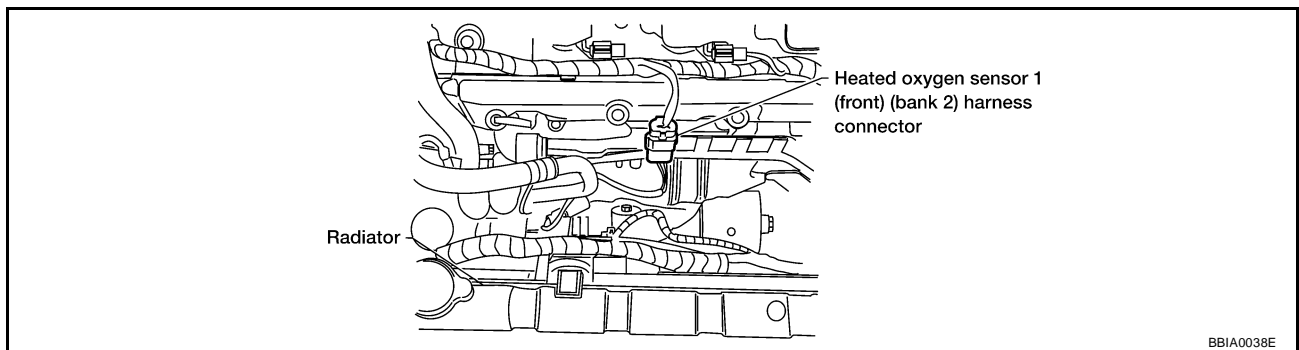
1. CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.

Bank 1



Bank 2

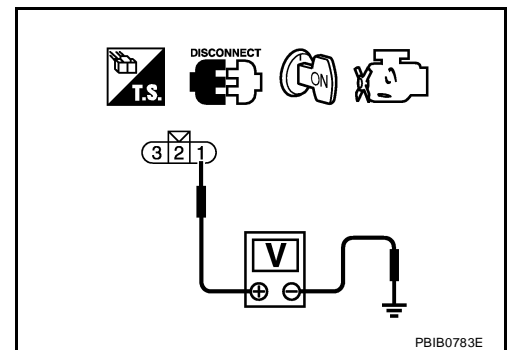


3. Turn ignition switch "ON".
4. Check voltage between HO2S1 terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M70, F58
- Fuse block (J/B) connector M4
- 15A fuse
- Harness for open or short between heated oxygen sensor 1 and fuse

>> Repair harness or connectors.

3. CHECK HO2S1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0031, P0032	39	3	1
P0051, P0052	40	3	2

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 HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-780, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace malfunctioning heated oxygen sensor 1.

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 1 HEATER

UBS0036Q

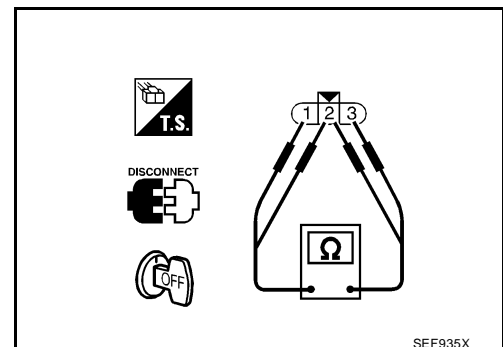
1. Check resistance between HO2S1 terminals as follows.

Terminal No.	Resistance
1 and 3	2.3 - 4.3 Ω at 25°C (77°F)
2 and 1, 3	$\infty \Omega$ (Continuity should not exist)

2. If NG, replace heated oxygen sensor 1.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.



DTC P0031, P0032, P0051, P0052 HO2S1 HEATER

[VQ]

- 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.

A

Removal and Installation HEATED OXYGEN SENSOR 1

UBS0036R

Refer to [EM-116, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

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DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

[VQ]

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

PF2:226A0

Description SYSTEM DESCRIPTION

UBS0036S

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)			

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

UBS0036T

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1) HO2S2 HTR (B2)	● Engine speed: Below 3,800 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more]	ON
	● Engine speed: Above 3,600 rpm	OFF

On Board Diagnosis Logic

UBS0036U

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 1 heater.)	<ul style="list-style-type: none"> ● Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.) ● Heater oxygen sensor 1 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 1 heater.)	<ul style="list-style-type: none"> ● Harness or connectors (The heated oxygen sensor 1 heater circuit is shorted.) ● Heater oxygen sensor 1 heater
P0058 0058 (Bank 2)			

DTC Confirmation Procedure

UBS0036V

NOTE:

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

TESTING CONDITION:

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

④ WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine.
3. Drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

[VQ]

4. Stop vehicle and let engine idle for at least 6 seconds.
5. If 1st trip DTC is detected, go to [EC-787, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

1. Start engine.
 2. Drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
 3. Stop vehicle and let engine idle for at least 6 seconds.
 4. Turn ignition switch "OFF" and wait at least 10 seconds.
 5. Start engine.
 6. Drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
 7. Stop vehicle and let engine idle for at least 6 seconds.
 8. Select "MODE 3" with GST.
 9. If DTC is detected, go to [EC-787, "Diagnostic Procedure"](#) .
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

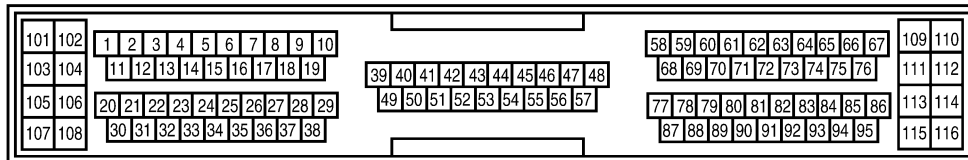
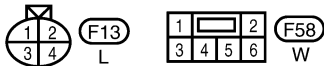
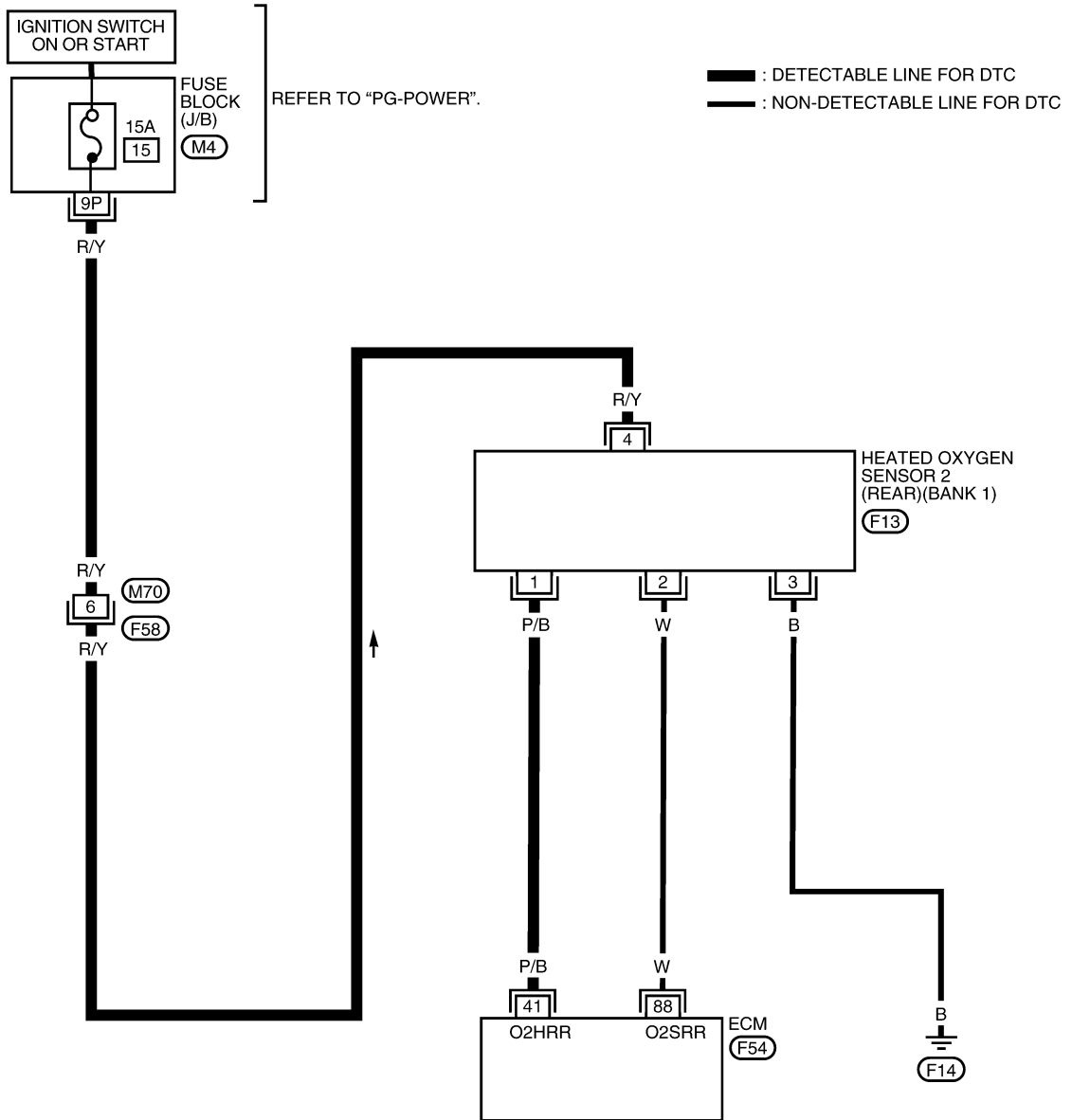
DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

[VQ]

Wiring Diagram BANK 1

UBS0036W

EC-O2H2B1-01



REFER TO THE FOLLOWING.

- M4 - FUSE BLOCK
- J/B - JUNCTION BOX (J/B)



BBWA0060E

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

[VQ]

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
41	P/B	Heated oxygen sensor 2 heater (bank 1)	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more. 	0 - 1.0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Engine stopped [Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)

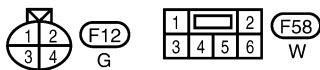
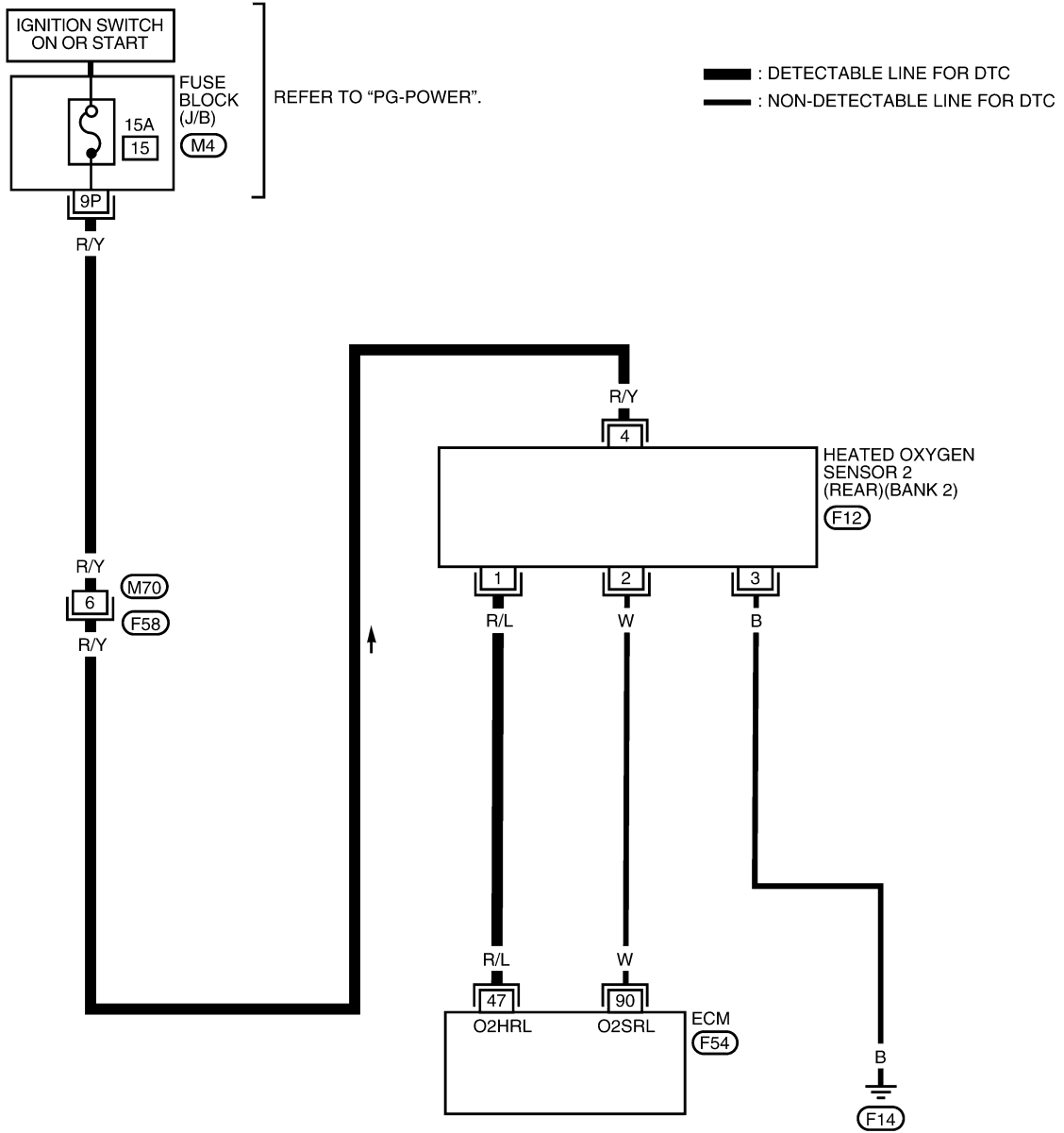
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DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

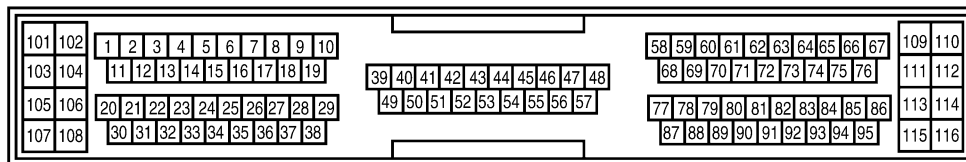
[VQ]

BANK 2

EC-O2H2B2-01



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0061E

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	R/L	Heated oxygen sensor 2 heater (bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> Engine speed is below 3,600 rpm. After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more. 	0 - 1.0V
			<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 is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)

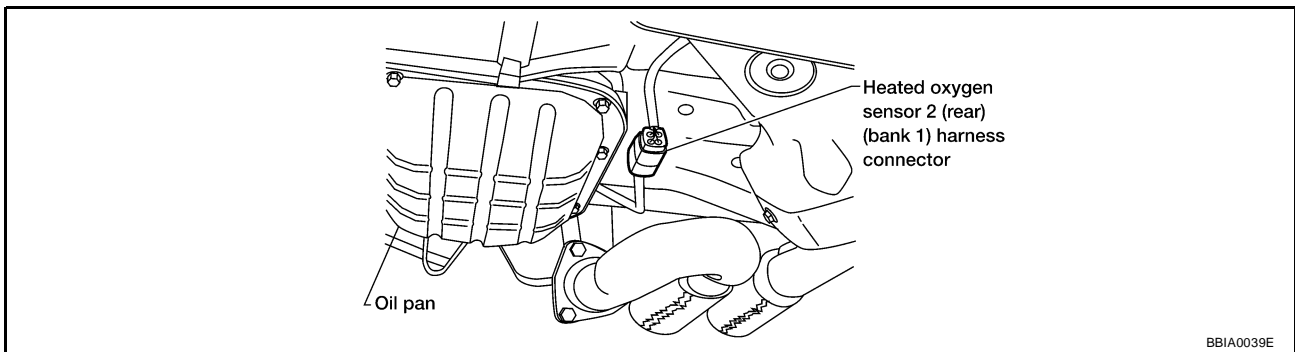
Diagnostic Procedure

UBS0036X

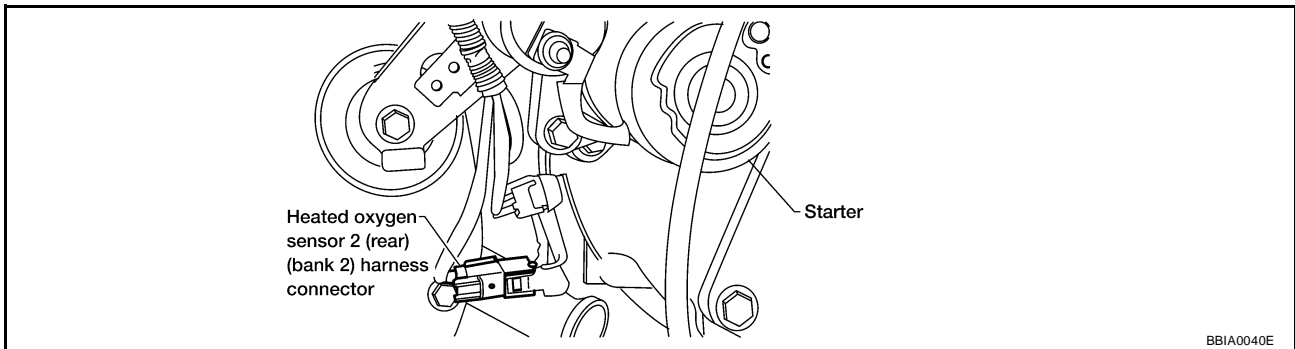
1. CHECK HO2S2 POWER SUPPLY CIRCUIT

- Turn ignition switch "OFF".
- Disconnect heated oxygen sensor 2 harness connector.

Bank 1



Bank 2

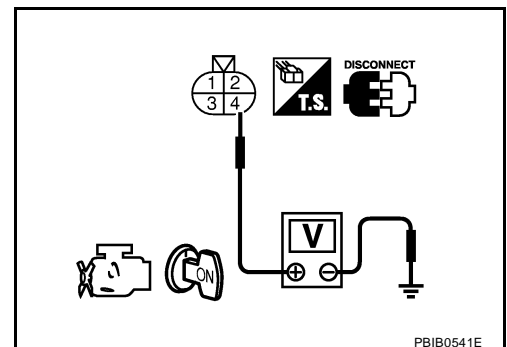


- Turn ignition switch "ON".
- Check voltage between HO2S2 terminal 4 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M70, F58
- Fuse block (J/B) connector M4
- 15A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair harness or connectors.

3. 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 and HO2S2 terminal as follows.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0037, P0038	41	1	1
P0057, P0058	47	1	2

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 HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-789, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace malfunctioning heated oxygen sensor 2.

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

Component Inspection
HEATED OXYGEN SENSOR 2 HEATER

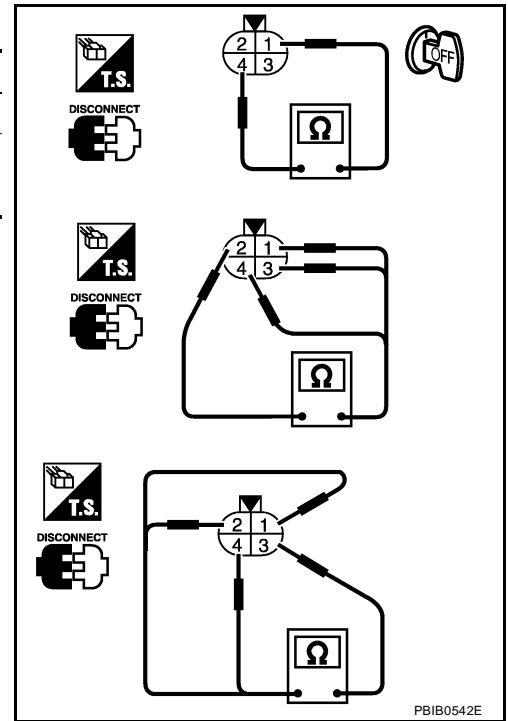
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
1 and 4	2.3 - 4.3 Ω at 25°C (77°F)
2 and 1, 3, 4	∞ Ω
3 and 1, 2, 4	(Continuity should not exist)

2. If NG, replace heated oxygen sensor 2.

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.



Removal and Installation
HEATED OXYGEN SENSOR 2

Refer to [EX-6, "EXHAUST SYSTEM \(VQ35DE\)"](#) .

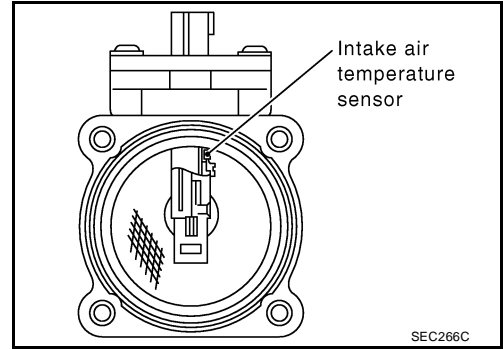
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DTC P0101 MAF SENSOR

Component Description

UBS00370

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

UBS00371

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle	1.1 - 1.5V
		2,500 rpm	1.7 - 2.4V
CAL/LD VALUE	ditto	Idle	10.0 - 35.0%
		2,500 rpm	10.0 - 35.0%
MASS AIRFLOW	ditto	Idle	2.0 - 6.0 g·m/s
		2,500 rpm	7.0 - 20.0 g·m/s

On Board Diagnosis Logic

UBS00372

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0101 0101	Mass air flow sensor circuit range/performance problem	A)	A high voltage from the sensor is sent to ECM under light load driving condition.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor
		B)	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 ● Mass air flow sensor

DTC Confirmation Procedure

UBS00373

Perform "PROCEDURE FOR MALFUNCTION A" first.

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

NOTE:

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

PROCEDURE FOR MALFUNCTION A

NOTE:

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

With CONSULT-II

1. Turn ignition switch "ON".

DTC P0101 MAF SENSOR

[VQ]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and warm it up to normal operating temperature.
4. Run engine for at least 10 seconds at idle speed.
5. If 1st trip DTC is detected, go to [EC-794, "Diagnostic Procedure"](#)

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

SEF174Y

With GST

Follow the procedure "With CONSULT-II" above.

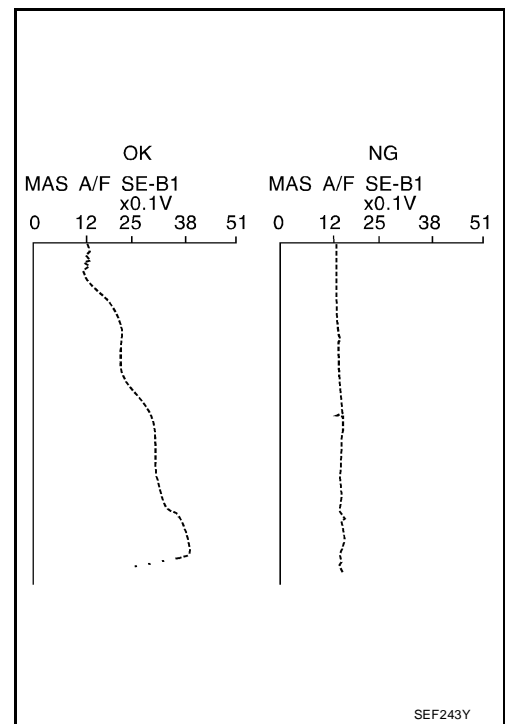
PROCEDURE FOR MALFUNCTION B

CAUTION:

Always drive vehicle at a safe speed.

With CONSULT-II

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
If engine cannot be started, go to [EC-794, "Diagnostic Procedure"](#) .
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
5. Increases engine speed to about 4,000 rpm.
6. Monitor the linear voltage rise in response to engine speed increases.
If NG, go to [EC-794, "Diagnostic Procedure"](#) .
If OK, go to following step.



7. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL SEN 1	More than 3V
THRTL SEN 2	More than 3V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

8. If 1st trip DTC is detected, go to [EC-794, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
THRTL SEN 1	XXX V
THRTL SEN 2	XXX V

PBIB0199E

Overall Function Check PROCEDURE FOR MALFUNCTION B

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

With GST

1. Start engine and warm it up to normal operating temperature.
2. Select "MODE 1" with GST.
3. Check the mass air flow sensor signal with "MODE 1".
4. Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.
5. If NG, go to [EC-794, "Diagnostic Procedure"](#) .

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

SEF534P

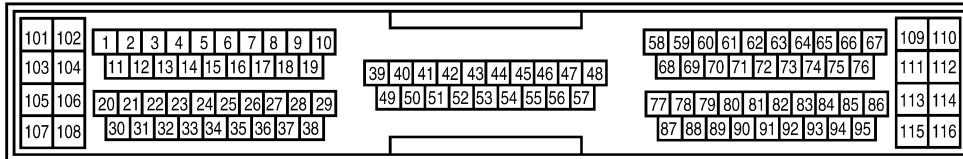
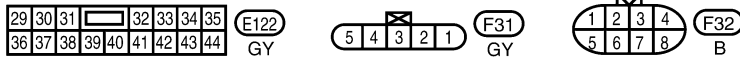
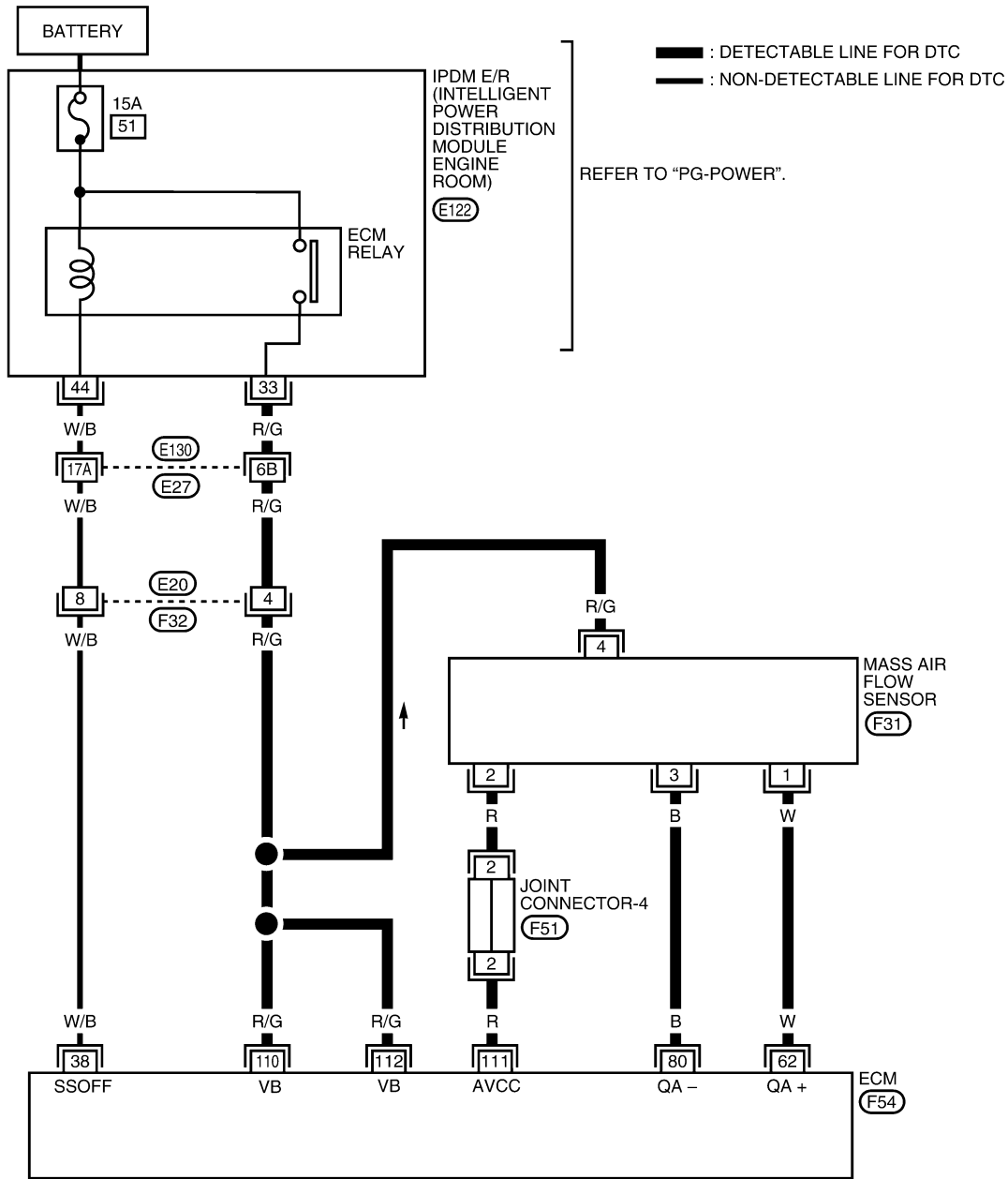
DTC P0101 MAF SENSOR

[VQ]

UBS00375

Wiring Diagram

EC-MAFS-01



REFER TO THE FOLLOWING.

- (E130) - SUPER MULTIPLE JUNCTION (SMJ)
- (F51) - JOINT CONNECTOR (J/C)



BBWA0050E

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

DTC P0101 MAF SENSOR

[VQ]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
38	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For a few seconds after turning ignition switch "OFF"	0 - 1.5V
			[Ignition switch "OFF"] ● A few seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
62	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.7 - 2.4V
80	B	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
111	R	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
110 112	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00376

1. INSPECTION START

Which malfunction (A or B) is duplicated?

A or B

- A >> GO TO 3.
- B >> GO TO 2.

2. CHECK INTAKE SYSTEM

Check the following for connection.

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

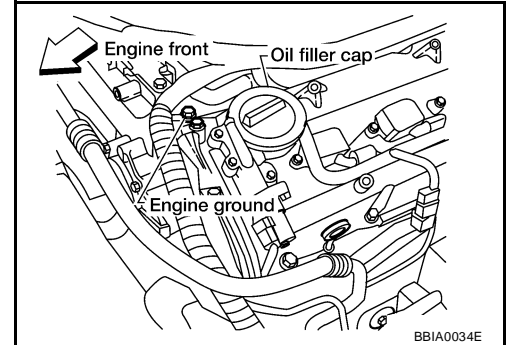
OK or NG

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

3. RETIGHTEN GROUND SCREWS

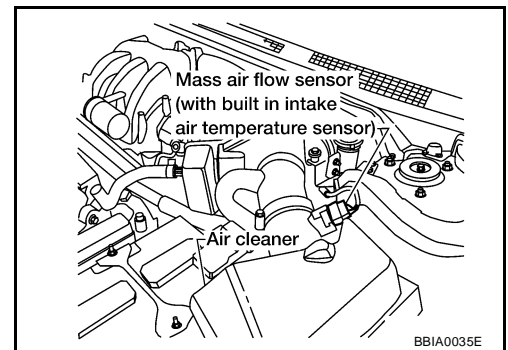
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

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

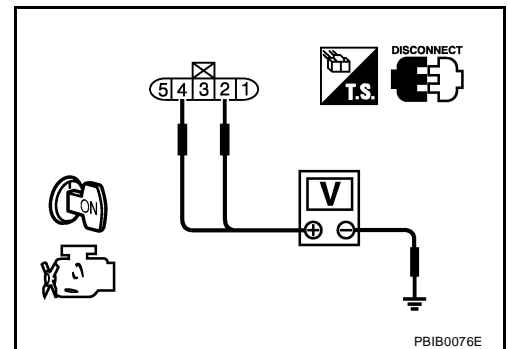


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

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



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector E130, E27
- Harness connectors E20, F32
- Joint connector-4
- Harness for open or short between IPDM E/R and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

>> Repair 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 80.
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 1 and ECM terminal 62.
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-796, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
MASS AIR FLOW SENSOR**

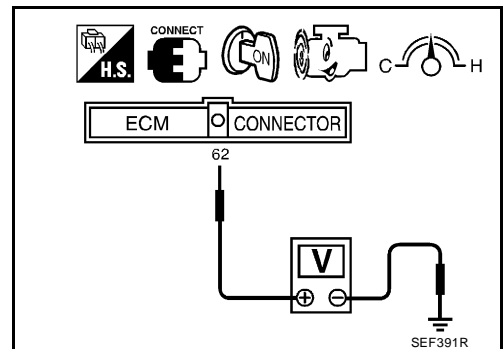
UBS00377

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0

*: 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.
 - Turn ignition switch "OFF".
 - Disconnect mass air flow sensor harness connector and reconnect it again.



- Perform steps 2 and 3 again.

5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.

6. If NG, clean or replace mass air flow sensor.

Removal and Installation

MASS AIR FLOW SENSOR

Refer to [EM-110, "AIR CLEANER AND AIR DUCT"](#) .

UBS00378

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DTC P0102, P0103 MAF SENSOR

[VQ]

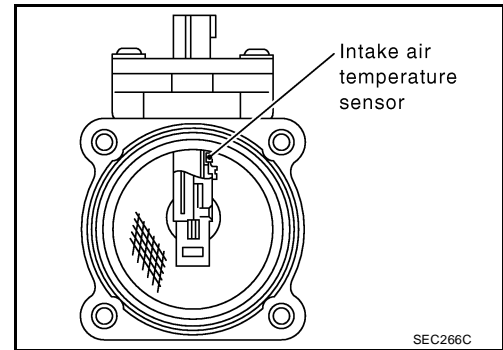
DTC P0102, P0103 MAF SENSOR

PF2:22680

Component Description

UBS00379

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

UBS0037A

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load Idle	Approx. 1.1 - 1.5V
	2,500 rpm	Approx. 1.7 - 2.4V
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: "N" ● 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: "N" ● Air conditioner switch: OFF ● No-load Idle	2.0 - 6.0 g-m/s
	2,500 rpm	7.0 - 20.0 g-m/s

On Board Diagnosis Logic

UBS0037B

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 (The 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 (The sensor circuit is open or shorted.) ● Mass air flow sensor

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters in 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

UBS0037C

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

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait 5 seconds at most.
4. If DTC is detected, go to [EC-801, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR DTC P0103

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-801, "Diagnostic Procedure"](#) .
If 1st trip DTC is not detected, go to next step.
5. Start engine and wait at least 5 seconds.
6. If DTC is detected, go to [EC-801, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

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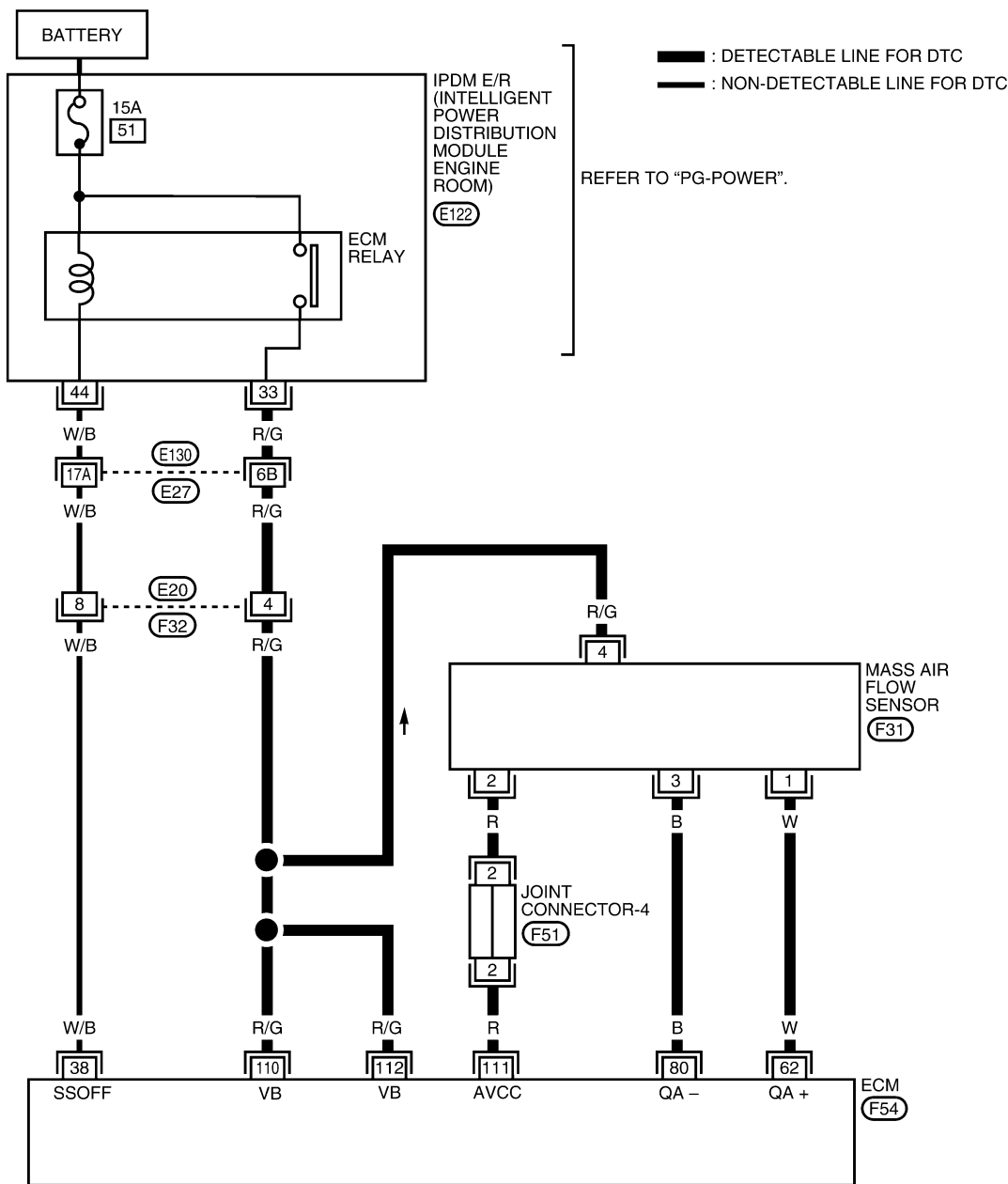
DTC P0102, P0103 MAF SENSOR

[VQ]

UBS0037D

Wiring Diagram

EC-MAFS-01



29	30	31	32	33	34	35		
36	37	38	39	40	41	42	43	44

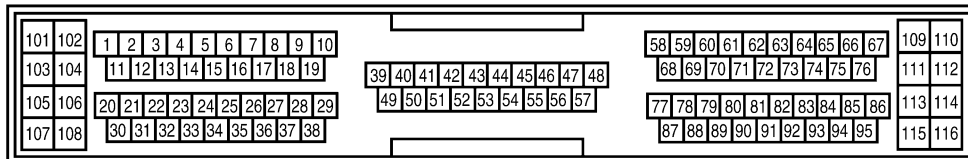
(E122)
GY

5	4	3	2	1
---	---	---	---	---

(F31)
GY

1	2	3	4
5	6	7	8

(F32)
B



REFER TO THE FOLLOWING.

(E130) - SUPER MULTIPLE JUNCTION (SMJ)

(F51) - JOINT CONNECTOR (J/C)

(F54)
GY



BBWA0050E

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

DTC P0102, P0103 MAF SENSOR

[VQ]

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.7 - 2.4V
80	B	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

Diagnostic Procedure

UBS0037E

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 to intake manifold

OK or NG

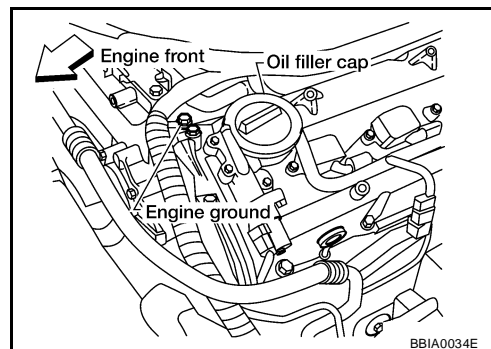
OK >> GO TO 3.

NG >> Reconnect the parts.

3. RETIGHTEN GROUND SCREWS

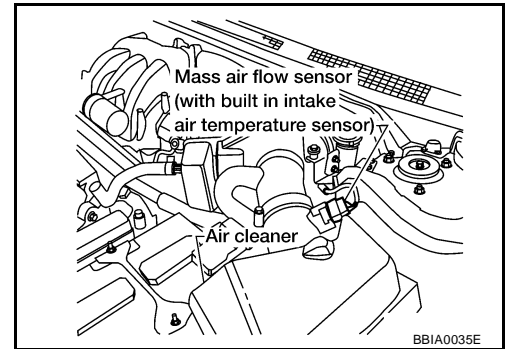
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

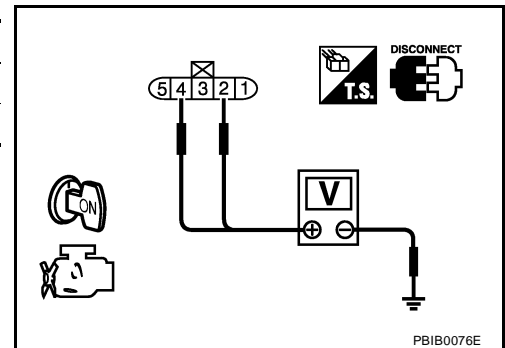


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

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



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Joint connector-4
- Harness for open or short between IPDM E/R relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

>> Repair 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 80. 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 1 and ECM terminal 62.
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-803, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection MASS AIR FLOW SENSOR

UBS0037F

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0

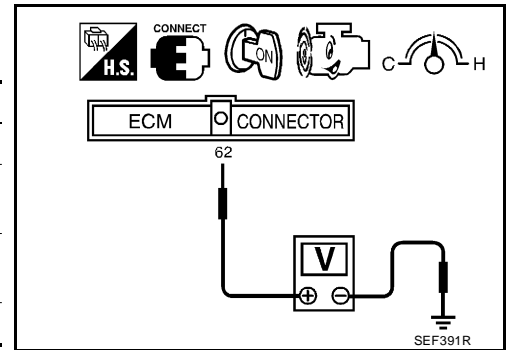
*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
 - Turn ignition switch "OFF".
 - Disconnect mass air flow sensor harness connector and reconnect it again.
 - Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.

Removal and Installation MASS AIR FLOW SENSOR

UBS0037G

Refer to [EM-110, "AIR CLEANER AND AIR DUCT"](#) .



DTC P0107, P0108 ABSOLUTE PRESSURE SENSOR

[VQ]

DTC P0107, P0108 ABSOLUTE PRESSURE SENSOR

PF0:22365

Component Description

UBS0037H

The absolute pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the microcomputer.

On Board Diagnosis Logic

UBS0037I

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0107 0107	Absolute pressure sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">● Harness or connectors (The sensor circuit is open or shorted.)● Engine coolant temperature sensor
P0108 0108	Absolute pressure sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

UBS0037J

NOTE:

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

④ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
4. If 1st trip DTC is detected, go to [EC-805, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

④ WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure**1. INSPECTION START****④ With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure".**
See [EC-804](#) .
5. Is the 1st trip DTC P0107 or P0108 displayed again?

⑥ With GST

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure".**
See [EC-804](#) .
5. Is the 1st trip DTC P0107 or P0108 displayed again?

Yes or No

Yes >> GO TO 2.

No >> **INSPECTION END****2. REPLACE ECM**

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to [EC-689](#), "[NVIS \(Nissan Vehicle Immobilizer System — NATS\)](#)".
3. Perform [EC-668](#), "[Accelerator Pedal Released Position Learning](#)".
4. Perform [EC-669](#), "[Throttle Valve Closed Position Learning](#)".
5. Perform [EC-669](#), "[Idle Air Volume Learning](#)".

>> **INSPECTION END**

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DTC P0112, P0113 IAT SENSOR

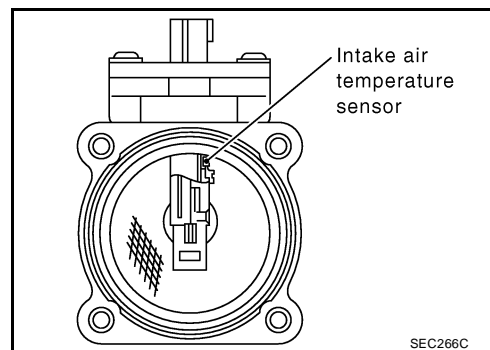
PFP:22630

Component Description

UBS0037L

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

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



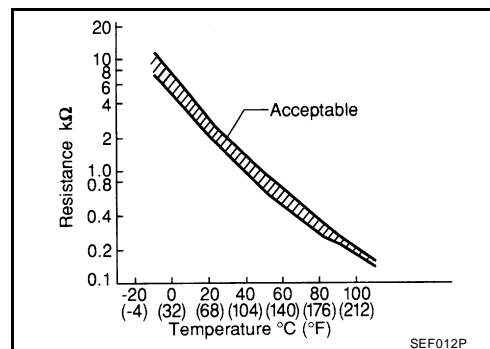
<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

*: These data are reference values and are measured between ECM terminal 66 (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

UBS0037M

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 (The 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

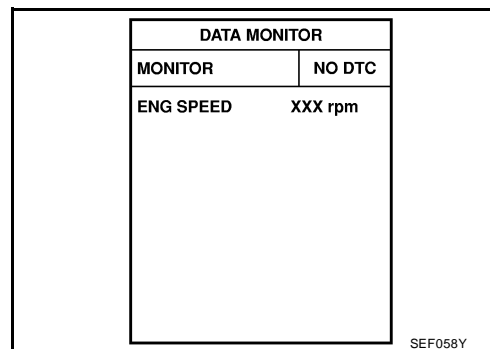
UBS0037N

NOTE:

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

④ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-809, "Diagnostic Procedure"](#)



DTC P0112, P0113 IAT SENSOR

[VQ]



WITH GST

Follow the procedure "With CONSULT-II" above.

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DTC P0112, P0113 IAT SENSOR

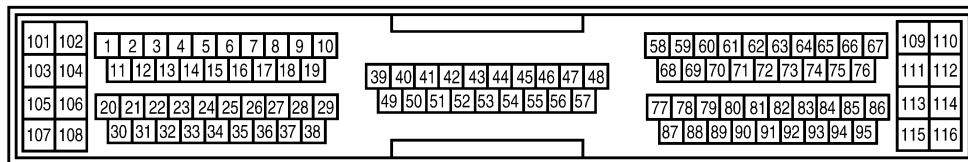
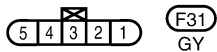
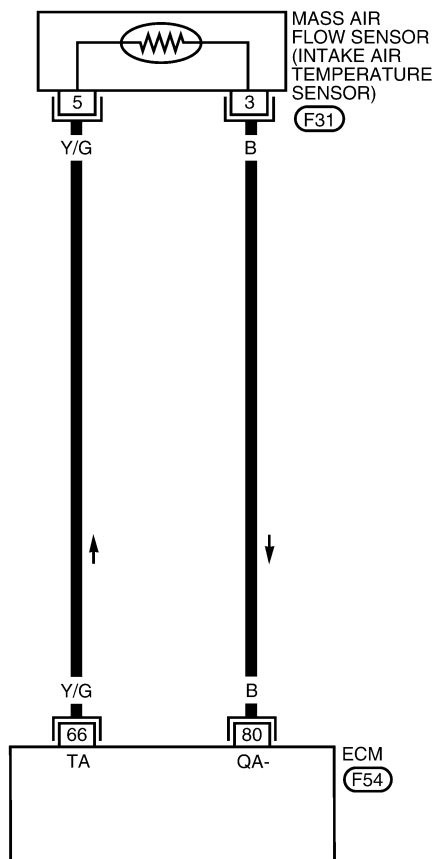
[VQ]

Wiring Diagram

UBS00370

EC-IATS-01

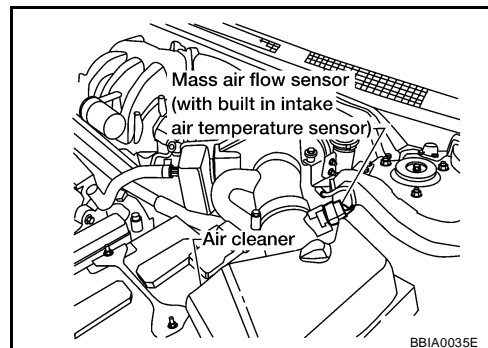
: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BBWA0051E

Diagnostic Procedure**1. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect mass air flow sensor (intake air temperature sensor is built-into) harness connector.
3. Turn ignition switch "ON".

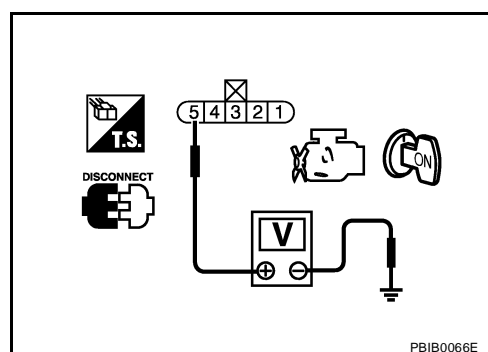


4. Check voltage between mass air flow sensor terminal 5 and ground.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 2.
 NG >> Repair harness or connectors.

**2. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM.
3. Check harness continuity between mass air flow sensor terminal 3 and ECM 80. 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 3.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-810, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.
 NG >> Replace mass air flow sensor (with intake air temperature sensor).

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

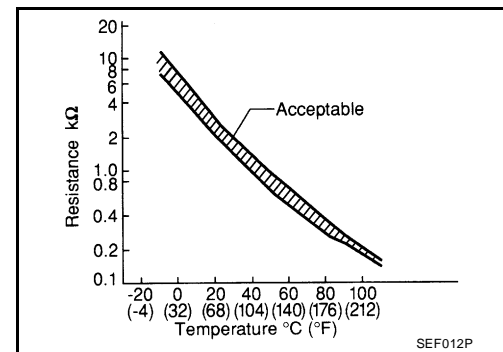
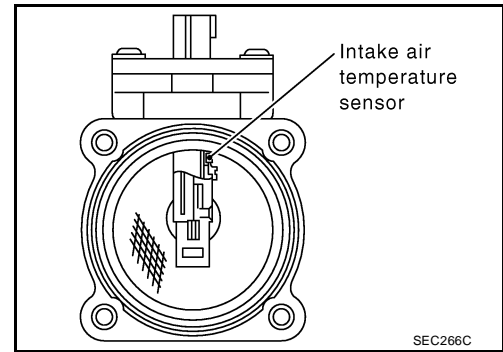
>> **INSPECTION END**

Component Inspection INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between intake air temperature sensor terminals 3 and 5 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



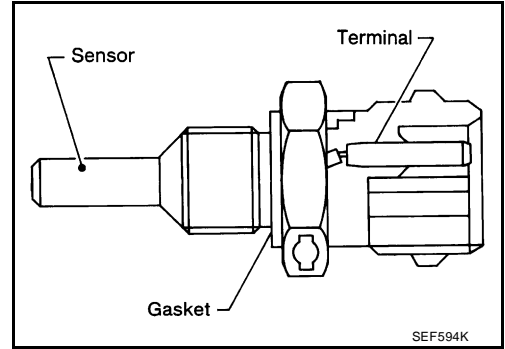
Removal and Installation MASS AIR FLOW SENSOR

Refer to [EM-110, "AIR CLEANER AND AIR DUCT"](#) .

DTC P0117, P0118 ECT SENSOR

Component Description

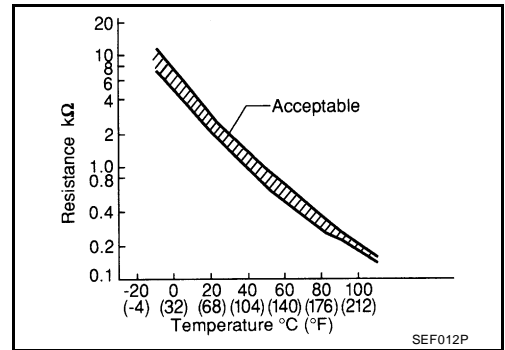
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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

*: These data are reference values and are measured between ECM terminal 93 (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

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 (The 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 in fail-safe mode and the MIL lights up.

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

NOTE:

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

④ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-814, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

④ WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0117, P0118 ECT SENSOR

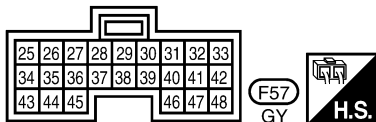
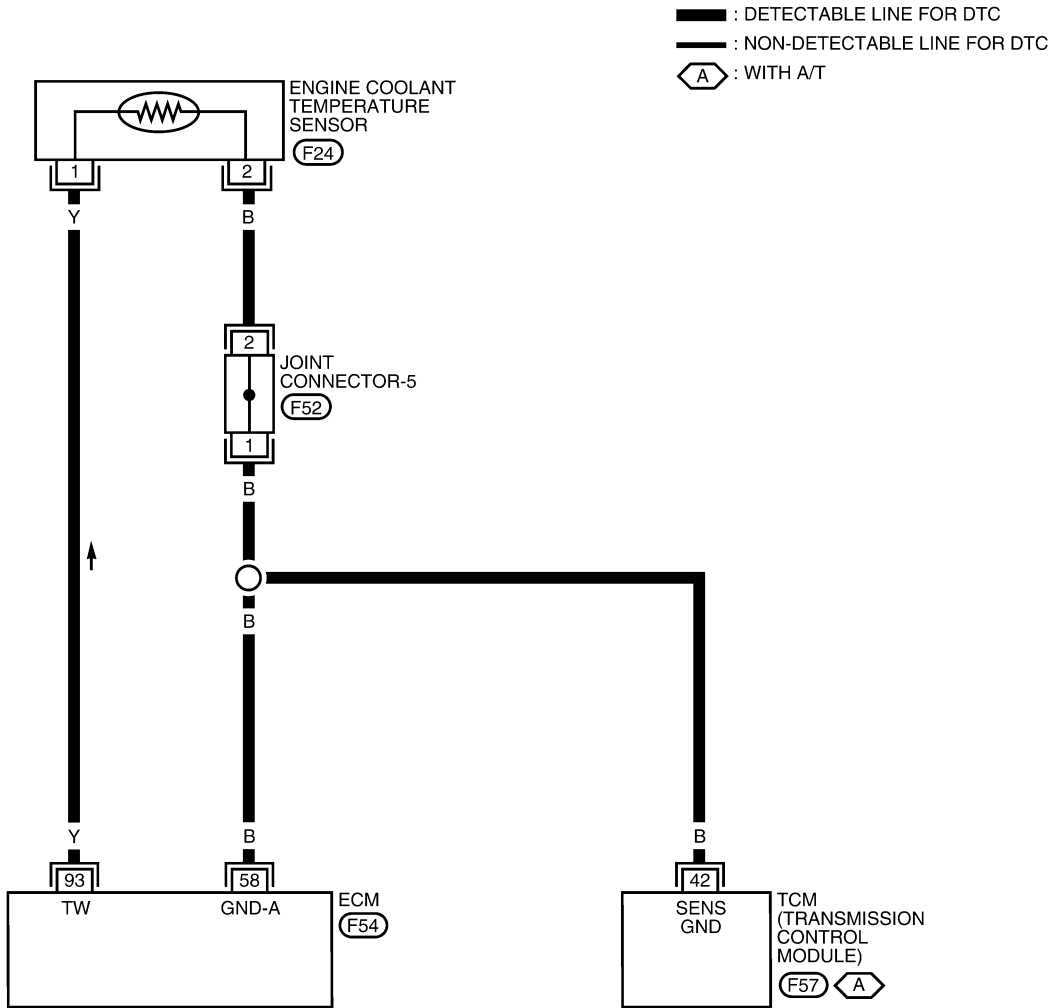
[VQ]

Wiring Diagram

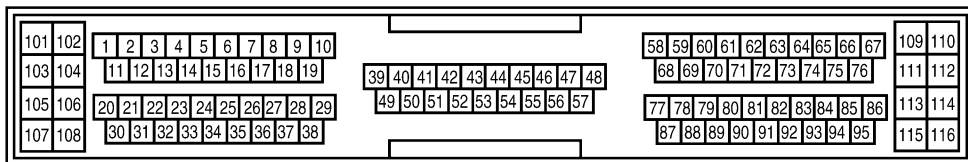
UBS0037V

EC-ECTS-01

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REFER TO THE FOLLOWING.
 (F52) - JOINT CONNECTOR (J/C)

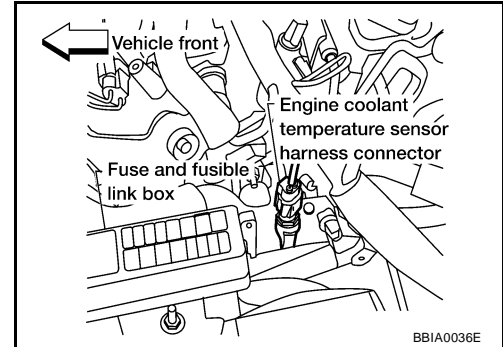


BBWA0052E

Diagnostic Procedure

1. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect engine coolant temperature (ECT) sensor harness connector.
3. Turn ignition switch "ON".

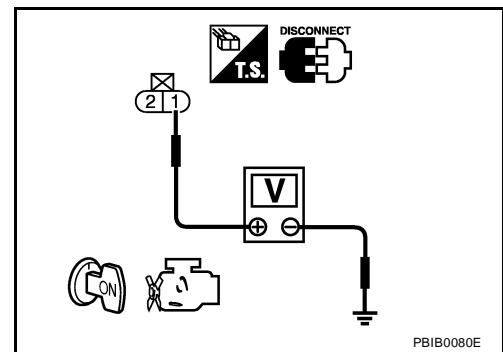


4. Check voltage between ECT sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 2.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



2. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ECT sensor terminal 2 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

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

3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-5
- Harness for open and short between ECT sensor and ECM
- Harness for open and short between ECT sensor and TCM

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

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-815, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
 NG >> Replace engine coolant temperature sensor.

5. CHECK INTERMITTENT INCIDENT

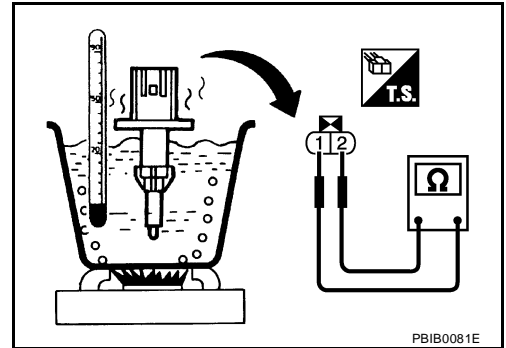
Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
ENGINE COOLANT TEMPERATURE SENSOR**

UBS0037X

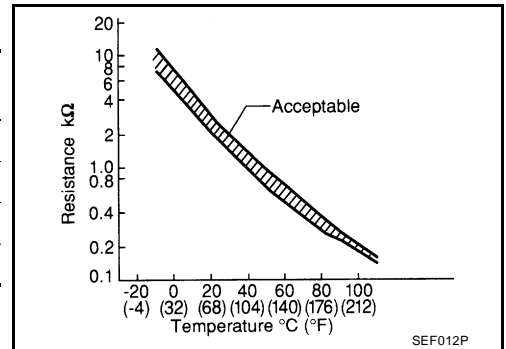
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<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

*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.



2. If NG, replace engine coolant temperature sensor.

**Removal and Installation
ENGINE COOLANT TEMPERATURE SENSOR**

UBS0037Y

Refer to [CO-45, "THERMOSTAT AND THERMOSTAT HOUSING"](#) .

DTC P0125 ECT SENSOR

PFP:22630

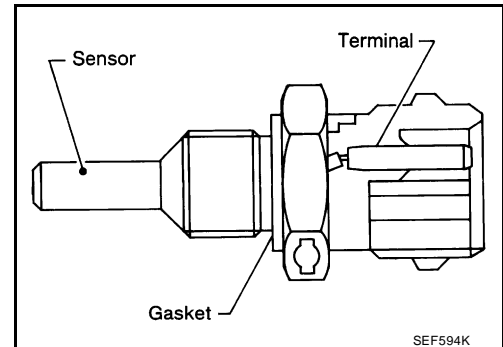
Component Description

UBS0037Z

NOTE:

If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-811](#).

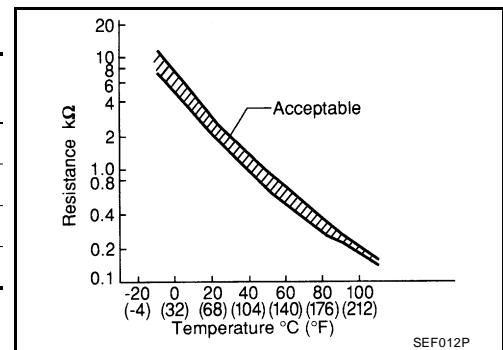
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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

*: These data are reference values and are measured between ECM terminal 93 (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

UBS00380

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

UBS00381

CAUTION:

Be careful not to overheat engine.

NOTE:

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

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Check that "COOLAN TEMP/S" is above 10°C (50°F).
If it is above 10°C (50°F), the test result will be OK.
If it is below 10°C (50°F), go to following step.

DTC P0125 ECT SENSOR

[VQ]

4. Start engine and run it for 65 minutes at idle speed.
If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.
5. If 1st trip DTC is detected, go to [EC-819, "Diagnostic Procedure"](#)

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

SEF174Y

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WITH GST

Follow the procedure "WITH CONSULT-II" above.

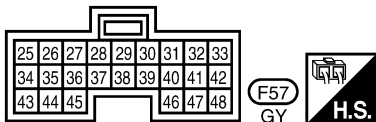
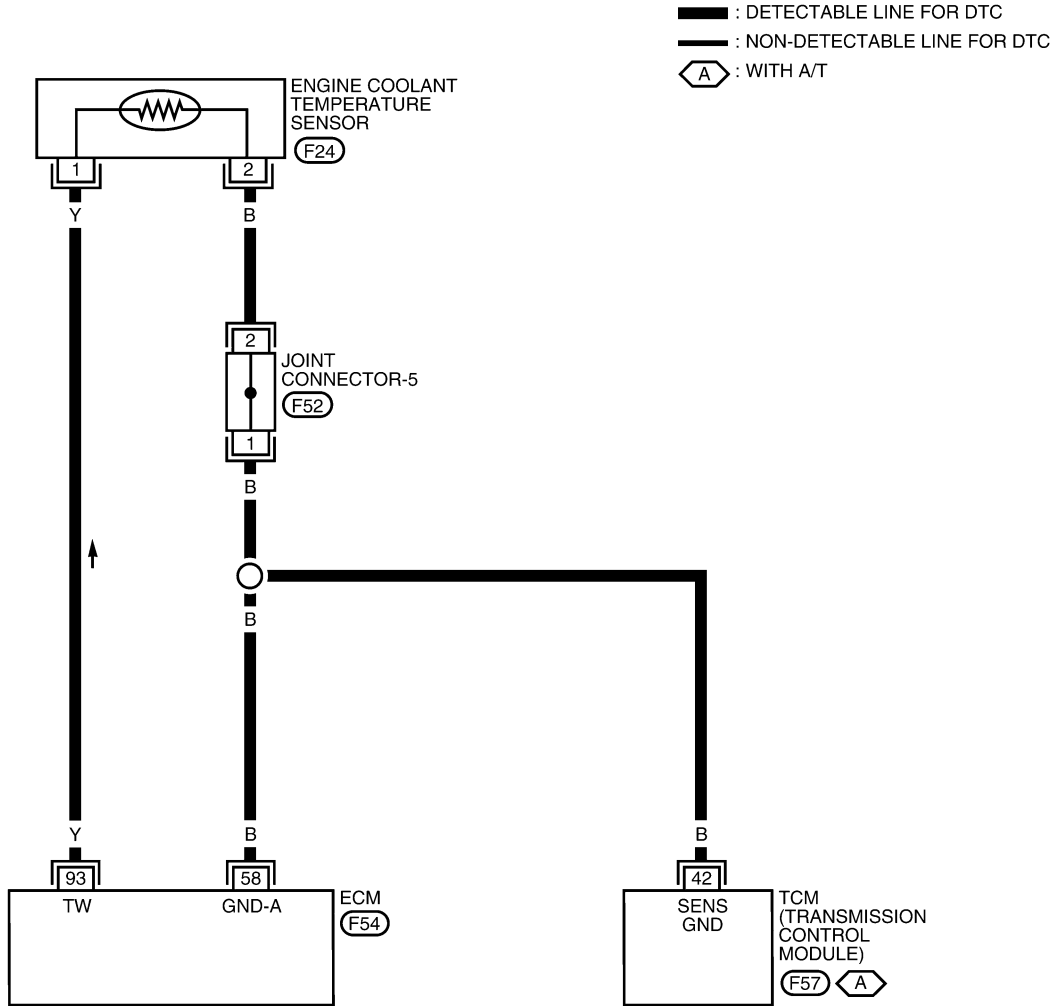
DTC P0125 ECT SENSOR

[VQ]

Wiring Diagram

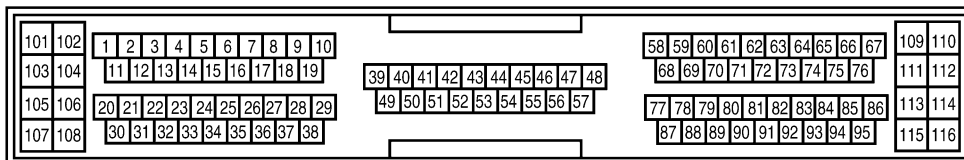
UBS00382

EC-ECTS-01



REFER TO THE FOLLOWING.

F52 - JOINT CONNECTOR (J/C)



BBWA0052E

Diagnostic Procedure

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-819, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Replace engine coolant temperature sensor.

2. CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace thermostat. Refer to [CO-45, "THERMOSTAT AND THERMOSTAT HOUSING"](#) .

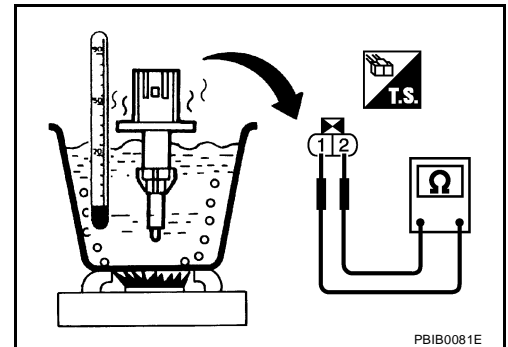
3. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

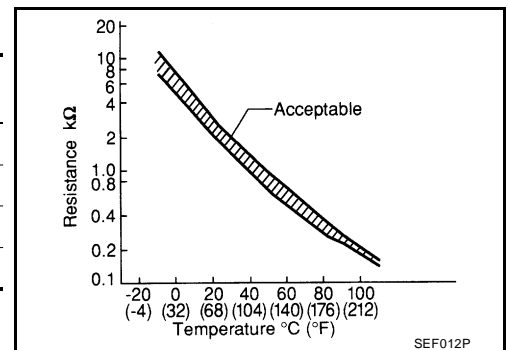
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature °C (°F)	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

*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.



2. If NG, replace engine coolant temperature sensor.

Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EM-164, "CYLINDER HEAD"](#) .

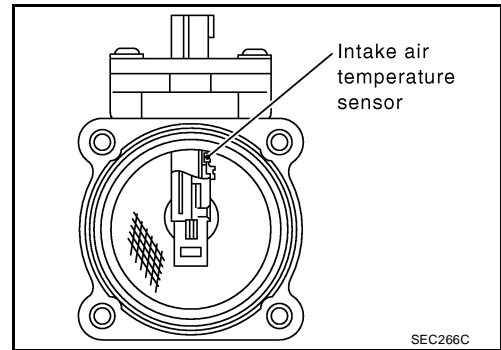
DTC P0127 IAT SENSOR

Component Description

UBS00386

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

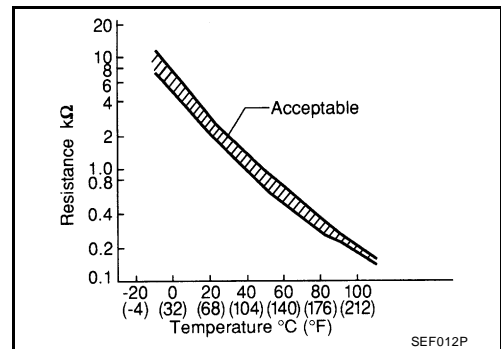
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

*: These data are reference values and are measured between ECM terminal 66 (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

UBS00387

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 (The sensor circuit is open or shorted) ● Intake air temperature sensor

DTC Confirmation Procedure

UBS00388

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.

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

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

④ WITH CONSULT-II

1. Wait until engine coolant temperature is less than 90°C (194°F)
 - a. Turn ignition switch "ON".

DTC P0127 IAT SENSOR

[VQ]

- b. Select "DATA MONITOR" mode with CONSULT-II.
- c. Check the engine coolant temperature.
- d. If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
 - Perform the following steps before engine coolant temperature is above 90°C (194°F).
2. Turn ignition switch "ON".
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. If 1st trip DTC is detected, go to [EC-823, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

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DTC P0127 IAT SENSOR

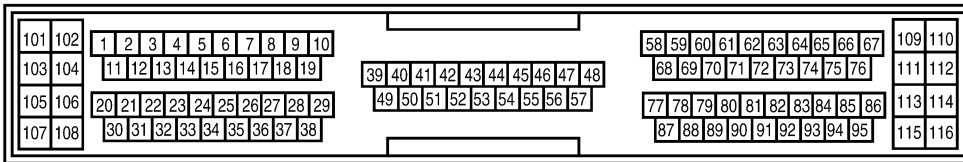
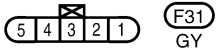
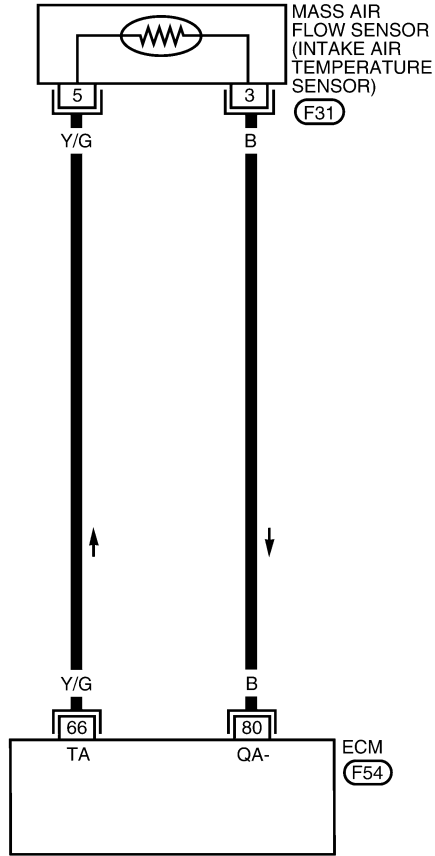
[VQ]

Wiring Diagram

UBS00389

EC-IATS-01

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

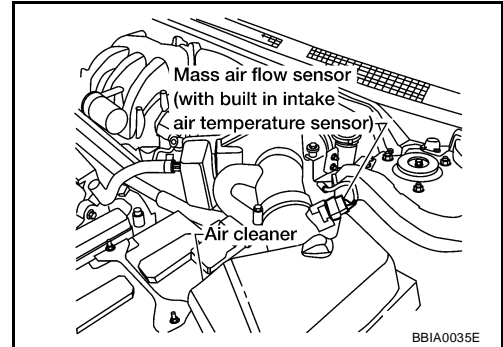


BBWA0051E

Diagnostic Procedure

1. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect mass air flow sensor (intake air temperature sensor is built-into) harness connector.
3. Turn ignition switch "ON".

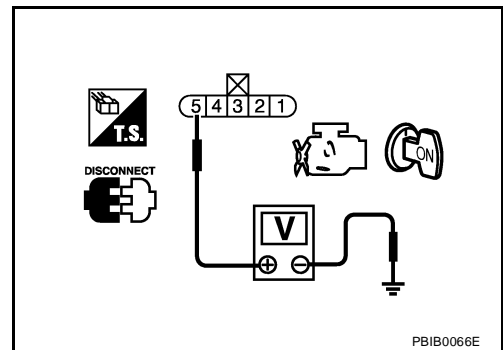


4. Check voltage between mass air flow sensor terminal 5 and ground.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 2.
- NG >> Repair harness or connectors.



2. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM.
3. Check harness continuity between mass air flow sensor terminal 3 and ECM 80. 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 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-824, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Replace mass air flow sensor (with intake air temperature sensor).

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

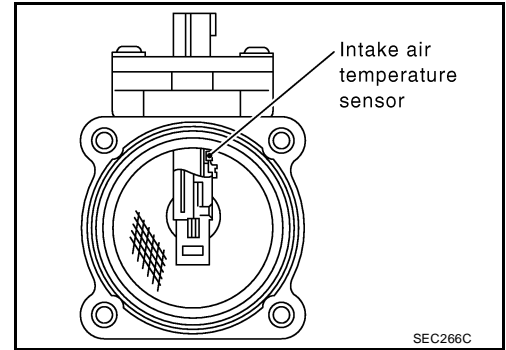
DTC P0127 IAT SENSOR

[VQ]

UBS0038B

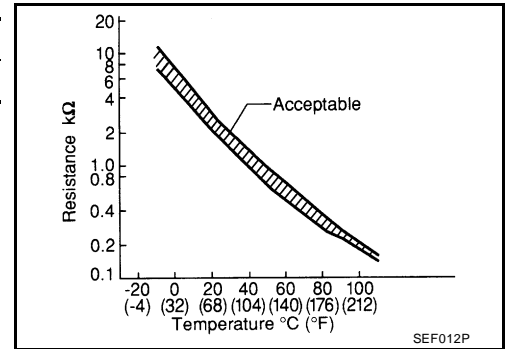
Component Inspection INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between intake air temperature sensor terminals 3 and 5 under the following conditions.



Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



UBS0038C

Removal and Installation INTAKE AIR TEMPERATURE SENSOR

Refer to [EM-110, "AIR CLEANER AND AIR DUCT"](#).

DTC P0128 THERMOSTAT FUNCTION

PFP:21200

On Board Diagnosis Logic

UBS0038D

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 function ● Leakage from sealing portion of thermostat ● Engine coolant temperature sensor

DTC Confirmation Procedure

UBS0038E

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 60°C (140°F).

 **WITH CONSULT-II**

1. Replace thermostat with new one. Refer to [EC-1089, "Component Description"](#) . Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2. Turn ignition switch “ON”.
3. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
4. Check that the “COOLAN TEMP/S” is above 60°C (140°F).
If it is below 60°C (140°F), go to following step.
If it is above 60°C (140°F), stop engine and cool down the engine to less than 60°C (140°F), then retry from step 1.
5. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)
---------------	-----------------------------

If 1st trip DTC is detected, go to [EC-825, "Diagnostic Procedure"](#) .

 **WITH GST**

1. Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

UBS0038F

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-826, "Component Inspection"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace engine coolant temperature sensor.

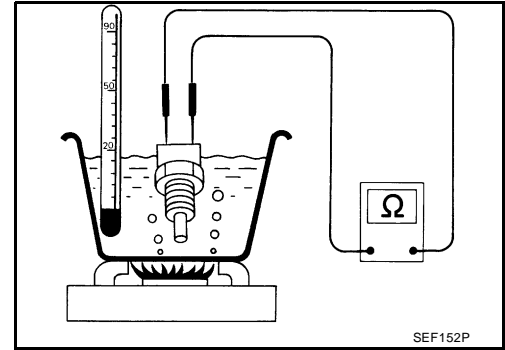
DTC P0128 THERMOSTAT FUNCTION

[VQ]

UBS0038G

Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

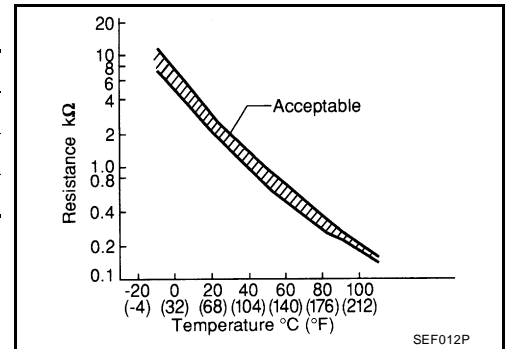
Check resistance as shown in the figure.



<Reference data>

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

If NG, replace engine coolant temperature sensor.



UBS0038H

Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [CO-45, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

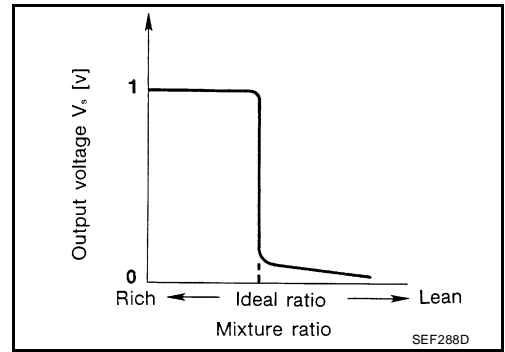
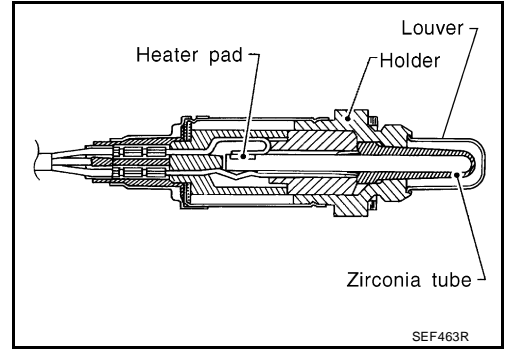
DTC P0132, P0152 HO2S1

PFP:22690

Component Description

UBS0038I

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



CONSULT-II Reference Value in Data Monitor Mode

UBS0038J

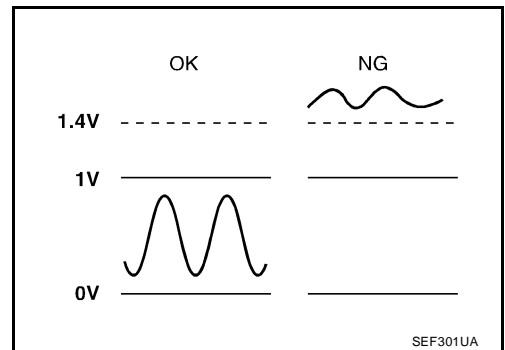
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS0038K

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 output is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0132 0132 (Bank 1)	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 1
P0152 0152 (Bank 2)			

DTC Confirmation Procedure

NOTE:

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

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Restart engine and let it idle for 2 minutes.
6. If 1st trip DTC is detected, go to [EC-832, "Diagnostic Procedure"](#)

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

SEF174Y

WITH GST

1. Start engine and warm it up to normal operating temperature.
 2. Turn ignition switch "OFF" and wait at least 10 seconds.
 3. Restart engine and let it idle for 2 minutes.
 4. Turn ignition switch "OFF" and wait at least 10 seconds.
 5. Restart engine and let it idle for 2 minutes.
 6. Select "MODE 3" with GST.
 7. If DTC is detected, go to [EC-832, "Diagnostic Procedure"](#).
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

DTC P0132, P0152 HO2S1

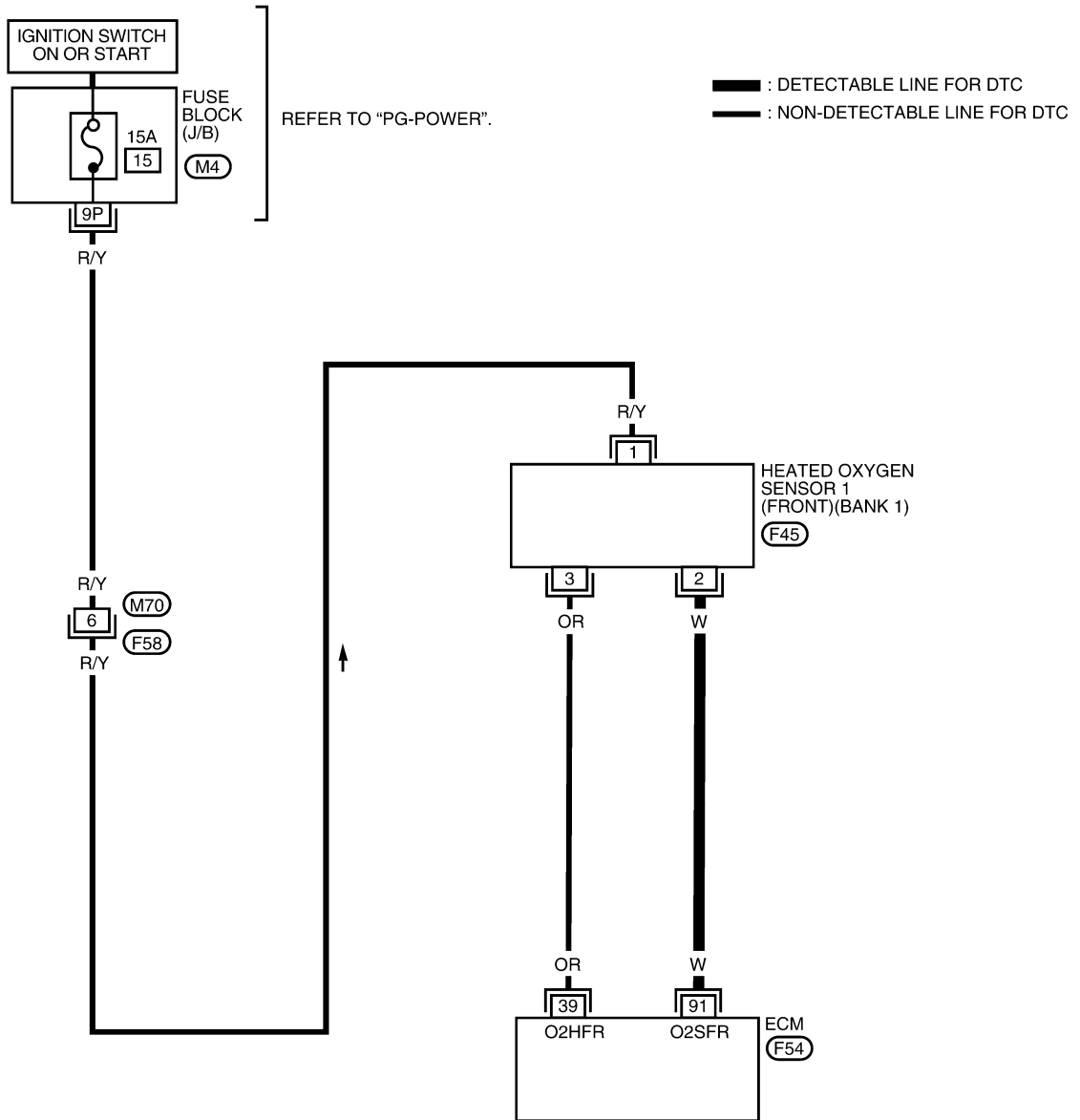
[VQ]

Wiring Diagram BANK 1

UBS0038M

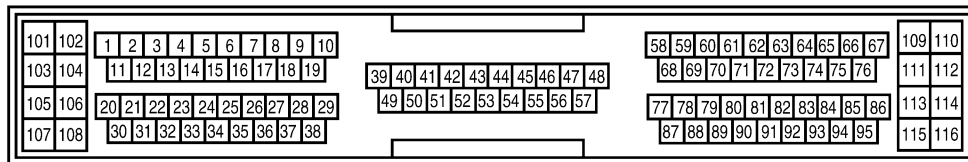
EC-O2S1B1-01

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REFER TO THE FOLLOWING.

(M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



DTC P0132, P0152 HO2S1

[VQ]

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

CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Heated oxygen sensor 1 (bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Engine speed is below 3,600 rpm.	0 - Approximately 1.0V (Periodically change)

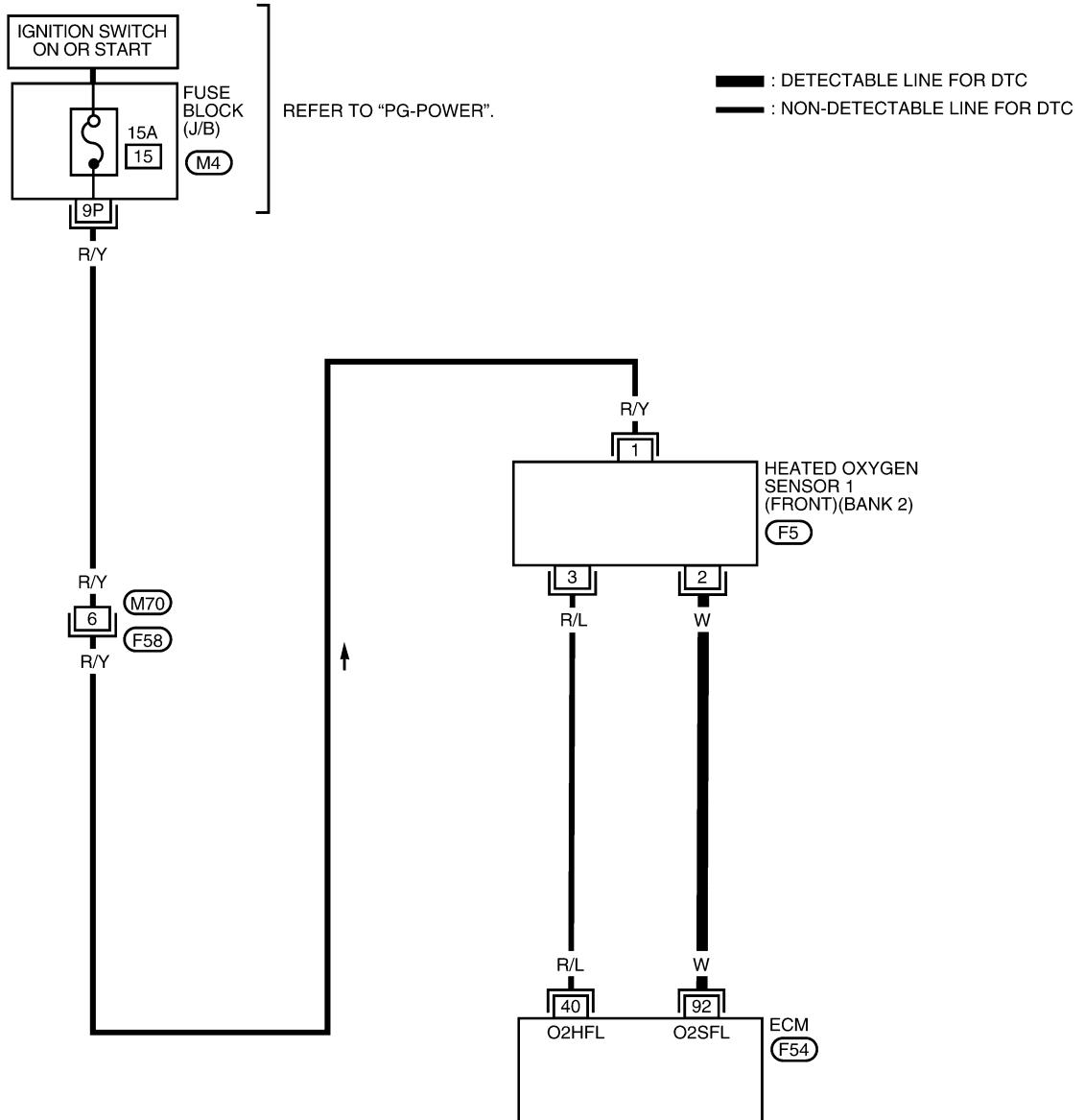
DTC P0132, P0152 HO2S1

[VQ]

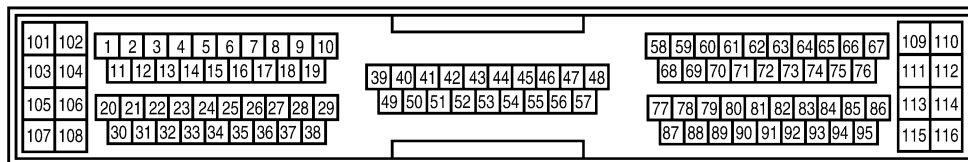
BANK 2

EC-O2S1B2-01

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REFER TO THE FOLLOWING.
(M4) - FUSE BLOCK
- JUNCTION BOX (J/B)



BBWA0055E

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

CAUTION:

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

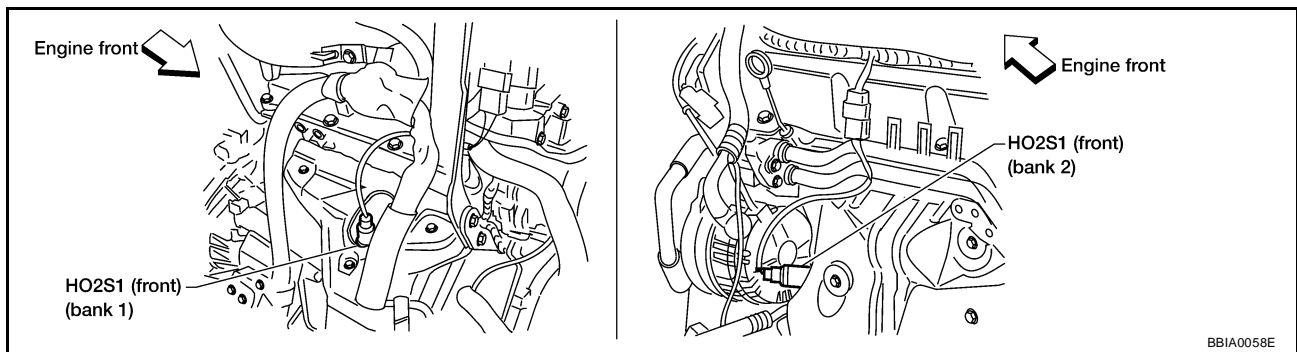
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	W	Heated oxygen sensor 1 (bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is below 3,600 rpm. 	0 - Approximately 1.0V (Periodically change)

Diagnostic Procedure

UBS0038N

1. RETIGHTEN HEATED OXYGEN SENSOR 1

1. Turn ignition switch "OFF".
2. Loosen and retighten corresponding heated oxygen sensor 1.



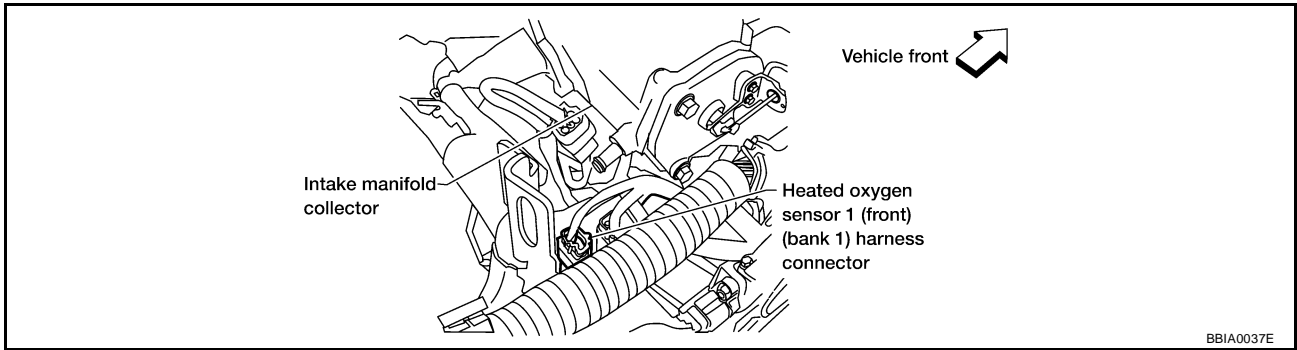
BBIA0058E

Tightening torque: 40 - 60 N·m (4.1 - 6.2 kg·m, 30 - 44 ft·lb)

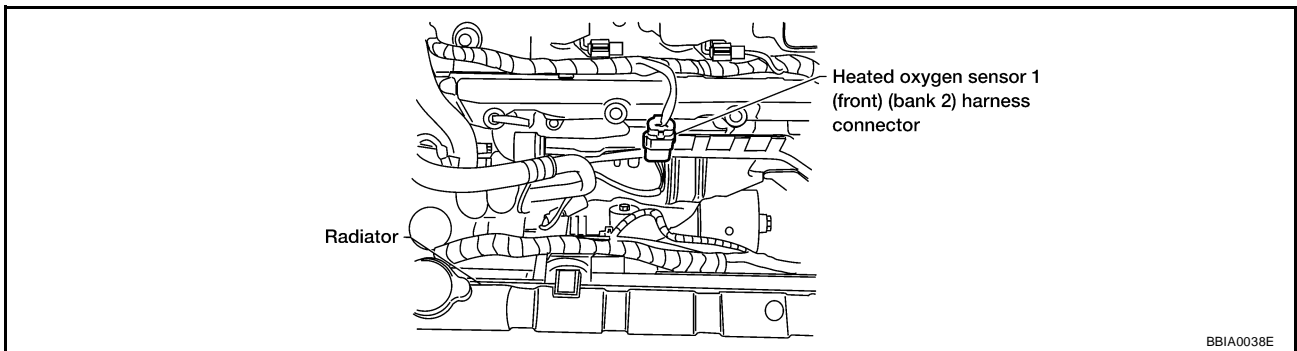
>> GO TO 2.

2. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
Bank 1



Bank 2



2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0132	91	2	1
P0152	92	2	2

Continuity should exist.

4. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0132	91	2	1
P0152	92	2	2

Continuity should not exist.

5. Also check harness for 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 HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.

Water should not exist.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace harness or connectors.

4. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-834, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace malfunctioning heated oxygen sensor 1.

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 1

UBS00380

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

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

SEF646Y

6. Check the following.
 - "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
5 times (cycles) are counted as shown at right.
 - "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Bank 1	cycle	1 2 3 4 5
	HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R
Bank 2	cycle	1 2 3 4 5
	HO2S1 MNTR (B2)	R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1)/(B2) indicates RICH L means HO2S1 MNTR (B1)/(B2) indicates LEAN		

SEF647Y

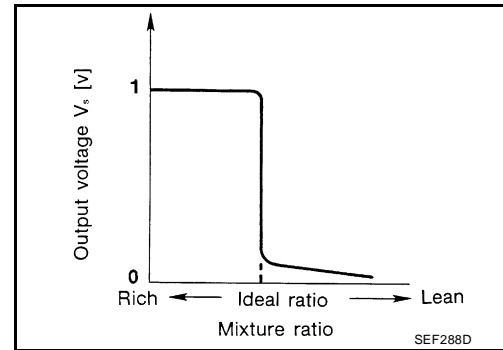
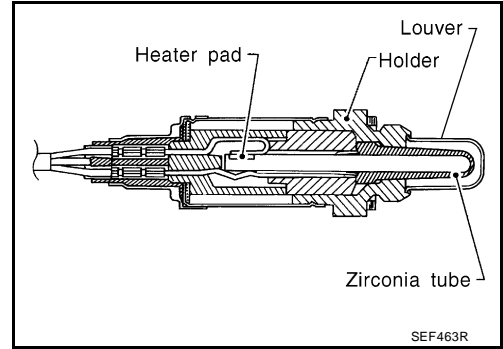
DTC P0133, P0153 HO2S1

PFP:22690

Component Description

UBS0038Q

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



CONSULT-II Reference Value in Data Monitor Mode

UBS0038R

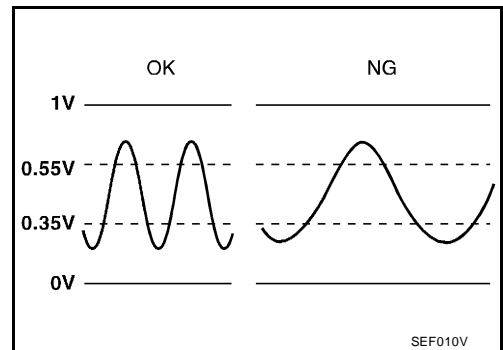
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS0038S

To judge the malfunction of heated oxygen sensor 1, this diagnosis measures response time of heated oxygen sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 temperature index. Judgment is based on whether the compensated time (heated oxygen sensor 1 cycling time index) is inordinately long or not.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0133 0133 (Bank 1)	Heated oxygen sensor 1 circuit slow response	The response of the voltage signal from the sensor takes more than the specified time.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Injectors ● Intake air leaks ● Exhaust gas leaks ● PCV valve ● Mass air flow sensor
P0153 0153 (Bank 2)			

DTC Confirmation Procedure

UBS0038T

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P0133” or “HO2S1 (B2) P0153” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

HO2S1 (B1) P0133	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF338Z

6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 20 to 50 seconds.)

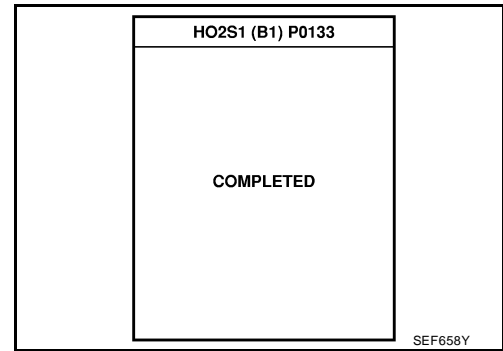
ENG SPEED	1,200 - 3,100 rpm
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	2.5 - 12.0 msec
Selector lever	Suitable position

HO2S1 (B1) P0133	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF339Z

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-842, "Diagnostic Procedure"](#).



Overall Function Check

UBS0038U

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

WITH GST

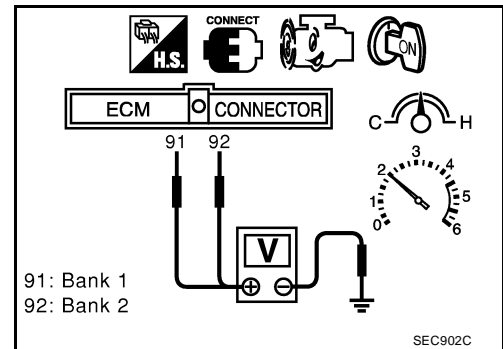
1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 [HO2S1(B1) signal] or 92 [HO2S1(B2) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

times: → 0 - 0.3V

4. If NG, go to [EC-842, "Diagnostic Procedure"](#).



DTC P0133, P0153 HO2S1

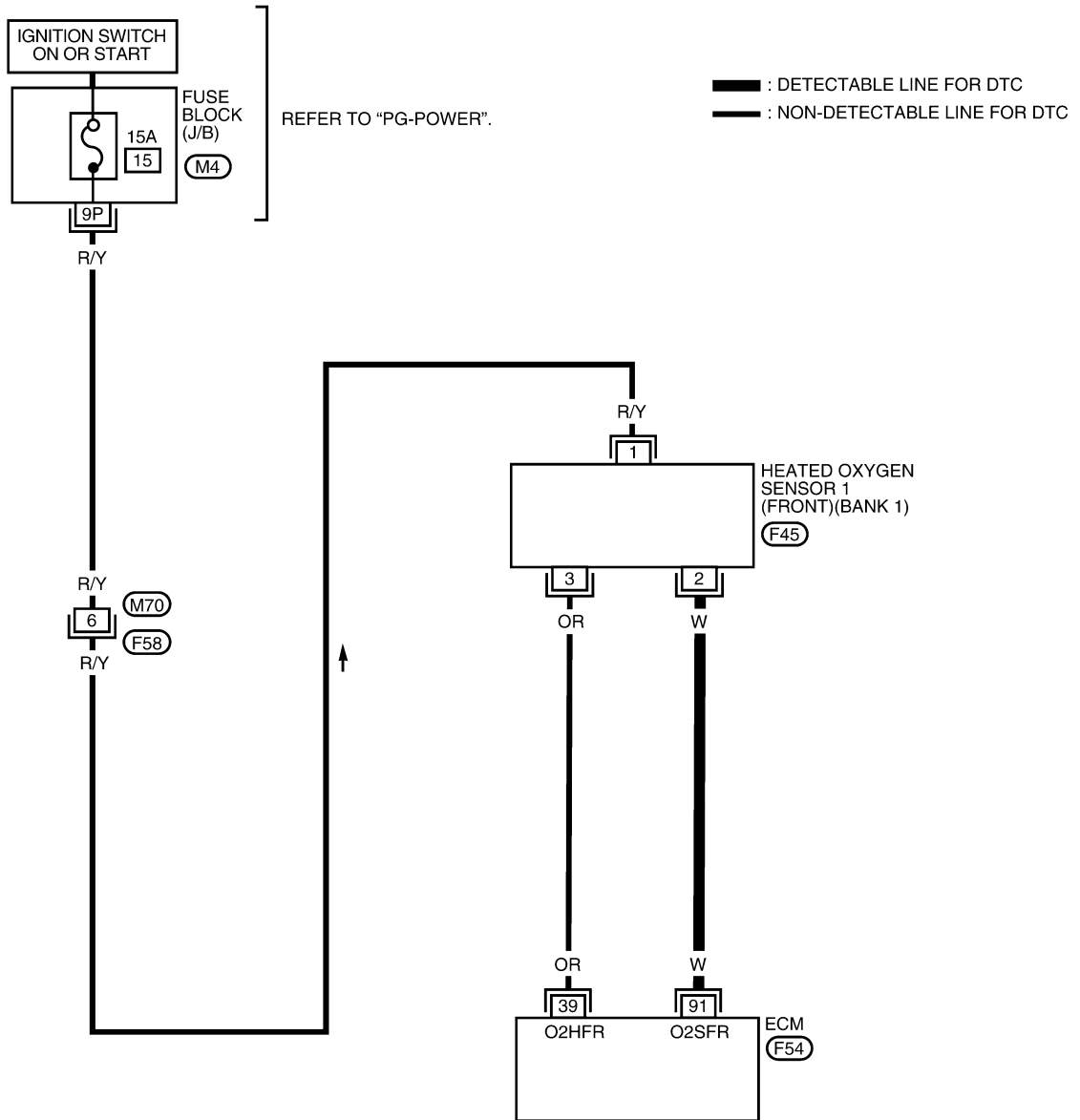
[VQ]

UBS0038V

Wiring Diagram BANK 1

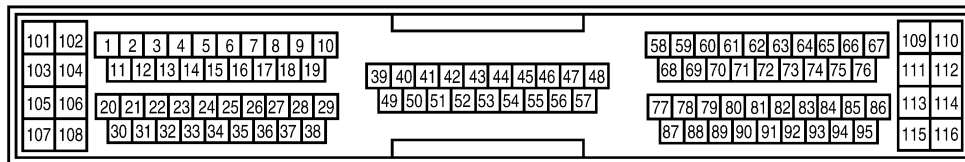
EC-O2S1B1-01

A
EC
C
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.

(M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



DTC P0133, P0153 HO2S1

[VQ]

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

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Heated oxygen sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)

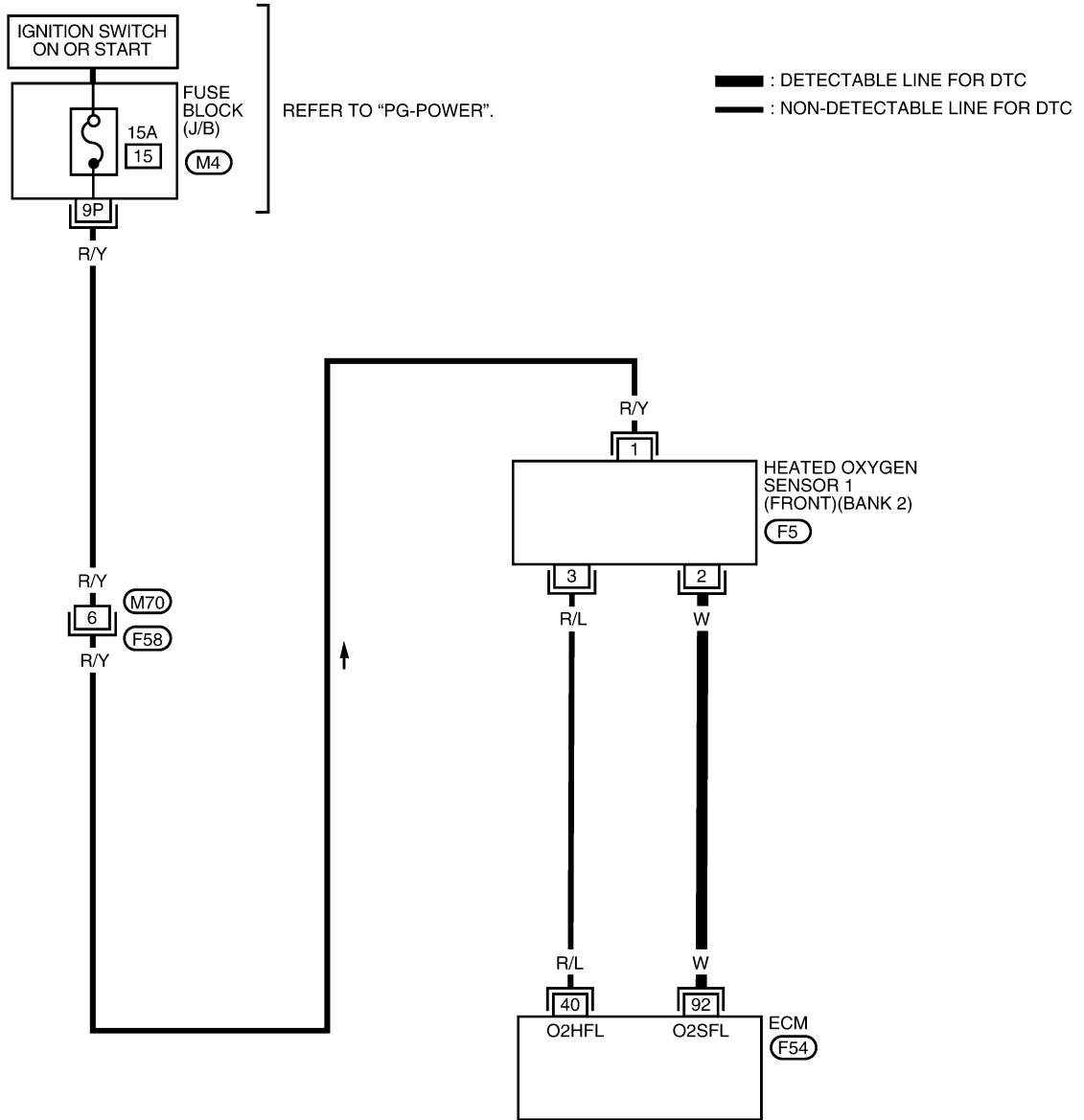
DTC P0133, P0153 HO2S1

[VQ]

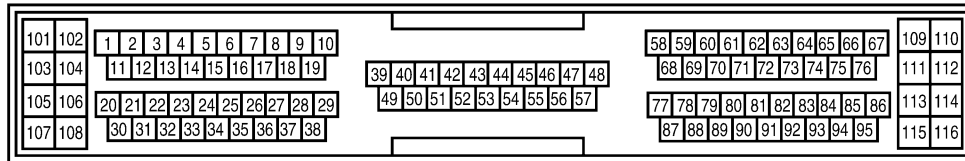
BANK 2

EC-O2S1B2-01

A
EC
C
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.
(M4) - FUSE BLOCK
- JUNCTION BOX (J/B)



BBWA0055E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	W	Heated oxygen sensor 1 (Bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V (Periodically change)

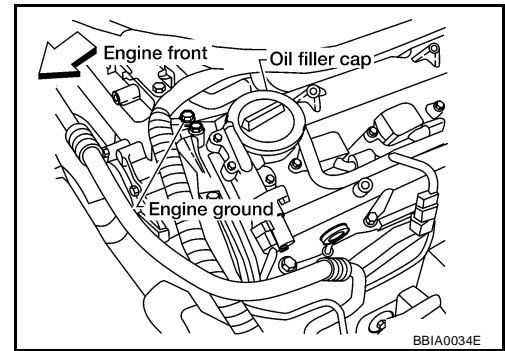
Diagnostic Procedure

UBS0038W

1. RETIGHTEN GROUND SCREWS

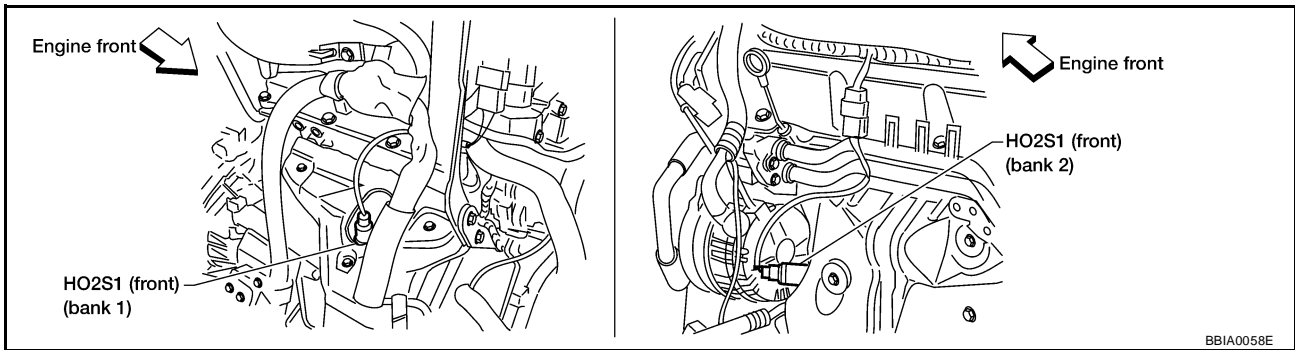
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.



Tightening torque: 40 - 60 N·m (4.1 - 6.2 kg·m, 30 - 44 ft·lb)

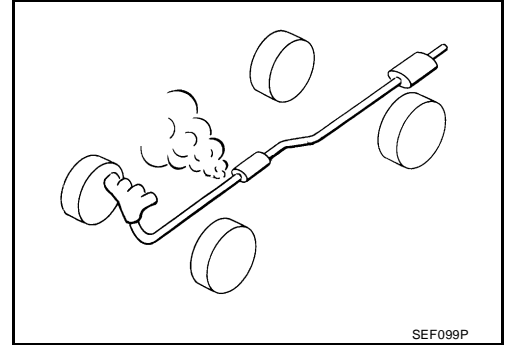
>> GO TO 3.

3. CHECK FOR EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air 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.

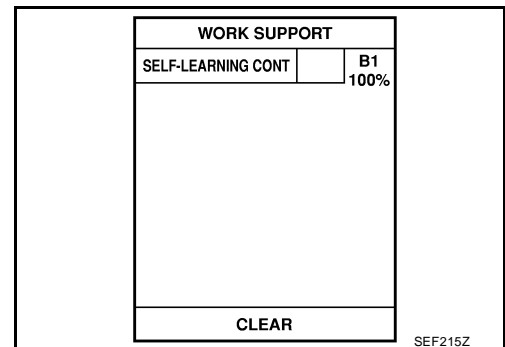
OK or NG

- OK >> GO TO 5.
 NG >> Repair or replace.

5. CLEAR THE SELF-LEARNING DATA

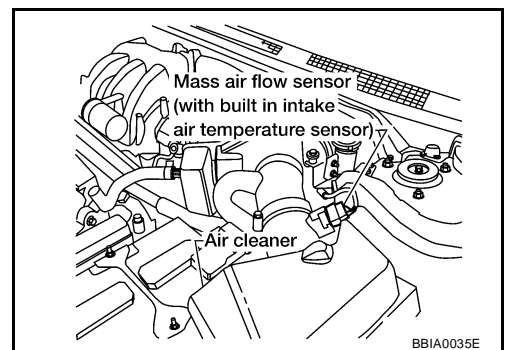
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
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-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-687, "HOW TO ERASE 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?

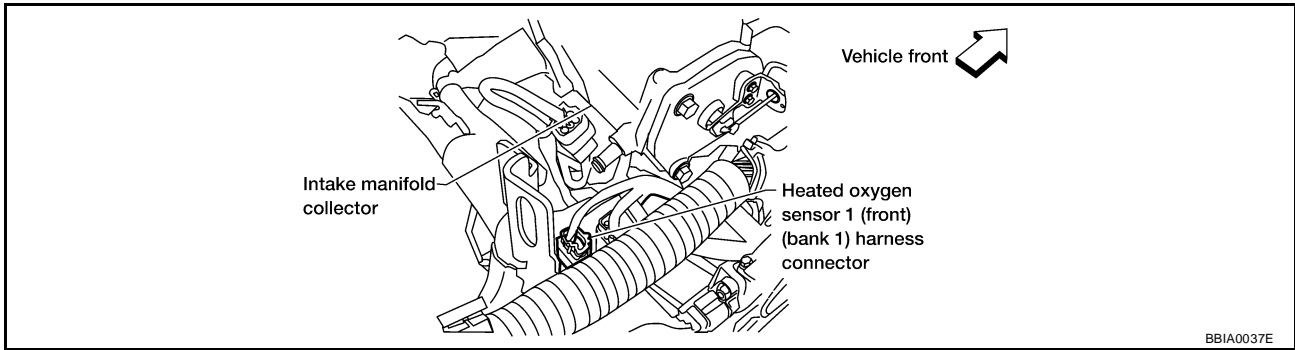


Yes or No

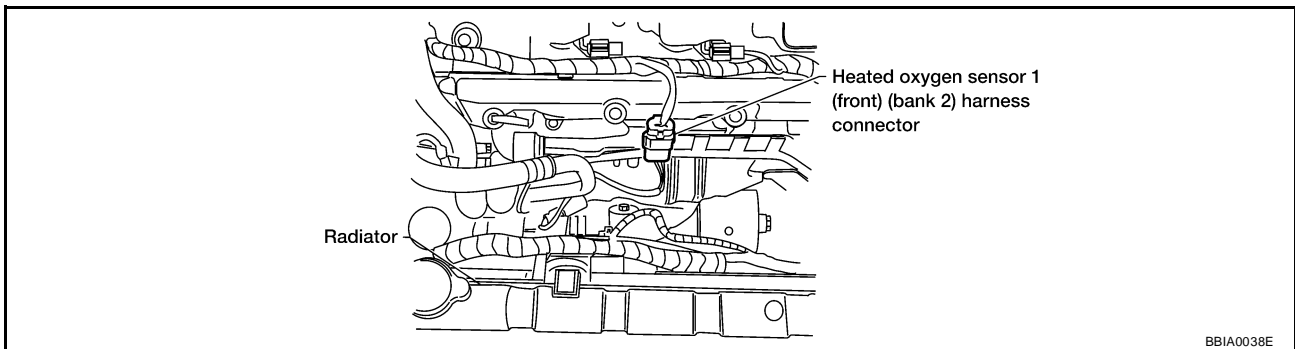
- Yes >> Perform trouble diagnosis for DTC P0171 or DTC P0172 (Refer to [EC-877](#) or [EC-885](#)).
 No >> GO TO 6.

6. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
Bank 1



Bank 2



2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0133	91	2	1
P0153	92	2	2

Continuity should exist.

4. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0133	91	2	1
P0153	92	2	2

Continuity should not exist.

5. Also check harness for 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 HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-780, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace malfunctioning heated oxygen sensor 1.

8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-803, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace mass air flow sensor.

9. CHECK PCV VALVE

Refer to [EC-1284, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace PCV valve.

10. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-845, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
- NG >> Replace malfunctioning heated oxygen sensor 1.

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
HEATED OXYGEN SENSOR 1**

UBS0038X

With CONSULT-II

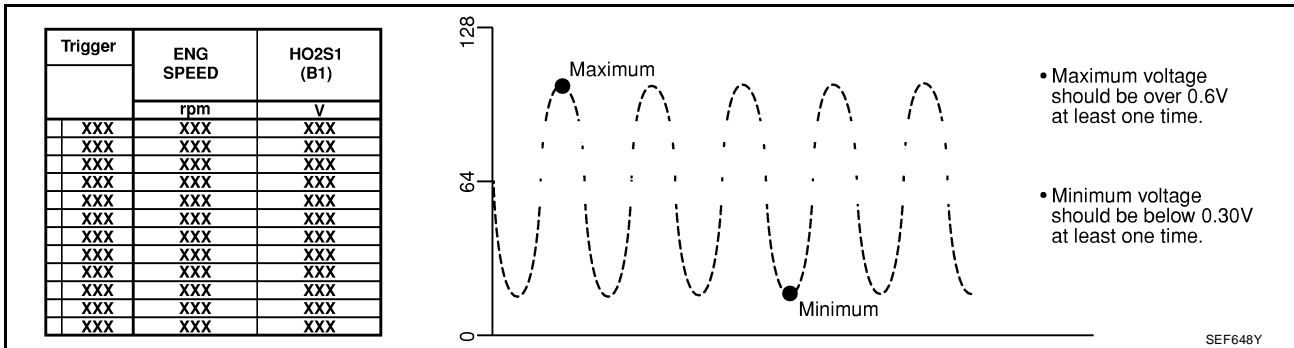
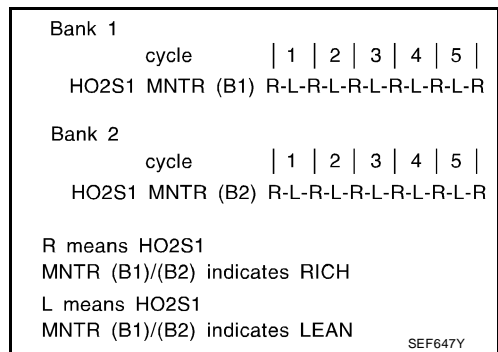
1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
5 times (cycles) are counted as shown at right.
- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.



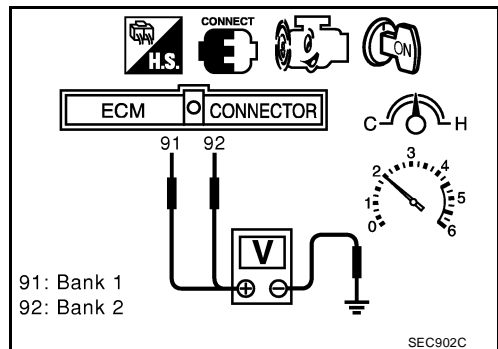
Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
 2. Set voltmeter probes between ECM terminal 91 [HO2S1 (B1) signal] or 92 [HO2S1 (B2) signal] and engine ground.
 3. Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is below 0.3V at least one time.
 - The voltage never exceeds 1.0V.
- 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V



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.

**Removal and Installation
HEATED OXYGEN SENSOR 1**

UBS0038Y

Refer to [EM-116, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

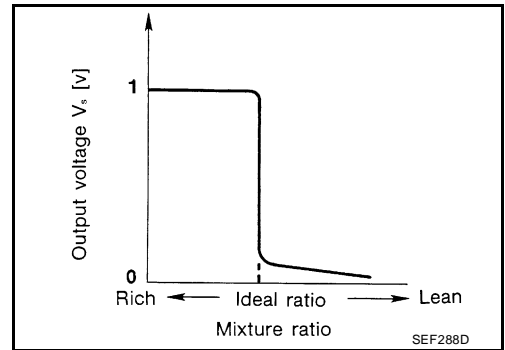
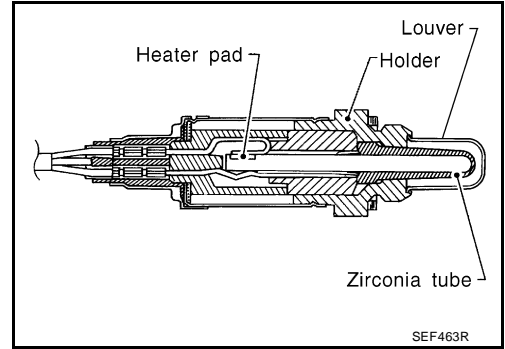
DTC P0134, P0154 HO2S1

PFP:22690

Component Description

UBS0038Z

The heated oxygen sensor 1 is placed into the front tube. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



CONSULT-II Reference Value in Data Monitor Mode

UBS00390

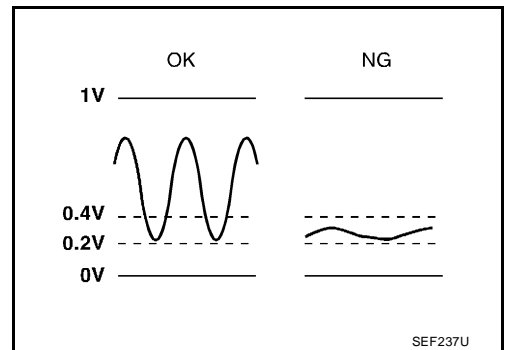
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS00391

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134 (Bank 1)	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 1
P0154 0154 (Bank 2)			

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “HO2S1 (B1) P0134” or “HO2S1 (B2) P0154” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
3. Touch “START”.
4. Let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 4.

HO2S1 (B1) P0134	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0544E

5. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 10 to 60 seconds.)

ENG SPEED	1,400 - 2,600 rpm
Vehicle speed	More than 64 km/h (40 MPH)
B/FUEL SCHDL	2.0 - 12.0 msec
Selector lever	Suitable position

HO2S1 (B1) P0134	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0545E

If “TESTING” is not displayed after 5 minutes, retry from step 2.

6. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-853, "Diagnostic Procedure"](#) .

HO2S1 (B1) P0134	
COMPLETED	

SEC750C

Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

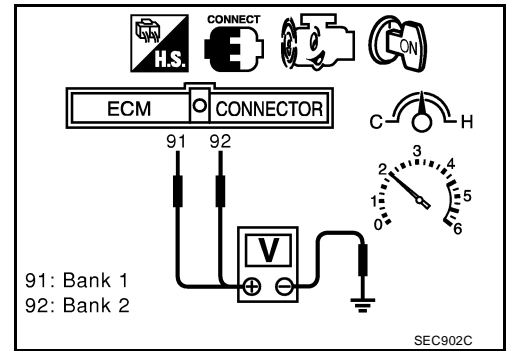
WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 [HO2S1 (B1) signal] or 92 [HO2S1 (B2) signal] and engine ground.

DTC P0134, P0154 HO2S1

[VQ]

3. Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage does not remain in the range of 0.2 - 0.4V.
4. If NG, go to [EC-853, "Diagnostic Procedure"](#) .



A

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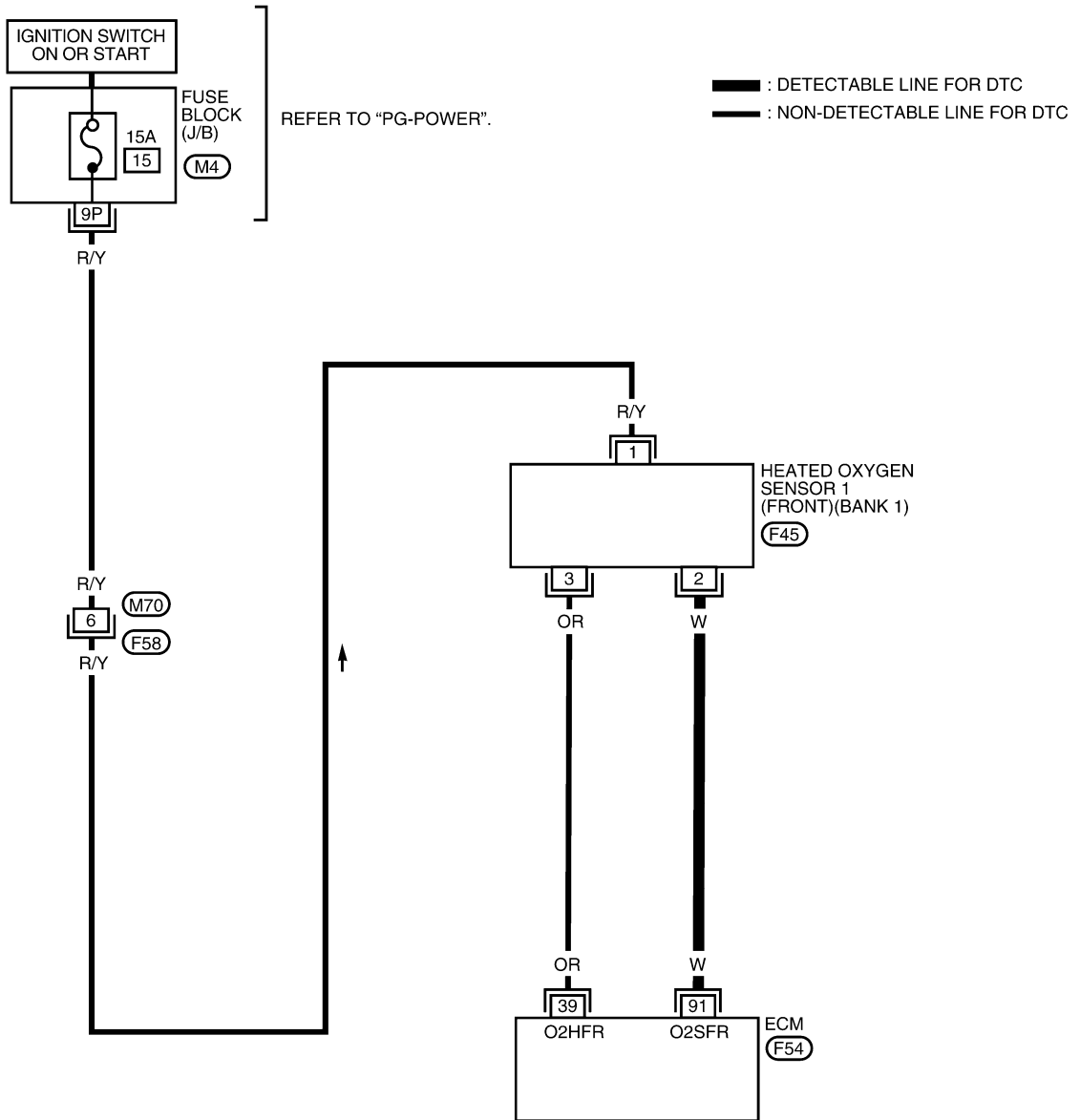
DTC P0134, P0154 HO2S1

[VQ]

UBS00394

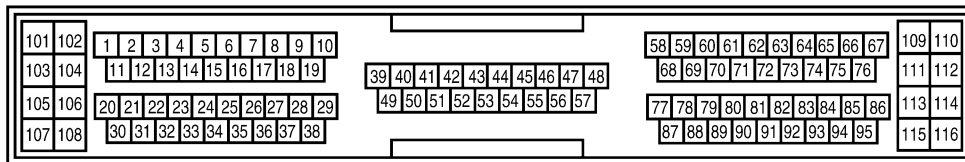
Wiring Diagram BANK 1

EC-O2S1B1-01



REFER TO THE FOLLOWING.

(M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



DTC P0134, P0154 HO2S1

[VQ]

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

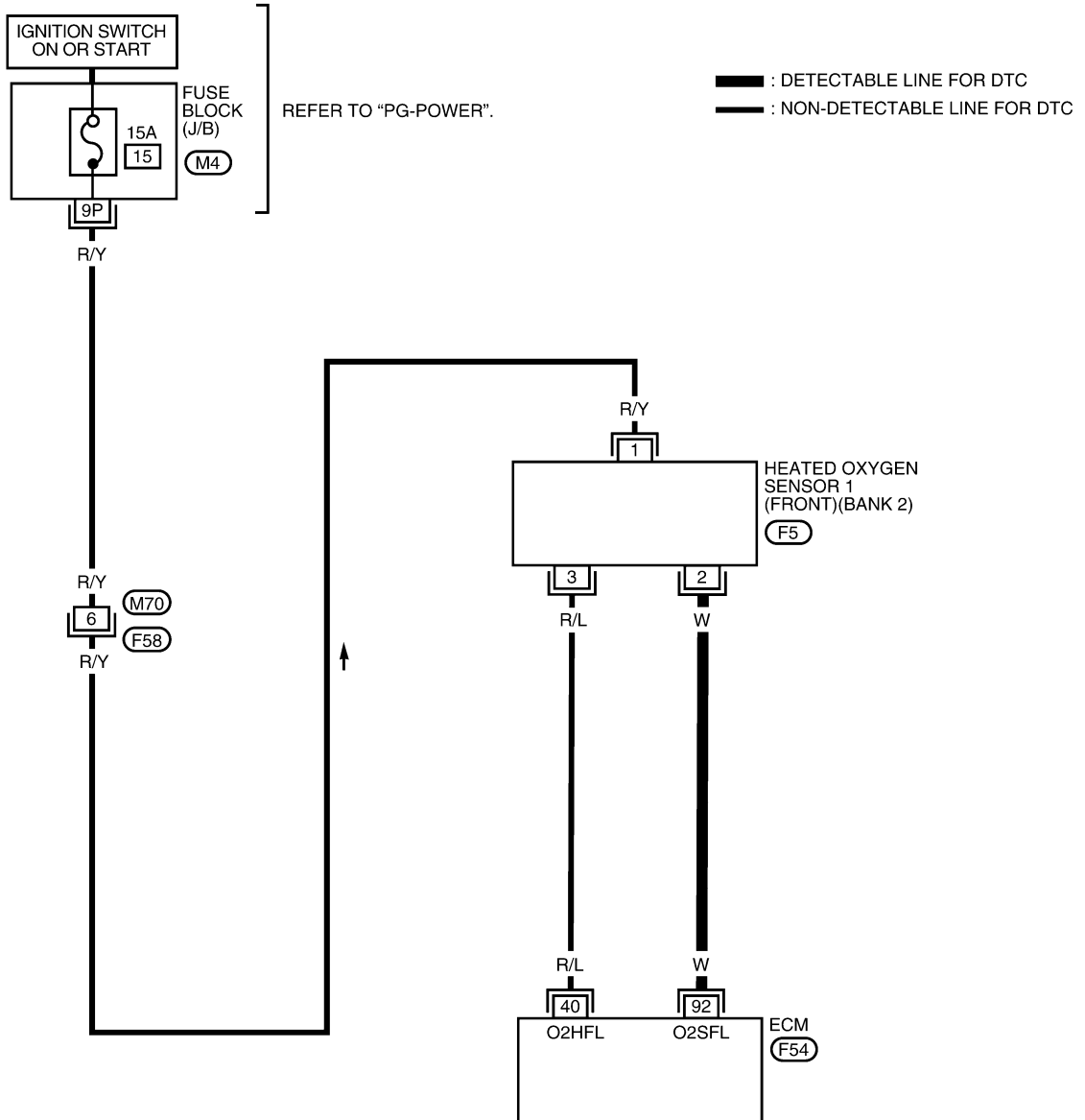
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Heated oxygen sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V (Periodically change)

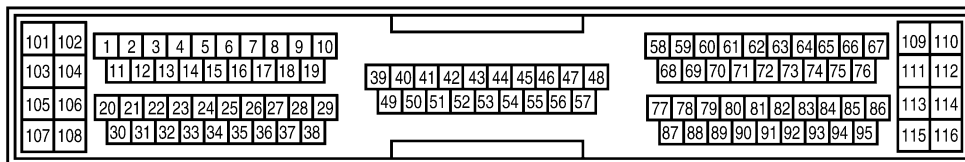
A
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BANK 2

EC-O2S1B2-01



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	W	Heated oxygen sensor 1 (Bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V (Periodically change)

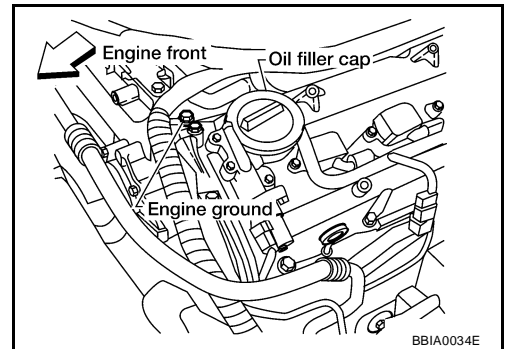
Diagnostic Procedure

UBS00395

1. INSPECTION START

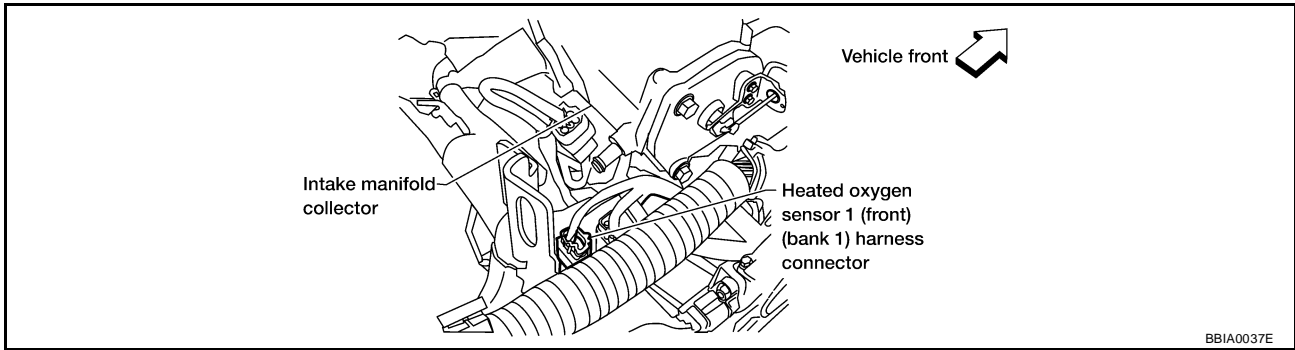
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

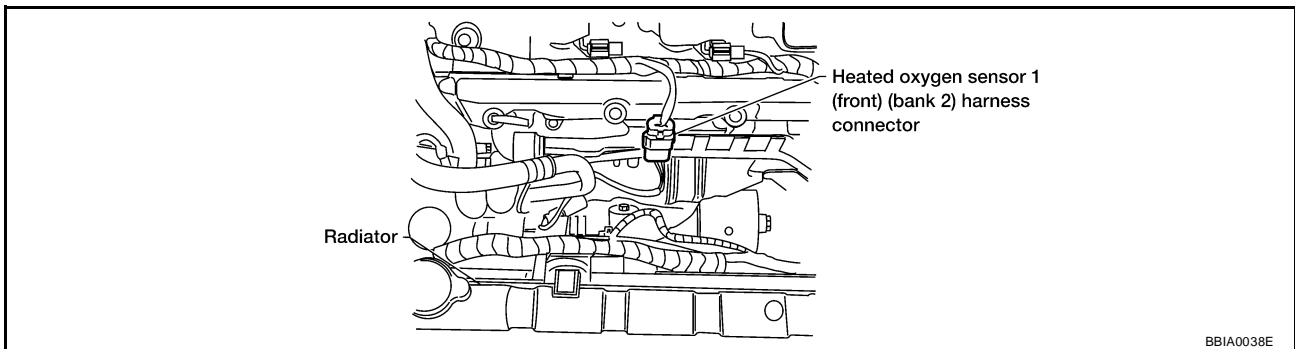


2. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect HO2S1 harness connector.
Bank 1



Bank 2



2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0134	91	2	1
P0154	92	2	2

Continuity should exist.

4. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0134	91	2	1
P0154	92	2	2

Continuity should not exist.

5. Also check harness for 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 HEATED OXYGEN SENSOR 1

Refer to [EC-855, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Replace malfunctioning heated oxygen sensor 1.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection HEATED OXYGEN SENSOR 1

UBS00396

④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

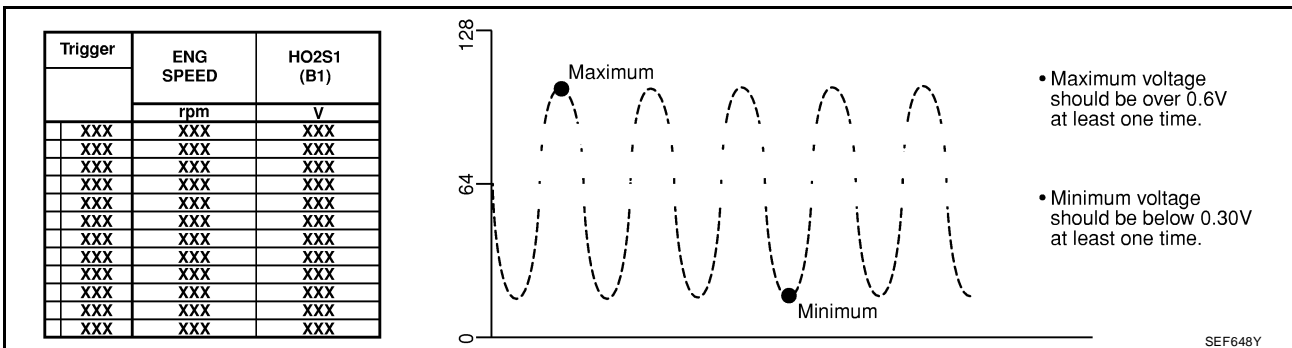
SEF646Y

6. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
5 times (cycles) are counted as shown at right.
- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Bank 1	cycle 1 2 3 4 5
	HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R
Bank 2	cycle 1 2 3 4 5
	HO2S1 MNTR (B2) R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1)/(B2) indicates RICH	
L means HO2S1 MNTR (B1)/(B2) indicates LEAN	

SEF647Y



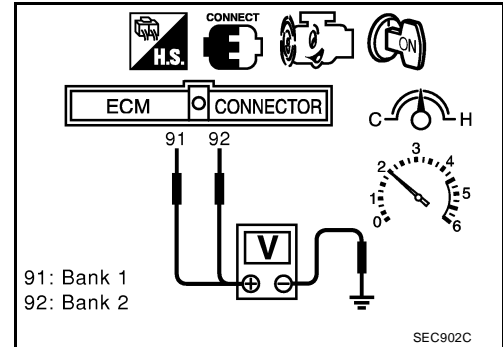
CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 [HO2S1 (B1) signal] or 92 [HO2S1 (B2) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is below 0.3V at least one time.
 - The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

**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.

Removal and Installation

HEATED OXYGEN SENSOR 1

UBS00397

Refer to [EM-116, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P0138, P0158 HO2S2

PF2:226A0

Component Description

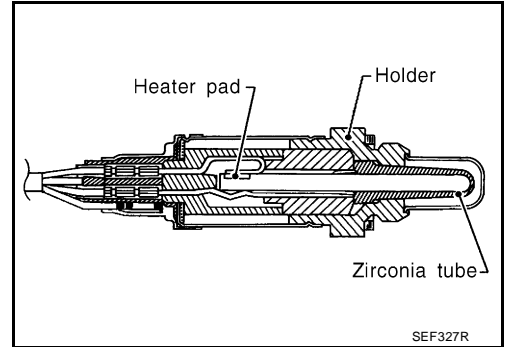
UBS00398

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen 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 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

UBS00399

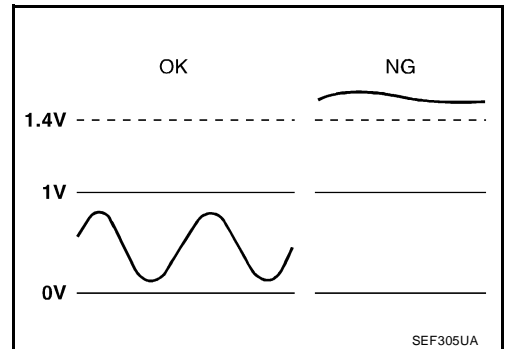
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

On Board Diagnosis Logic

UBS0039A

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high 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	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2
P0158 0158 (Bank 2)			

DTC Confirmation Procedure

UBS0039B

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
3. Stop vehicle with engine running.
4. Let engine idle for 1 minute.

5. Maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,000 - 3,000 rpm
VHCL SPEED SE	More than 32 km/h (20 MPH)
B/FUEL SCHDL	3.0 - 7.0 msec
COOLAN TEMP/S	70 - 100°C (158 - 212°F)
Selector lever	Suitable position

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y

6. If 1st trip DTC is detected, go to [EC-862, "Diagnostic Procedure"](#)

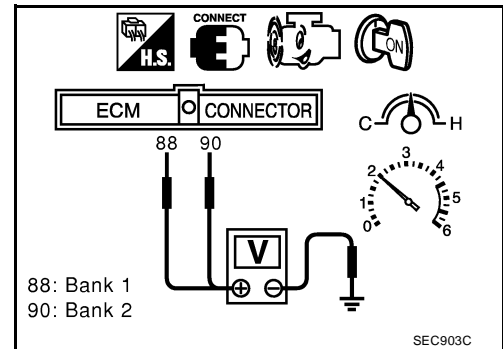
Overall Function Check

UBS0039C

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

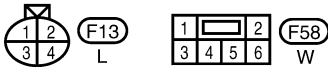
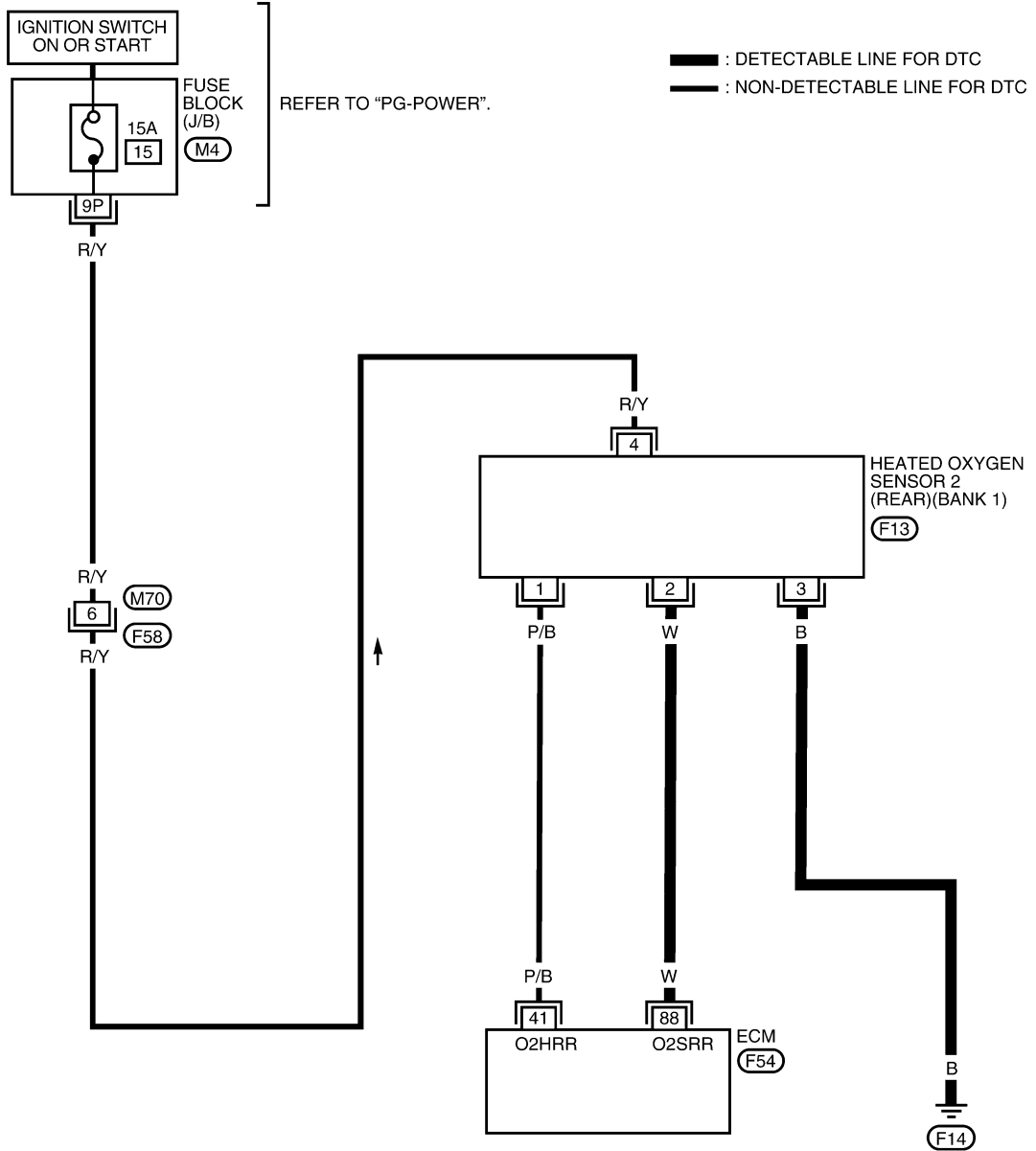
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 [HO2S2 (B1) signal] or 90 [HO2S2 (B2) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 1.4V during this procedure.
5. If NG, go to [EC-862, "Diagnostic Procedure"](#).



Wiring Diagram
BANK 1

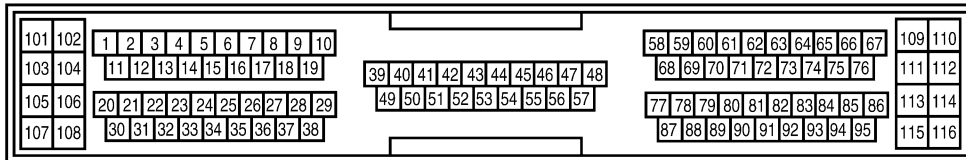
EC-O2S2B1-01

A
EC
C
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E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)



DTC P0138, P0158 HO2S2

[VQ]

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

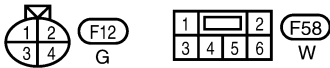
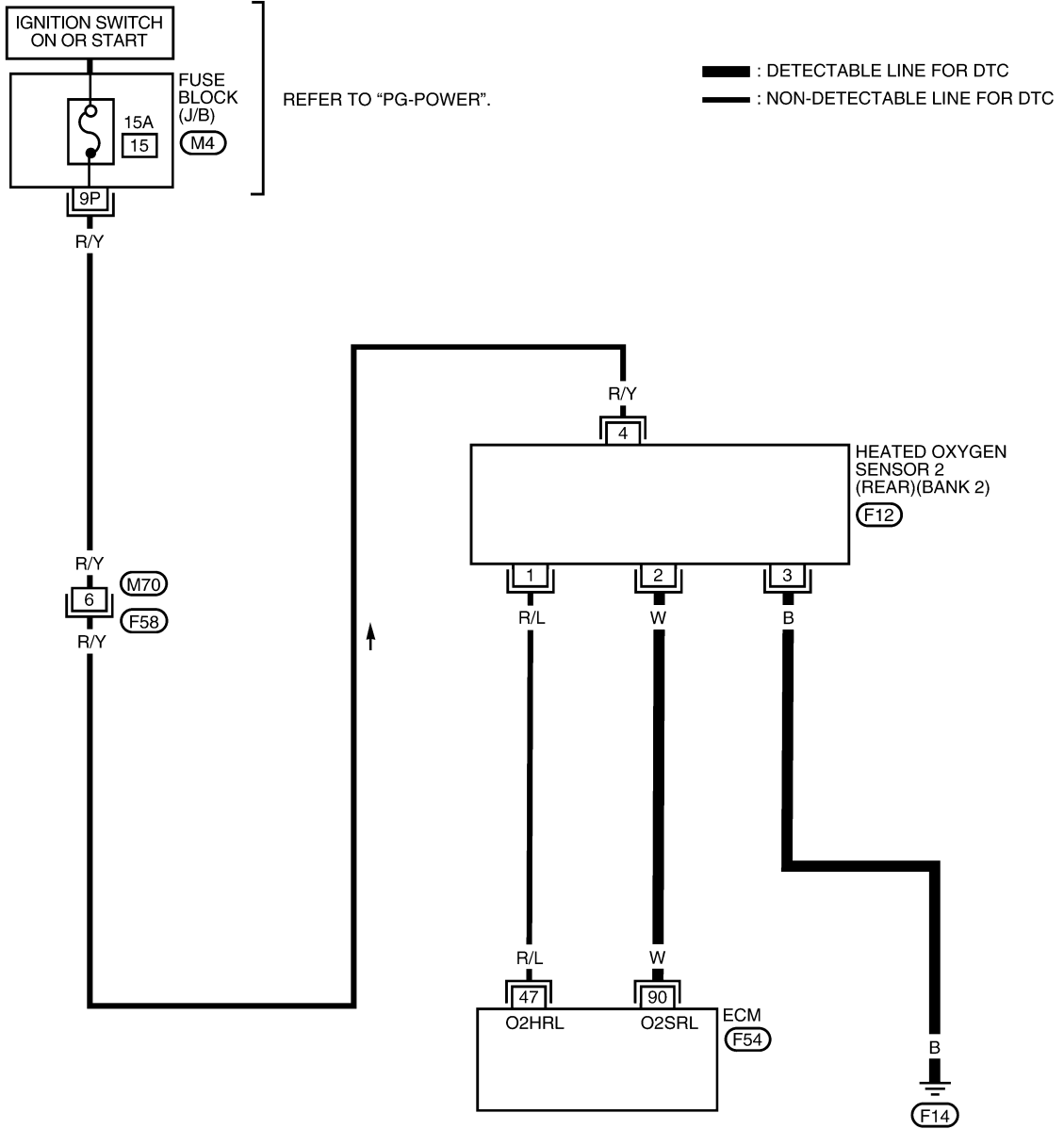
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
88	W	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Engine speed is 2,000 rpm.	0 - Approximately 1.0V

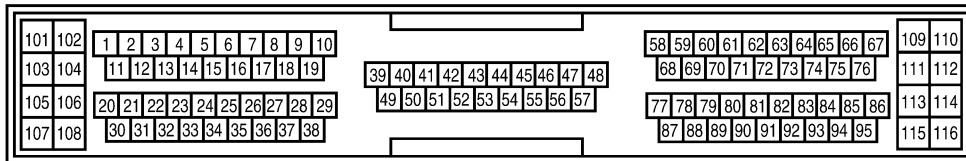
BANK 2

EC-O2S2B2-01

A
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H
I
J
K
L
M



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
90	W	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V

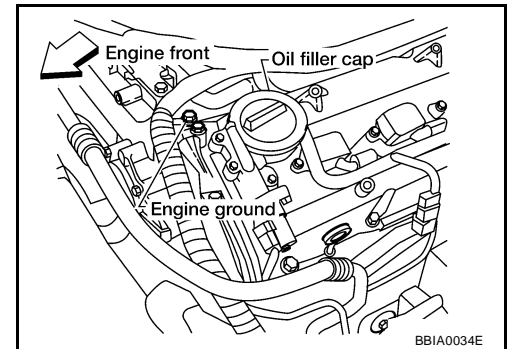
Diagnostic Procedure

UBS0039E

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

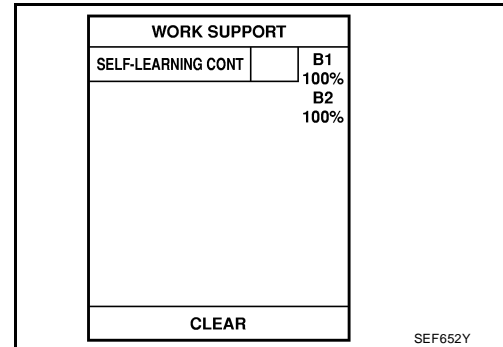
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

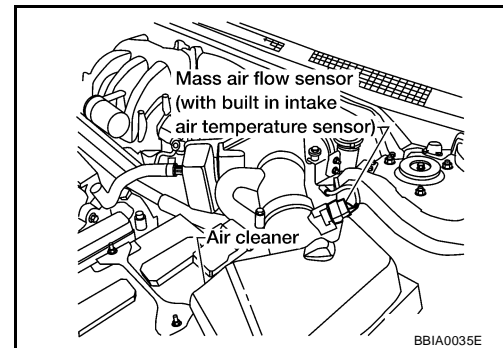
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
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-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-687, "HOW TO ERASE 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 P0172 or P0175 detected?
Is it difficult to start engine?**



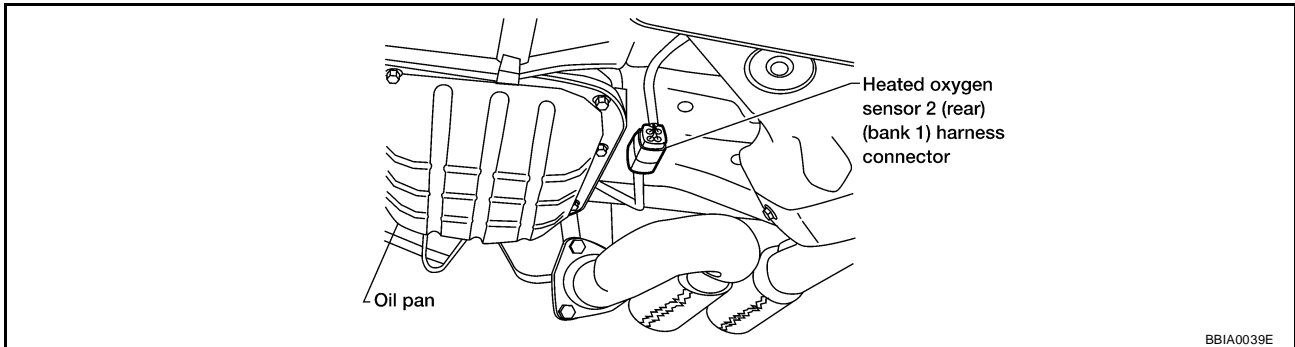
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172 or P0175. Refer to [EC-885](#).
- No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

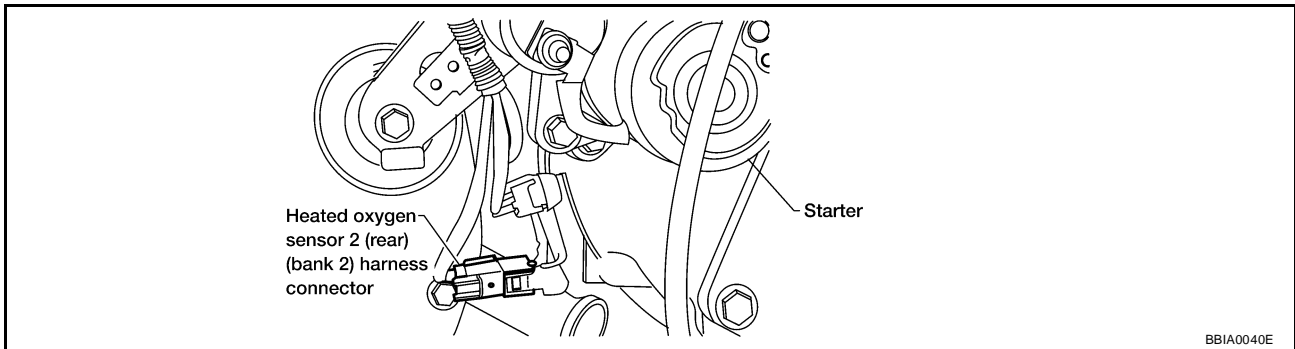
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.

Bank 1



BBIA0039E

Bank 2



BBIA0040E

3. Check harness continuity between HO2S2 terminal 3 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0138	88	2	1
P0158	90	2	2

Continuity should exist.

3. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0138	88	2	1
P0158	90	2	2

Continuity should not exist.

4. Also check harness for short to ground or 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-865, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace malfunctioning heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection
HEATED OXYGEN SENSOR 2**

UBS0039F

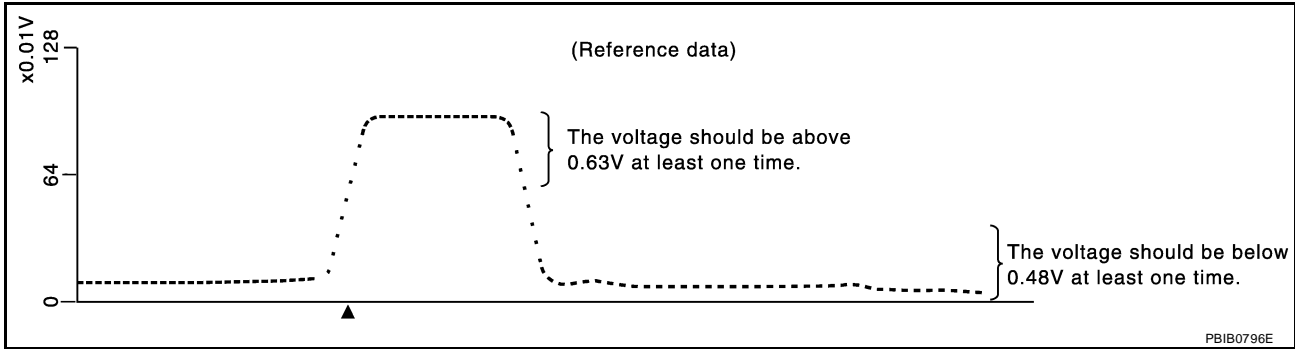
With CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



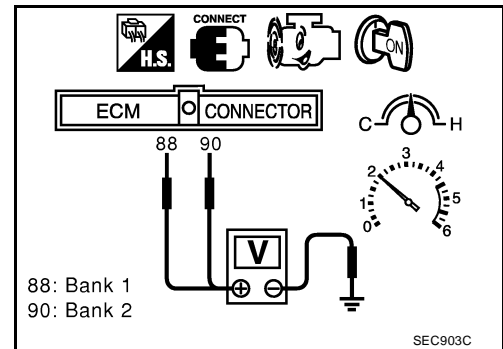
"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.48V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

Without CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 [HO2S2 (B1) signal] or 90 [HO2S2 (B2) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage is above 0.63V at step 4, step 5 is not necessary.
5. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should be below 0.48V at least once during this procedure.
6. If NG, replace heated oxygen sensor 2.



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.

**Removal and Installation
 HEATED OXYGEN SENSOR 2**

UBS0039G

Refer to [EX-6, "EXHAUST SYSTEM \(VQ35DE\)"](#).

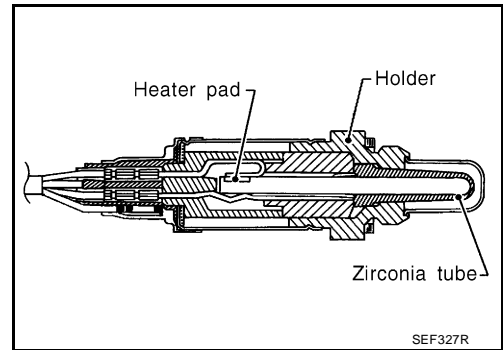
DTC P0139, P0159 HO2S2

PF2:226A0

Component Description

UBS0039H

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the heated oxygen 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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

UBS0039I

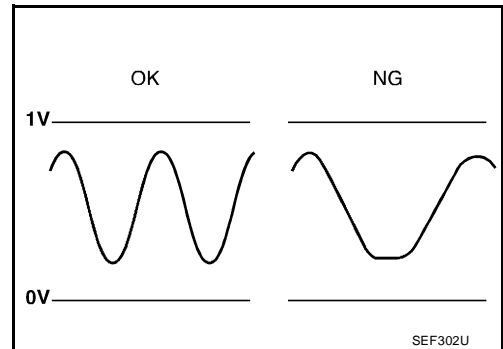
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

On Board Diagnosis Logic

UBS0039J

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst 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 the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139 (Bank 1)	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors ● Intake air leaks
P0159 0159 (Bank 2)			

DTC Confirmation Procedure

UBS0039K

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

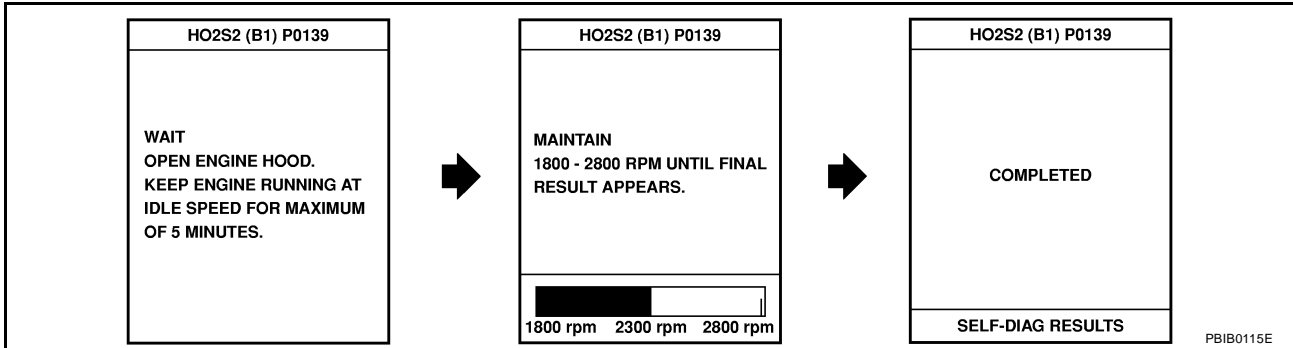
TESTING CONDITION:

Open engine hood before conducting following procedure.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.

5. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
6. Select "HO2S2 (B1) P0139" or "HO2S2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7. Start engine and following the instruction of CONSULT-II.



8. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
 If "NG" is displayed, refer to [EC-872, "Diagnostic Procedure"](#) .
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
 - b. Turn ignition switch "ON".
 - c. Select "DATA MONITOR" mode with CONSULT-II.
 - d. Start engine.
 - e. Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

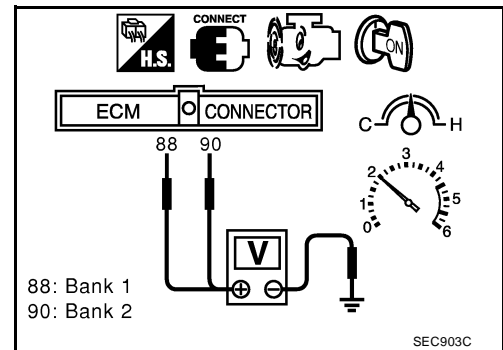
Overall Function Check

UBS0039L

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

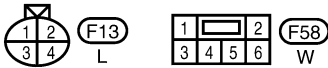
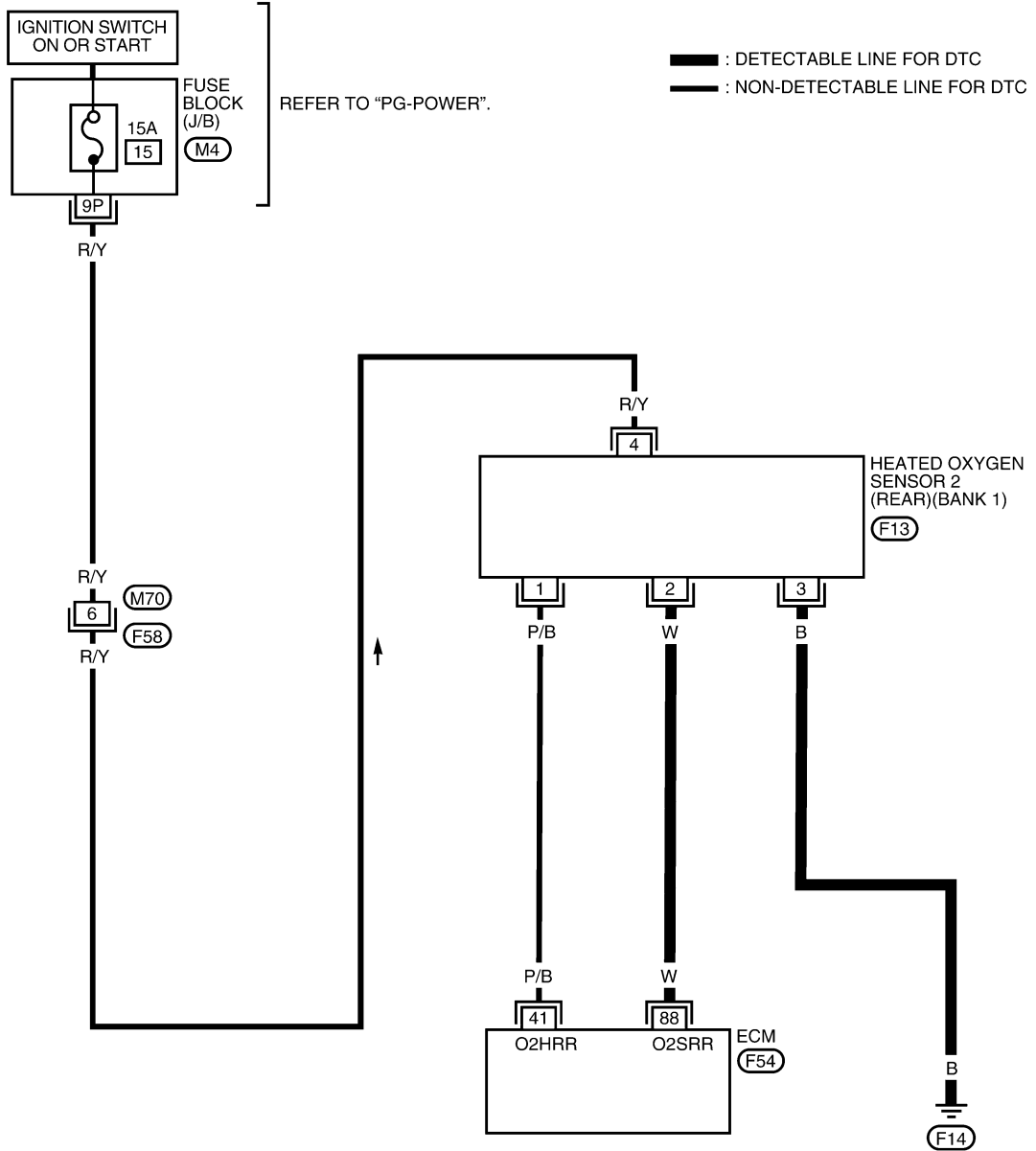
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 [HO2S2 (B1) signal] or 90 [HO2S2 (B2) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should change at more than 0.06V for 1 second during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
5. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should change at more than 0.06V for 1 second during this procedure.
6. If NG, go to [EC-872, "Diagnostic Procedure"](#) .



Wiring Diagram
BANK 1

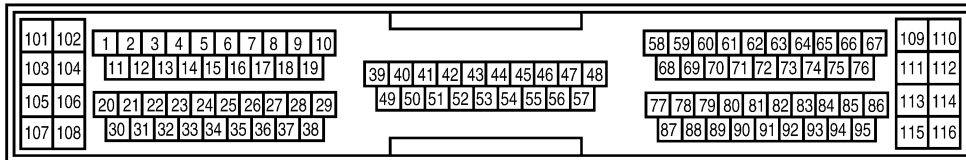
EC-O2S2B1-01

A
EC
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M



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)



DTC P0139, P0159 HO2S2

[VQ]

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

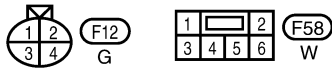
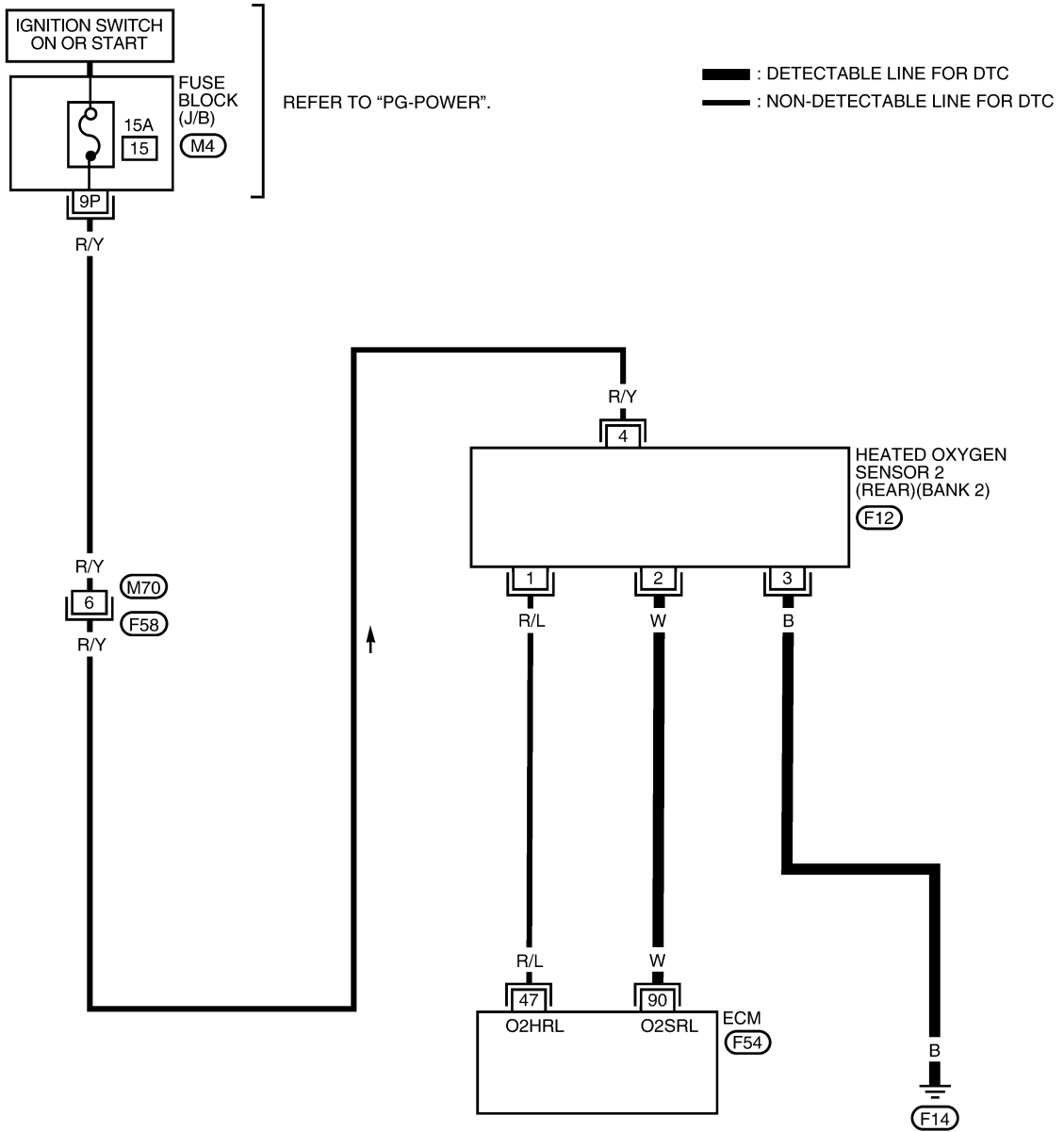
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
88	W	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Engine speed is 2,000 rpm.	0 - Approximately 1.0V

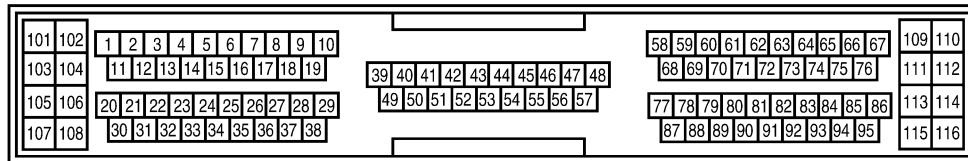
BANK 2

EC-O2S2B2-01

A
EC
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J
K
L
M



REFER TO THE FOLLOWING.
M4 - FUSE BLOCK
- JUNCTION BOX (J/B)



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
90	W	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V

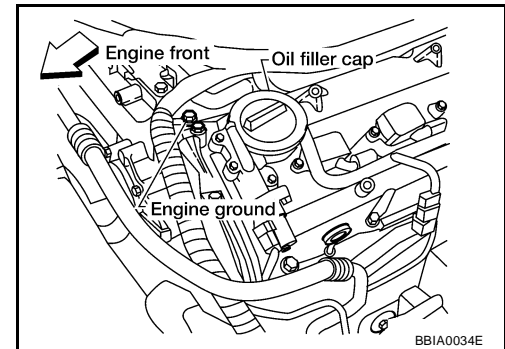
Diagnostic Procedure

UBS0039N

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

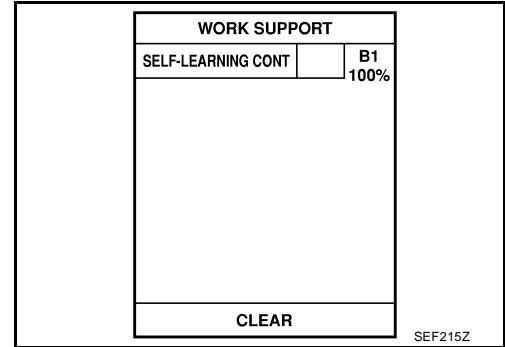
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

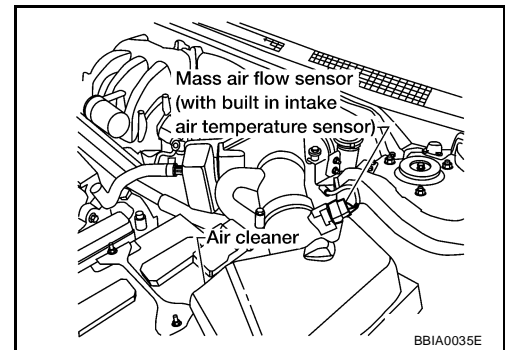
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
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-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-687, "HOW TO ERASE 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, P0172, P0174 or P0175 detected?
Is it difficult to start engine?**



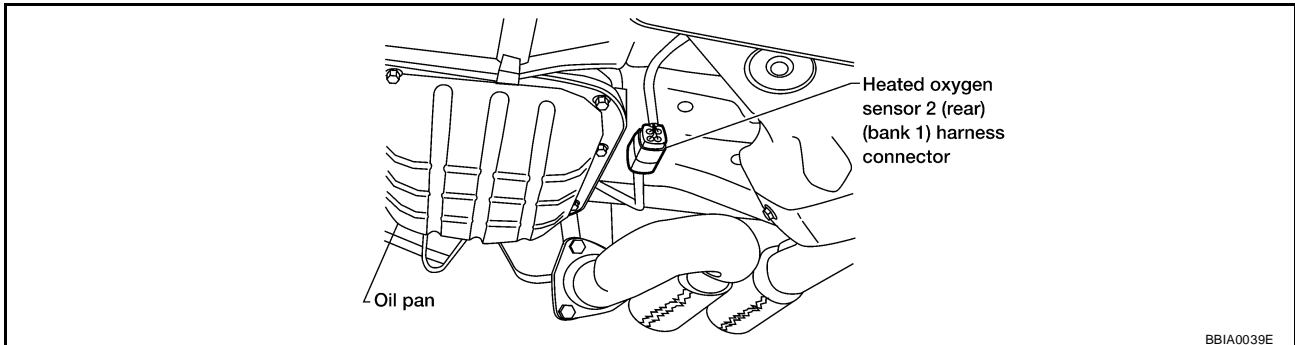
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to [EC-877](#) or [EC-885](#).
- No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

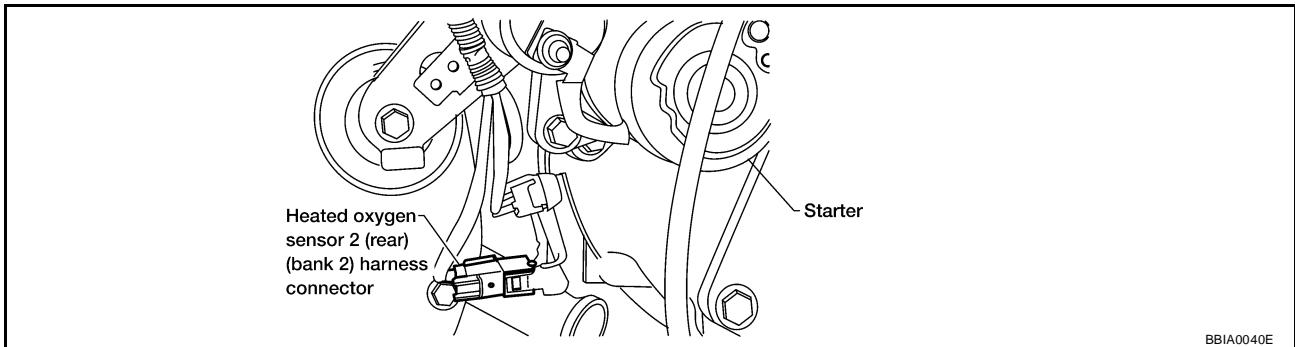
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.

Bank 1



BBIA0039E

Bank 2



BBIA0040E

3. Check harness continuity between HO2S2 terminal 3 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0138	88	2	1
P0158	90	2	2

Continuity should exist.

3. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0138	88	2	1
P0158	90	2	2

Continuity should not exist.

4. Also check harness for short to ground or 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-875, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace malfunctioning heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection
HEATED OXYGEN SENSOR 2**

UBS00390

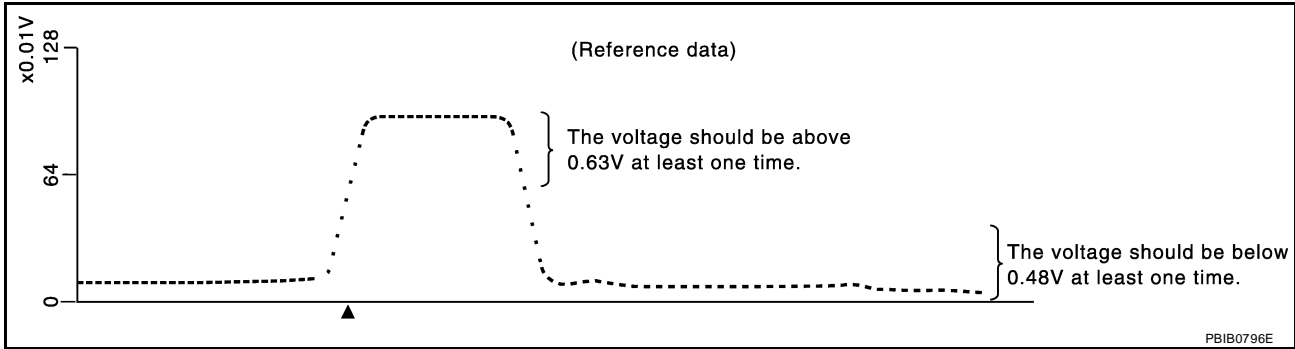
 **With CONSULT-II**

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



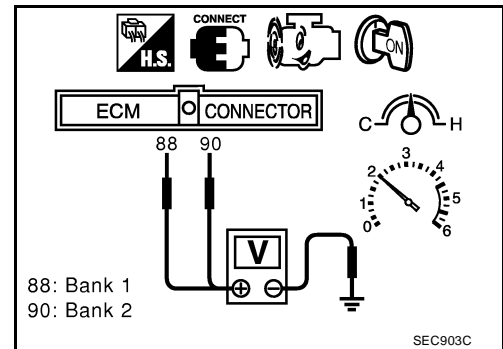
"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.48V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

Without CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 [HO2S2 (B1) signal] or 90 [HO2S2 (B2) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage is above 0.63V at step 4, step 5 is not necessary.
5. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should be below 0.48V at least once during this procedure.
6. If NG, replace heated oxygen sensor 2.



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.

**Removal and Installation
 HEATED OXYGEN SENSOR 2**

UBS0039P

Refer to [EX-6, "EXHAUST SYSTEM \(VQ35DE\)"](#).

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

[VQ]

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

PF:16600

On Board Diagnosis Logic

UBS0039Q

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensors 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 light up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

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 Heated oxygen sensor 1 Injectors Exhaust gas leaks Incorrect fuel pressure Lack of fuel Mass air flow sensor Incorrect PCV hose connection
P0174 0174 (Bank 2)			

DTC Confirmation Procedure

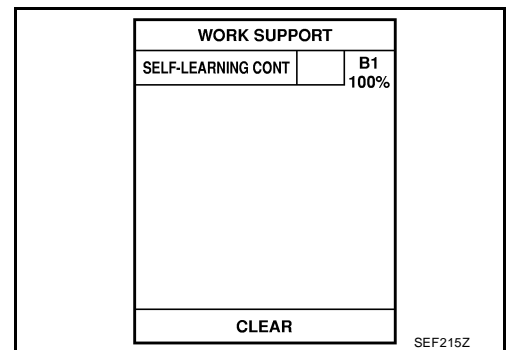
UBS0039R

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch “OFF” and wait at least 10 seconds.
- Turn ignition switch “ON” and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
- Clear the self-learning control coefficient by touching “CLEAR”.
- Select “DATA MONITOR” mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0171 or P0174 should be detected at this stage, if a malfunction exists. If so, go to “Diagnostic Procedure”, [EC-881](#).
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
- Crank engine while depressing accelerator pedal. If engine starts, go to “Diagnostic Procedure”, [EC-881](#). If engine does not start, check exhaust and intake air leak visually.



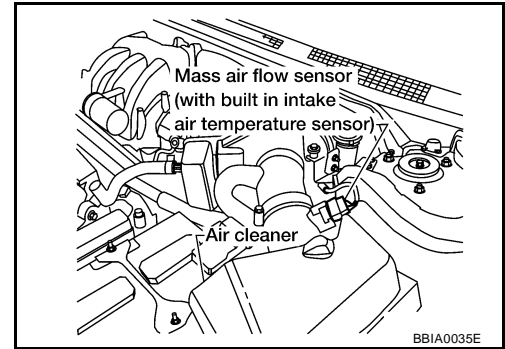
WITH GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch “OFF” and wait at least 10 seconds.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

[VQ]

3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 3" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select "MODE 7" with GST. The 1st trip DTC P0171 or P0174 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", [EC-881](#).
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", [EC-881](#). If engine does not start, check exhaust and intake air leak visually.



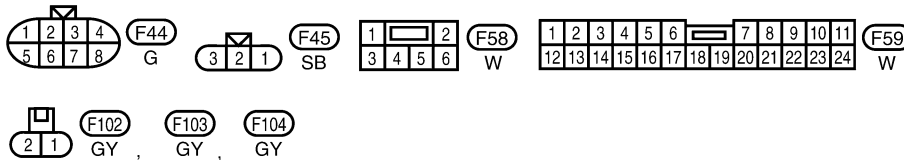
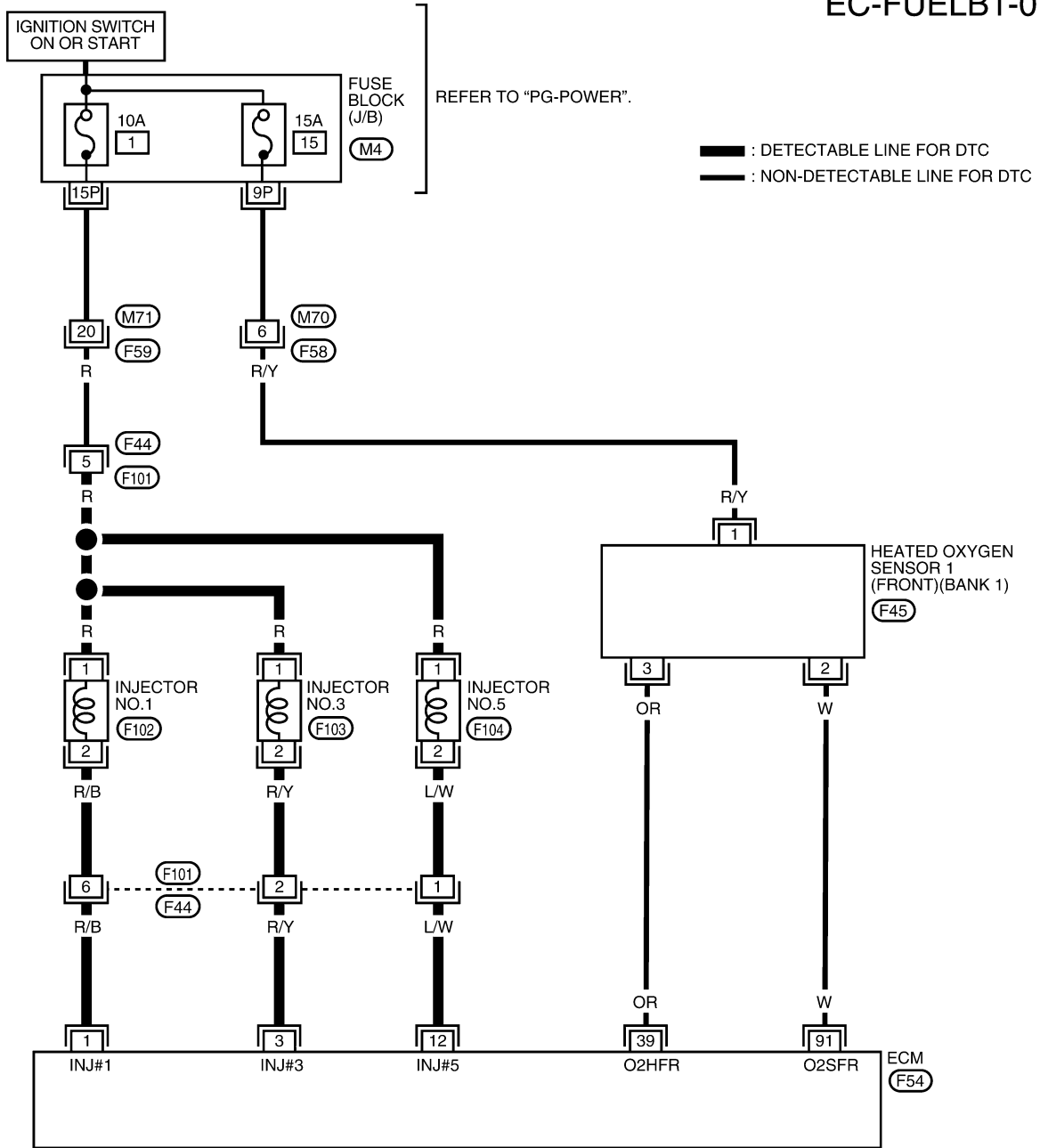
DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

[VQ]

UBS0039S

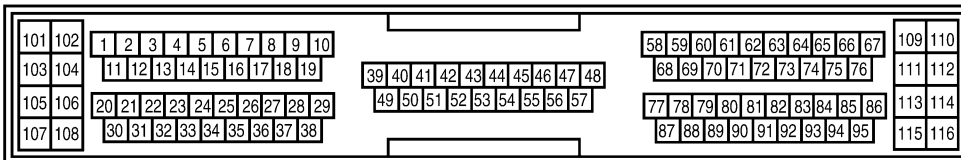
Wiring Diagram BANK 1

EC-FUELB1-01



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)



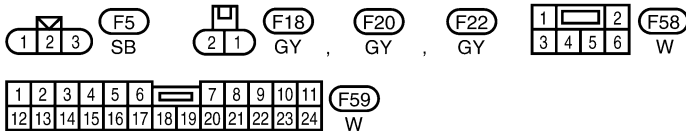
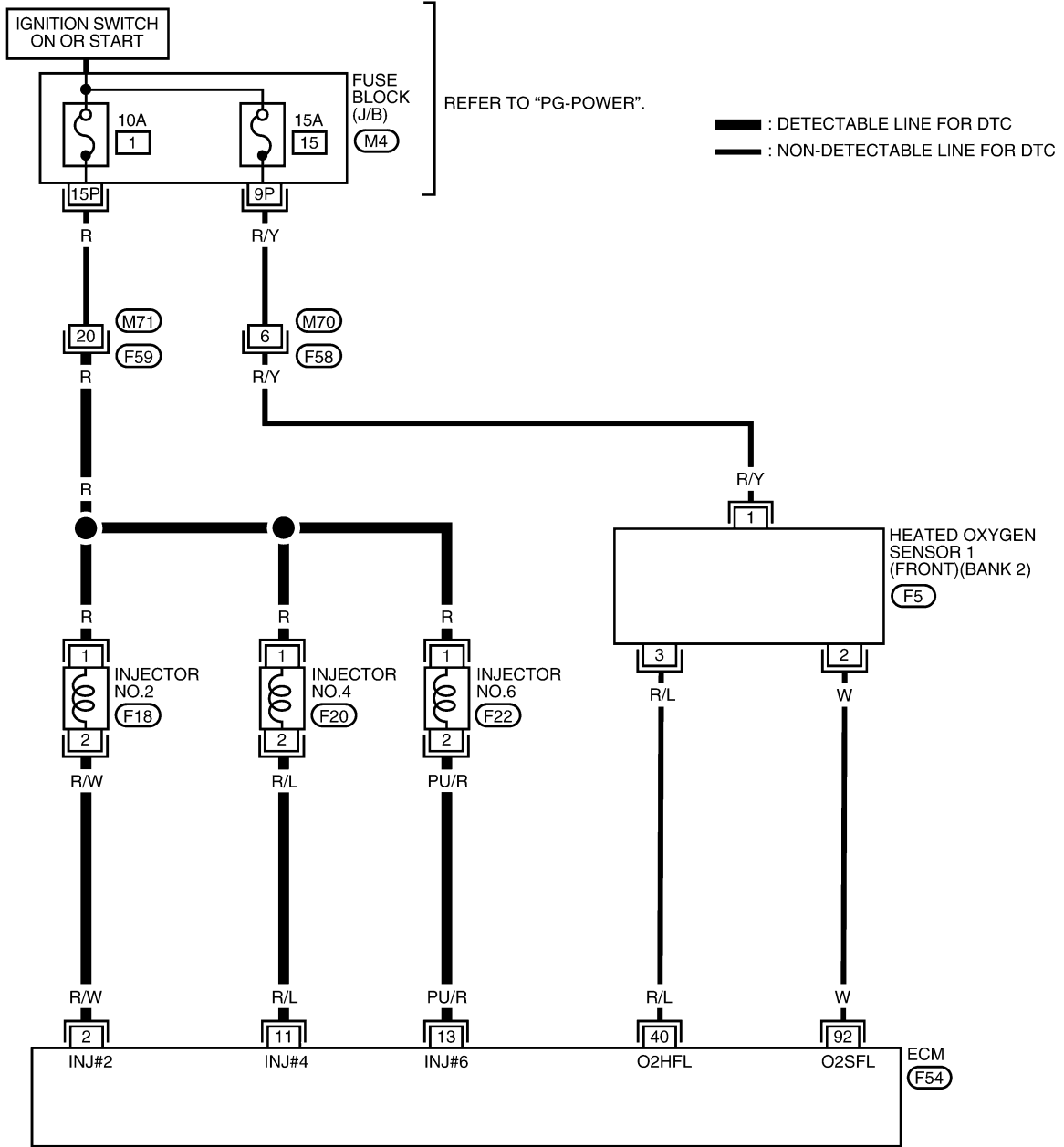
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DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

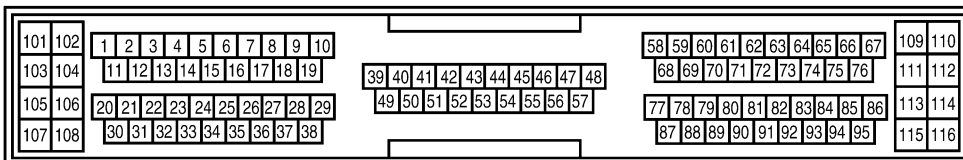
[VQ]

BANK 2

EC-FUEL2-01



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0063E

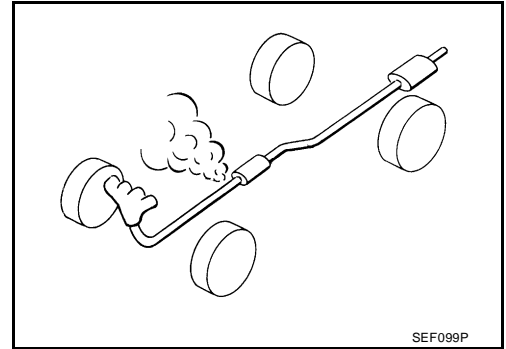
Diagnostic Procedure

1. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst.

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace.



2. CHECK FOR INTAKE AIR LEAK

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.

3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect corresponding heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0171	91	1	1
P0174	92	1	2

Continuity should exist.

5. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0171	91	1	1
P0174	92	1	2

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-671, "FUEL PRESSURE RELEASE"](#) .
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-672, "FUEL PRESSURE CHECK"](#) .

At idling: 350 kPa (3.7 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-1240](#) .)
- Fuel pressure regulator (Refer to [EC-672](#) .)
- Fuel lines (Refer to [EC-1116, "Wiring Diagram"](#) .)
- Fuel filter for clogging

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

 With CONSULT-II

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

2.0 - 6.0 g-m/sec: at idling

7.0 - 20.0 g-m/sec: at 2,500 rpm

 With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

2.0 - 6.0 g-m/sec: at idling

7.0 - 20.0 g-m/sec: at 2,500 rpm

OK or NG

- OK >> GO TO 7.
 NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-790, "DTC P0101 MAF SENSOR"](#) .

7. CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

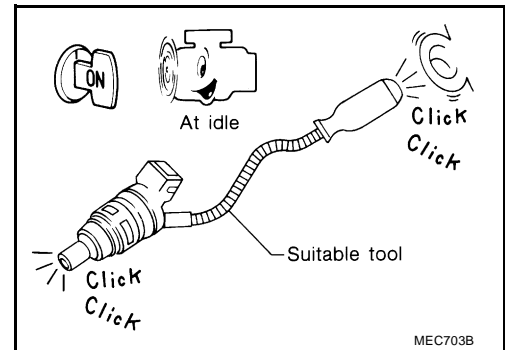
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.

Clicking noise should be heard.



OK or NG

OK >> GO TO 8.

NG >> Perform trouble diagnosis for "INJECTORS", [EC-1230](#).

8. CHECK INJECTOR

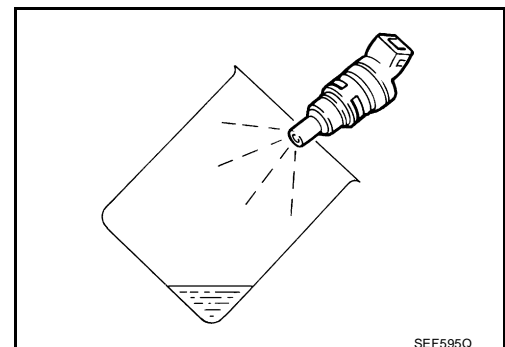
1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Disconnect injector harness connectors on bank 2 (for DTC P0171), bank 1 (for DTC P0174).
4. Remove injector gallery assembly. Refer to [EM-129, "FUEL INJECTOR AND FUEL TUBE"](#).
Keep fuel hose and all injectors connected to injector gallery.
The injector harness connectors on bank 1 (for DTC P0171), bank 2 (for DTC P0174) should remain connected.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each injector.
7. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.

Fuel should be sprayed evenly for each injector.

OK or NG

OK >> GO TO 9.

NG >> Replace injectors from which fuel does not spray out.
Always replace O-ring with new ones.



9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

PFP:16600

On Board Diagnosis Logic

UBS0039U

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensors 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 light up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172 0172 (Bank 1)	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"> ● Heated oxygen sensor 1 ● Injectors ● Exhaust gas leaks ● Incorrect fuel pressure ● Mass air flow sensor
P0175 0175 (Bank 2)			

DTC Confirmation Procedure

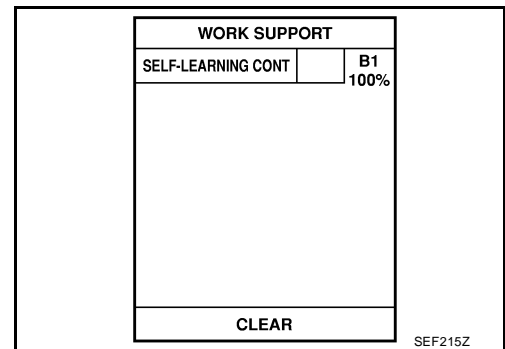
UBS0039V

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
4. Clear the self-learning control coefficient by touching “CLEAR”.
5. Select “DATA MONITOR” mode with CONSULT-II.
6. Start engine again and let it idle for at least 10 minutes.
The 1st trip DTC P0172, P0175 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", [EC-889](#).
7. If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
8. Crank engine while depressing accelerator pedal.
If engine starts, go to “Diagnostic Procedure”, [EC-889](#). If engine does not start, remove ignition plugs and check for fouling, etc.



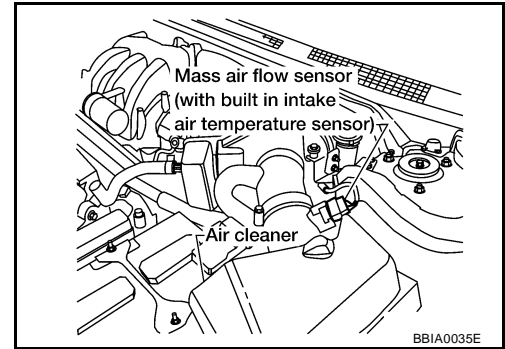
WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

[VQ]

3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 3" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select "MODE 7" with GST. The 1st trip DTC P0172 or P0175 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", [EC-889](#).
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal.
If engine starts, go to "Diagnostic Procedure", [EC-889](#). If engine does not start, check exhaust and intake air leak visually.

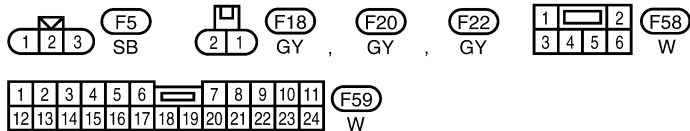
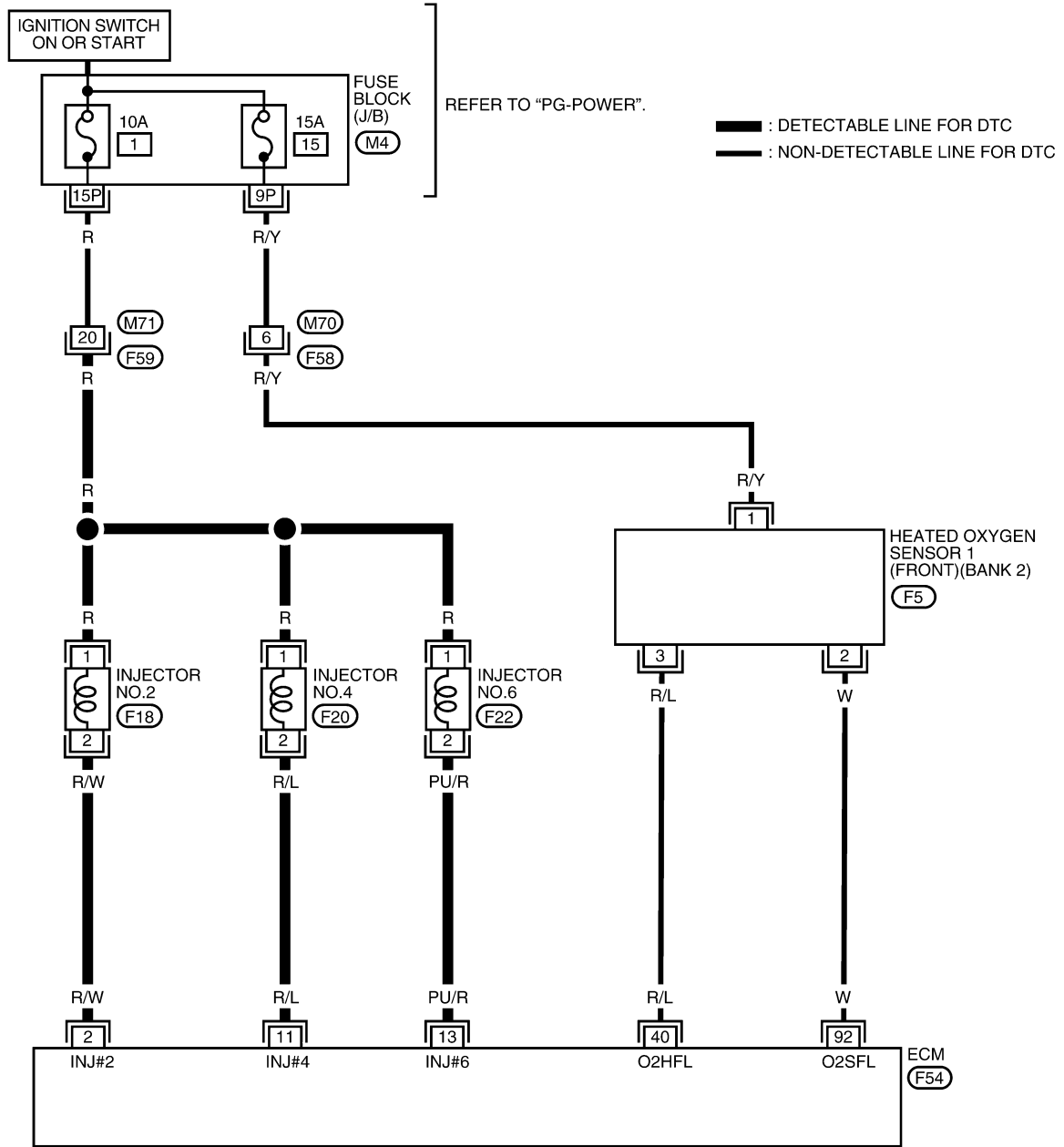


DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

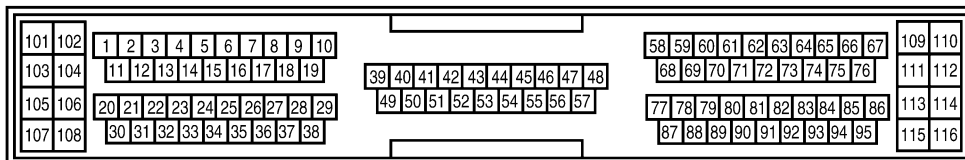
[VQ]

BANK 2

EC-FUEL2-01



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0063E

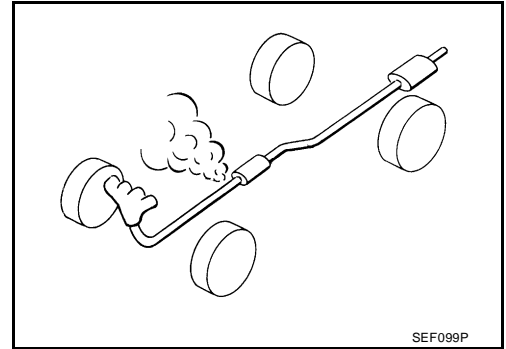
Diagnostic Procedure

1. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst.

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.



2. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect corresponding heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0172	91	1	1
P0175	92	1	2

Continuity should exist.

5. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0172	91	1	1
P0175	92	1	2

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-671, "FUEL PRESSURE RELEASE"](#) .
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-672, "FUEL PRESSURE CHECK"](#) .

At idling: 350 kPa (3.7 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-1240](#) .)
- Fuel pressure regulator (Refer to [EC-672](#) .)

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

 **With CONSULT-II**

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

2.0 - 6.0 g-m/sec: at idling
7.0 - 20.0 g-m/sec: at 2,500 rpm

 **With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

2.0 - 6.0 g-m/sec: at idling
7.0 - 20.0 g-m/sec: at 2,500 rpm

OK or NG

- OK >> GO TO 7.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-790, "DTC P0101 MAF SENSOR"](#) .

7. CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

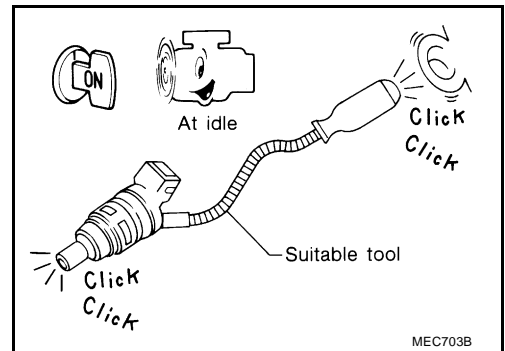
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.

Clicking noise should be heard.



OK or NG

- OK >> GO TO 8.
- NG >> Perform trouble diagnosis for "INJECTORS", [EC-1230](#).

8. CHECK INJECTOR

1. Remove injector assembly. Refer to [EM-129, "FUEL INJECTOR AND FUEL TUBE"](#). Keep fuel hose and all injectors connected to injector gallery.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect injector harness connectors bank 2 (for DTC P0172), bank 1 (for P0175). The injector harness connectors on bank 1 (for P0172), bank 2 (for P0175) should remain connected.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each injectors.
6. Crank engine for about 3 seconds. Make sure fuel does not drip from injector.

OK or NG

- OK (Does not drip.)>>GO TO 9.
- NG (Drips.)>>Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

9. CHECK INTERMITTENT INCIDENT

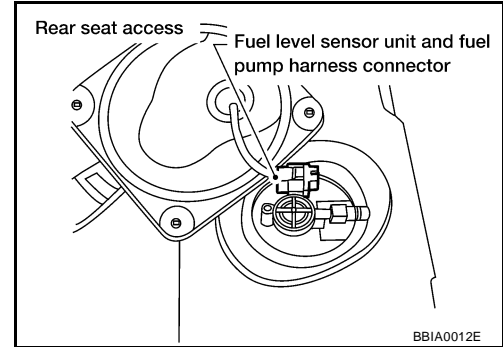
Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

DTC P0181 FTT SENSOR

Component Description

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



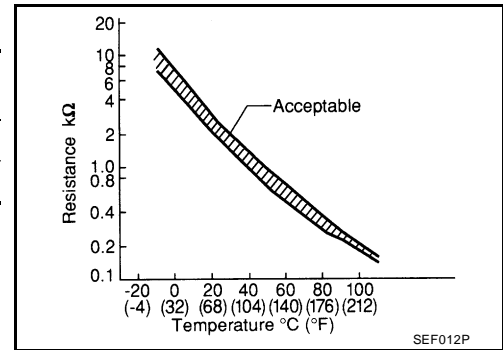
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: These data are reference values and are measured between ECM terminal 75 (Fuel tank temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



On Board Diagnosis Logic

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 (The sensor circuit is open or shorted) ● Fuel tank temperature sensor

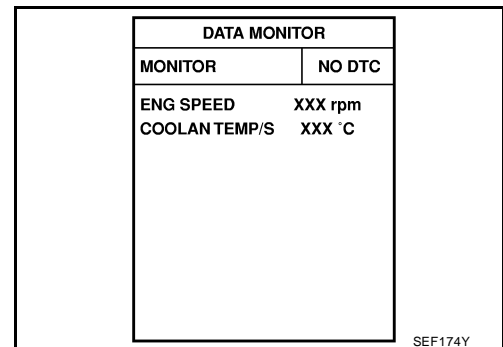
DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
If the result is NG, go to [EC-895, "Diagnostic Procedure"](#).
If the result is OK, go to following step.
4. Check "COOLAN TEMP/S" value.
If "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.
If "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
5. Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).
6. Wait at least 10 seconds.
7. If 1st trip DTC is detected, go to [EC-895, "Diagnostic Procedure"](#).



DTC P0181 FTT SENSOR

[VQ]



WITH GST

Follow the procedure "WITH CONSULT-II" above.

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DTC P0181 FTT SENSOR

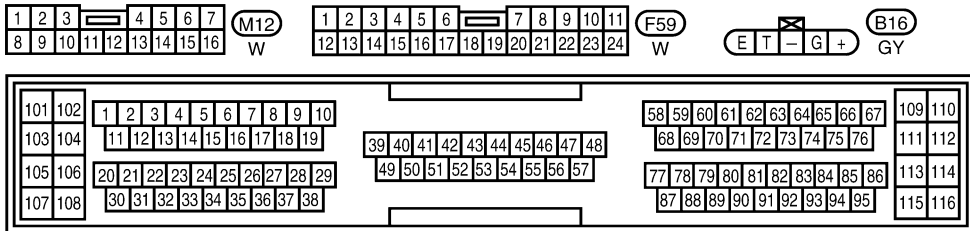
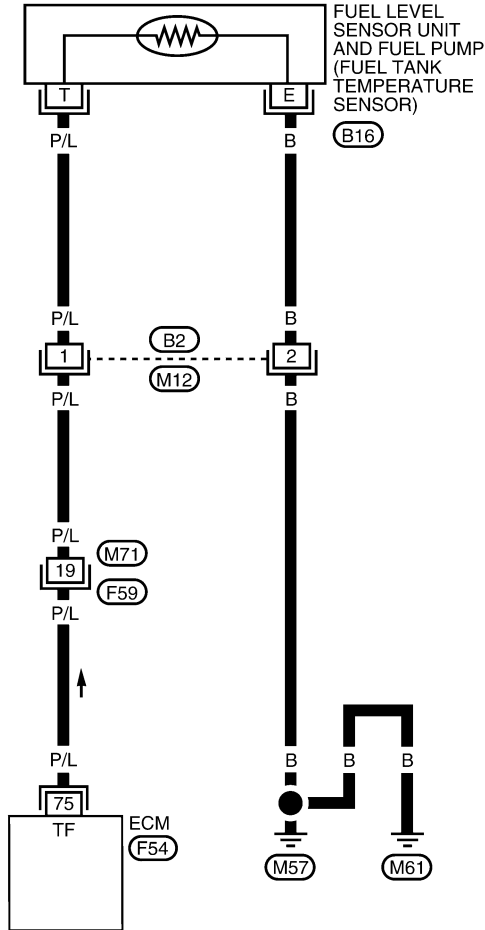
[VQ]

Wiring Diagram

UBS003A1

EC-FTTS-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC

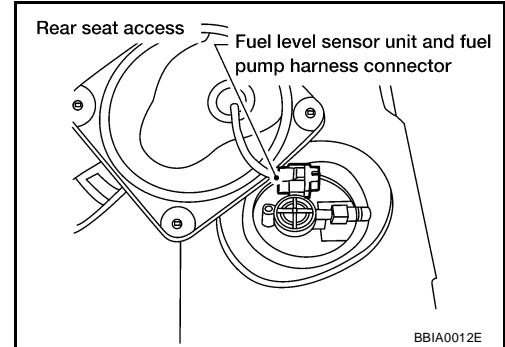


BBWA0064E

Diagnostic Procedure

1. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

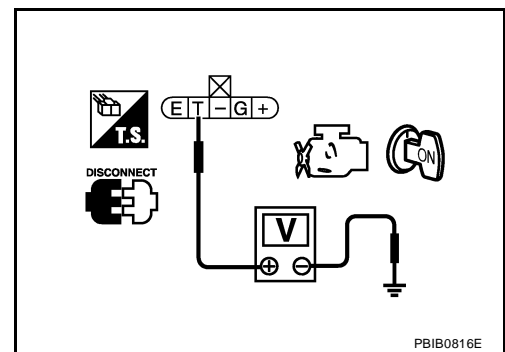


4. Check voltage between fuel level sensor unit and fuel pump terminal T and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M12
- Harness connectors M71, F59
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair harness or connector.

3. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal E and body ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M12
- Harness for open or short between fuel level sensor unit and fuel pump and body ground

>> Repair open circuit or short to power in harness or connector.

5. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-896, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
 NG >> Replace fuel level sensor unit.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

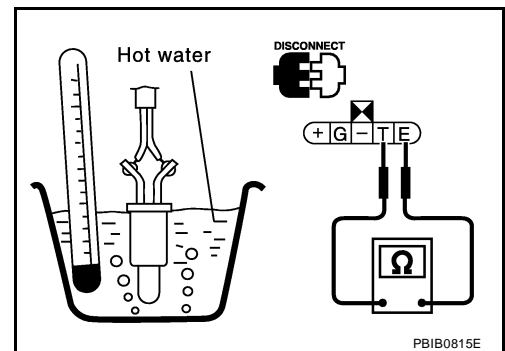
>> INSPECTION END

Component Inspection FUEL TANK TEMPERATURE SENSOR

UBS003A3

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals T and E by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



UBS003A4

Removal and Installation FUEL TANK TEMPERATURE SENSOR

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

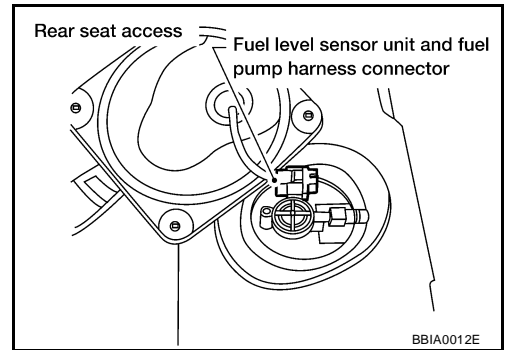
DTC P0182, P0183 FTT SENSOR

PFP:22630

Component Description

UBS003A5

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



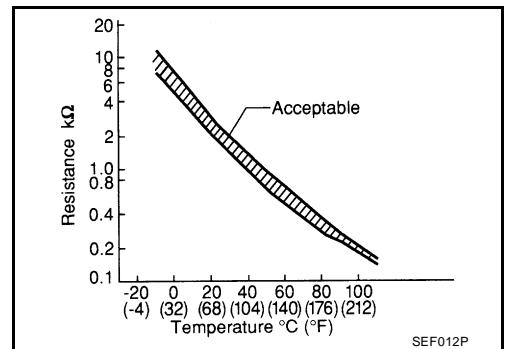
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: These data are reference values and are measured between ECM terminal 75 (Fuel tank temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



On Board Diagnosis Logic

UBS003A6

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 (The 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

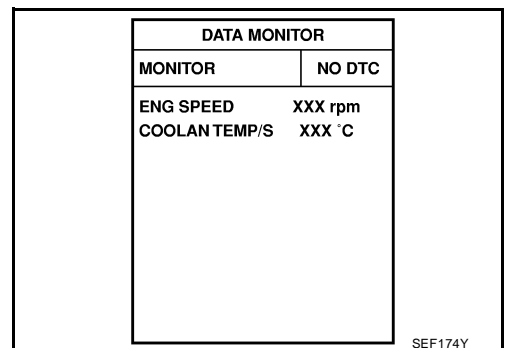
UBS003A7

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-899, "Diagnostic Procedure"](#)



WITH GST

Follow the procedure "With CONSULT-II" above.

DTC P0182, P0183 FTT SENSOR

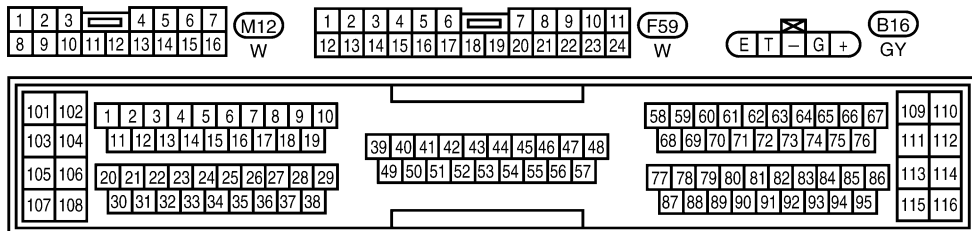
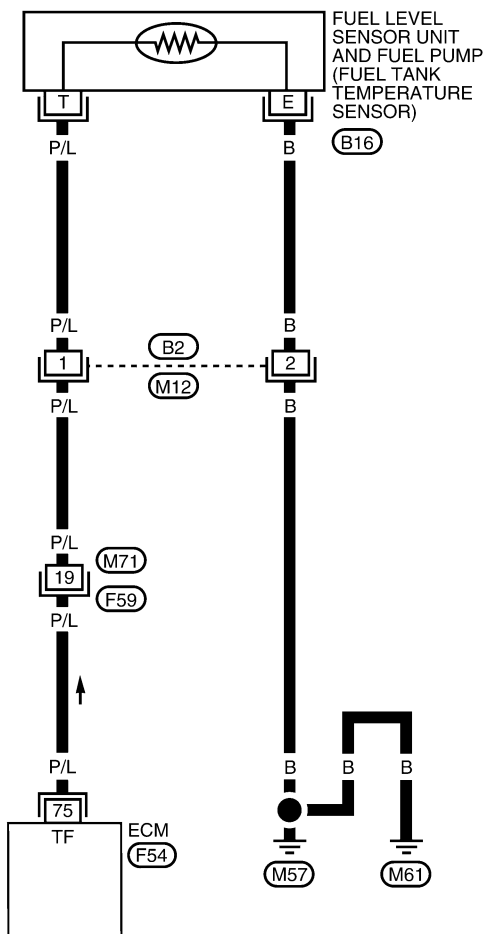
[VQ]

Wiring Diagram

UBS003A8

EC-FTTS-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC

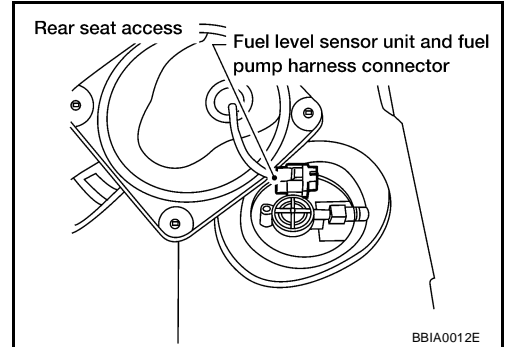


BBWA0064E

Diagnostic Procedure

1. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

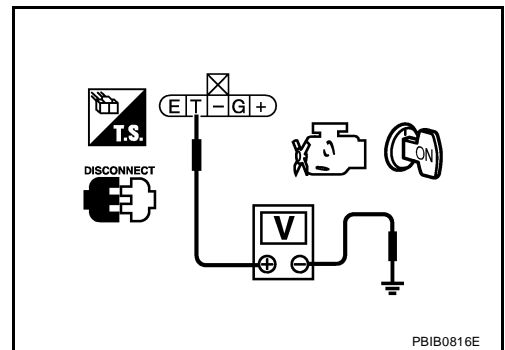


4. Check voltage between fuel level sensor unit and fuel pump terminal T and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M12
- Harness connectors M71, F59
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair harness or connector.

3. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal E and body ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M12
- Harness for open or short between fuel level sensor unit and fuel pump and body ground

>> Repair open circuit or short to power in harness or connector.

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5. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-900, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace fuel level sensor unit.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

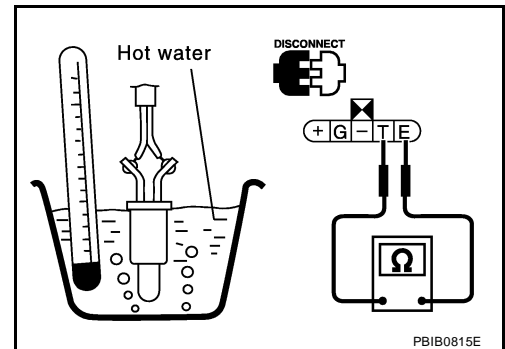
>> INSPECTION END

Component Inspection FUEL TANK TEMPERATURE SENSOR

UBS003AA

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals T and E by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



PBIB0815E

Removal and Installation FUEL TANK TEMPERATURE SENSOR

UBS003AB

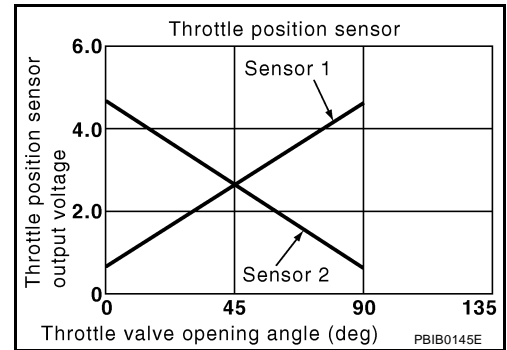
Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0221 TP SENSOR

Component Description

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 the 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-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL SEN1 THRTL SEN2	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) 	Accelerator pedal: Fully released More than 0.36V
	<ul style="list-style-type: none"> Shift lever: D (A/T model) 1st (M/T model) 	Accelerator pedal: Fully depressed Less than 4.75V

On Board Diagnosis Logic

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0221 0221	Throttle position sensor circuit range/performance problem	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 (The 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 in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P0221 TP SENSOR

[VQ]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-904, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0221 TP SENSOR

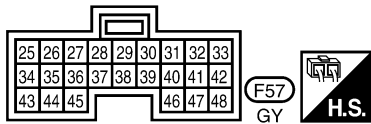
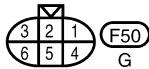
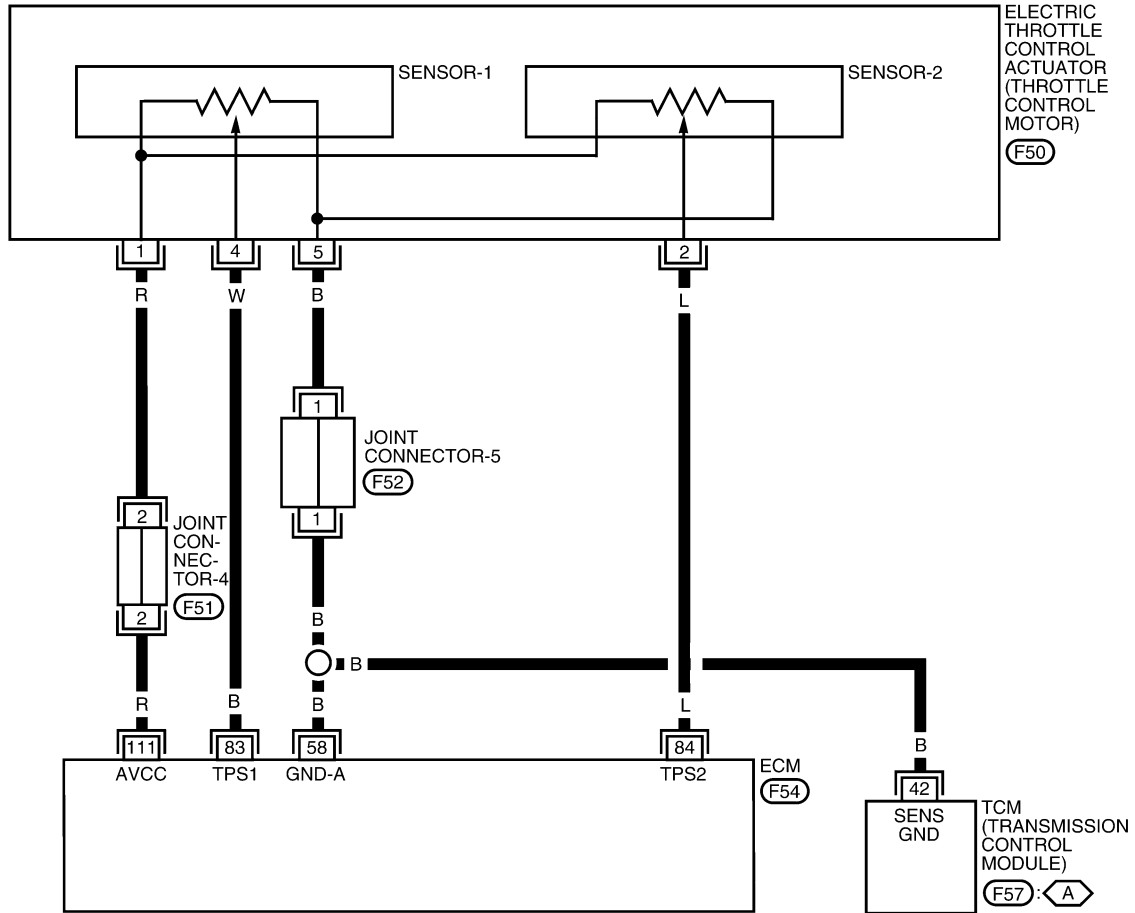
[VQ]

Wiring Diagram

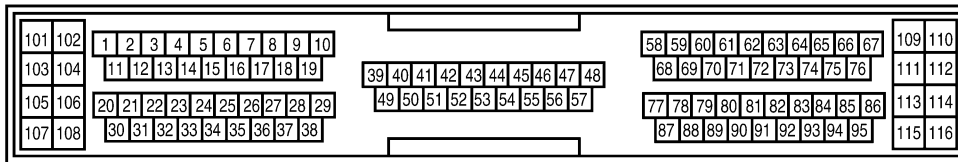
UBS003AG

EC-TPS3-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- A** : WITH A/T



REFER TO THE FOLLOWING.
F51, **F52** - JOINT CONNECTOR (J/C)



BBWA0195E

Specification data are reference values and are measured between each terminal and ground.

DTC P0221 TP SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
83	W	Throttle position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully released 	More than 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully depressed 	Less than 4.75V
84	L	Throttle position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully released 	Less than 4.75V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully depressed 	More than 0.36V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

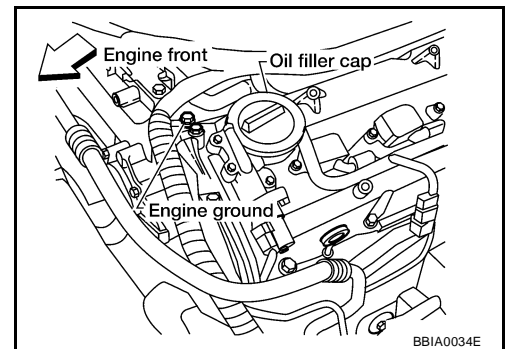
Diagnostic Procedure

UBS003AH

1. RETIGHTEN GROUND SCREWS

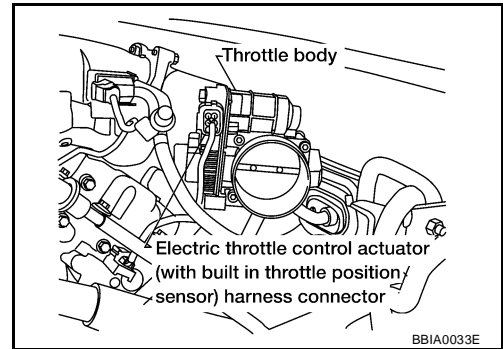
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

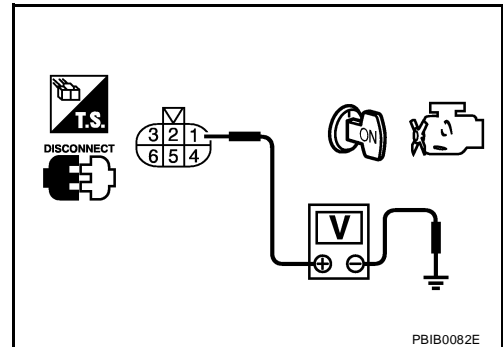


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-4
- Harness for open or short between electric throttle control actuator and ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-5
- Harness for open or short between electric throttle control actuator and ECM
- Harness for open or short between electric throttle control actuator and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 83 and electric throttle control actuator terminal 4, ECM terminal 84 and electric throttle control actuator 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 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK THROTTLE POSITION SENSOR

Refer to [EC-906, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.

8. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-669, "Idle Air Volume Learning"](#) .

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

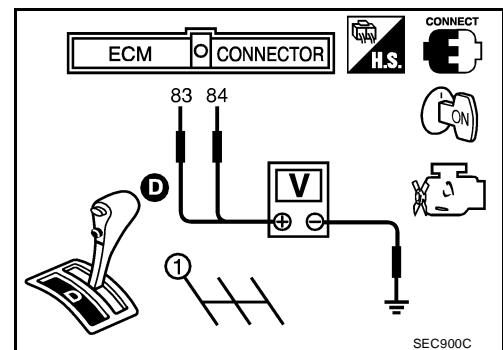
Component Inspection THROTTLE POSITION SENSOR

UBS003AI

1. Reconnect all harness connectors disconnected.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 83 (TP sensor 1signal), 84 (TP sensor 2signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
84 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-669, "Idle Air Volume Learning"](#) .



SEC900C

Removal and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

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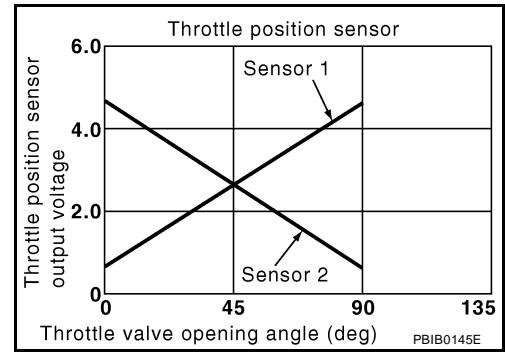
DTC P0222, P0223 TP SENSOR

UBS003AK

Component Description

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 the 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-II Reference Value in Data Monitor Mode

UBS003AL

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL SEN1	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) 	Accelerator pedal: Fully released More than 0.36V
	<ul style="list-style-type: none"> Shift lever: D (A/T model) 1st (M/T model) 	Accelerator pedal: Fully depressed Less than 4.75V

On Board Diagnosis Logic

UBS003AM

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 (The TP sensor 1 circuit is open or shorted.) Electric throttle control actuator (TP sensor 1)
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, ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS003AN

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P0222, P0223 TP SENSOR

[VQ]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-911, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0222, P0223 TP SENSOR

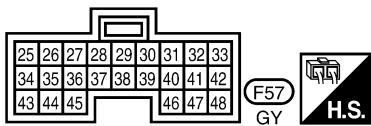
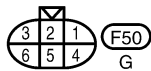
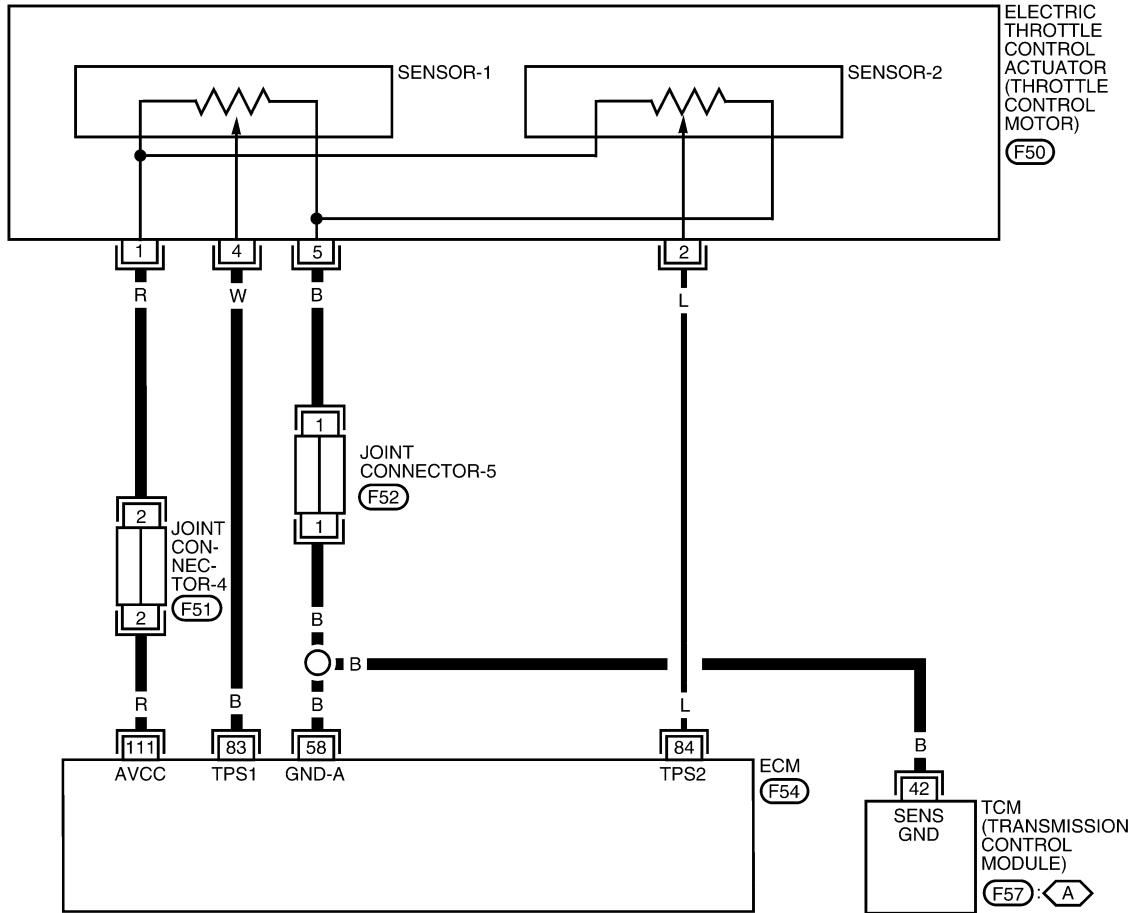
[VQ]

Wiring Diagram

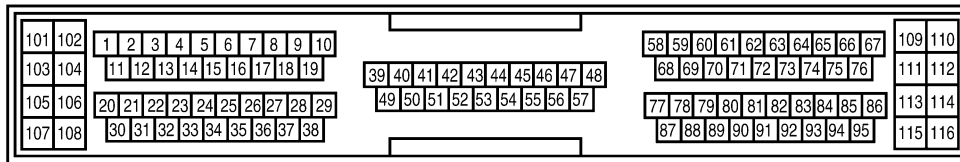
UBS003A0

EC-TPS1-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- A** : WITH A/T



REFER TO THE FOLLOWING.
F51, **F52** - JOINT CONNECTOR (J/C)



BBWA0053E

Specification data are reference values and are measured between each terminal and ground.

DTC P0222, P0223 TP SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
83	W	Throttle position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully released 	More than 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully depressed 	Less than 4.75V
84	L	Throttle position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully released 	Less than 4.75V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully depressed 	More than 0.36V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

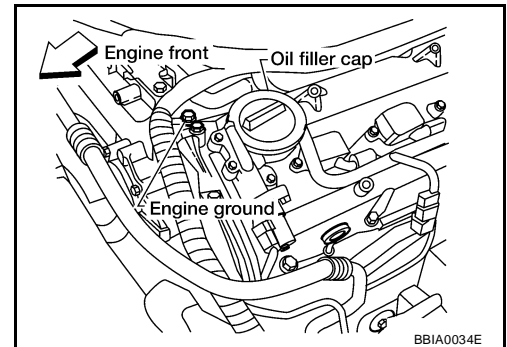
Diagnostic Procedure

UBS003AP

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

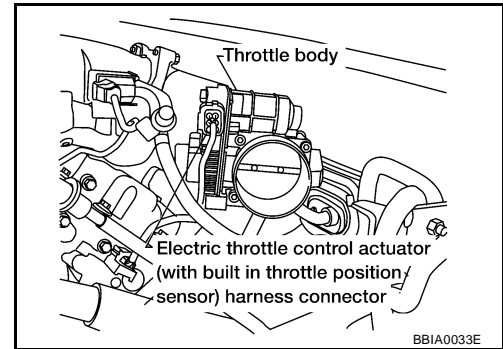
>> GO TO 2.



BBI A0034E

2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

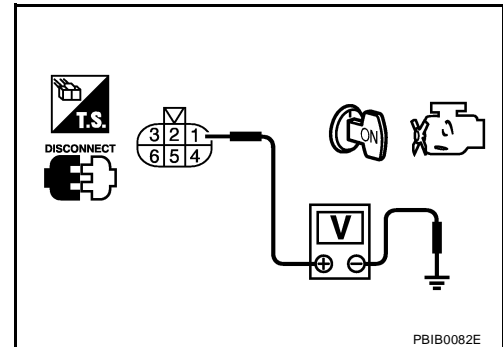


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 3.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-4
- Harness for open or short between electric throttle control actuator and ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-4
- Harness for open or short between electric throttle control actuator and ECM
- Harness for open or short between electric throttle control actuator and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 83 and electric throttle control actuator terminal 4. 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 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK THROTTLE POSITION SENSOR

Refer to [EC-913, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.

8. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-669, "Idle Air Volume Learning"](#) .

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

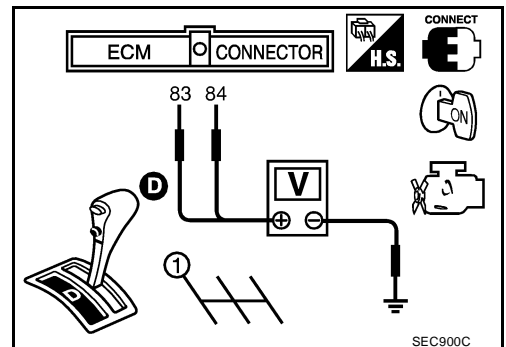
>> INSPECTION END

**Component Inspection
THROTTLE POSITION SENSOR**

UBS003A0

1. Reconnect all harness connectors disconnected.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 83 (TP sensor 1 signal), 84 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
84 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-669, "Idle Air Volume Learning"](#) .

Removal and Installation
ELECTRIC THROTTLE CONTROL ACTUATOR

UBS003AR

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

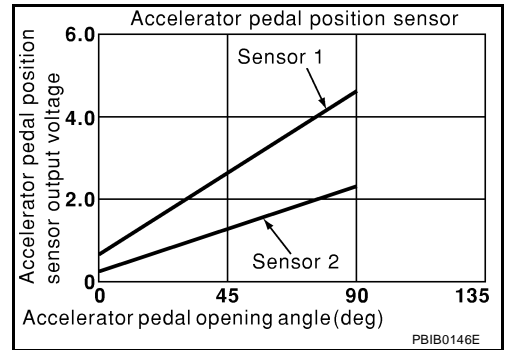
DTC P0226 APP SENSOR

Component Description

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-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1 ACCEL SEN2	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
CLSD THL POS	● Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0226 0226	Accelerator pedal position sensor circuit range/performance problem	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 (The APP sensor 1 and 2 circuit is open or shorted.) ● Accelerator pedal position sensor 1 and 2

FAIL-SAFE MODE

When the malfunction is detected, ECM enters in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch “ON”.

DTC P0226 APP SENSOR

[VQ]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-918, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



WITH GST

Follow the procedure "WITH CONSULT-II" above.

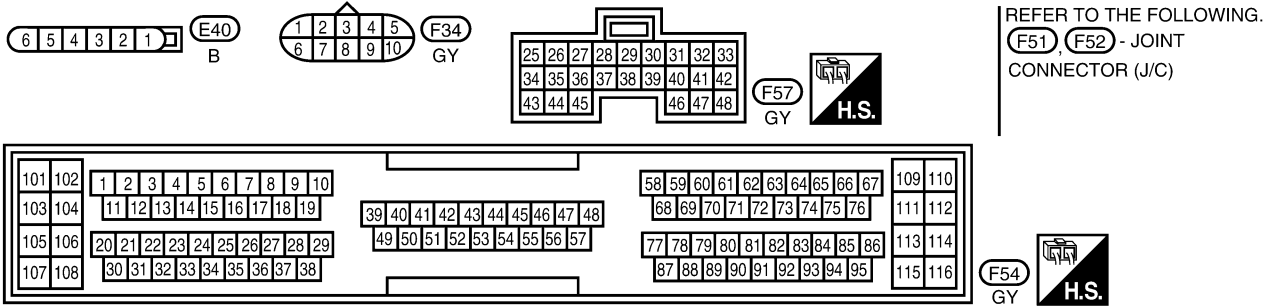
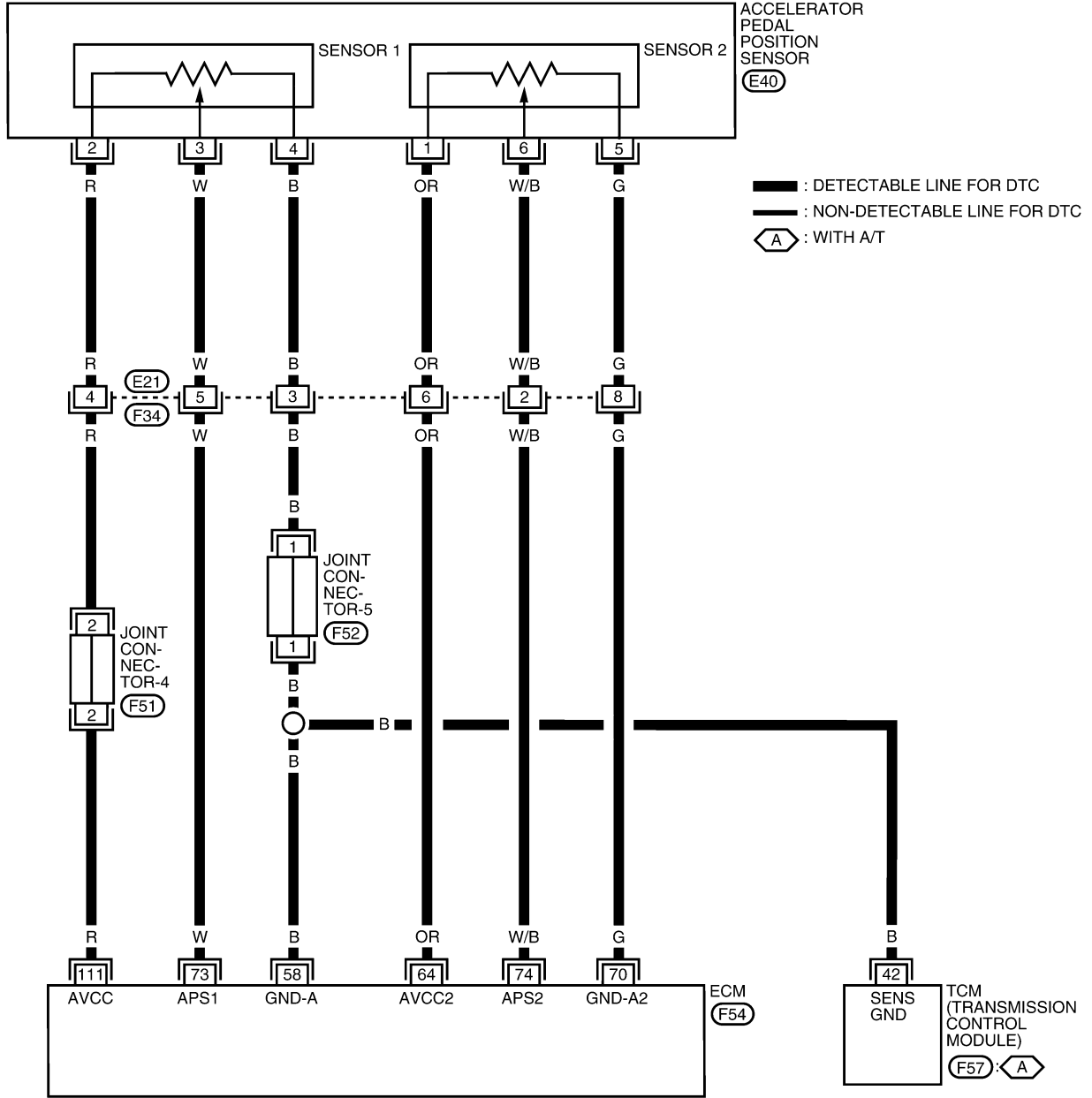
DTC P0226 APP SENSOR

[VQ]

Wiring Diagram

UBS003AW

EC-APPS3-01



Specification data are reference values and are measured between each terminal and ground.

DTC P0226 APP SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
70	G	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V
73	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] ● Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 4.2V
74	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] ● Accelerator pedal fully released	0.21 - 0.36V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 2.1V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

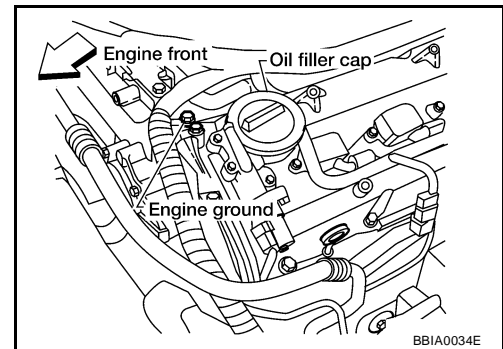
Diagnostic Procedure

UBS003AX

1. RETIGHTEN GROUND SCREWS

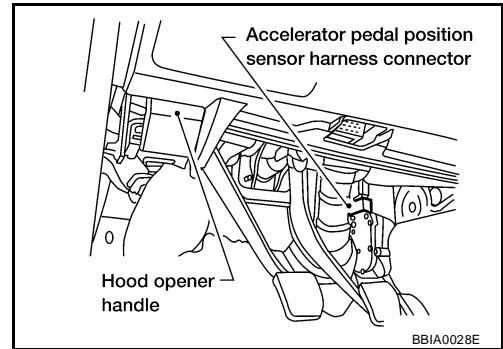
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

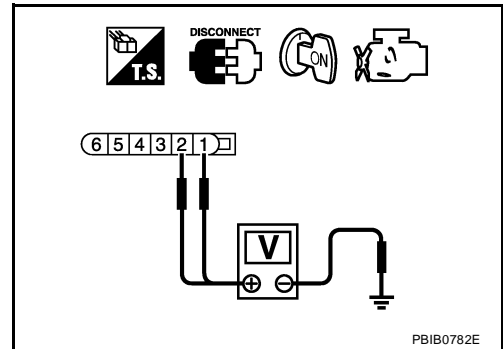


3. Check voltage between APP sensor terminals 1, 2 and ground with CONSULT-II or tester.

APP sensor terminal	Voltage (V)
1	Approximately 2.5
2	Approximately 5

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Joint connector-4
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminals 4, 5 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Joint connector-5
- Harness for open or short between ECM and accelerator pedal position sensor
- Harness for open or short between TCM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 73 and APP sensor terminal 3, ECM terminal 74 and APP sensor terminal 6.
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 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to [EC-920, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

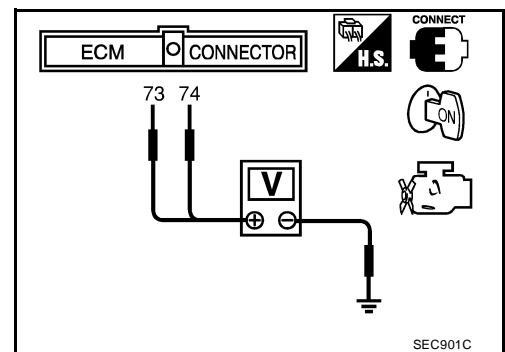
>> INSPECTION END

Component Inspection ACCELERATOR PEDAL POSITION SENSOR

UBS003AY

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 73 (APP sensor 1 signal), 74 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 4.2V
74 (Accelerator pedal position sensor 2)	Fully released	0.21 - 0.36V
	Fully depressed	More than 2.1V



SEC901C

4. If NG, replace accelerator pedal assembly and go to next step.
5. Perform [EC-668, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-669, "Idle Air Volume Learning"](#) .

Removal and Installation ACCELERATOR PEDAL

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

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DTC P0227, P0228 APP SENSOR

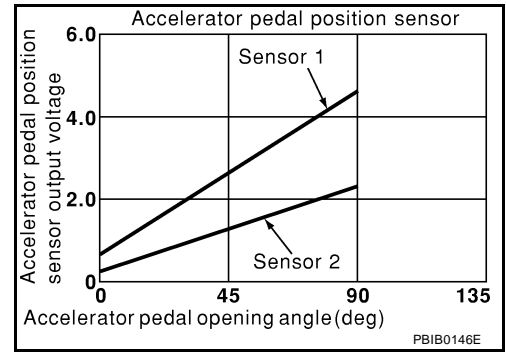
Component Description

UBS003B0

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-II Reference Value in Data Monitor Mode

UBS003B1

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1 ACCEL SEN2	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
CLSD THL POS	● Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

UBS003B2

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0227 0227	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	● Harness or connectors (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P0228 0228	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 in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS003B3

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P0227, P0228 APP SENSOR

[VQ]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-925, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

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WITH GST

Follow the procedure "WITH CONSULT-II" above.

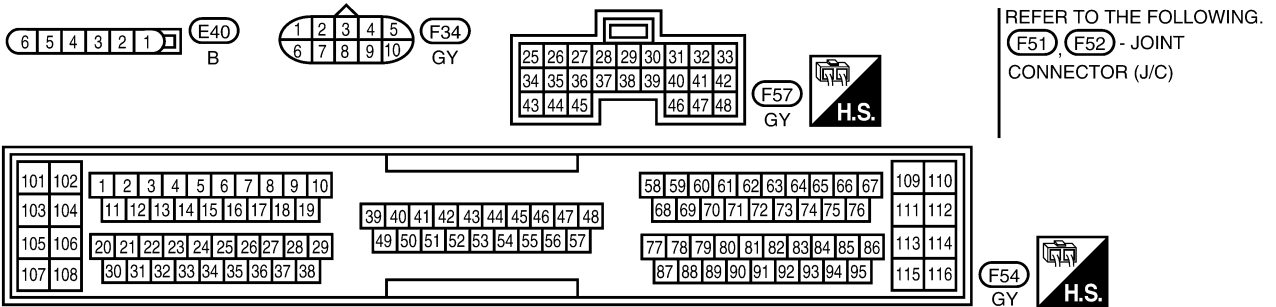
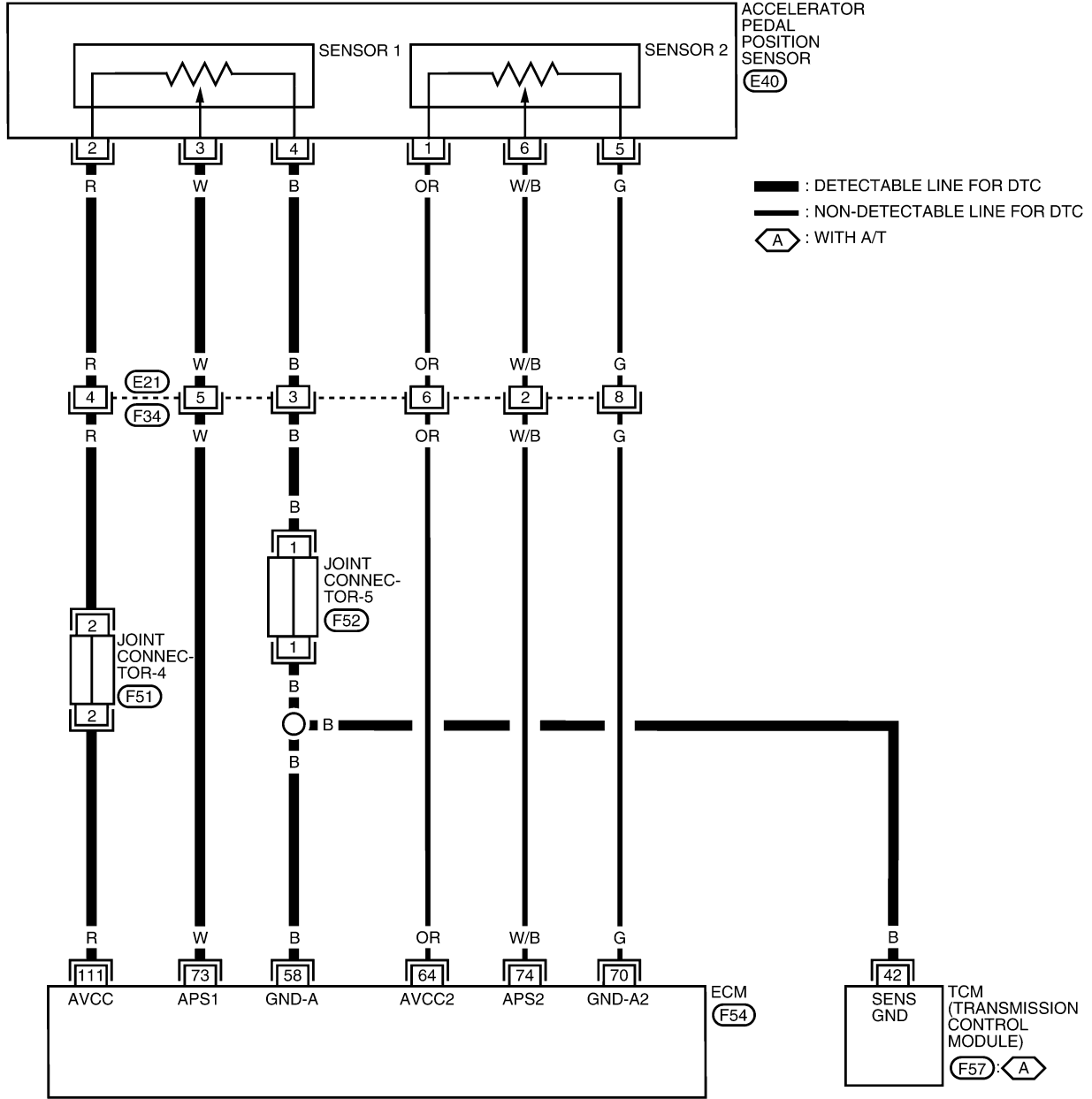
DTC P0227, P0228 APP SENSOR

[VQ]

UBS003B4

Wiring Diagram

EC-APPS1-01



BBWA0099E

Specification data are reference values and are measured between each terminal and ground.

DTC P0227, P0228 APP SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
70	G	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V
73	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] ● Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 4.2V
74	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] ● Accelerator pedal fully released	0.21 - 0.36V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 2.1V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

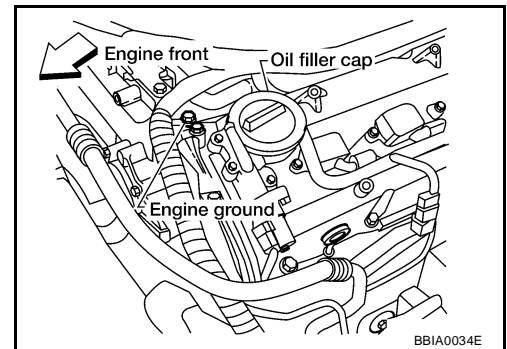
Diagnostic Procedure

UBS003B5

1. RETIGHTEN GROUND SCREWS

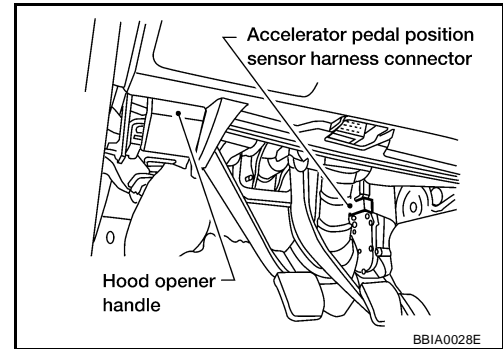
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

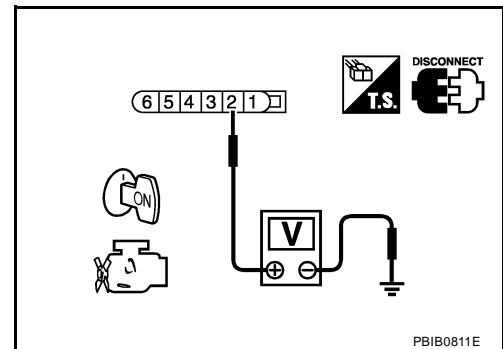


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Joint connector-4
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminal 4 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Joint connector-5
- Harness for open or short between ECM and accelerator pedal position sensor
- Harness for open or short between TCM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 73 and APP sensor terminal 3. 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 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to [EC-927, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

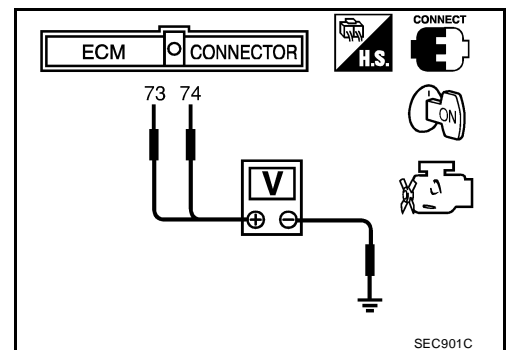
>> **INSPECTION END**

**Component Inspection
ACCELERATOR PEDAL POSITION SENSOR**

UBS003B6

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 73 (APP sensor 1 signal), 74 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 3.9V
74 (Accelerator pedal position sensor 2)	Fully released	0.09 - 0.48V
	Fully depressed	More than 1.9V



4. If NG, replace accelerator pedal assembly.
5. Perform [EC-668, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-669, "Idle Air Volume Learning"](#) .

**Removal and Installation
ACCELERATOR PEDAL**

UBS003B7

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

[VQ]

DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

PF0:0000

On Board Diagnosis Logic

UBS003B8

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 first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.
 When a misfire condition occurs, the ECM monitors the CKP sensor 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 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 ● The injector circuit is open or shorted ● Fuel injectors ● Intake air leak ● The ignition signal circuit is open or shorted ● Lack of fuel ● Drive plate or flywheel ● Heated oxygen sensor 1
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.	
P0305 0305	No. 5 cylinder misfire detected	No. 4 cylinder misfires.	
P0306 0306	No. 6 cylinder misfire detected	No. 4 cylinder misfires.	

DTC Confirmation Procedure

UBS003B9

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

- Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.

DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

[VQ]

- Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.
Hold the accelerator pedal as steady as possible.
NOTE:
Refer to the freeze frame data for the test driving conditions.
- If 1st trip DTC is detected, go to [EC-929, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS003BA

1. CHECK FOR INTAKE AIR LEAK

- Start engine and run it at idle speed.
- Listen for the sound of the intake air leak.

OK or NG

- OK >> GO TO 2.
NG >> Discover air leak location and repair.

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 it.

3. PERFORM POWER BALANCE TEST

With CONSULT-II

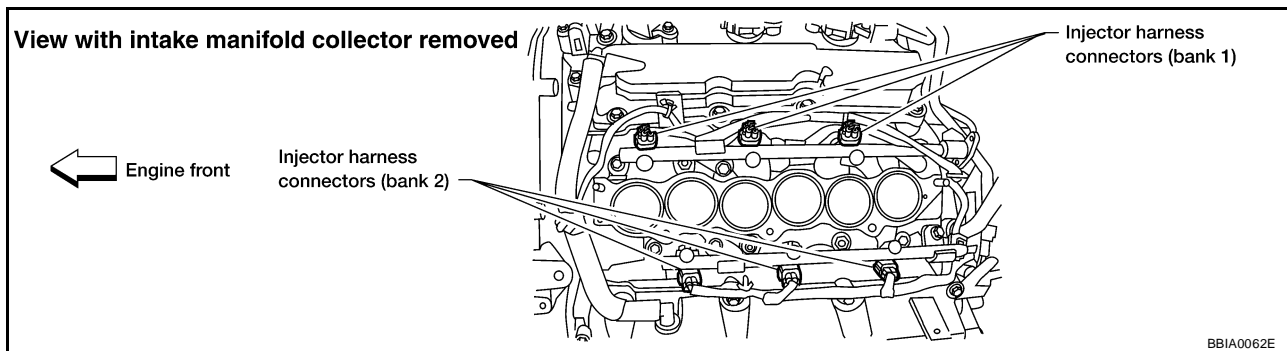
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

Without CONSULT-II

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



BBIA0062E

Yes or No

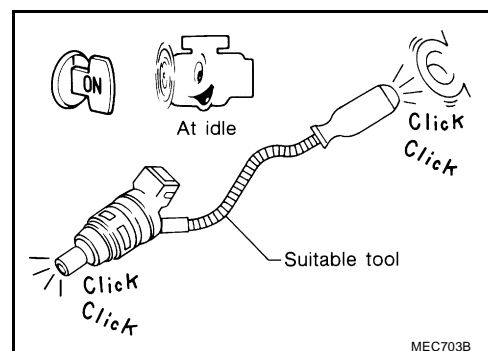
- Yes >> GO TO 4.
- No >> GO TO 7.

4. CHECK INJECTOR

Does each injector make an operating sound at idle?

Yes or No

- Yes >> GO TO 5.
- No >> Check injector(s) and circuit(s). Refer to [EC-1230](#), "[INJECTOR CIRCUIT](#)".



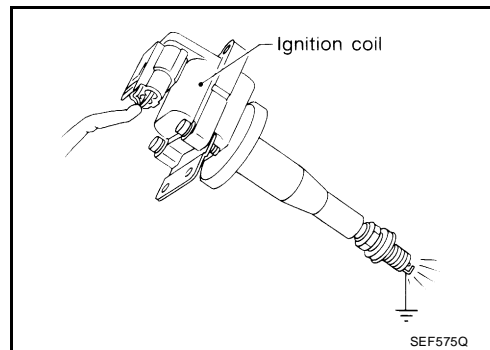
MEC703B

5. CHECK IGNITION SPARK

1. Remove ignition coil assembly from rocker cover.
2. Remove spark plug from ignition coil assembly
3. Connect a known good spark plug to the ignition coil.
4. Place end of spark plug against a suitable ground and crank engine.
5. Check for spark.

OK or NG

- OK >> GO TO 6.
 NG >> Check ignition coil, power transistor and their circuits.
 Refer to [EC-1210, "IGNITION SIGNAL"](#) .

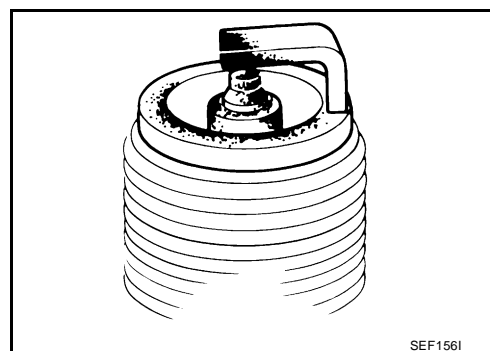


6. CHECK SPARK PLUGS

Remove the spark plugs and check for fouling, etc.

OK or NG

- OK >> GO TO 7.
 NG >> Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to, [MA-21, "ENGINE MAINTENANCE \(VQ35DE ENGINE\)"](#) .



7. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-164, "CHECKING COMPRESSION PRESSURE"](#) .

Standard:	1,275 kPa (13.0 kg/cm² , 185 psi)/300 rpm
Minimum:	981 kPa (10.0 kg/cm² , 142 psi)/300 rpm
Difference between each cylinder:	98 kPa (1.0 kg/cm² , 14 psi)/300 rpm

OK or NG

- OK >> GO TO 8.
 NG >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

8. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to [EC-671, "FUEL PRESSURE RELEASE"](#) .
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-672, "FUEL PRESSURE CHECK"](#) .

At idle: Approx. 350 kPa (3.7 kg/cm² , 51 psi)

OK or NG

- OK >> GO TO 10.
 NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-1240, "FUEL PUMP CIRCUIT"](#) .)
- Fuel pressure regulator (Refer to [EC-672, "FUEL PRESSURE CHECK"](#) .)
- Fuel lines (Refer to [EC-1116, "Wiring Diagram"](#) .)
- Fuel filter for clogging

>> Repair or replace.

10. CHECK IGNITION TIMING

Check the following items. Refer to [EC-705, "Basic Inspection"](#) .

Items	Specifications
Target idle speed	M/T: 700 ± 50 rpm
	A/T: 700 ± 50 rpm (in "P" or "N" position)
Ignition timing	M/T: 15 ± 5° BTDC
	A/T: 15 ± 5° BTDC (in "P" or "N" position)

OK or NG

OK >> GO TO 11.

NG >> Follow the [EC-705, "Basic Inspection"](#) .

11. CHECK HEATED OXYGEN SENSOR 1 (BANK 1)/(BANK 2)

Refer to [EC-834, "Component Inspection"](#) .

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. CHECK MASS AIR FLOW SENSOR

 **With CONSULT-II**

Check mass air flow sensor signal in "DATA MONITOR" mode with CONSULT-II.

2.0 - 6.0 g-m/sec: at idling

7.0 - 20.0 g-m/sec: at 2,500 rpm

 **With GST**

Check mass air flow sensor signal in MODE 1 with GST.

2.0 - 6.0 g-m/sec: at idling

7.0 - 20.0 g-m/sec: at 2,500 rpm

OK or NG

OK >> GO TO 13.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-790, "DTC P0101 MAF SENSOR"](#) .

13. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in [EC-710, "Symptom Matrix Chart"](#) .

OK or NG

OK >> GO TO 14.

NG >> Repair or replace.

DTC P0300 - P0306 MULTIPLE CYLINDER MISFIRE, NO. 1 - 6 CYLINDER MISFIRE

[VQ]

14. 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-687, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

>> GO TO 15.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

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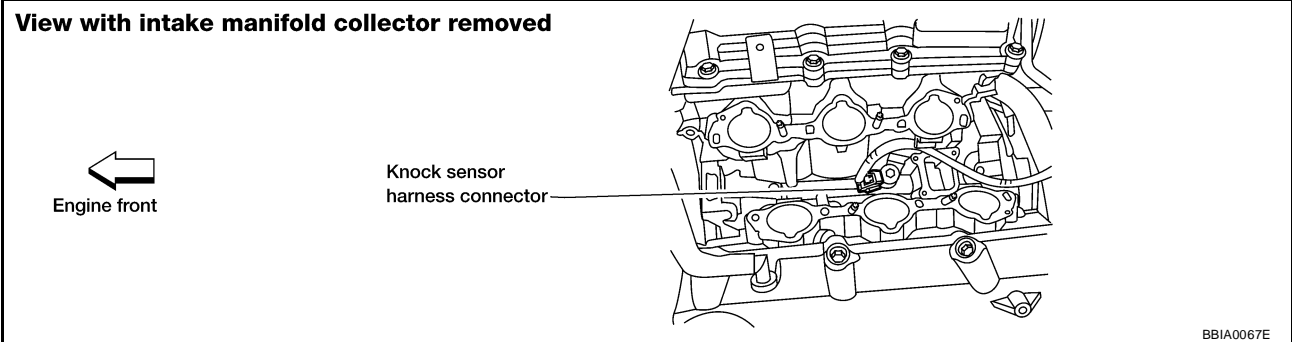
DTC P0327, P0328 KS

PFP:22060

Component Description

UBS003BB

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



On Board Diagnosis Logic

UBS003BC

The MIL will not light for knock sensor malfunction.

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 (The 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

UBS003BD

NOTE:

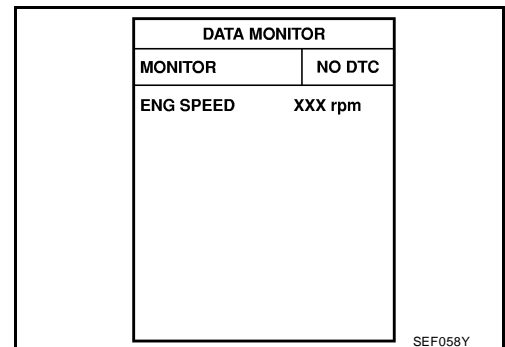
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-936, "Diagnostic Procedure"](#)



WITH GST

Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

UBS003BE

EC-KS-01

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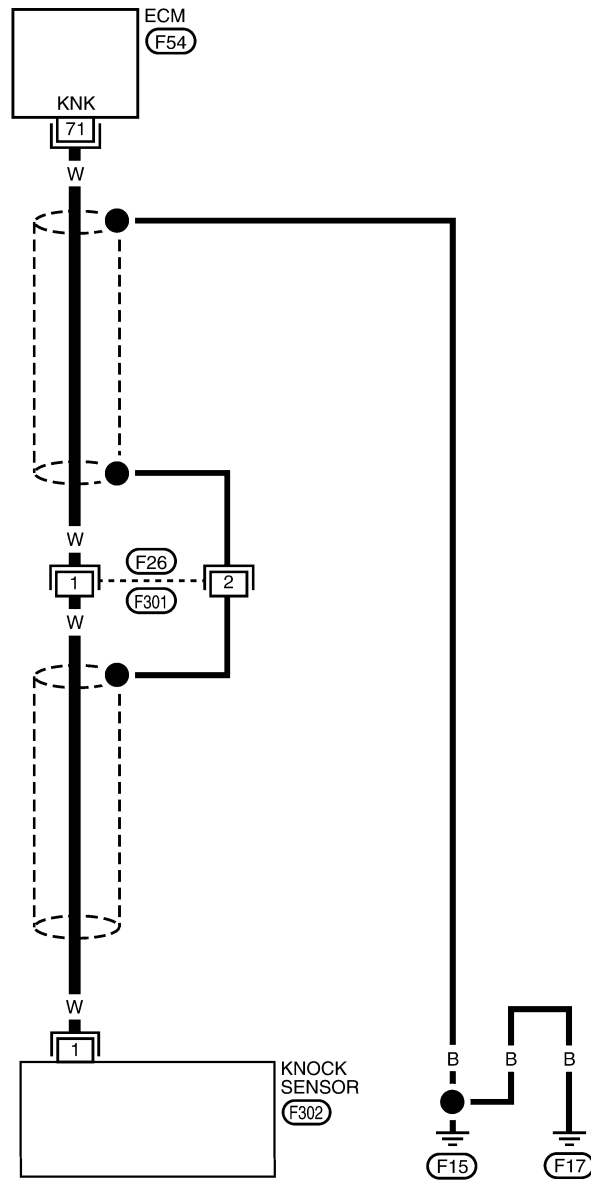
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101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110										
103	104	11	12	13	14	15	16	17	18	19			39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112		
105	106	20	21	22	23	24	25	26	27	28	29			49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114	
107	108	30	31	32	33	34	35	36	37	38																								115	116



BBWA0374E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
71	W	Knock sensor	[Engine is running] ● Idle speed	Approximately 2.5V

Diagnostic Procedure

UBS003BF

1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 71 and engine ground. Refer to Wiring Diagram.

NOTE:

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]

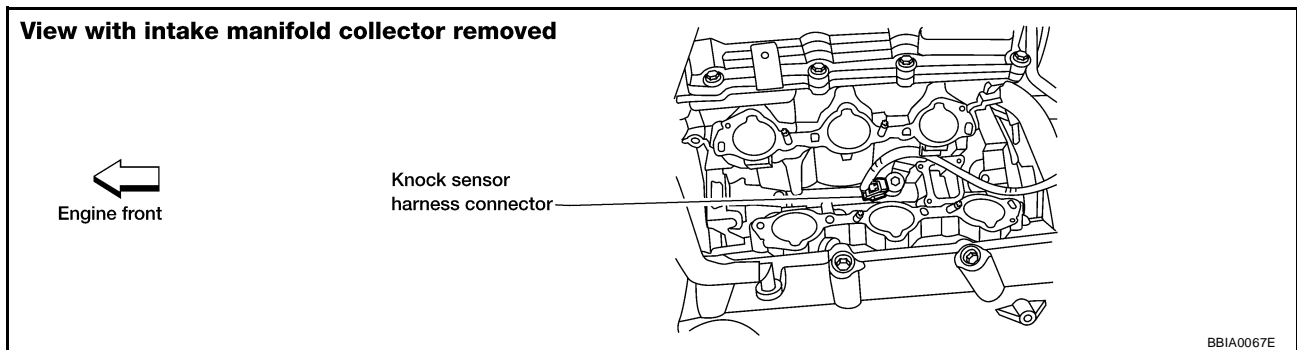
4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 2.

2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect knock sensor harness connector.



2. Check harness continuity between ECM terminal 71 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 4.
- NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F26, F301
- Harness for open or short between ECM and knock sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK KNOCK SENSOR

Refer to [EC-937, "Component Inspection"](#) .

OK or NG

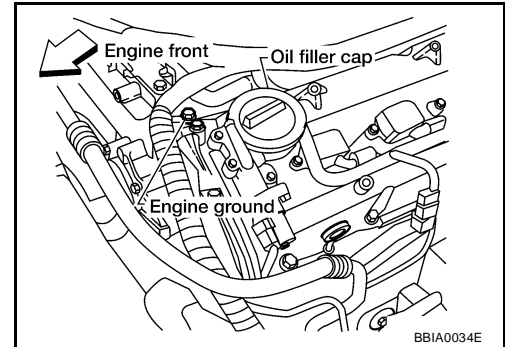
OK >> GO TO 5.

NG >> Replace knock sensor.

5. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

>> GO TO 6.



6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection KNOCK SENSOR

Check resistance between knock sensor terminal 1 and ground.

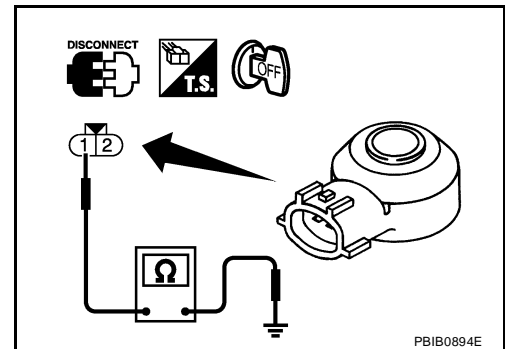
NOTE:

It is necessary to use an ohmmeter which can measure more than 10 M Ω .

Resistance: Approximately 530 - 590k Ω [at 20°C (68°F)]

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.



Removal and Installation KNOCK SENSOR

Refer to [EM-186, "CYLINDER BLOCK"](#) .

DTC P0335 CKP SENSOR (POS)

PFP:23731

Component Description

UBS003BI

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.

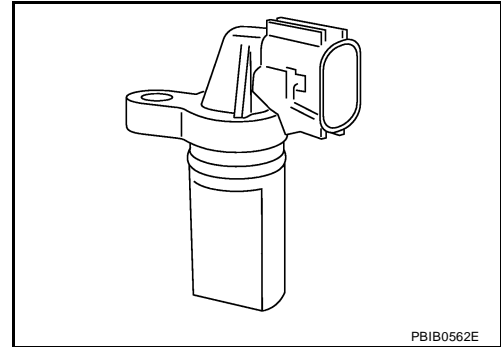
The sensor consists of a permanent magnet and hall IC.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor 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.



PBIB0562E

CONSULT-II Reference Value in Data Monitor Mode

UBS003BJ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> ● Tachometer: Connect ● Run engine and compare tachometer indication with the CONSULT-II value. 	Almost the same speed as the CONSULT-II value.

On Board Diagnosis Logic

UBS003BK

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 (The sensor circuit is open or shorted) ● Crankshaft position sensor (POS) ● Signal plate

DTC Confirmation Procedure

UBS003BL

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

④ WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-941, "Diagnostic Procedure"](#)
If 1st trip DTC is not detected, go to next step.
4. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
5. If 1st trip DTC is detected, go to [EC-941, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC P0335 CKP SENSOR (POS)

[VQ]



WITH GST

Follow the procedure "WITH CONSULT-II" above.

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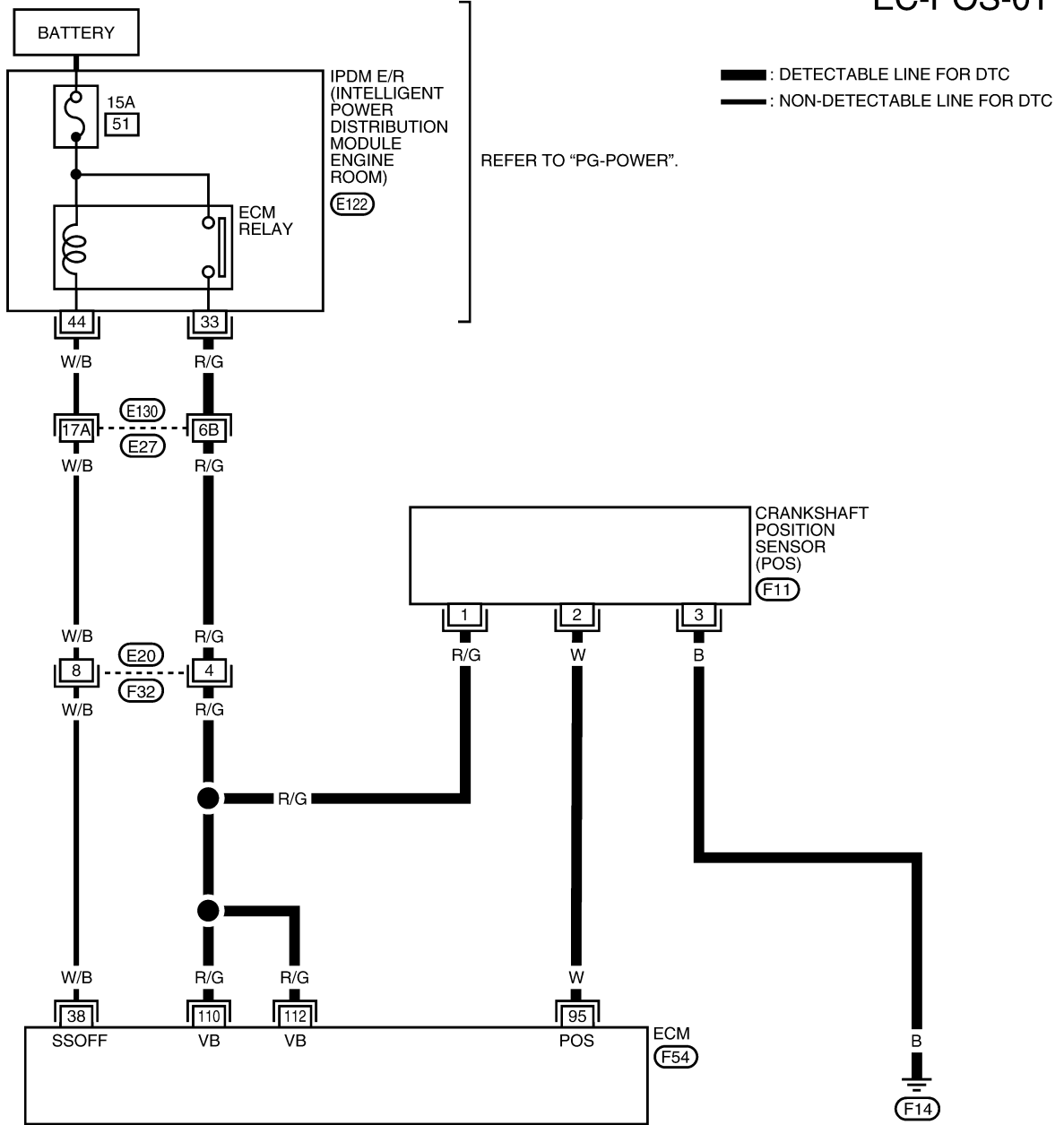
DTC P0335 CKP SENSOR (POS)

[VQ]

UBS003BM

Wiring Diagram

EC-POS-01



29	30	31	32	33	34	35		
36	37	38	39	40	41	42	43	44

(E122)
GY

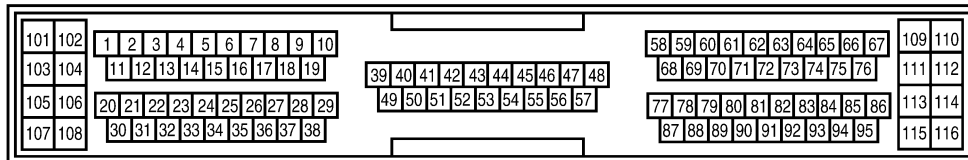
3	2	1
---	---	---

(F11)
B

1	2	3	4
5	6	7	8

(F32)
B

REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



(F54)
GY



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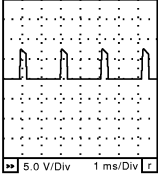
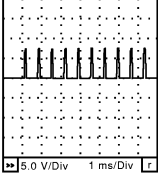
Specification data are reference values and are measured between each terminal and ground.

DTC P0335 CKP SENSOR (POS)

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Crankshaft position sensor (POS)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>Approximately 2.4V★</p>  <p>SEC035D</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	<p>Approximately 2.3V★</p>  <p>SEC036D</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

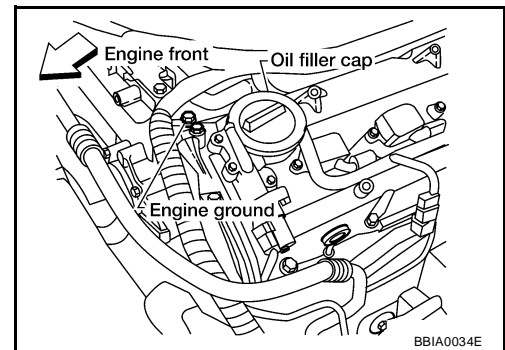
Diagnostic Procedure

UBS003BN

1. RETIGHTEN GROUND SCREWS

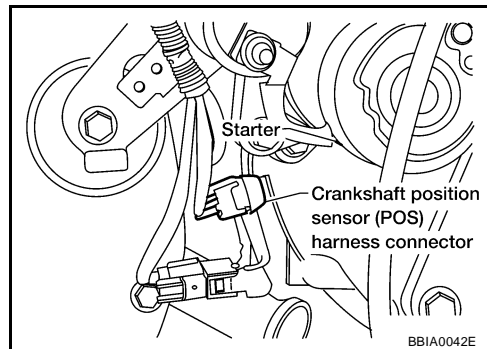
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch "ON".



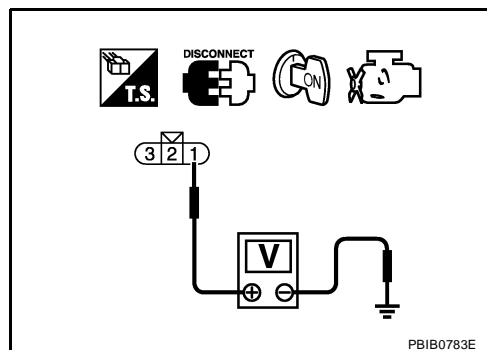
3. Check voltage between CKP sensor (POS) terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

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 E130, E27
- Harness connectors E20, F32
- Harness for open or short between crankshaft position sensor (POS) and ECM
- Harness for open or short between crankshaft position sensor (POS) and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between CKP sensor (POS) terminal 3 and engine ground. 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 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and CKP sensor (POS) 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 CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-943, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace crankshaft position sensor (POS).

7. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 8.

NG >> Replace the signal plate.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

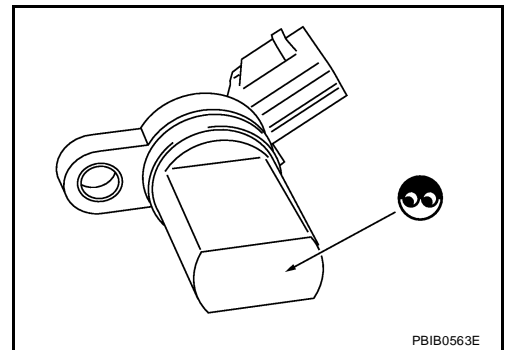
>> **INSPECTION END**

Component Inspection

CRANKSHAFT POSITION SENSOR (POS)

UBS003B0

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.

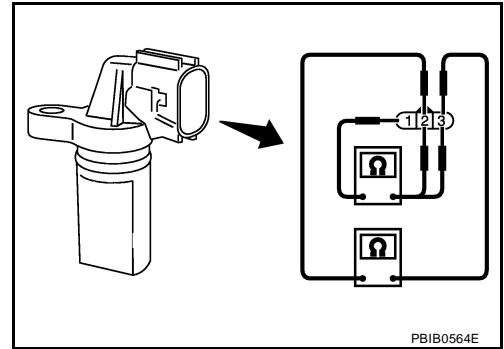


DTC P0335 CKP SENSOR (POS)

[VQ]

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 (-)	



PBIB0564E

UBS003BP

Removal and Installation CRANKSHAFT POSITION SENSOR (POS)

Refer to [EM-186, "CYLINDER BLOCK"](#) .

DTC P0340, P0345 CMP SENSOR (PHASE)

PFP:23731

Component Description

UBS003BQ

The camshaft position sensor (PHASE) senses the retraction with intake valve camshaft to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

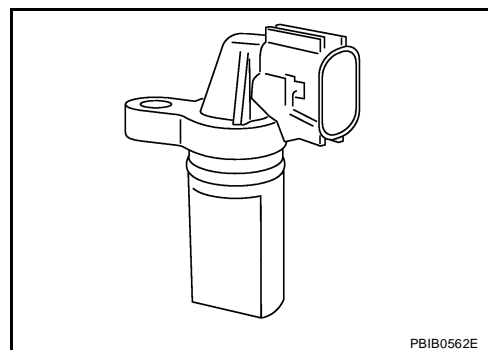
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.



PBIB0562E

On Board Diagnosis Logic

UBS003BR

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 sent 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 (The sensor circuit is open or shorted) ● Camshaft position sensor (PHASE) ● Camshaft (Intake) ● Starter motor (Refer to SC-9.) ● Starting system circuit (Refer to SC-9.) ● Dead (Weak) battery

DTC Confirmation Procedure

UBS003BS

NOTE:

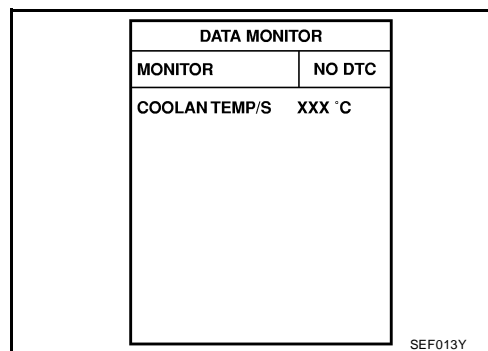
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
4. If 1st trip DTC is detected, go to [EC-949, "Diagnostic Procedure"](#).
If 1st trip DTC is not detected, go to next step.
5. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
6. If 1st trip DTC is detected, go to [EC-949, "Diagnostic Procedure"](#).



SEF013Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

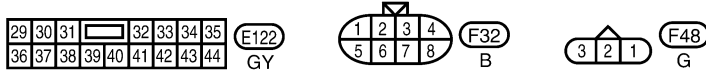
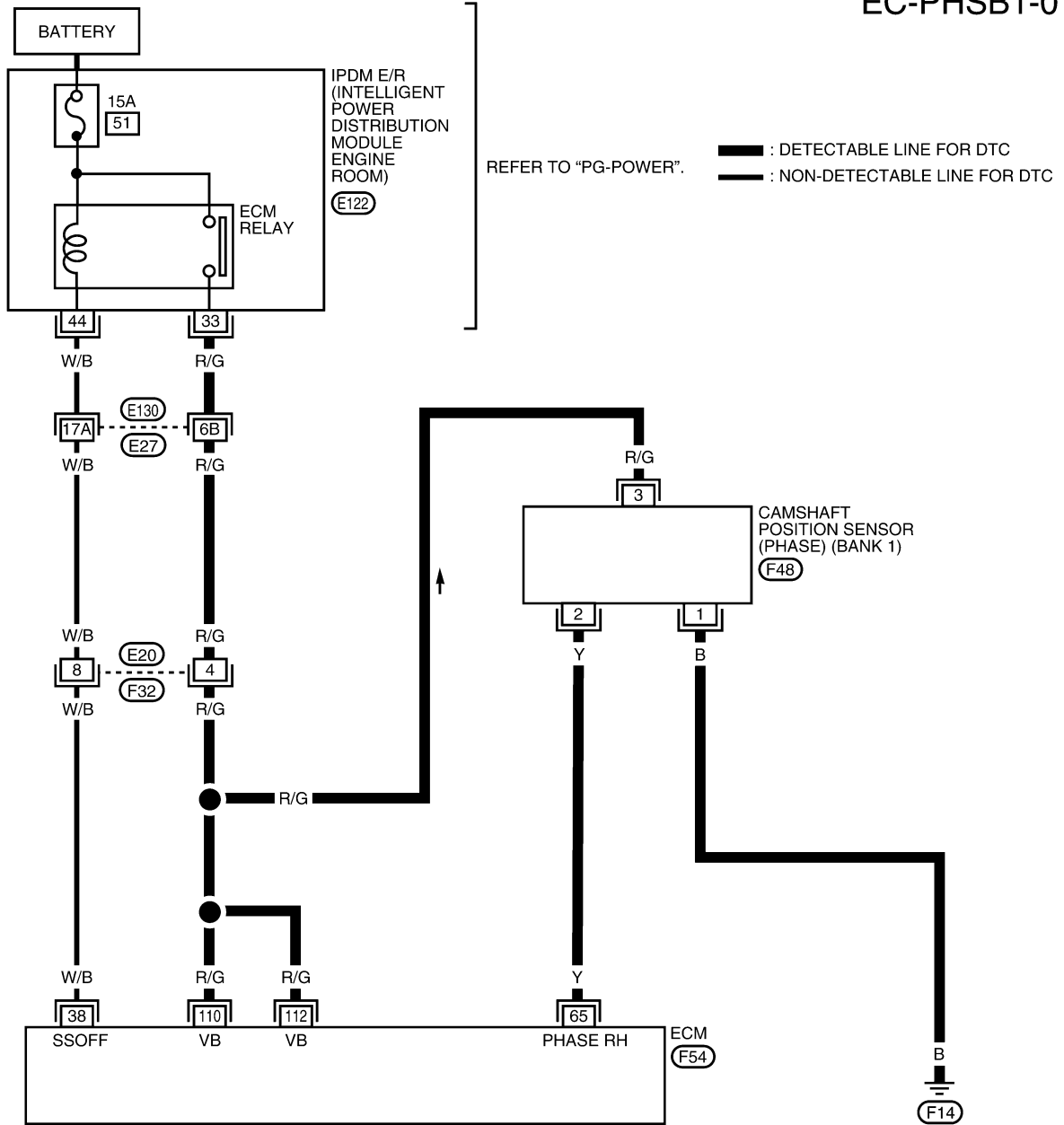
DTC P0340, P0345 CMP SENSOR (PHASE)

[VQ]

UBS003BT

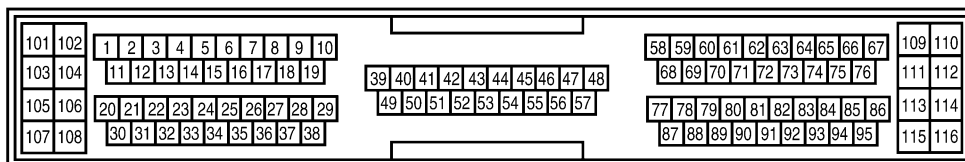
Wiring Diagram BANK 1

EC-PHSB1-01



REFER TO THE FOLLOWING.

(E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0079E

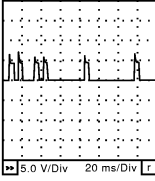
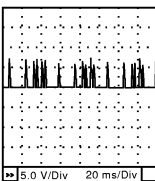
DTC P0340, P0345 CMP SENSOR (PHASE)

[VQ]

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	Y	Camshaft position sensor (PHASE) (bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>1.0 - 4.0V★</p>  <p>SEC033D</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm. 	<p>1.0 - 4.0V★</p>  <p>SEC034D</p>

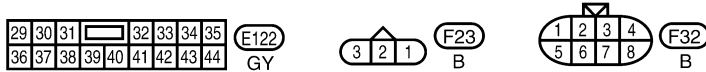
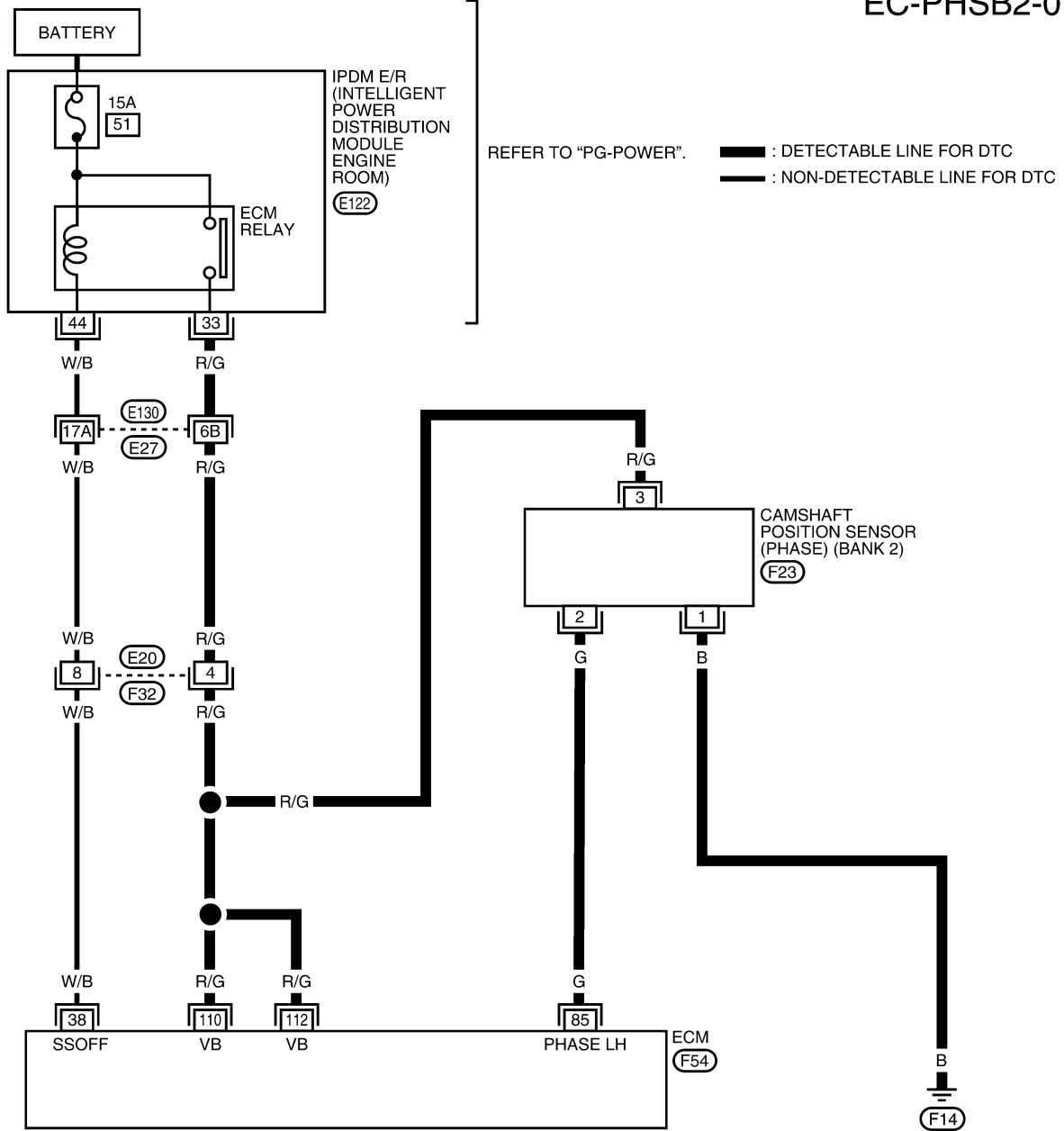
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0340, P0345 CMP SENSOR (PHASE)

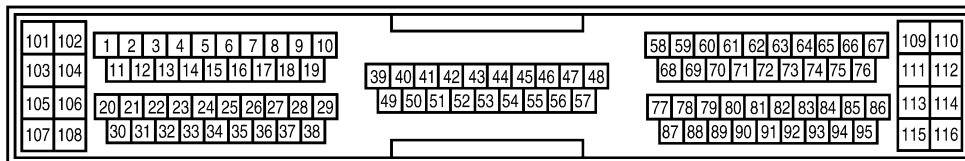
[VQ]

BANK 2

EC-PHSB2-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0080E

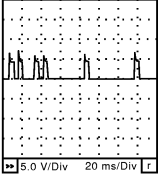
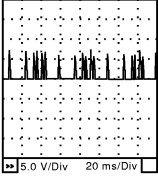
Specification data are reference values and are measured between each terminal and ground.

DTC P0340, P0345 CMP SENSOR (PHASE)

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
85	G	Camshaft position sensor (PHASE) (bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>1.0 - 4.0V★</p>  <p>SEC033D</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm. 	<p>1.0 - 4.0V★</p>  <p>SEC034D</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS003BU

1. CHECK STARTING SYSTEM

Turn ignition switch to "START" position.

Does the engine turn over?

Does the starter motor operate?

Yes or No

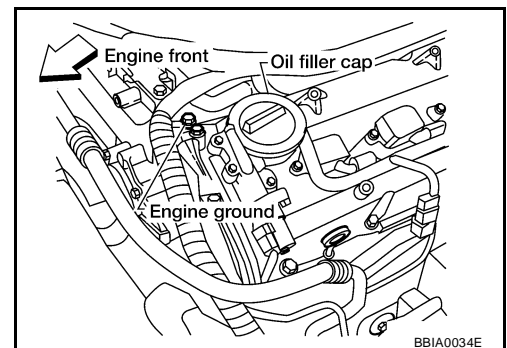
Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-9, "STARTING SYSTEM"](#).)

2. RETIGHTEN GROUND SCREWS

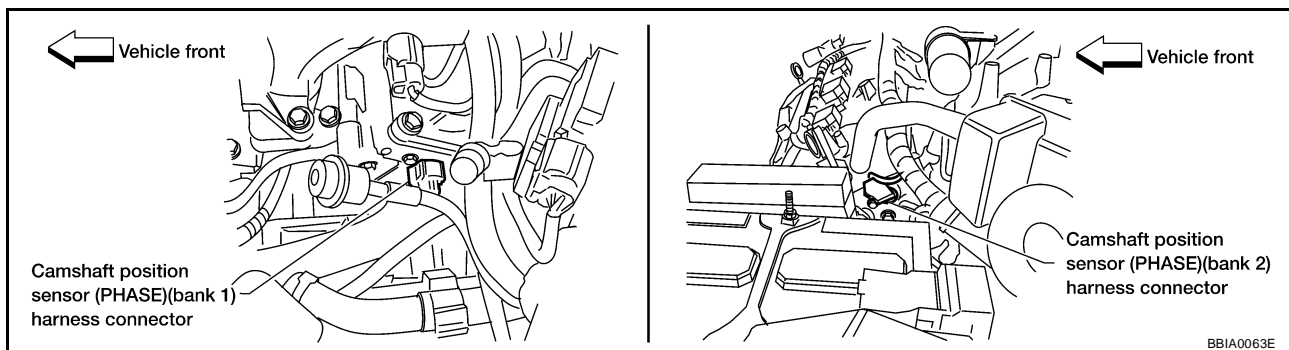
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 3.



3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.



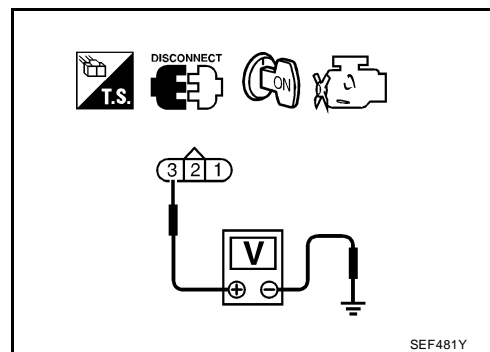
2. Turn ignition switch "ON".
3. Check voltage between CMP sensor (PHASE) terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

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 E130, E27
- Harness connectors E20, F32
- Harness for open or short between camshaft position sensor (PHASE) and ECM
- Harness for open or short between camshaft position sensor (PHASE) and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between CMP sensor (PHASE) terminal 1 and engine ground.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or short to power in harness or connectors.

6. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 65 or 85 and CMP sensor (PHASE) terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground or 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 CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-951, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace camshaft position sensor (PHASE).

8. CHECK CAMSHAFT (INTAKE)

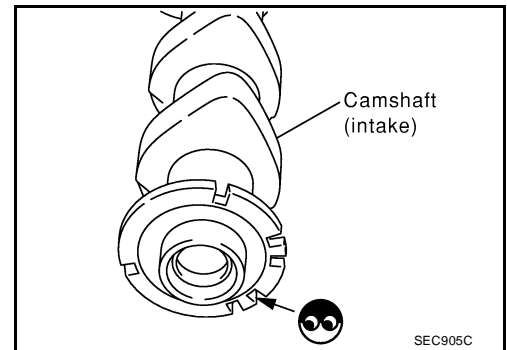
Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 9.

NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



9. CHECK INTERMITTENT INCIDENT

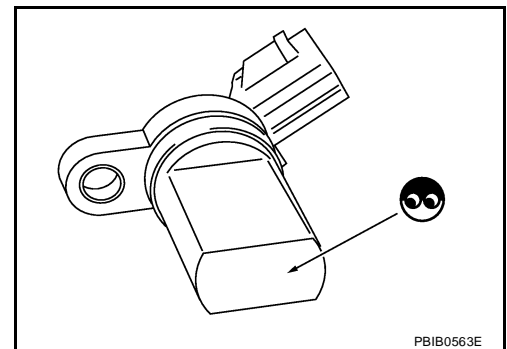
Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection
CAMSHAFT POSITION SENSOR (PHASE)**

UBS003BV

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.

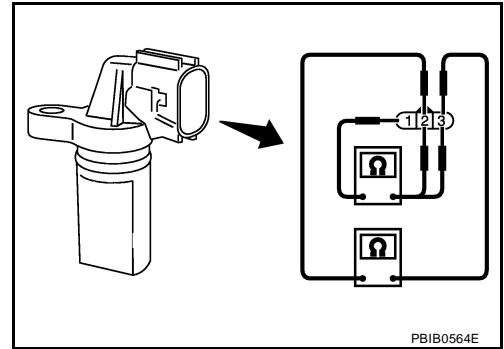


DTC P0340, P0345 CMP SENSOR (PHASE)

[VQ]

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 (-)	



UBS003BW

Removal and Installation CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EM-134, "CAMSHAFT"](#) .

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

[VQ]

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

PFP:20905

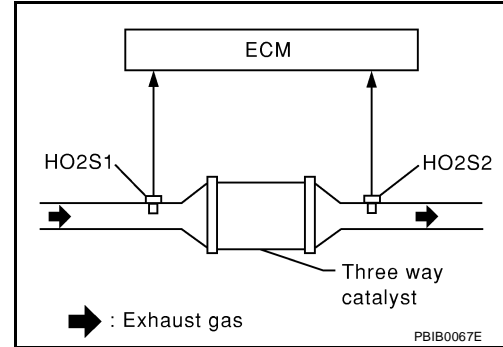
On Board Diagnosis Logic

UBS003BX

The ECM monitors the switching frequency ratio of heated oxygen sensors 1 and 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 heated oxygen sensors 1 and 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 injectors Fuel injector leaks Spark plug Improper ignition timing
P0430 0430 (Bank 2)			

DTC Confirmation Procedure

UBS003BY

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

TESTING CONDITION:

- Open engine hood before conducting the following procedure.
 - Do not hold engine speed for more than the specified minutes below.
- Turn ignition switch "ON".
 - Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
 - Start engine.
 - Rev engine up to 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 "COMPLT", go to step 7
 - Wait 5 seconds at idle.

SRT WORK SUPPORT	
CATALYST	INCMP
EVAP SYSTEM	INCMP
HO2S HTR	COMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
HO2S1 (B1)	XXX V

SEF940Z

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

[VQ]

- 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.

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
HO2S1 (B1)	XXX V

SEF941Z

- Select "SELF-DIAG RESULTS" mode with CONSULT-II.
- Confirm that the 1st trip DTC is not detected.
If the 1st trip DTC is detected, go to [EC-955, "Diagnostic Procedure"](#).

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF535Z

Overall Function Check

UBS003BZ

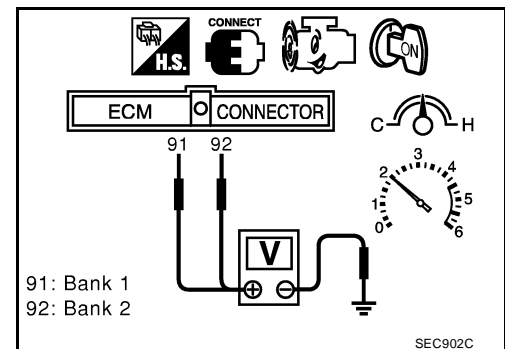
Use this procedure to check the overall function of the three way catalyst (Manifold). During this check, a 1st trip DTC might not be confirmed.

CAUTION:

Always drive vehicle at a safe speed.

WITH GST

- Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- Stop vehicle with engine running.
- Set voltmeters probes between ECM terminals 91 [HO2S1 (bank 1) signal], 92 [HO2S1 (bank 2) signal] and engine ground, and ECM terminals 88 [HO2S2 (bank 1) signal], 90 [HO2S2 (bank 2) signal] and engine ground.
- Keep engine speed at 2,000 rpm constant under no load.



- Make sure that the voltage switching frequency (high & low) between ECM terminals 88 and engine ground, or 90 and engine ground is very less than that of ECM terminals 91 and engine ground, or 92 and engine ground.

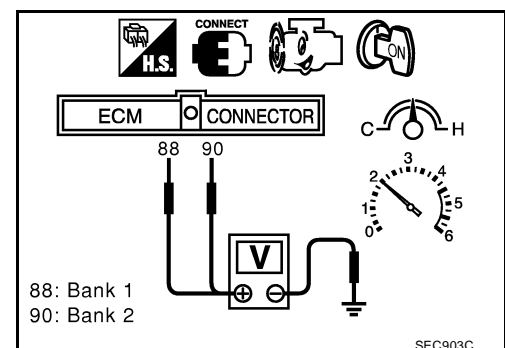
Switching frequency ratio = A/B

A: Heated oxygen sensor 2 voltage switching frequency

B: Heated oxygen sensor 1 voltage switching frequency

This ratio should be less than 0.75.

If the ratio is greater than above, it means three way catalyst does not operate properly. Go to [EC-955, "Diagnostic Procedure"](#).



NOTE:

If the voltage at terminal 91 or 92 does not switch periodically more than 5 times within 10 seconds at step 5, perform trouble diagnosis for "DTC P0133, P0153" first. (See [EC-836](#).)

Diagnostic Procedure

1. CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

OK or NG

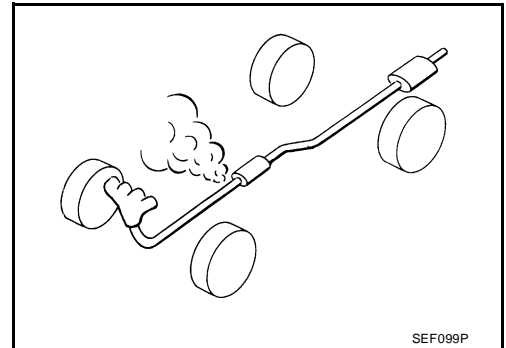
- OK >> GO TO 2.
- NG >> Repair or replace.

2. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air 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-705, "Basic Inspection"](#) .

Items	Specifications
Ignition timing	M/T: 15° ± 5° BTDC
	A/T: 15° ± 5° BTDC (in "P" or "N" position)
Target idle speed	M/T: 700 ± 50 rpm
	A/T: 700 ± 50 rpm (in "P" or "N" position)

OK or NG

- OK >> GO TO 5.
- NG >> Follow the [EC-705, "Basic Inspection"](#) .

5. CHECK INJECTORS

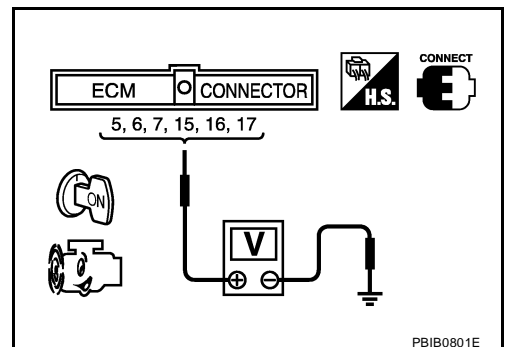
1. Stop engine and then turn ignition switch "ON".
2. Check voltage between ECM terminals 5, 6, 7, 13, 14, 15, 16, 17 and ground with CONSULT-II or tester.

Battery voltage should exist.

3. Refer to Wiring Diagram for Injectors, [EC-1231](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Perform [EC-1232, "Diagnostic Procedure"](#) .



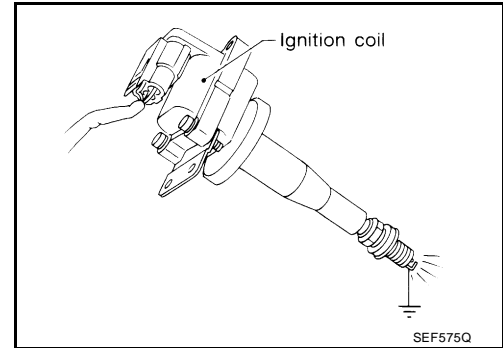
6. CHECK IGNITION SPARK

1. Turn ignition switch "OFF".
2. Disconnect ignition coil assembly from rocker cover.
3. Connect a known good spark plug to the ignition coil assembly.
4. Place end of spark plug against a suitable ground and crank engine.
5. Check for spark.

OK or NG

OK >> GO TO 7.

NG >> Check ignition coil with power transistor and their circuit.
Refer to [EC-1210, "IGNITION SIGNAL"](#) .



7. CHECK INJECTOR

1. Turn ignition switch "OFF".
2. Remove injector assembly.
Refer to [EM-129, "FUEL INJECTOR AND FUEL TUBE"](#) .
Keep fuel hose and all injectors connected to injector gallery.
3. Disconnect all ignition coil harness connectors.
4. Turn ignition switch "ON".
Make sure fuel does not drip from injector.

OK or NG

OK (Does not drip.)>>GO TO 8.

NG (Drips.)>>Replace the injector(s) from which fuel is dripping.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

Trouble is fixed.>>**INSPECTION END**

Trouble is not fixed.>>Replace three way catalyst (Manifold).

DTC P0441 EVAP CONTROL SYSTEM

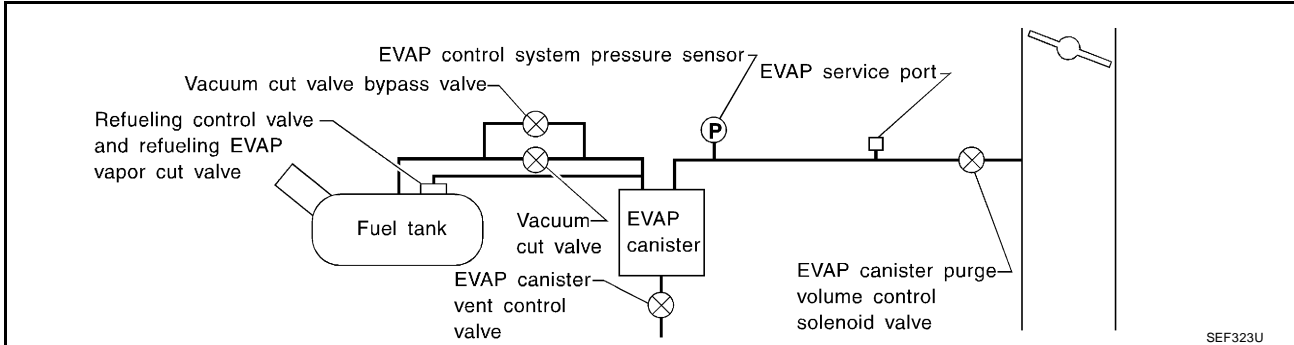
PF:14950

System Description

UBS003C1

NOTE:

If DTC P0441 is displayed with other DTC such as P0226, P0227, P0228, P1227 or P1228, 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

UBS003C2

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	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

DTC Confirmation Procedure

UBS003C3

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.

④ WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. 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-II.
5. Touch “START”.

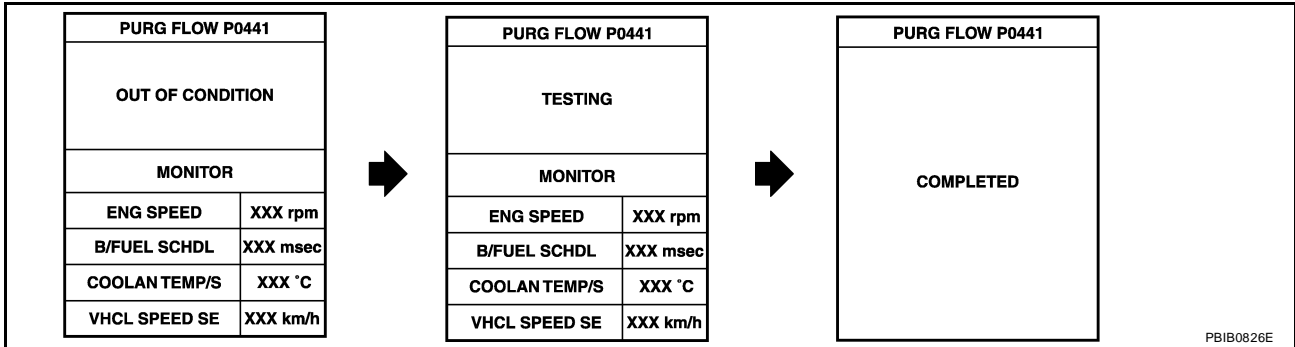
DTC P0441 EVAP CONTROL SYSTEM

[VQ]

If "COMPLETED" is displayed, go to step 7.

- When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,000 rpm
B/FUEL SCHDL	1.3 - 9.0 msec
Engine coolant temperature	70 - 100°C (158 - 212°F)



If "TESTING" is not changed for a long time, retry from step 2.

- Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-959, "Diagnostic Procedure"](#).

Overall Function Check

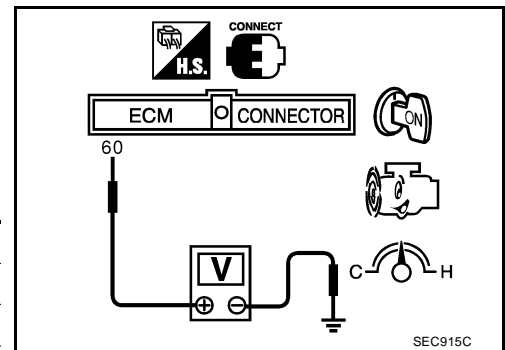
UBS003C4

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

- Lift up drive wheels.
- Start engine (TCS switch "OFF") and warm it up to normal operating temperature.
- Turn ignition switch "OFF", wait at least 10 seconds.
- Start engine and wait at least 70 seconds.
- Set voltmeter probes to ECM terminals 60 (EVAP control system pressure sensor signal) and ground.
- Check EVAP control system pressure sensor value at idle speed and note it.
- Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Steering wheel	Fully turned
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than "P", "N" or "R"



- Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
- If NG, go to [EC-959, "Diagnostic Procedure"](#).

Diagnostic Procedure

1. CHECK EVAP CANISTER

1. Turn ignition switch "OFF".
2. Check EVAP canister for cracks.

OK or NG

- OK (With CONSULT-II)>>GO TO 2.
- OK (Without CONSULT-II)>>GO TO 3.
- NG >> Replace EVAP canister.

2. CHECK PURGE FLOW

Ⓜ **With CONSULT-II**

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-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#).
2. Start engine and let it idle.
3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
4. Rev engine up to 2,000 rpm.
5. Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

PURG VOL CONT/V	Vacuum
100.0%	Should exist.
0.0%	Should not exist.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.

ACTIVE TEST	
PURG VOL CONT/V	0 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %

PBIB0147E

3. CHECK PURGE FLOW

Ⓜ **Without CONSULT-II**

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-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#).
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum gauge indication when revving engine up to 2,000 rpm.

Vacuum should exist.

6. Release the accelerator pedal fully and let idle.

Vacuum should not exist.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.

4. CHECK EVAP PURGE LINE

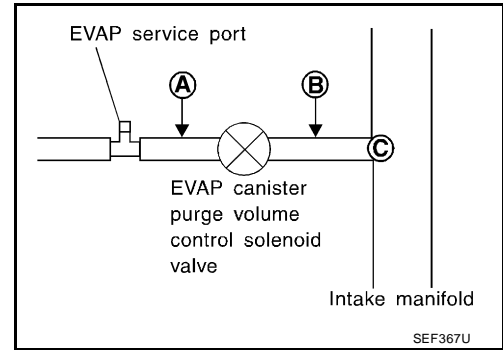
1. Turn ignition switch "OFF".
2. Check EVAP purge line for improper connection or disconnection.
Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 5.
- OK (Without CONSULT-II)>>GO TO 6.
- NG >> Repair it.

5. CHECK EVAP PURGE HOSE AND PURGE PORT

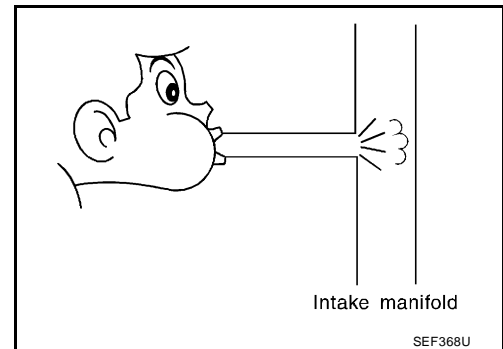
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B** .
2. Blow air into each hose and EVAP purge port **C** .



3. Check that air flows freely.

OK or NG

- OK >> GO TO 6.
- NG >> Repair or clean hoses and/or purge port.



6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

④ With CONSULT-II

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

ACTIVE TEST	
PURG VOL CONT/V	0 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %

PBIB0147E

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-977, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP canister purge volume control solenoid valve.

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

1. Turn ignition switch "OFF".
2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 9.
 NG >> Repair it.

9. 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 10.
 NG >> Replace EVAP control system pressure sensor.

10. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTIONRefer to "DTC Confirmation Procedure" for DTC P0452 [EC-985](#) , P0453 [EC-991](#) .

OK or NG

- OK >> GO TO 11.
 NG >> Replace EVAP control system pressure sensor.

11. 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 12.
 NG >> Clean the rubber tube using an air blower.

12. CHECK EVAP CANISTER VENT CONTROL VALVERefer to [EC-983, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 13.
 NG >> Replace EVAP canister vent control valve.

13. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

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-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P0442 EVAP CONTROL SYSTEM

PFV:14950

On Board Diagnosis Logic

UBS003C6

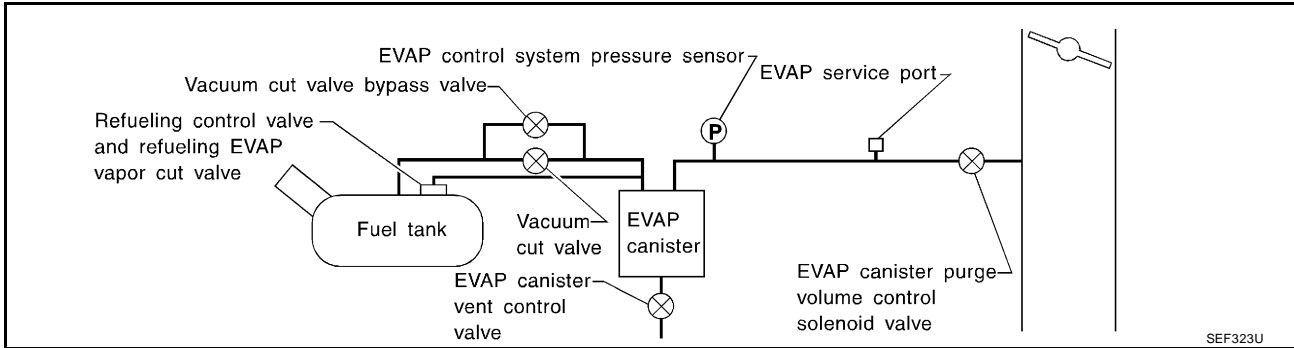
NOTE:

If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1149.)

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions.

The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



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 ● Blocked or bent rubber tube to EVAP control system pressure sensor ● Loose or disconnected rubber tube ● EVAP canister vent control valve and the circuit ● EVAP canister purge volume control solenoid valve and the circuit ● Absolute pressure sensor ● Fuel tank temperature sensor ● O-ring of EVAP canister vent control valve is missing or damaged ● Water separator ● EVAP canister is saturated with water ● EVAP control system pressure sensor ● Fuel level sensor and the circuit ● Refueling control valve ● ORVR system leaks

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

UBS003C7

NOTE:

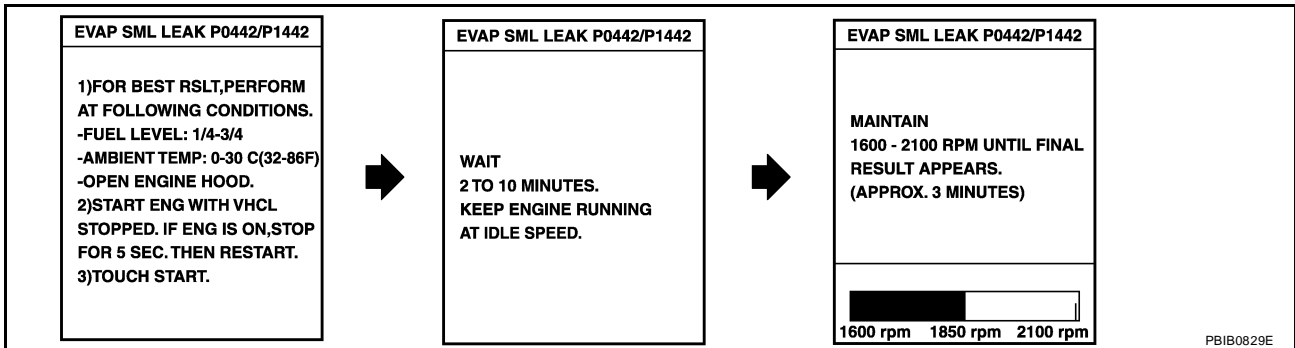
- If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See [EC-1149](#).)
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
4. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 30°C (32 - 86°F)
5. Select “EVAP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
 Follow the instruction displayed.



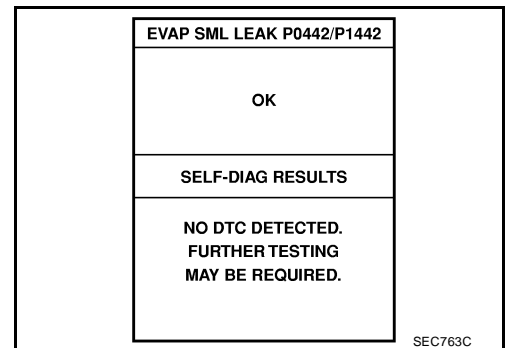
NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-705, "Basic Inspection"](#).

6. Make sure that “OK” is displayed.
 If “NG” is displayed, refer to [EC-965, "Diagnostic Procedure"](#).

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.



WITH GST

NOTE:

Be sure to read the explanation of “Driving Pattern” on [EC-684](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to "Driving Pattern", [EC-684](#) .
3. Stop vehicle.
4. Select "MODE 1" with GST.
 - If SRT of EVAP system is not set yet, go to the following step.
 - If SRT of EVAP system is set, the result will be OK.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start engine.

It is not necessary to cool engine down before driving.
7. Drive vehicle again according to the "Driving Pattern", [EC-684](#) .
8. Stop vehicle.
9. Select "MODE 3" with GST.
 - If P0442 is displayed on the screen, go to [EC-965, "Diagnostic Procedure"](#) .
 - If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, [EC-959](#) .
 - If P0441 and P0442 are not displayed on the screen, go to the following step.
10. Select "MODE 1" with GST.
 - If SRT of EVAP system is set, the result will be OK.
 - If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

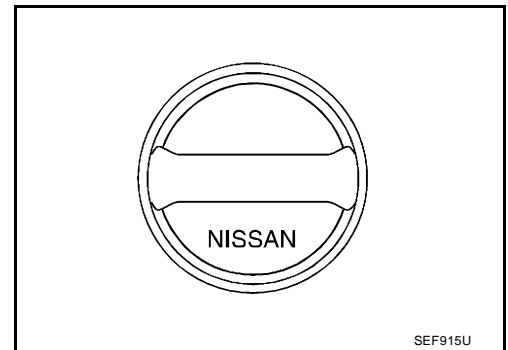
UBS003C8

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 >> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
 ● 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-1275, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FILLER CAP\)"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace fuel filler cap with a genuine one.

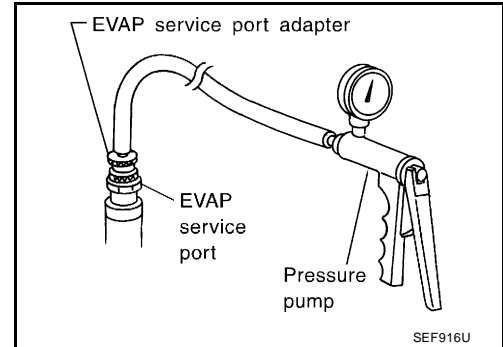
5. INSTALL THE PRESSURE PUMP

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, refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

- Models with CONSULT-II>>GO TO 6.
- Models without CONSULT-II>>GO TO 7.



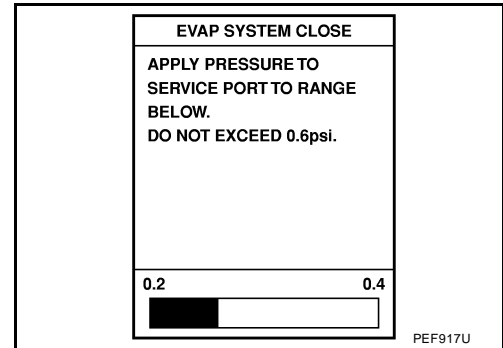
6. CHECK FOR EVAP LEAK

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.

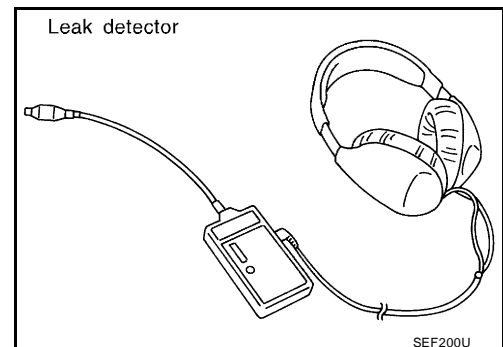


4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.

Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

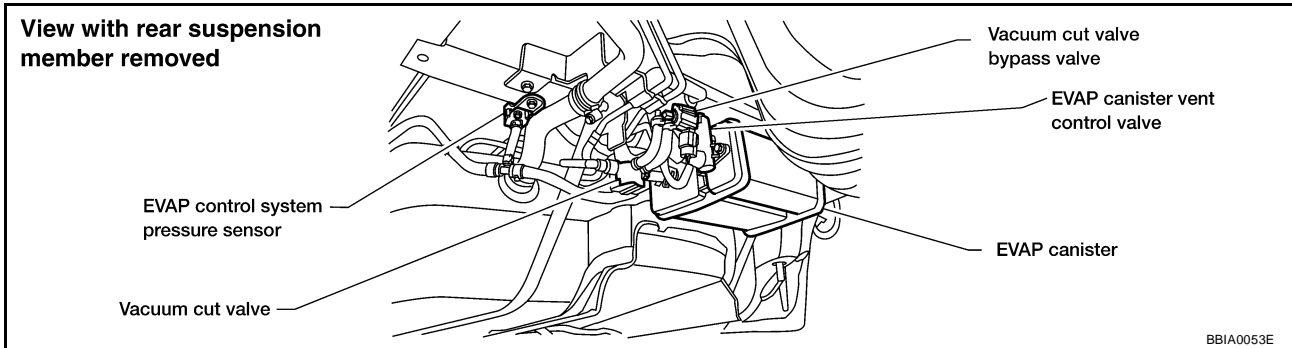
- OK >> GO TO 8.
- NG >> Repair or replace.



7. CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

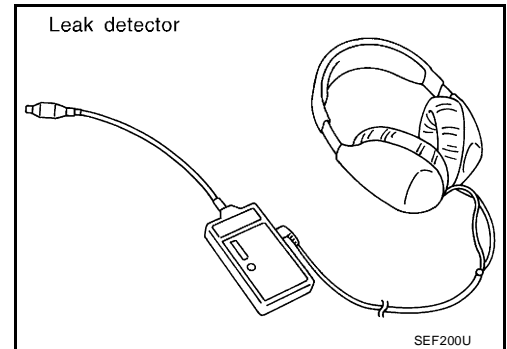
NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace.



8. CHECK WATER SEPARATOR

Refer to [EC-970, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace water separator.

9. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

Refer to "DTC Confirmation Procedure", [EC-1143](#).

OK or NG

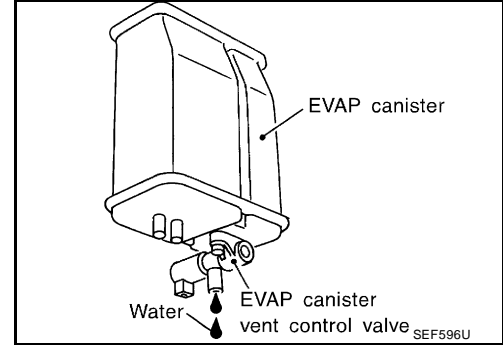
- OK >> GO TO 10.
- NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 11.
- No (With CONSULT-II)>>GO TO 13.
- No (Without CONSULT-II)>>GO TO 14.



11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

The weight should be less than 1.8 kg (4.0 lb).

OK or NG

- OK (With CONSULT-II)>>GO TO 13.
- OK (Without CONSULT-II)>>GO TO 14.
- NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓟ With CONSULT-II

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-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	0 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %

PBIB0147E

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

⊗ Without CONSULT-II

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-647, "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-977, "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
- NG >> Replace EVAP canister purge volume control solenoid valve.

17. CHECK ABSOLUTE PRESSURE SENSOR

Refer to [EC-804, "DTC Confirmation Procedure"](#).

OK or NG

- OK >> GO TO 18.
- NG >> Replace absolute pressure sensor.

18. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-896, "Component Inspection"](#).

OK or NG

- OK >> GO TO 19.
- NG >> Replace fuel level sensor unit.

19. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-990, "Component Inspection"](#).

OK or NG

- OK >> GO TO 20.
- NG >> Replace EVAP control system pressure sensor.

20. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK >> GO TO 21.
- NG >> Repair or reconnect the hose.

21. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 22.

22. CHECK REFUELING EVAP VAPOR LINE

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-1278, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

OK >> GO TO 23.

NG >> Repair or replace hoses and tubes.

23. CHECK SIGNAL LINE AND RECIRCULATION LINE

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 24.

NG >> Repair or replace hoses, tubes or filler neck tube.

24. CHECK REFUELING CONTROL VALVE

Refer to [EC-1283, "REFUELING CONTROL VALVE"](#) .

OK or NG

OK >> GO TO 25.

NG >> Replace refueling control valve with fuel tank.

25. CHECK FUEL LEVEL SENSOR

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

OK or NG

OK >> GO TO 26.

NG >> Replace fuel level sensor unit.

26. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection WATER SEPARATOR

UBS003C9

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.

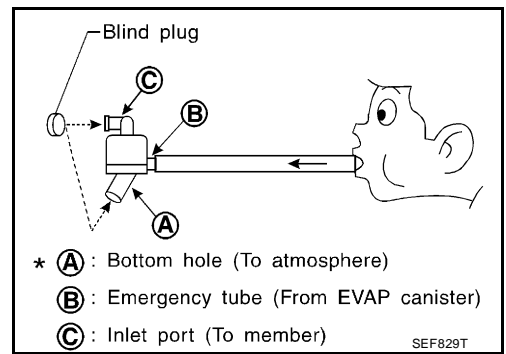
DTC P0442 EVAP CONTROL SYSTEM

[VQ]

4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

NOTE:

- Do not disassemble water separator.



A

EC

C

D

E

F

G

H

I

J

K

L

M

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ]

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PF1:14920

Description SYSTEM DESCRIPTION

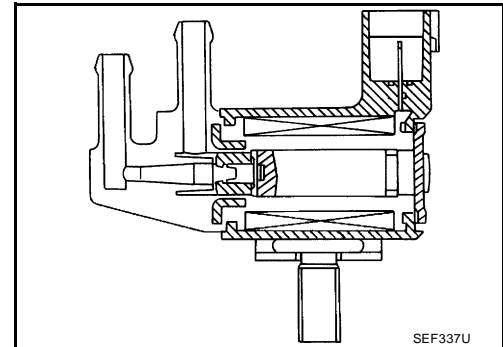
UBS003CA

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Vehicle speed signal	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

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-II Reference Value in Data Monitor Mode

UBS003CB

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Shift lever: N	Idle	0%
	● Air conditioner switch: OFF ● No-load	2,000 rpm	20 - 30%

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ]

On Board Diagnosis Logic

UBS003CC

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 (The 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 (The solenoid valve circuit is shorted.) ● EVAP canister purge volume control solenoid valve

DTC Confirmation Procedure

UBS003CD

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 13 seconds.
4. If 1st trip DTC is detected, go to [EC-975, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

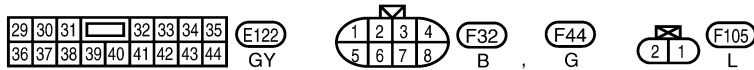
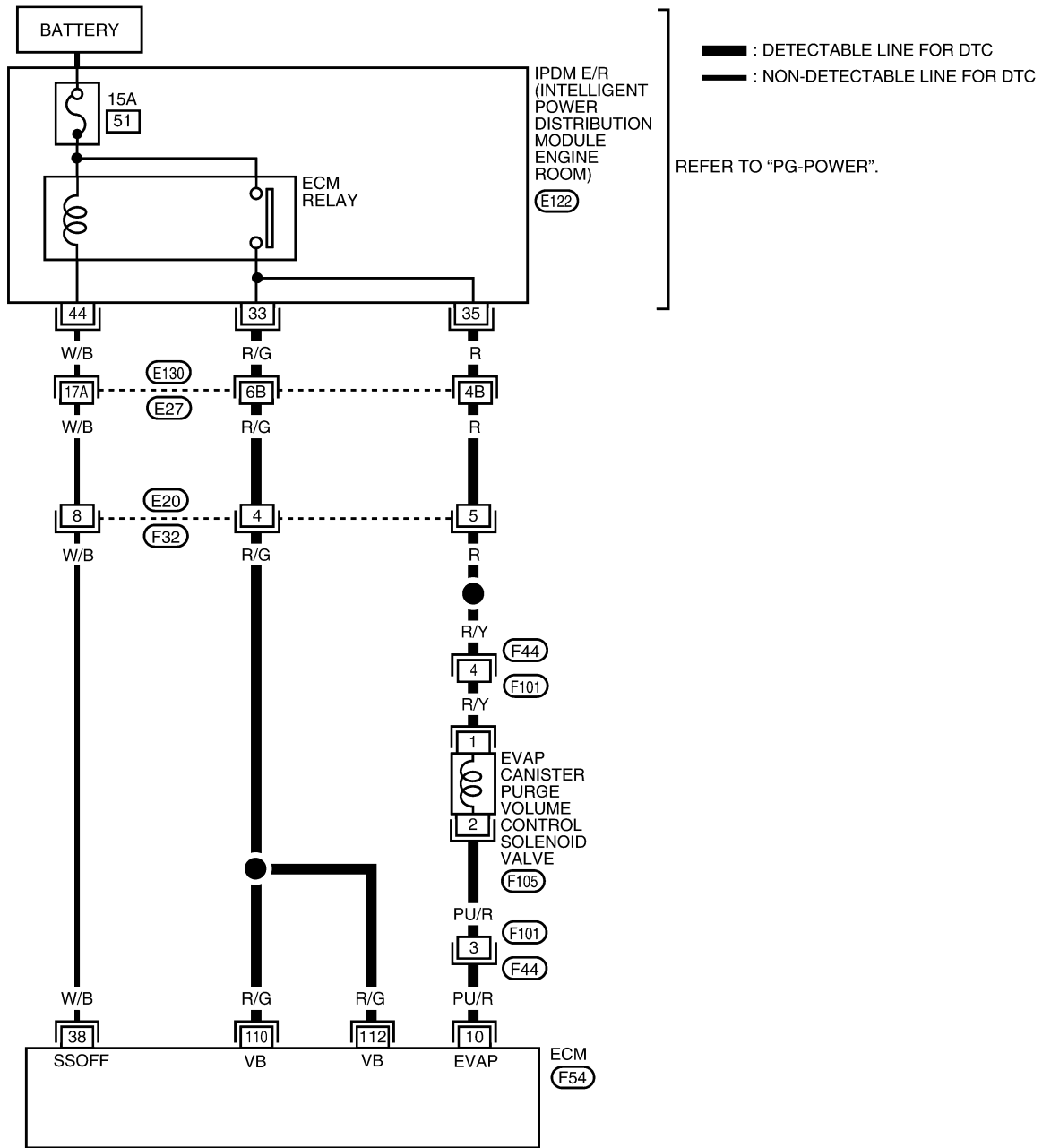
DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ]

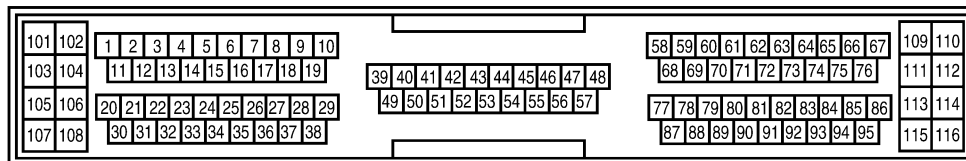
UBS003CE

Wiring Diagram

EC-PGC/V-01



REFER TO THE FOLLOWING.
(E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0068E

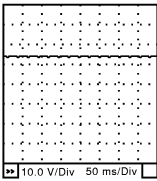
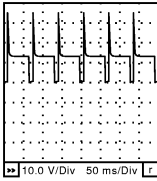
Specification data are reference values and are measured between each terminal and ground.

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
10	PU/R	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>SEC990C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>SEC991C</p>

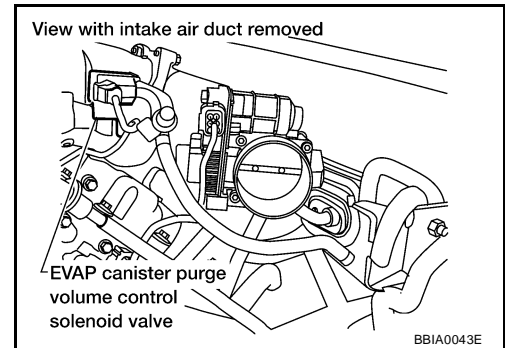
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS003CF

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 harness connector.
3. Turn ignition switch "ON".

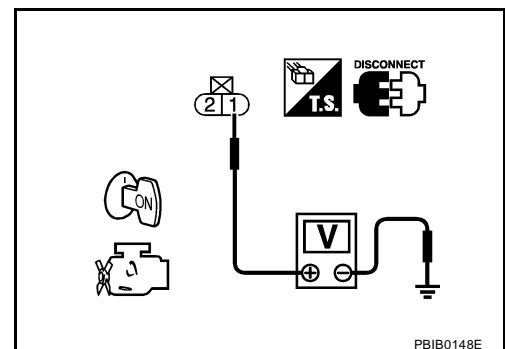


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
 NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F44, F101
- Harness connectors E20, F32
- Harness connectors E130, E27
- IPDM E/R harness connector E122
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between ECM and IPDM E/R

>> Repair 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 10 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-II)>>GO TO 5.

OK (Without CONSULT-II)>>GO TO 6.

NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F44, F101
- 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.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓟ **With CONSULT-II**

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 7.

NG >> GO TO 6.

ACTIVE TEST	
PURG VOL CONT/V	0 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %

PB1B0147E

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ]

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-977, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace EVAP canister purge volume control solenoid valve.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

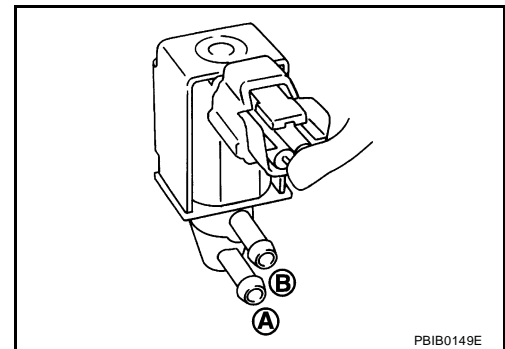
Component Inspection EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS003CG

Ⓟ With CONSULT-II

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
100.0%	Yes
0.0%	No

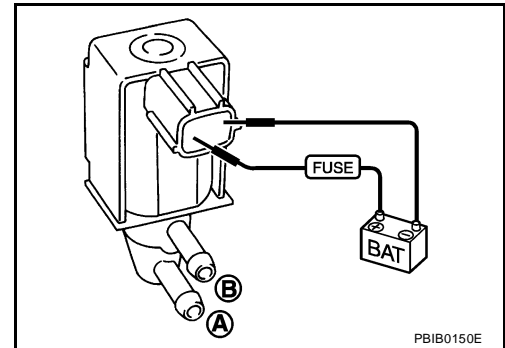


PBIB0149E

ⓧ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



PBIB0150E

Removal and Installation EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS003CH

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[VQ]

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

PFV:14935

Component Description

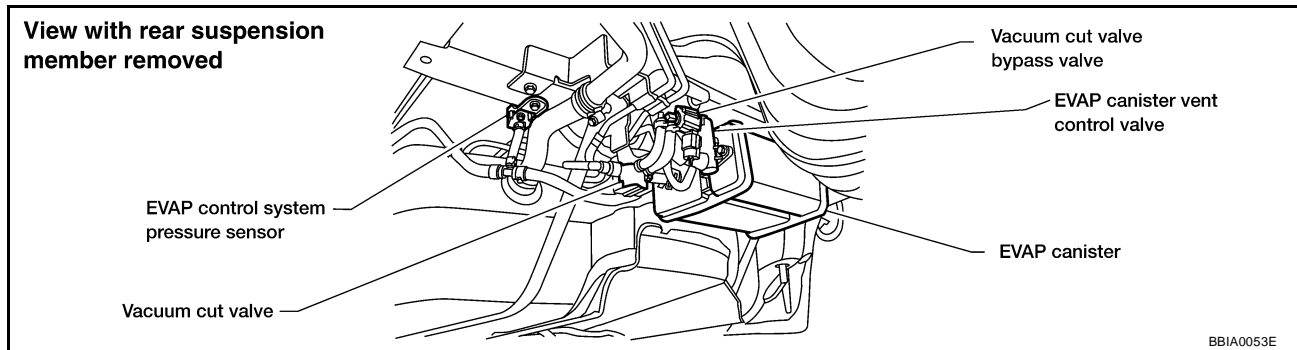
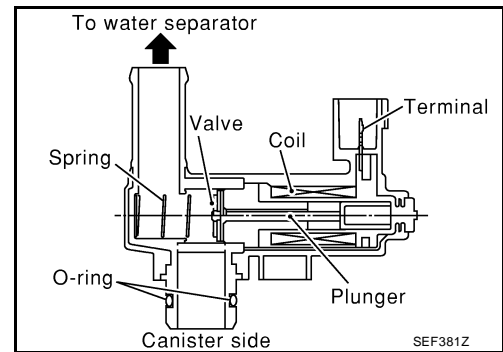
UBS003CI

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

UBS003CJ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS003CK

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 (The valve circuit is open or shorted.) ● EVAP canister vent control valve

DTC Confirmation Procedure

UBS003CL

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[VQ]

3. Start engine and wait at least 8 seconds.
4. If 1st trip DTC is detected, go to [EC-981, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

A

EC

C

D

E

F

G

H

I

J

K

L

M



WITH GST

Follow the procedure "WITH CONSULT-II" above.

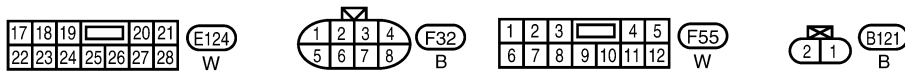
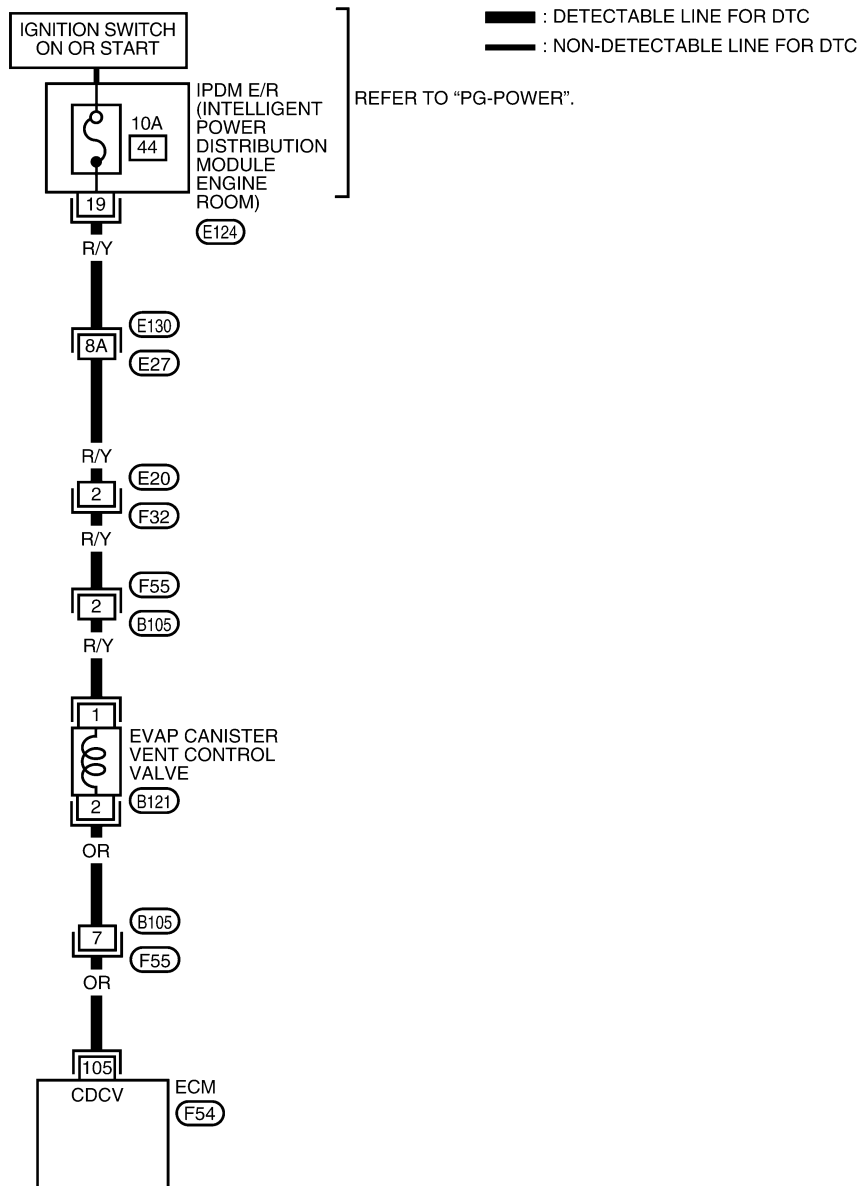
DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[VQ]

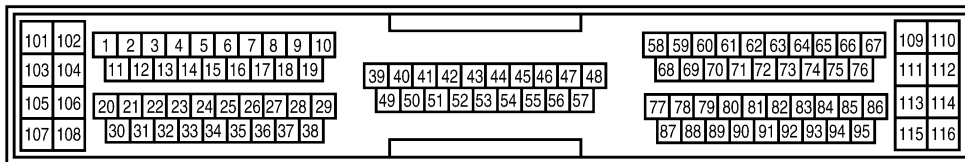
Wiring Diagram

UBS003CM

EC-VENT/V-01



REFER TO THE FOLLOWING.
 E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0069E

Specification data are reference values and are measured between each terminal and ground.

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
105	OR	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS003CN

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

Ⓜ With CONSULT-II

1. Turn ignition switch "OFF" and then turn "ON".
2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.
3. Touch "ON/OFF" on CONSULT-II screen.
4. Check for operating sound of the valve.

Clicking noise should be heard.

OK or NG

OK >> GO TO 7.

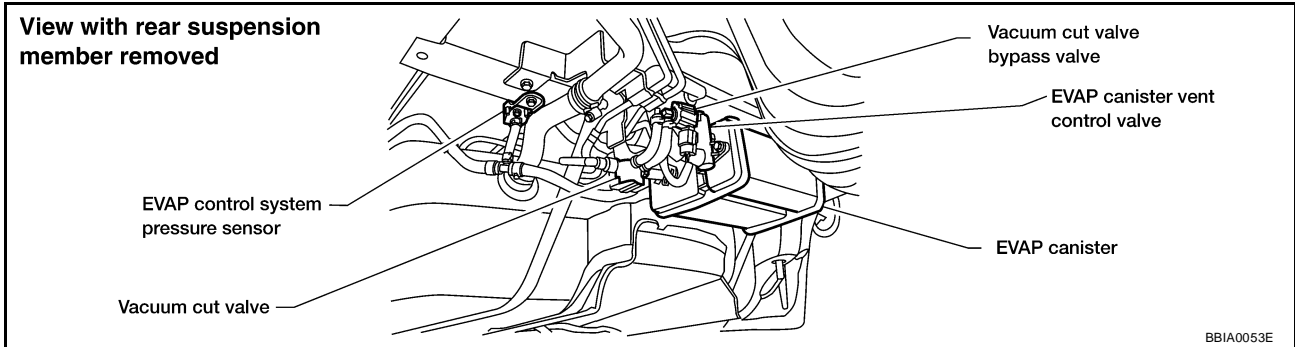
NG >> GO TO 3.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 (B1)	XXX V
HO2S1 (B2)	XXX V

PBIB0151E

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister vent control valve harness connector.

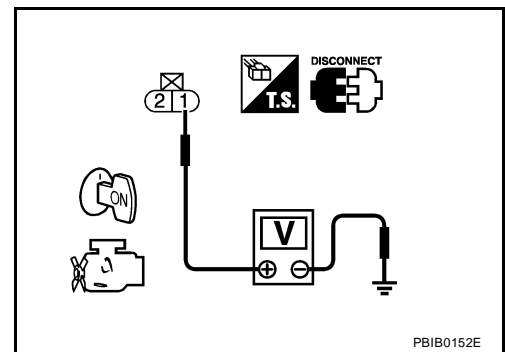


3. Turn ignition switch "ON".
4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- Harness connectors F32, E20
- Harness connectors E27, E130
- IPDM E/R harness connector E124
- 10A fuse
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

>> Repair 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 105 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 B105, F55
- 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 EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-983, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP canister vent control valve.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

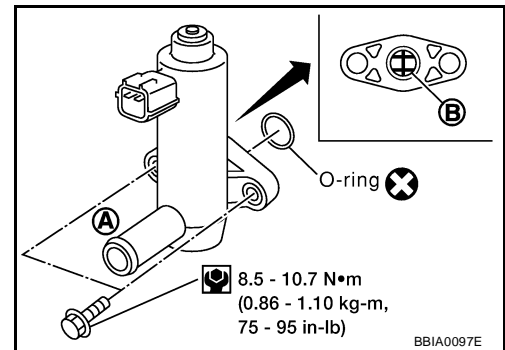
>> INSPECTION END

Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS003CO

With CONSULT-II

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.
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.

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.
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.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 (B1)	XXX V
HO2S1 (B2)	XXX V

PBIB0151E

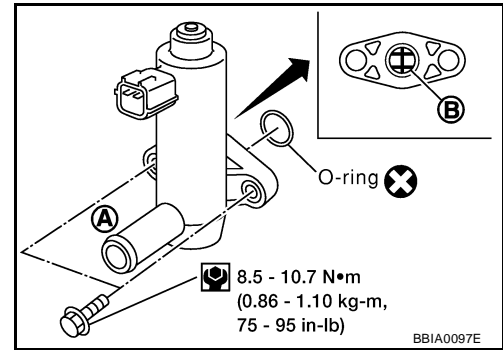
DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[VQ]

8. Perform step 6 again.

⊗ Without CONSULT-II

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.

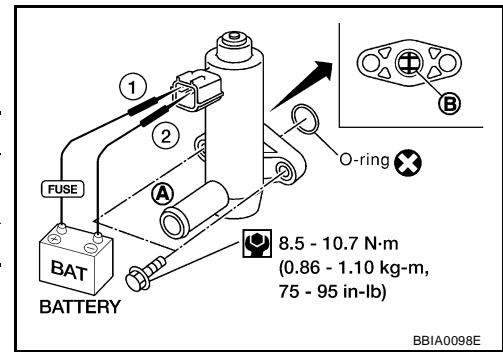
Make sure new O-ring is installed properly.

Condition	Air passage continuity between A and B
12V 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.
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 P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[VQ]

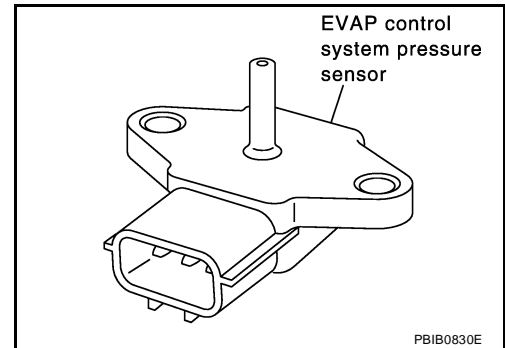
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

PF25085

Component Description

UBS003CP

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

UBS003CQ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

On Board Diagnosis Logic

UBS003CR

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 (The sensor circuit is open or shorted.) ● EVAP control system pressure sensor

DTC Confirmation Procedure

UBS003CS

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
If 1st trip DTC is detected, go to [EC-988, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

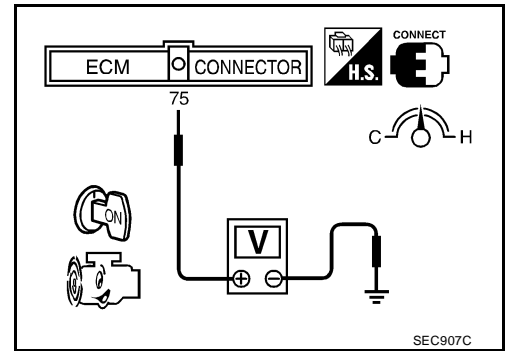
WITH GST

1. Start engine and warm it up to normal operating temperature.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[VQ]

2. Check that voltage between ECM terminal 75 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select "MODE 7" with GST.
If 1st trip DTC is detected, go to [EC-988, "Diagnostic Procedure"](#)



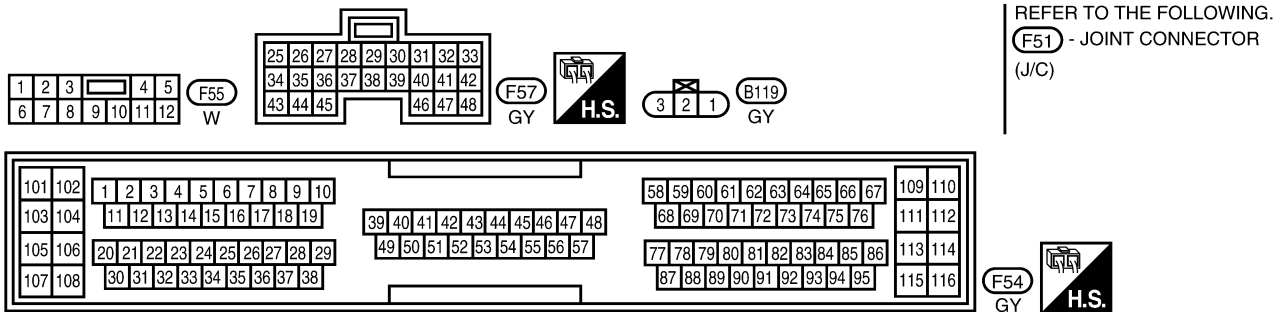
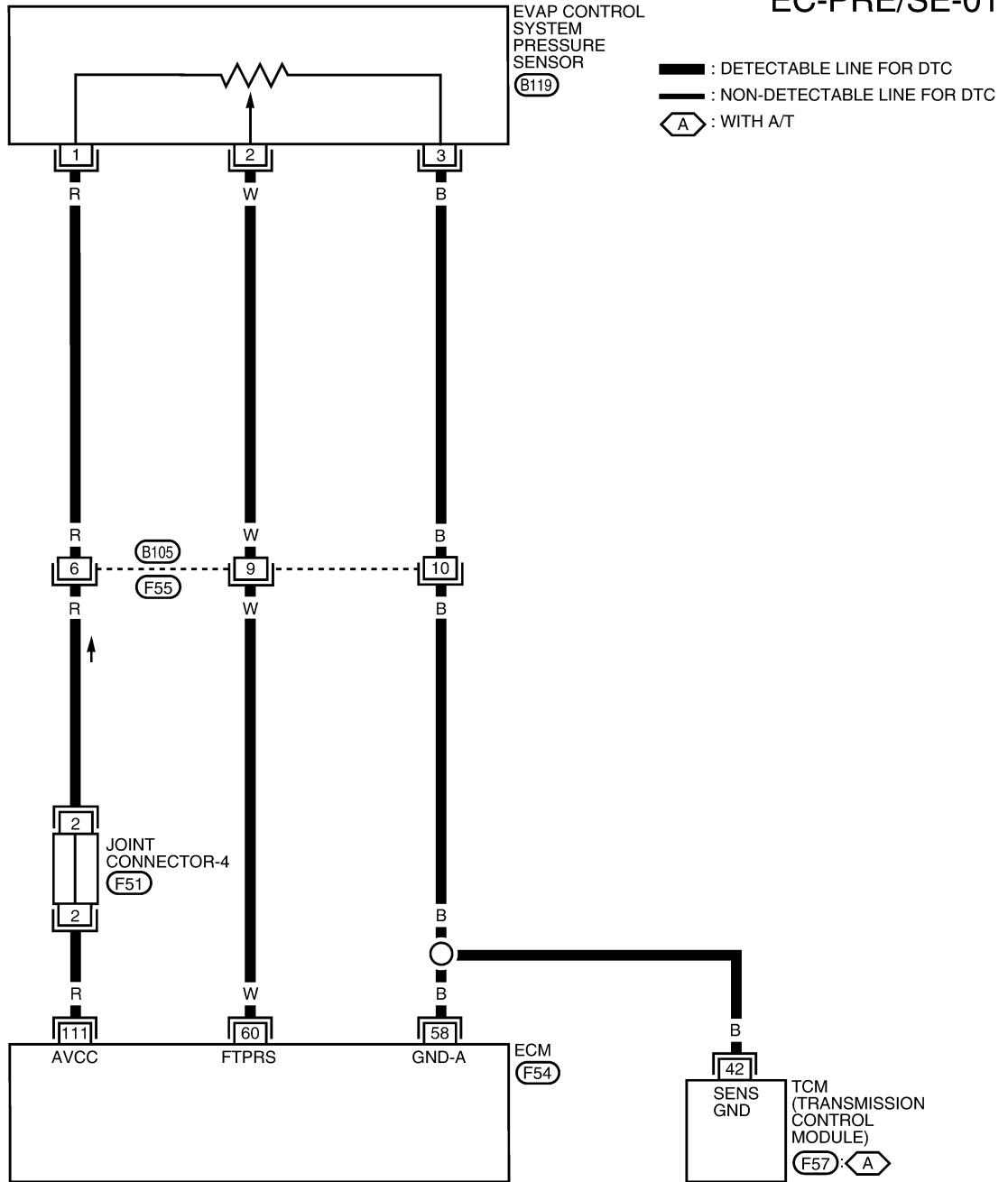
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[VQ]

Wiring Diagram

UBS003CT

EC-PRE/SE-01



Specification data are reference values and are measured between each terminal and ground.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
60	W	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 1.8 - 4.8V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

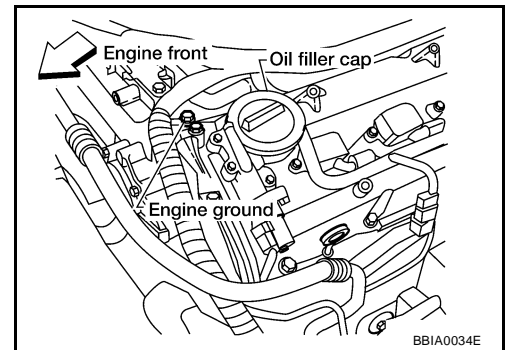
Diagnostic Procedure

UBS003CU

1. RETIGHTEN GROUND SCREWS

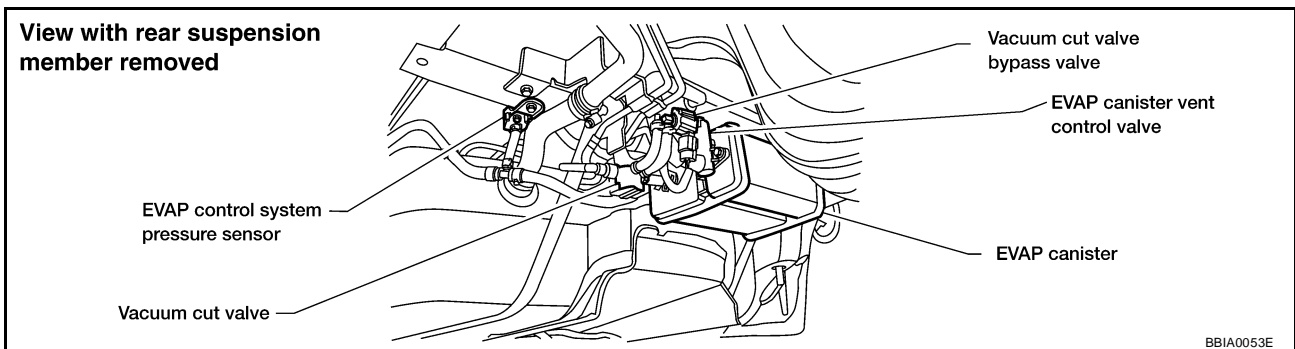
Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace harness connector.

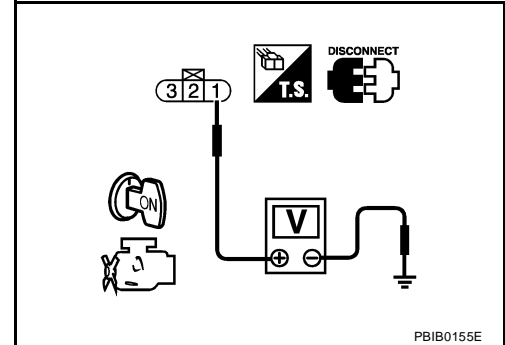
3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- Joint connector-4
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. 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 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- Harness for open or short between EVAP control system pressure sensor and ECM
- Harness for open or short between EVAP control system pressure sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 60 and EVAP control system pressure 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 9.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- 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.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-990, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

Component Inspection EVAP CONTROL SYSTEM PRESSURE SENSOR

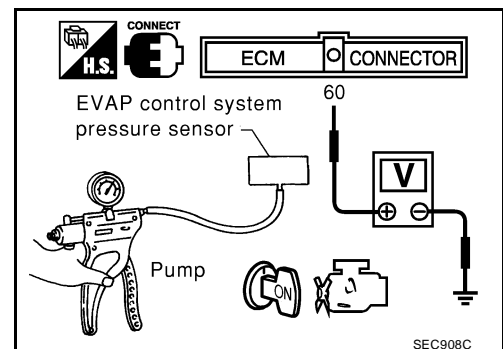
UBS003CV

1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove hose from EVAP control system pressure sensor.
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 60 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 - 2.5V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
 - Do not apply vacuum below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).
5. If NG, replace EVAP control system pressure sensor.



DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[VQ]

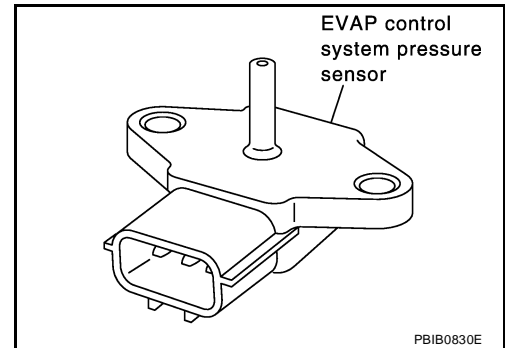
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

PF2:25085

Component Description

UBS003CW

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

UBS003CX

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

On Board Diagnosis Logic

UBS003CY

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 (The sensor circuit is open or shorted.) ● EVAP control system pressure sensor ● EVAP canister vent control valve ● EVAP canister ● Water separator ● Rubber hose from EVAP canister vent control valve to water separator

DTC Confirmation Procedure

UBS003CZ

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. If 1st trip DTC is detected, go to [EC-994, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

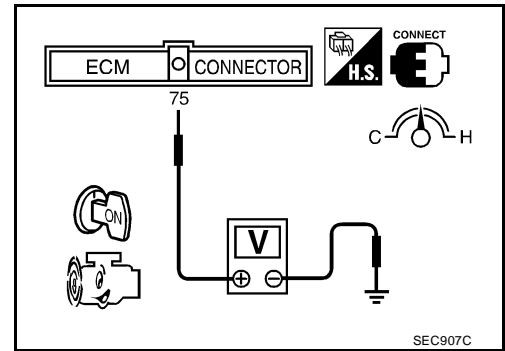
WITH GST

1. Start engine and warm it up to normal operating temperature.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[VQ]

2. Check that voltage between ECM terminal 75 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select "MODE 7" with GST.
If 1st trip DTC is detected, go to [EC-994, "Diagnostic Procedure"](#)



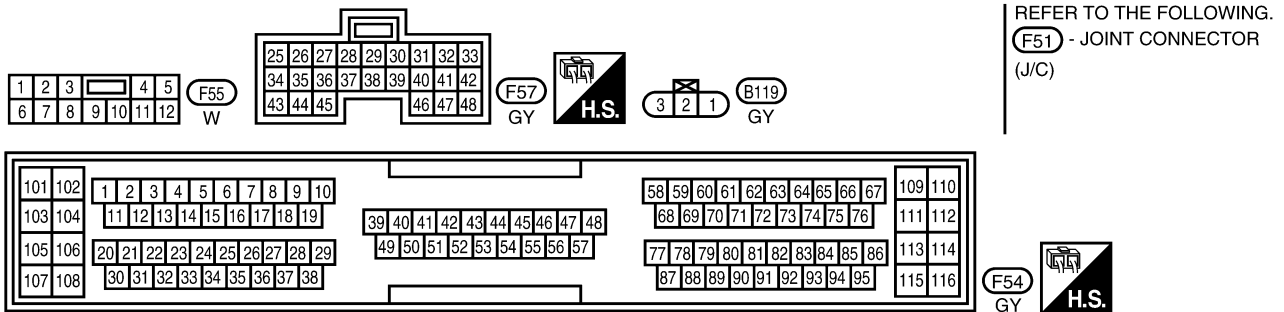
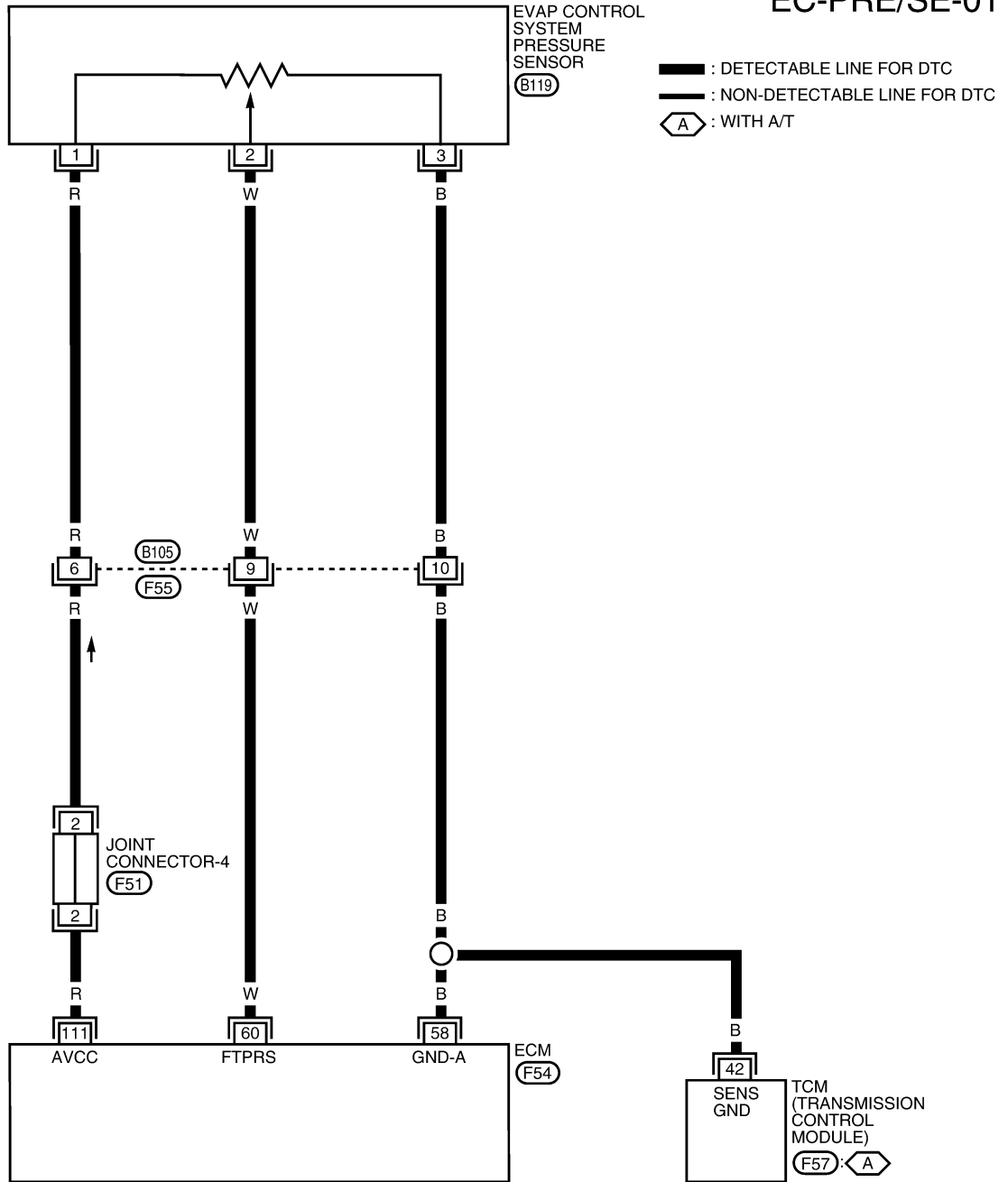
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[VQ]

Wiring Diagram

UBS003D0

EC-PRE/SE-01



BBWA0070E

Specification data are reference values and are measured between each terminal and ground.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
60	W	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 1.8 - 4.8V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

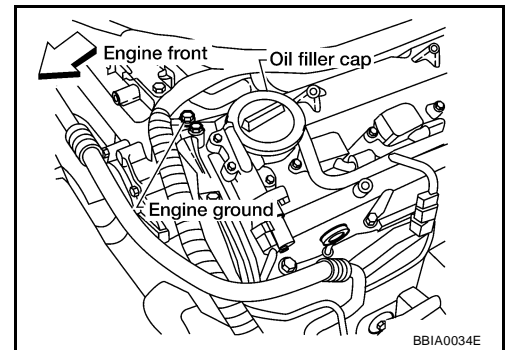
Diagnostic Procedure

UBS003D1

1. RETIGHTEN GROUND SCREWS

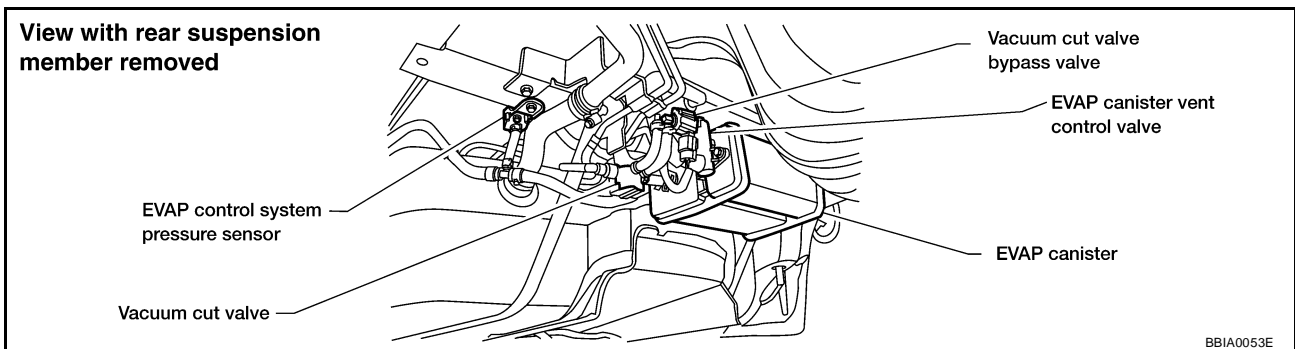
Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace harness connector.

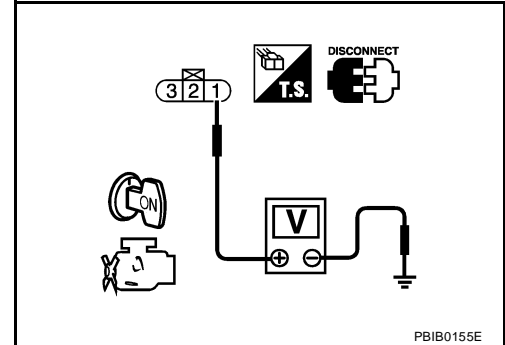
3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II 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 B105, F55
- Joint connector-4
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. 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 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- Harness for open or short between EVAP control system pressure sensor and ECM
- Harness for open or short between EVAP control system pressure sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 60 and EVAP control system pressure 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 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B105, F55
- 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.

9. 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 10.
NG >> Clean the rubber tube using an air blower.

10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-983, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> Replace EVAP canister vent control valve.

11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-997, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.
NG >> Replace EVAP control system pressure sensor.

12. CHECK RUBBER TUBE

Check obstructed rubber tube connected to EVAP canister vent control valve.

OK or NG

- OK >> GO TO 13.
NG >> Clean rubber tube using an air blower, repair or replace rubber tube.

13. CHECK WATER SEPARATOR

Refer to [EC-970, "Component Inspection"](#) .

OK or NG

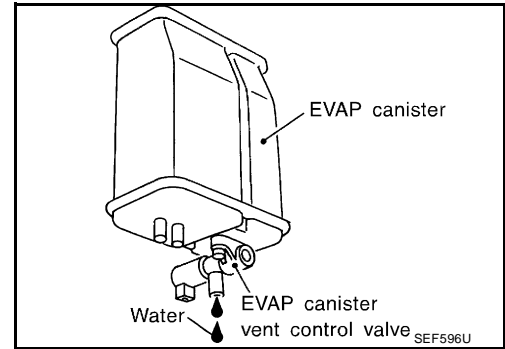
- OK >> GO TO 14.
NG >> Replace water separator.

14. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 15.
- No >> GO TO 17.



15. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

17. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection EVAP CONTROL PRESSURE SENSOR

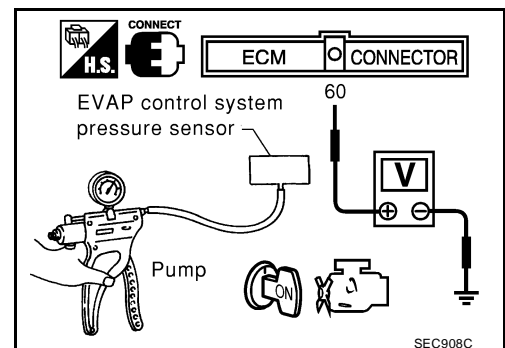
UBS003D2

1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove hose from EVAP control system pressure sensor.
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 60 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 - 2.5 lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
 - Do not apply vacuum below -93.3 kPa (-700 mmHg, -27.56 inHg) or over 101.3 kPa (760 mmHg, 29.92 inHg).
5. If NG, replace EVAP control system pressure sensor.



DTC P0456 EVAP CONTROL SYSTEM

PFP:14950

On Board Diagnosis Logic

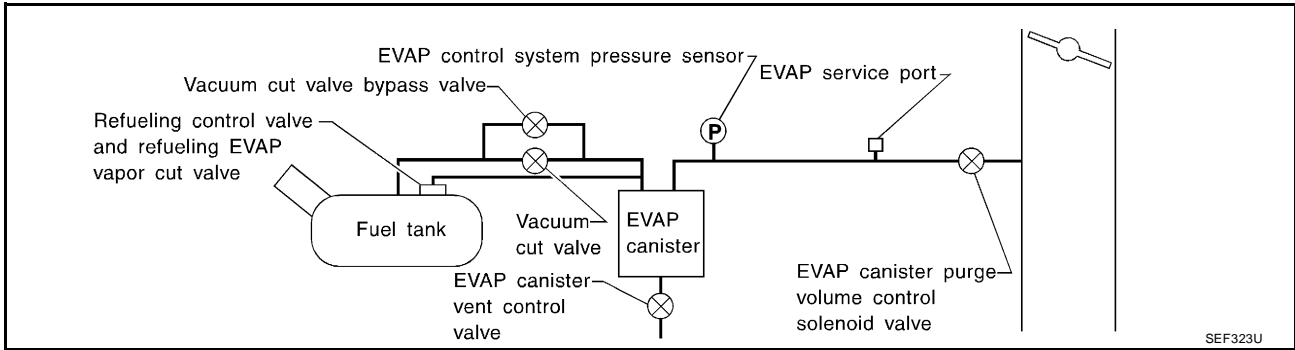
UBS003D3

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 ● Blocked or bent rubber tube to EVAP control system pressure sensor ● Loose or disconnected rubber tube ● EVAP canister vent control valve and the circuit ● EVAP canister purge volume control solenoid valve and the circuit ● Absolute pressure sensor ● Fuel tank temperature sensor ● O-ring of EVAP canister vent control valve is missing or damaged ● Water separator ● EVAP canister is saturated with water ● EVAP control system pressure sensor ● Refueling control 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 Confirmation Procedure

UBS003D4

NOTE:

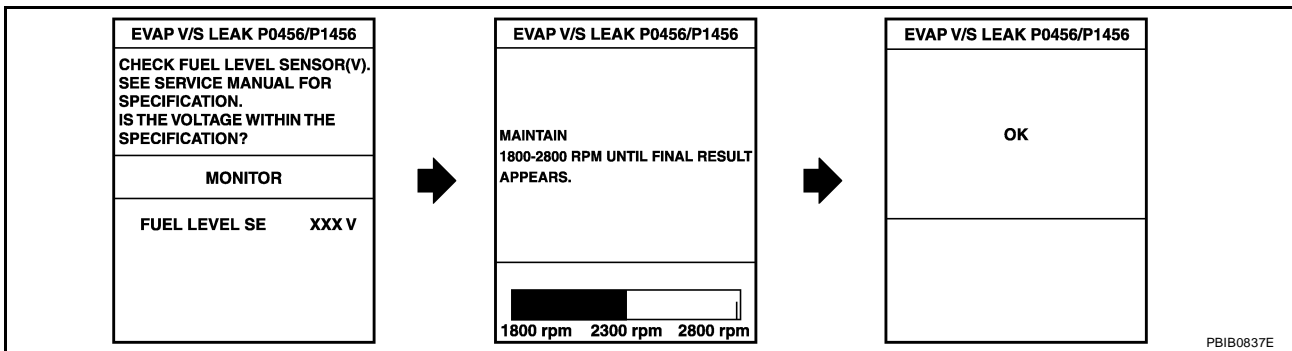
- If DTC P0456 is displayed with P0442, perform TROUBLE DIAGNOSIS FOR DTC P0456 first.
- After repair, make sure that the hoses and clips are installed properly.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting 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 11V at idle.

④ WITH CONSULT-II

1. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
2. Make sure the following conditions are met.
 - FUEL LEVEL SE: 0.25 - 1.15V**
 - 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-II.
Follow the instruction displayed.



6. Make sure that “OK” is displayed.
If “NG” is displayed, refer to [EC-1000, "Diagnostic Procedure"](#) .

NOTE:

- If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to [EC-705, "Basic Inspection"](#) .
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

Overall Function Check

UBS003D5

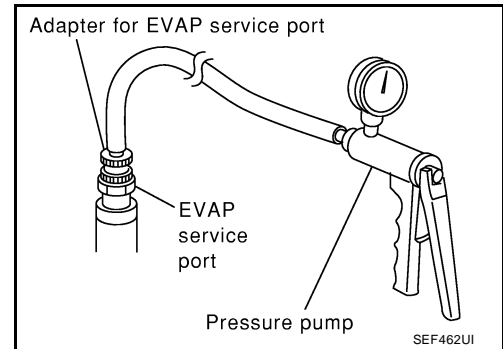
④ WITH GST

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. Set the pressure pump and a hose.
3. Also set a vacuum gauge via 3-way connector and a hose.
4. Turn ignition switch "ON".
5. Connect GST and select mode 8.
6. Using mode 8 control the EVAP canister vent control valve (close) and vacuum cut valve bypass valve (open).
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-1000, "Diagnostic 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.

Diagnostic Procedure

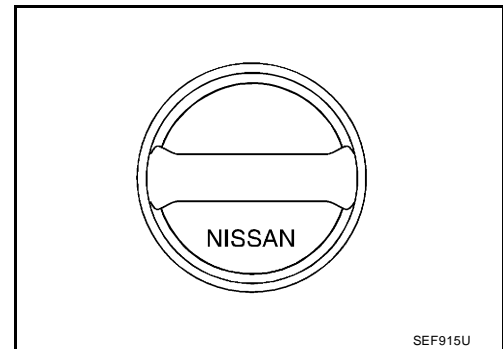
UBS003D6

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 >> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
 - 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-1275, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FILLER CAP\)"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace fuel filler cap with a genuine one.

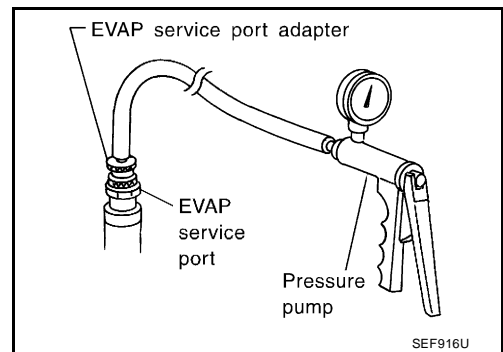
5. INSTALL THE PRESSURE PUMP

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, refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#).

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

- Models with CONSULT-II >> GO TO 6.
- Models without CONSULT-II >> GO TO 7.



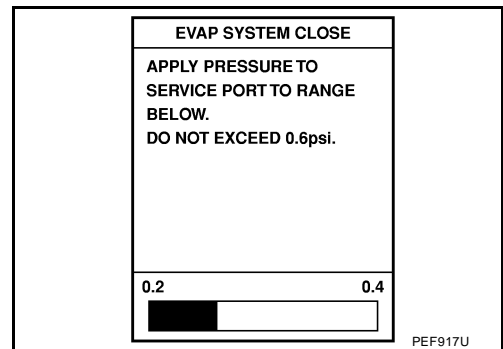
6. CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

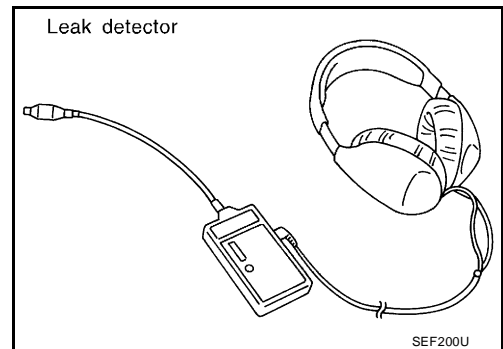
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

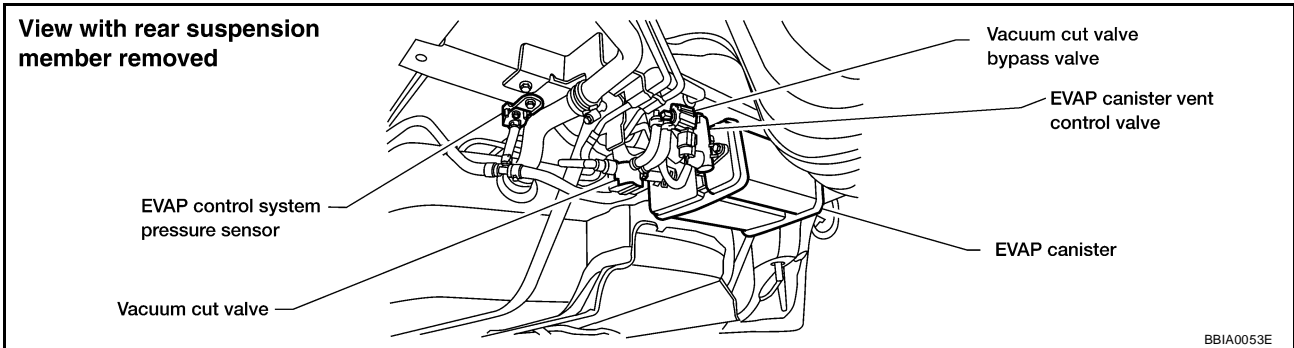
- OK >> GO TO 8.
- NG >> Repair or replace.



7. CHECK FOR EVAP LEAK

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

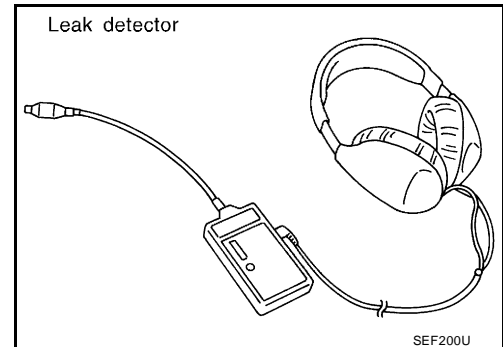
NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm² , 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 8.
 NG >> Repair or replace.



8. CHECK WATER SEPARATOR

Refer to [EC-1005, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
 NG >> Replace water separator.

9. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

Refer to "DTC Confirmation Procedure", [EC-1143](#) .

OK or NG

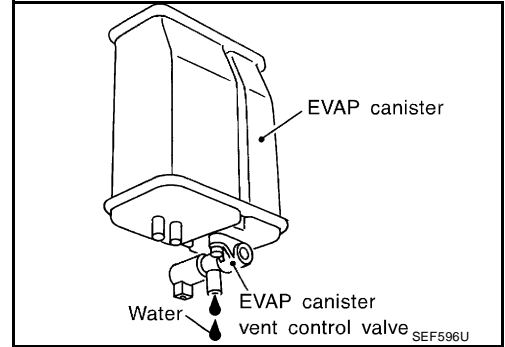
- OK >> GO TO 10.
 NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 11.
- No (With CONSULT-II)>>GO TO 13.
- No (Without CONSULT-II)>>GO TO 14.



11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

- OK (With CONSULT-II)>>GO TO 13.
- OK (Without CONSULT-II)>>GO TO 14.
- NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓜ **With CONSULT-II**

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-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	0 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %

PBIB0147E

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

⊗ Without CONSULT-II

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-647, "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-977, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.
NG >> Replace EVAP canister purge volume control solenoid valve.

17. CHECK ABSOLUTE PRESSURE SENSOR

Refer to [EC-804, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> GO TO 18.
NG >> Replace absolute pressure sensor.

18. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-896, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 19.
NG >> Replace fuel level sensor unit.

19. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-990, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 20.
NG >> Replace EVAP control system pressure sensor.

20. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 21.
NG >> Repair or reconnect the hose.

21. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 22.

22. CHECK REFUELING EVAP VAPOR LINE

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-1278, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#).

OK or NG

OK >> GO TO 23.

NG >> Repair or replace hoses and tubes.

23. CHECK SIGNAL LINE AND RECIRCULATION LINE

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 24.

NG >> Repair or replace hoses, tubes or filler neck tube.

24. CHECK REFUELING CONTROL VALVE

Refer to [EC-1281, "Component Inspection"](#).

OK or NG

OK >> GO TO 25.

NG >> Replace refueling control valve with fuel tank.

25. CHECK FUEL LEVEL SENSOR

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#).

OK or NG

OK >> GO TO 26.

NG >> Replace fuel level sensor unit.

26. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

**Component Inspection
WATER SEPARATOR**

UBS003D7

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.

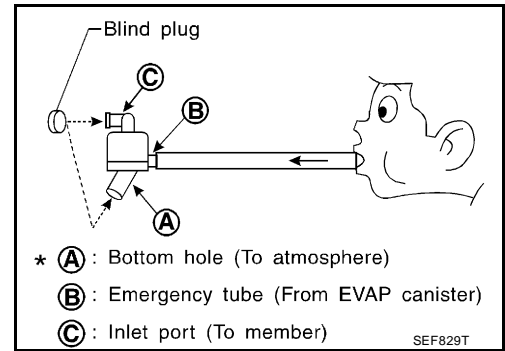
DTC P0456 EVAP CONTROL SYSTEM

[VQ]

4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

NOTE:

- Do not disassemble water separator.



DTC P0460 FUEL LEVEL SENSOR

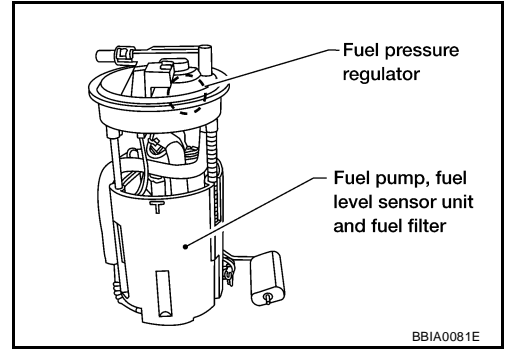
PFP:25060

Component Description

UBS003D8

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



UBS003D9

On Board Diagnosis Logic

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 (The sensor circuit is open or shorted) ● Fuel level sensor

DTC Confirmation Procedure

UBS003DA

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and wait maximum of 2 consecutive minutes.
4. If 1st trip DTC is detected, go to [EC-1009, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

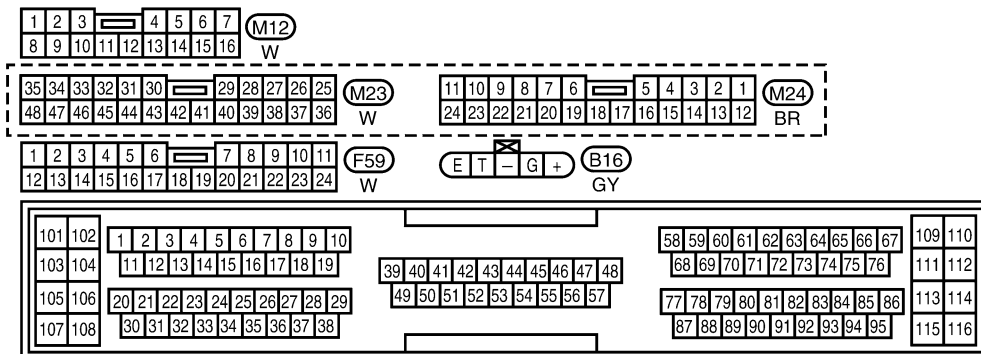
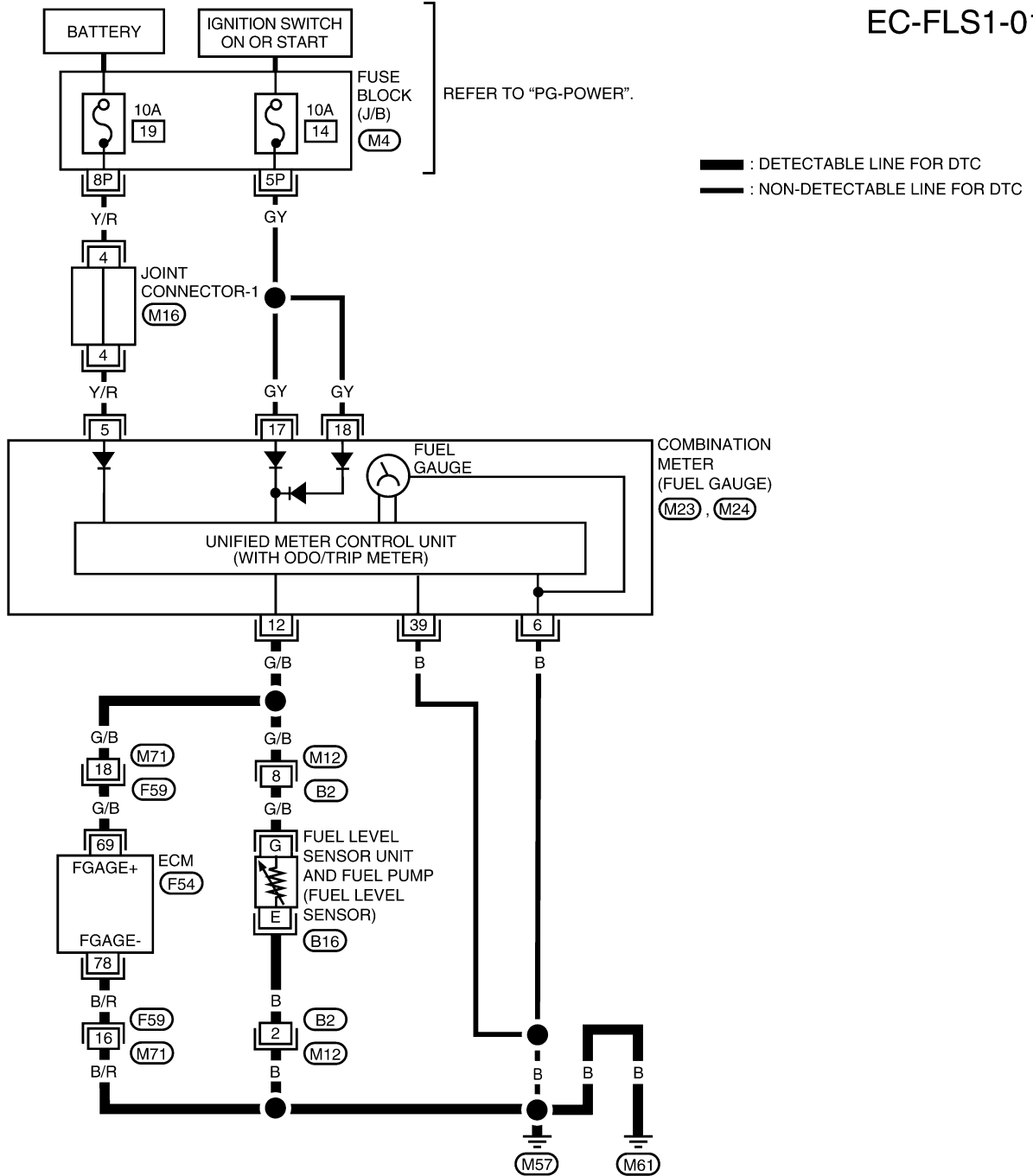
DTC P0460 FUEL LEVEL SENSOR

[VQ]

UBS003DB

Wiring Diagram

EC-FLS1-01



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)
- (M16) - JOINT CONNECTOR (J/C)



BBWA0071E

Specification data are reference values and are measured between each terminal and ground.

DTC P0460 FUEL LEVEL SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

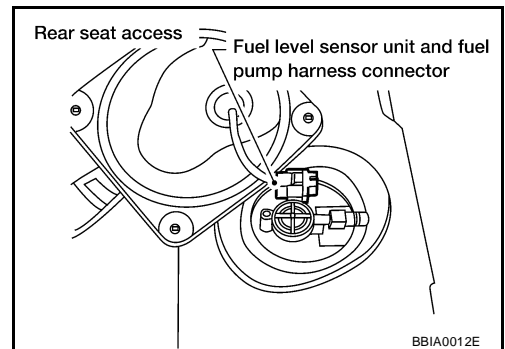
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
69	G/B	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
78	B/R	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V

Diagnostic Procedure

UBS003DC

1. CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

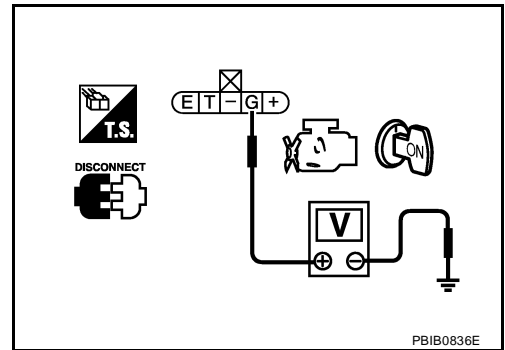


4. Check voltage between fuel level sensor unit and fuel pump terminal G and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness for open or short between combination meter and fuel level sensor until and fuel pump

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal E and body ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness for open or short between ECM and fuel level sensor until and fuel pump

>> Repair open circuit or short to power in harness or connectors.

5. CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 69 and fuel level sensor unit and fuel pump terminal G, ECM terminal 78 and fuel level sensor unit and fuel pump terminal E.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness connectors M71, F59
- Harness for open or short between ECM and fuel level sensor until and fuel pump

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK FUEL LEVEL SENSOR

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

OK or NG

- OK >> GO TO 8.
NG >> Replace fuel level sensor unit.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

DTC P0460 FUEL LEVEL SENSOR

[VQ]

Removal and Installation FUEL LEVEL SENSOR

UBS003DD

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

A

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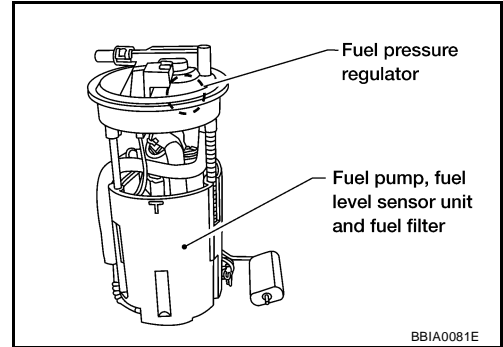
DTC P0461 FUEL LEVEL SENSOR

Component Description

UBS003DE

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



BBIA0081E

On Board Diagnosis Logic

UBS003DF

Driving long distances naturally affect fuel gauge level.

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 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 (The sensor circuit is open or shorted) ● Fuel level sensor

Overall Function Check

UBS003DG

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-8, "FUEL TANK"](#).

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

WITH CONSULT-II

NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-671, "FUEL PRESSURE RELEASE"](#).
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-II.
7. Check "FUEL LEVEL SE" output voltage and note it.
8. Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II.
9. Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11. Check "FUEL LEVEL SE" output voltage and note it.
12. Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11.
If NG, check the fuel level sensor, refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#).

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

DTC P0461 FUEL LEVEL SENSOR

[VQ]

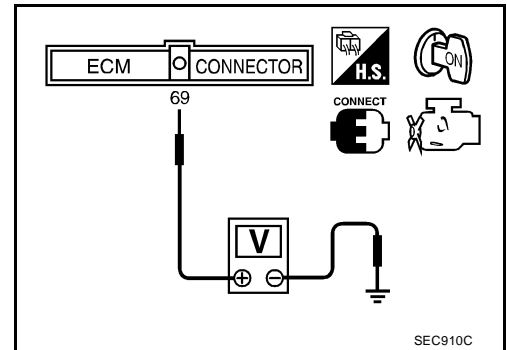
WITH GST

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-671, "FUEL PRESSURE RELEASE"](#) .
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch "OFF".
6. Set voltmeters probe between ECM terminal 69 (fuel level sensor signal) and ground.
7. Turn ignition switch "ON".
8. Check voltage between ECM terminal 69 and ground and note it.
9. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
10. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11. Confirm that the voltage between ECM terminal 69 and ground changes more than 0.03V during step 8 - 10.

If NG, check component of fuel level sensor, refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .



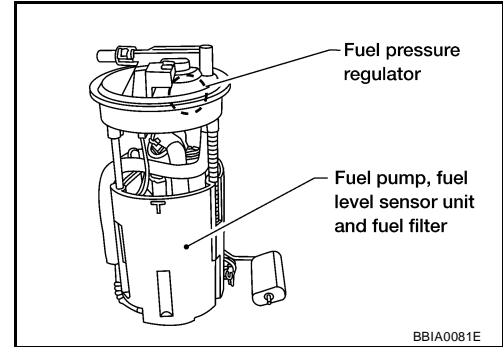
DTC P0462, P0463 FUEL LEVEL SENSOR

Component Description

UBS003DH

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



UBS003DI

On Board Diagnosis Logic

ECM receives two signals from the fuel level sensor circuit.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage is sent from the sensor is sent to ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage is sent from the sensor is sent to ECM.	

DTC Confirmation Procedure

UBS003DJ

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch "ON".

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1016, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

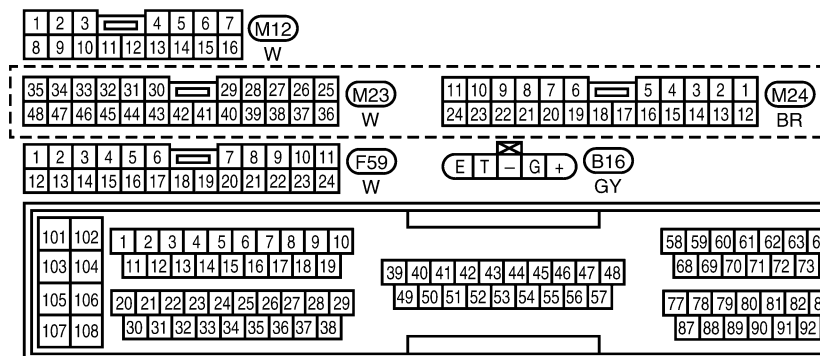
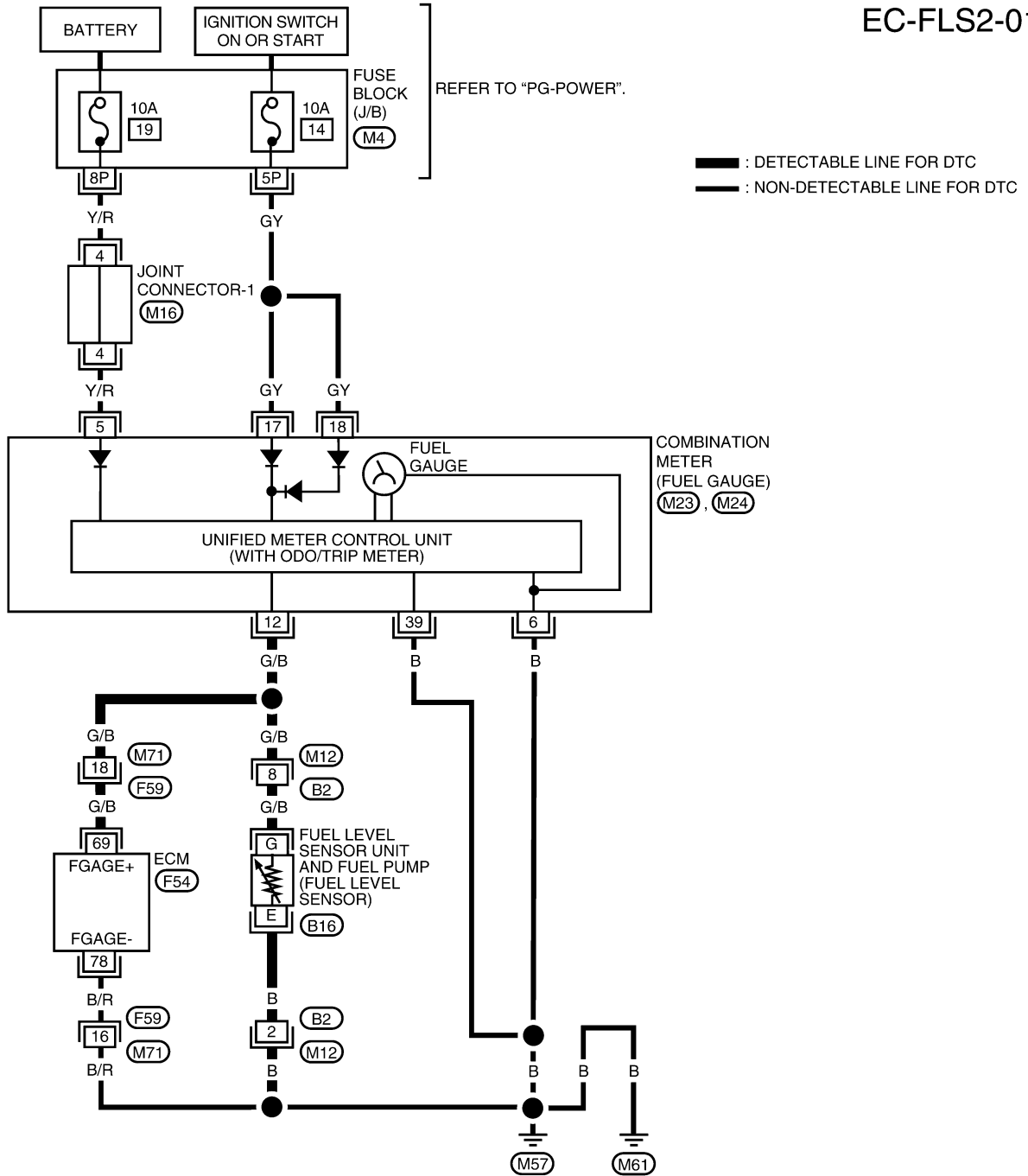
DTC P0462, P0463 FUEL LEVEL SENSOR

[VQ]

UBS003DK

Wiring Diagram

EC-FLS2-01



REFER TO THE FOLLOWING.
 (M4) - JOINT CONNECTOR
 - JUNCTION BOX (J/B)
 (M16) - JOINT CONNECTOR (J/C)

Specification data are reference values and are measured between each terminal and ground.

DTC P0462, P0463 FUEL LEVEL SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

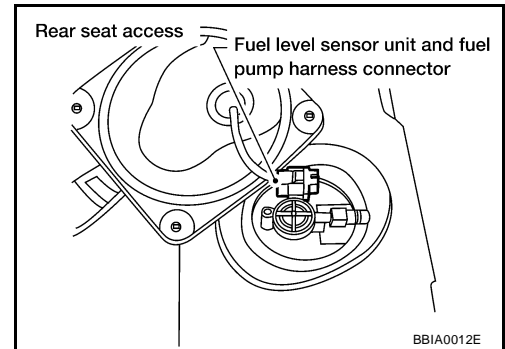
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
69	G/B	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
78	B/R	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V

Diagnostic Procedure

UBS003DL

1. CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

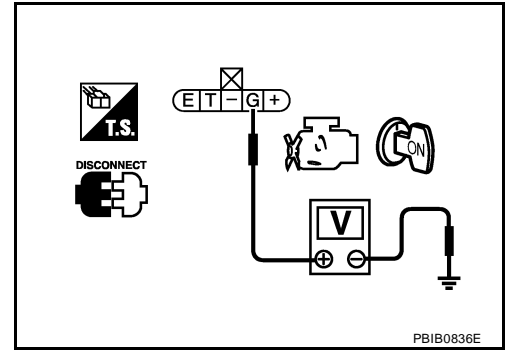


4. Check voltage between fuel level sensor unit and fuel pump terminal G and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness for open or short between combination meter and fuel level sensor until and fuel pump

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal E and body ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness for open or short between ECM and fuel level sensor until and fuel pump

>> Repair open circuit or short to power in harness or connectors.

5. CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 69 and fuel level sensor unit and fuel pump terminal G. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M12, B2
- Harness connectors M71, F59
- Harness for open or short between ECM and fuel level sensor until and fuel pump

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK FUEL LEVEL SENSOR

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

OK or NG

- OK >> GO TO 8.
NG >> Replace fuel level sensor unit.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

DTC P0462, P0463 FUEL LEVEL SENSOR

[VQ]

Removal and Installation FUEL LEVEL SENSOR

UBS003DM

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0500 VSS

PF:32702

Description

UBS003DN

NOTE:

If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-763, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the combination meter. The combination meter then sends a signal to the ECM through CAN communication line.

On Board Diagnosis Logic

UBS003DO

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500 0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	<ul style="list-style-type: none"> ● Harness or connectors (The CAN communication line is open or shorted) ● Harness or connectors (The vehicle speed sensor circuit is open or shorted) ● Vehicle speed sensor ● Combination meter

DTC Confirmation Procedure

UBS003DP

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:

Steps 1 and 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

 WITH CONSULT-II

1. Start engine (TCS switch "OFF").
2. Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
If NG, go to [EC-1020, "Diagnostic Procedure"](#).
If OK, go to following step.
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Warm engine up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,700 rpm (A/T models) More than 1,800 rpm (M/T models)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	More than 5.5 msec
Selector lever	Except "P" or "N" position
PW/ST SIGNAL	OFF

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

6. If 1st trip DTC is detected, go to [EC-1020, "Diagnostic Procedure"](#).

Overall Function Check

UBS003DQ

Use this procedure to check the overall function of the vehicle speed sensor circuit. During this check, a 1st trip DTC might not be confirmed.

 WITH GST

1. Lift up drive wheels.

-
2. Start engine.
 3. Read vehicle speed sensor signal in "MODE 1" with GST.
The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
 4. If NG, go to [EC-1020, "Diagnostic Procedure"](#) .

Diagnostic Procedure

UBS003DR

1. CHECK VEHICLE SPEED SENSOR CIRCUIT

Refer to [DI-19, "Vehicle Speed System"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

2. CHECK COMBINATION METER

Check combination meter function.

Refer to [DI-4, "COMBINATION METERS"](#) .

>> INSPECTION END

DTC P0506 ISC SYSTEM

PF:23781

Description

UBS003DS

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 crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

UBS003DT

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

UBS003DU

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 “Idle Air Volume Learning”, [EC-669](#), before conducting “DTC Confirmation Procedure”. For the target idle speed, refer to the “Service Data and Specifications (SDS)”, [EC-1288](#).

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

 WITH CONSULT-II

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch “OFF” and wait at least 10 seconds.
4. Turn ignition switch “ON” again and select “DATA MONITOR” mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-1022, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

 WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

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 NATS system and registration of all NATS ignition key IDs. Refer to EC-[EC-689](#), "[NVIS \(Nissan Vehicle Immobilizer System — NATS\)](#)".
4. Perform [EC-668](#), "[Accelerator Pedal Released Position Learning](#)".
5. Perform [EC-669](#), "[Throttle Valve Closed Position Learning](#)".
6. Perform [EC-669](#), "[Idle Air Volume Learning](#)".

>> **INSPECTION END**

DTC P0507 ISC SYSTEM

PFP:23781

Description

UBS003DW

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 crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

UBS003DX

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

UBS003DY

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 “Idle Air Volume Learning”, [EC-669](#), before conducting “DTC Confirmation Procedure”. For the target idle speed, refer to the “Service Data and Specifications (SDS)”, [EC-1288](#).

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

 WITH CONSULT-II

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch “OFF” and wait at least 10 seconds.
4. Turn ignition switch “ON” again and select “DATA MONITOR” mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-1024, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

 WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

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.
3. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EC-[EC-689](#), "[NVIS \(Nissan Vehicle Immobilizer System — NATS\)](#)".
4. Perform [EC-668](#), "[Accelerator Pedal Released Position Learning](#)".
5. Perform [EC-669](#), "[Throttle Valve Closed Position Learning](#)".
6. Perform [EC-669](#), "[Idle Air Volume Learning](#)".

>> **INSPECTION END**

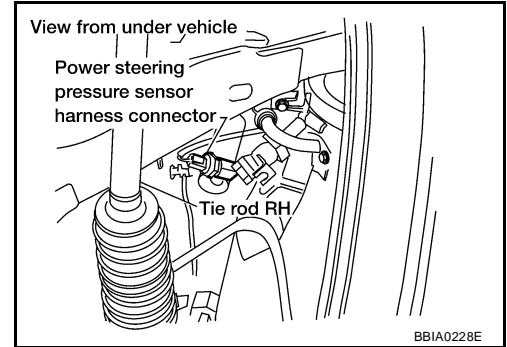
DTC P0550 PSP SENSOR

PFP:49763

Component Description

UBS003E0

Power steering pressure (PSP) sensor is installed to the power steering high-pressure tube and detects a power steering load. This sensor is a potentiometer which transforms the power steering load into output voltage, and emits the voltage signal to the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.



CONSULT-II Reference Value in Data Monitor Mode

UBS003E1

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	<ul style="list-style-type: none"> Engine: After warming up, idle the engine 	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON

On Board Diagnosis Logic

UBS003E2

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0550 0550	Power steering pressure sensor circuit	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted) Power steering pressure sensor

DTC Confirmation Procedure

UBS003E3

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1027, "Diagnostic Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P0550 PSP SENSOR

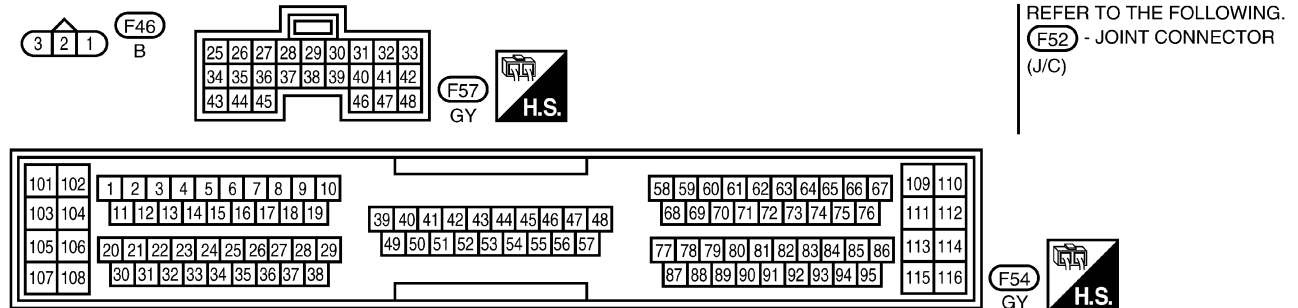
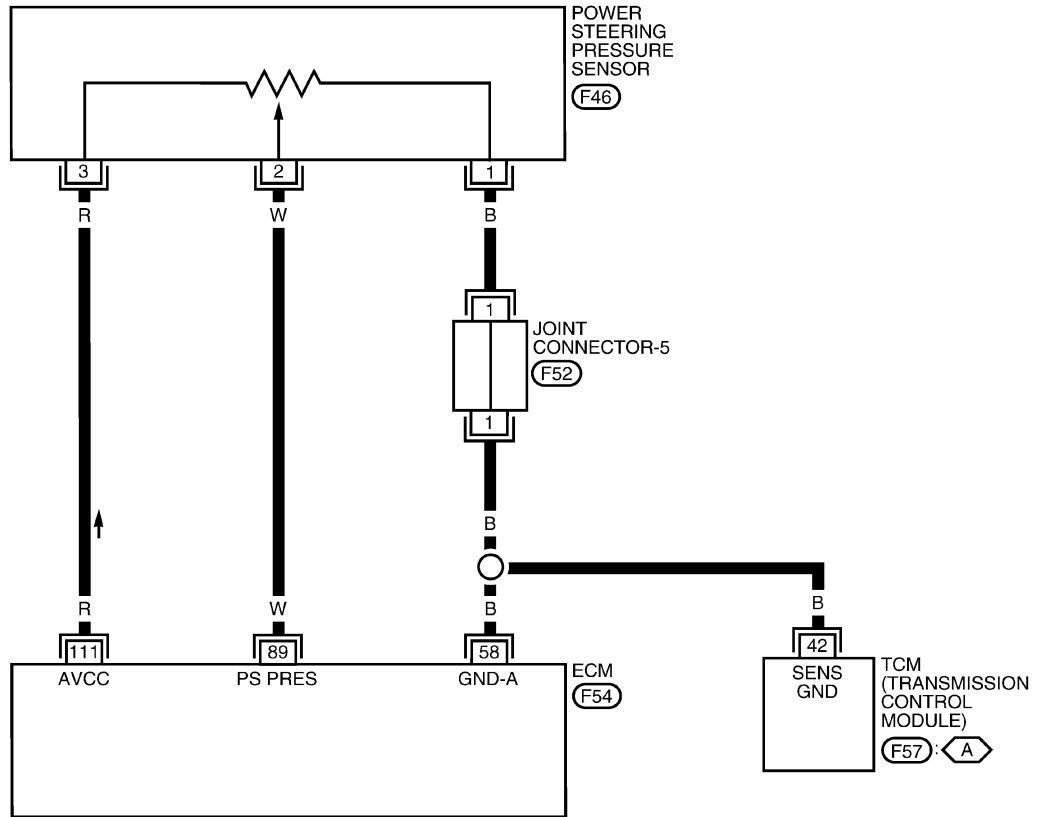
[VQ]

Wiring Diagram

UBS003E4

EC-PS/SEN-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- A** : WITH A/T



BBWA0562E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
89	W	Power steering pressure sensor	[Engine is running] ● Steering wheel is being turned.	0.5 - 4.0V
			[Engine is running] ● Steering wheel is not being turned.	0.4 - 0.8V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

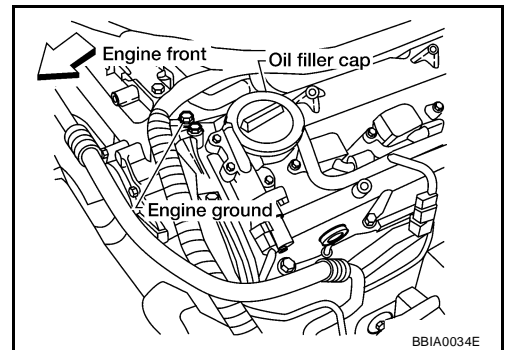
Diagnostic Procedure

UBS003E5

1. RETIGHTEN GROUND SCREWS

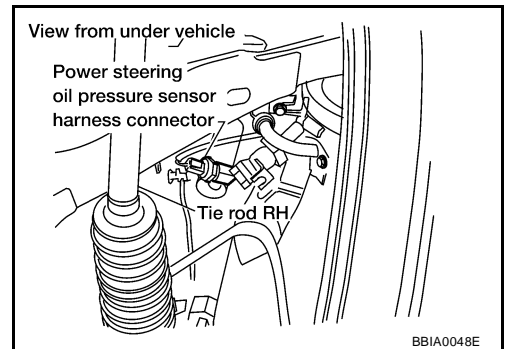
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK PSP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect PSP sensor harness connector.
2. Turn ignition switch "ON".

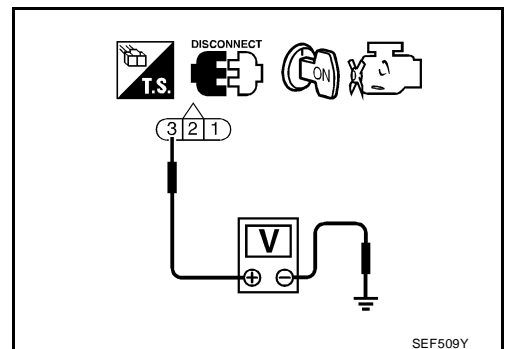


3. Check voltage between PSP sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 3.
- NG >> Repair harness or connectors.



3. CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between PSP sensor terminal 1 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- | | |
|----|-------------|
| OK | >> GO TO 5. |
| NG | >> GO TO 4. |

4. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-5
- Harness for open or short between power steering pressure sensor and ECM
- Harness for open or short between power steering pressure sensor and TCM

>> Repair open circuit or short to power in harness or connectors.

5. CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 89 and PSP sensor terminal 2.

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 PSP SENSOR

Refer to [EC-1028, "Component Inspection"](#) .

OK or NG

- | | |
|----|------------------------|
| OK | >> GO TO 7. |
| NG | >> Replace PSP sensor. |

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

Component Inspection POWER STEERING PRESSURE SENSOR

UBS003E6

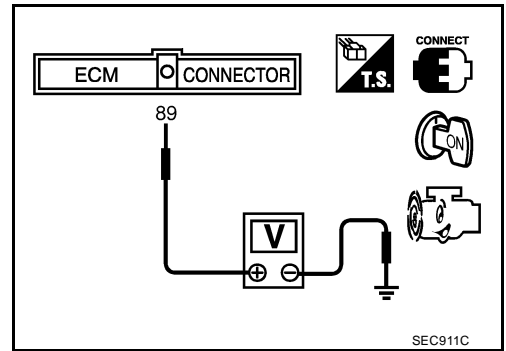
1. Reconnect all harness connectors disconnected.
2. Start engine and let it idle.

DTC P0550 PSP SENSOR

[VQ]

3. Check voltage between ECM terminal 89 and ground under the following conditions.

Condition	Voltage
Steering wheel is being turned fully.	Approximately 3.6V
Steering wheel is not being turned.	Approximately 0.6V



A

EC

C

D

E

F

G

H

I

J

K

L

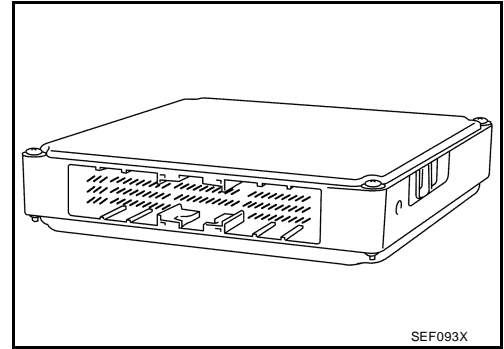
M

DTC P0605 ECM

Component Description

UBS003E7

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



SEF093X

On Board Diagnosis Logic

UBS003E8

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 in fail-safe mode when the 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

UBS003E9

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B". If there is no problem on "PROCEDURE FOR MALFUNCTION B", perform "PROCEDURE FOR MALFUNCTION C".

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-1031, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR MALFUNCTION B

With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. If 1st trip DTC is detected, go to [EC-1031, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. Repeat step 3 procedure, 32 times.
5. If 1st trip DTC is detected, go to [EC-1031, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

UBS003EA

1. INSPECTION START

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**. See [EC-1030](#).
5. Is the 1st trip DTC P0605 displayed again?

With GST

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**. See [EC-1030](#).
5. 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 NATS system and registration of all NATS ignition key IDs. Refer to EC-[EC-689](#), "[NVIS \(Nissan Vehicle Immobilizer System — NATS\)](#)".
3. Perform [EC-668](#), "[Accelerator Pedal Released Position Learning](#)".
4. Perform [EC-669](#), "[Throttle Valve Closed Position Learning](#)".
5. Perform [EC-669](#), "[Idle Air Volume Learning](#)".

>> INSPECTION END

DTC P0650 MIL

PF:24810

Component Description

UBS003EB

Malfunction Indicator Lamp (MIL) is located on the instrument panel. When the ignition switch is turned ON without engine running, MIL will light up. This is a bulb check. When the engine is started, MIL should go off. If MIL remains on, the on board diagnostic system has detected an engine system malfunction.

On Board Diagnosis Logic

UBS003EC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0650 0650	Malfunction indicator lamp (MIL) control circuit	<ul style="list-style-type: none"> An excessively high voltage is sent to ECM through the MIL circuit under the condition that calls for MIL light up. An excessively low voltage is sent to ECM through the MIL circuit under the condition that calls for MIL not to light up. 	<ul style="list-style-type: none"> Harness or connectors (MIL circuit is open or shorted.) MIL

FAIL-SAFE MODE

ECM enters in fail-safe mode when both DTC P0650 and another DTC, which calls for MIL to light up, are detected at the same time.

Detected items	Engine operating condition in fail-safe mode
MIL circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut

DTC Confirmation Procedure

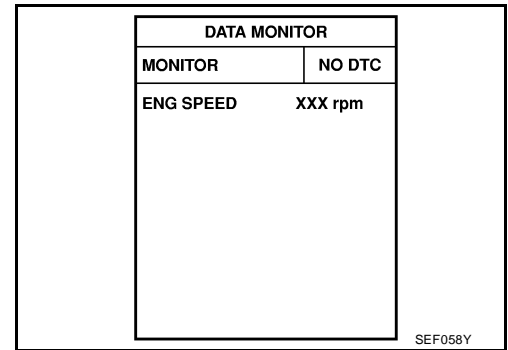
UBS003ED

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

- Turn ignition switch "ON" and wait at least 1 second.
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine and let it idle for 1 second.
- If 1st trip DTC is detected, go to [EC-1035, "Diagnostic Procedure"](#).



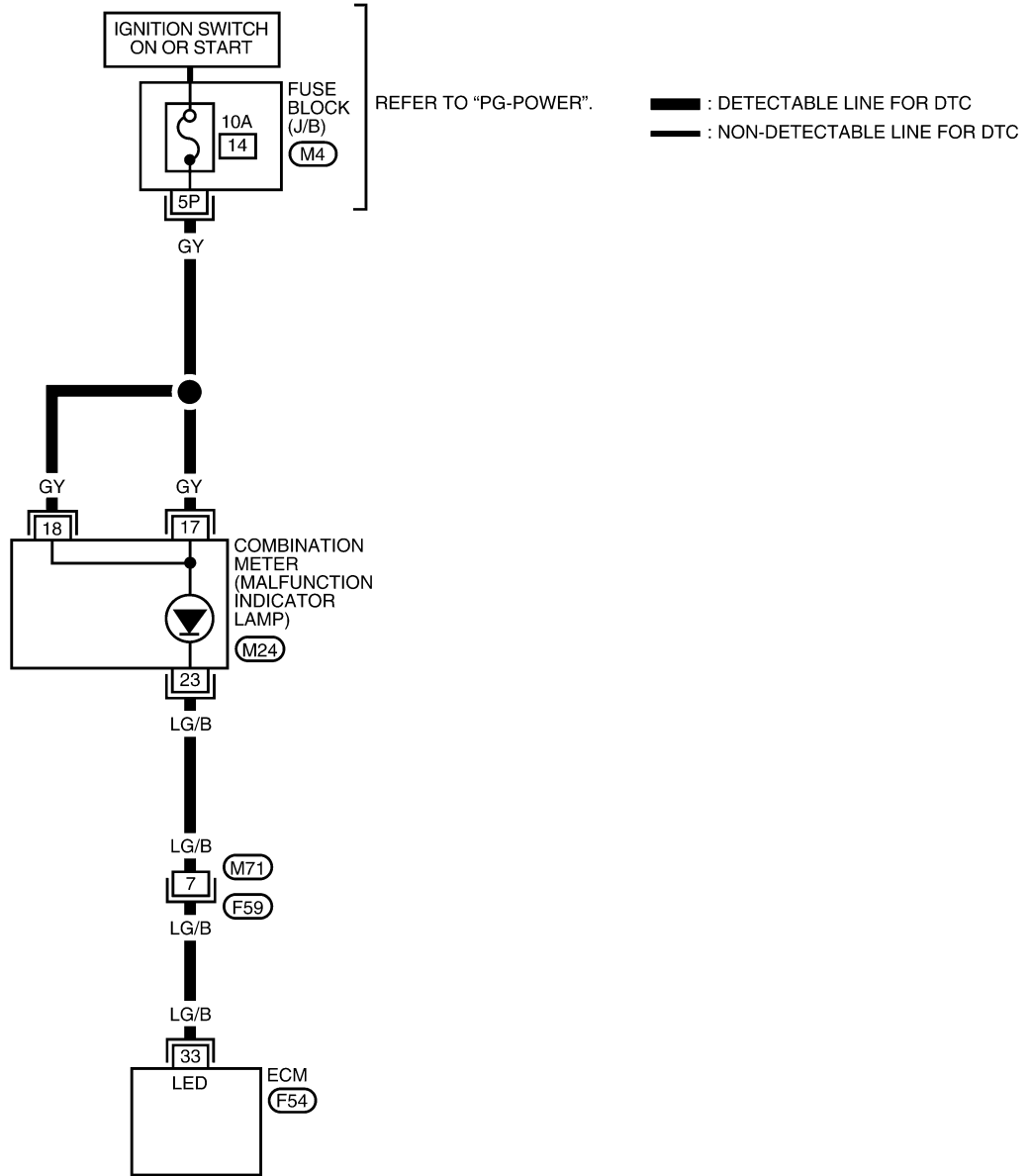
WITH GST

Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

UBS003EE

EC-MIL-01



11	10	9	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	9	10	11				
24	23	22	21	20	19	18	17	16	15	14	13	12	12	13	14	15	16	17	18	19	20	21	22	23	24

M24 BR

F59 W

REFER TO THE FOLLOWING.
 M4 - FUSE BLOCK
 - JUNCTION BOX (J/B)

101	102	1	2	3	4	5	6	7	8	9	10	58	59	60	61	62	63	64	65	66	67	109	110									
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38											87	88	89	90	91	92	93	94	95	115	116	

F54 GY

H.S.

BBWA0075E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
33	LG/B	MIL	[Ignition switch "ON"]	0 - 1.0V
			[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS003EF

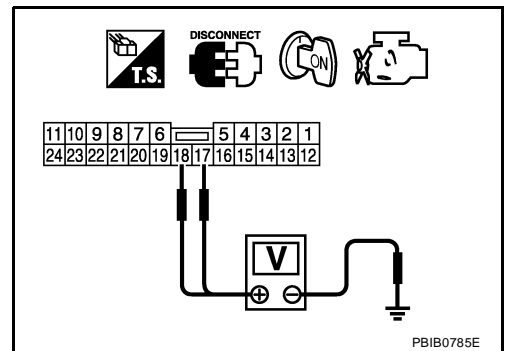
1. CHECK MIL POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect combination meter harness connector.
3. Turn ignition switch "ON".
4. Check voltage between combination meter terminals 17, 18 and ground with CONSULT-II or tester

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M4
- 10A fuse
- Harness for open or short between fuse block (J/B) and combination meter

>> Repair harness or connectors.

3. CHECK MIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 33 and combination meter terminal 23. 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.

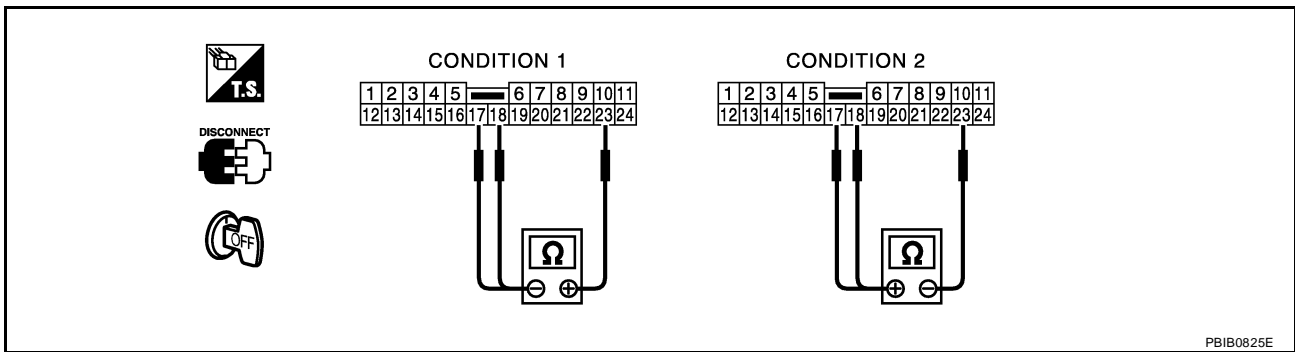
- Harness connectors F59, M71
- Harness for open or short between ECM and combination meter

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK COMBINATION METER

1. Turn ignition switch "OFF".
2. Disconnect combination meter harness connector.
3. Check continuity under the following conditions.

CONDITION	Combination meter terminal No. (Polarity)	Continuity
1	23 (+) - 17 (-)	Should exist.
	23 (+) - 18 (-)	
2	17 (+) - 23 (-)	Should not exist.
	18 (+) - 23 (-)	



PBIB0825E

OK or NG

OK >> GO TO 6.

NG >> Replace combination meter. Refer to [DI-21, "Removal and Installation"](#) .

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

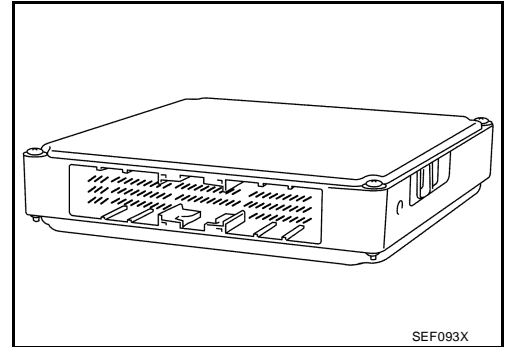
DTC P1065 ECM POWER SUPPLY

PF0:23710

Component Description

UBS003EG

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

UBS003EH

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065 1065	ECM power supply circuit	ECM back up RAM system does not function properly.	<ul style="list-style-type: none"> ● Harness or connectors [ECM power supply (back-up) circuit is open or shorted.] ● ECM

DTC Confirmation Procedure

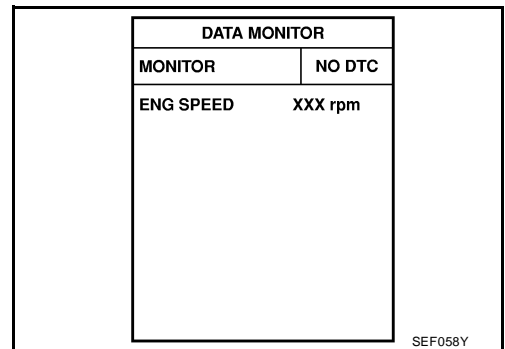
UBS003EI

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch “ON” and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
5. Repeat steps 3 and 4 four times.
6. If 1st trip DTC is detected, go to [EC-1039, "Diagnostic Procedure"](#) .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

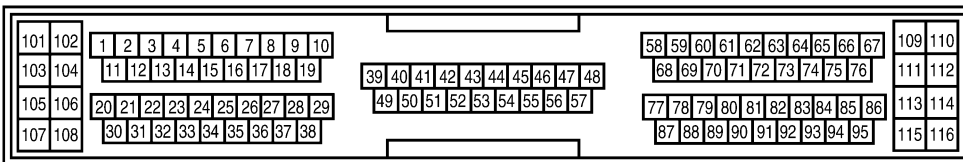
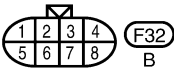
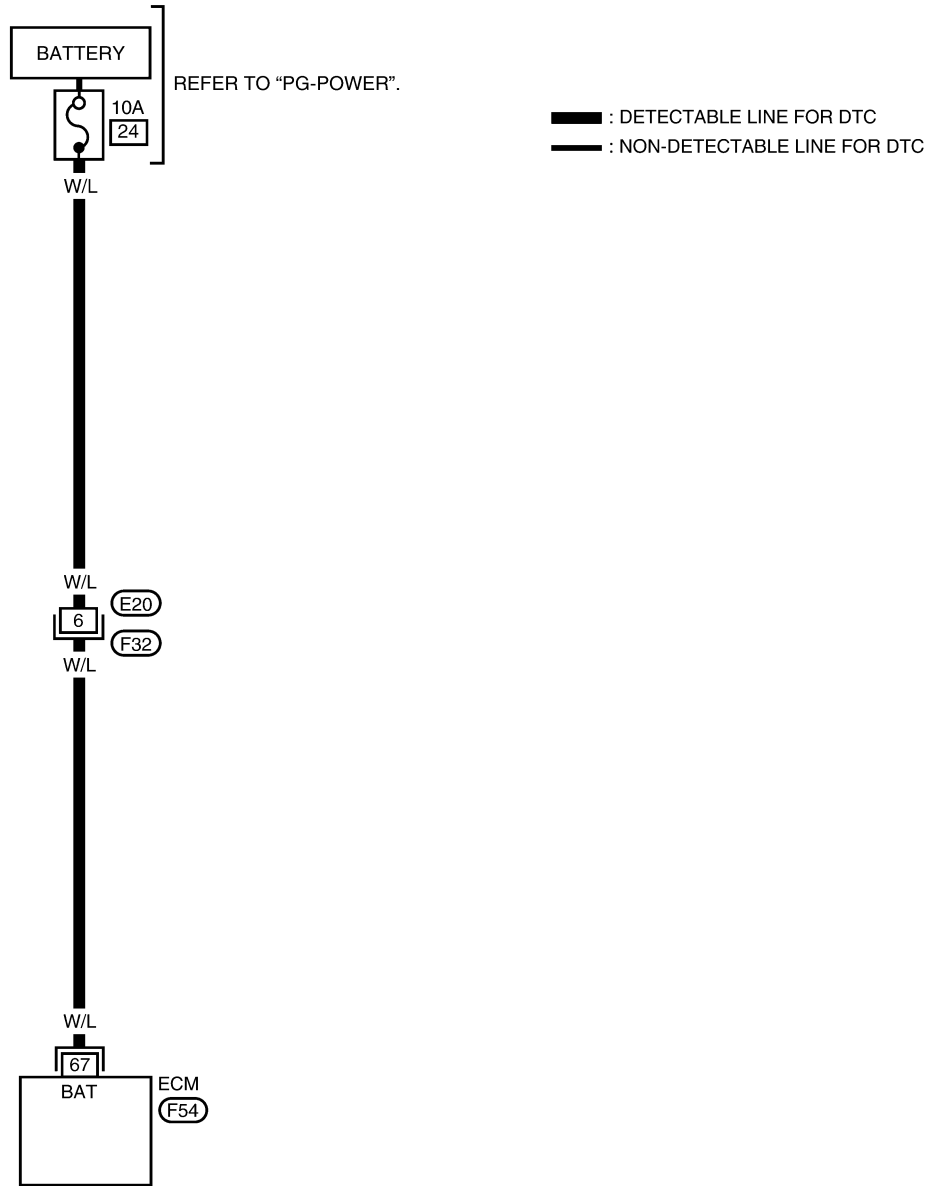
DTC P1065 ECM POWER SUPPLY

[VQ]

Wiring Diagram

UBS003EJ

EC-ECM/PW-01



BBWA0076E

Diagnostic Procedure

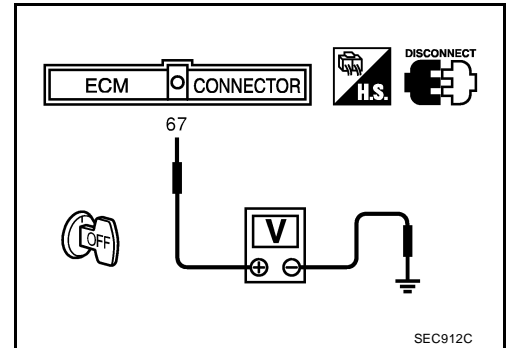
1. CHECK ECM POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check voltage between ECM terminal 67 and ground with CONSULT-II 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 E20, F32
- 10A fuse
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**.
See [EC-1037](#) .
5. Is the 1st trip DTC P1065 displayed again?

With GST

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**.
See [EC-1037](#) .
5. Is the 1st trip DTC P1065 displayed again?

Yes or No

- Yes >> GO TO 5.
- No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EC- [EC-689, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .
3. Perform [EC-668, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-669, "Idle Air Volume Learning"](#) .

>> INSPECTION END

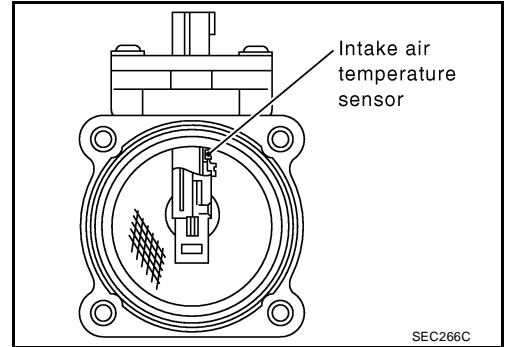
DTC P1102 MAF SENSOR

PFP:22680

Component Description

UBS003EL

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

UBS003EM

Specification data are reference values.

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.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load 	Idle	Approx. 1.0 - 1.5V
		2,500 rpm	Approx. 1.7 - 2.4V
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N ● 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: N ● Air conditioner switch: OFF ● No-load 	Idle	2.0 - 6.0 g-m/s
		2,500 rpm	7.0 - 20.0 g-m/s

On Board Diagnosis Logic

UBS003EN

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1102 1102	Mass air flow sensor circuit range/performance problem	A voltage from the sensor is constantly approx.1.0V when engine is running.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters in 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

UBS003EO

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P1102 MAF SENSOR

[VQ]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait 5 seconds at most.
4. If DTC is detected, go to [EC-1044, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



WITH GST

Follow the procedure "WITH CONSULT-II" above.

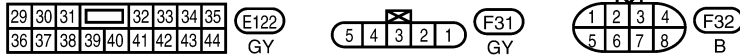
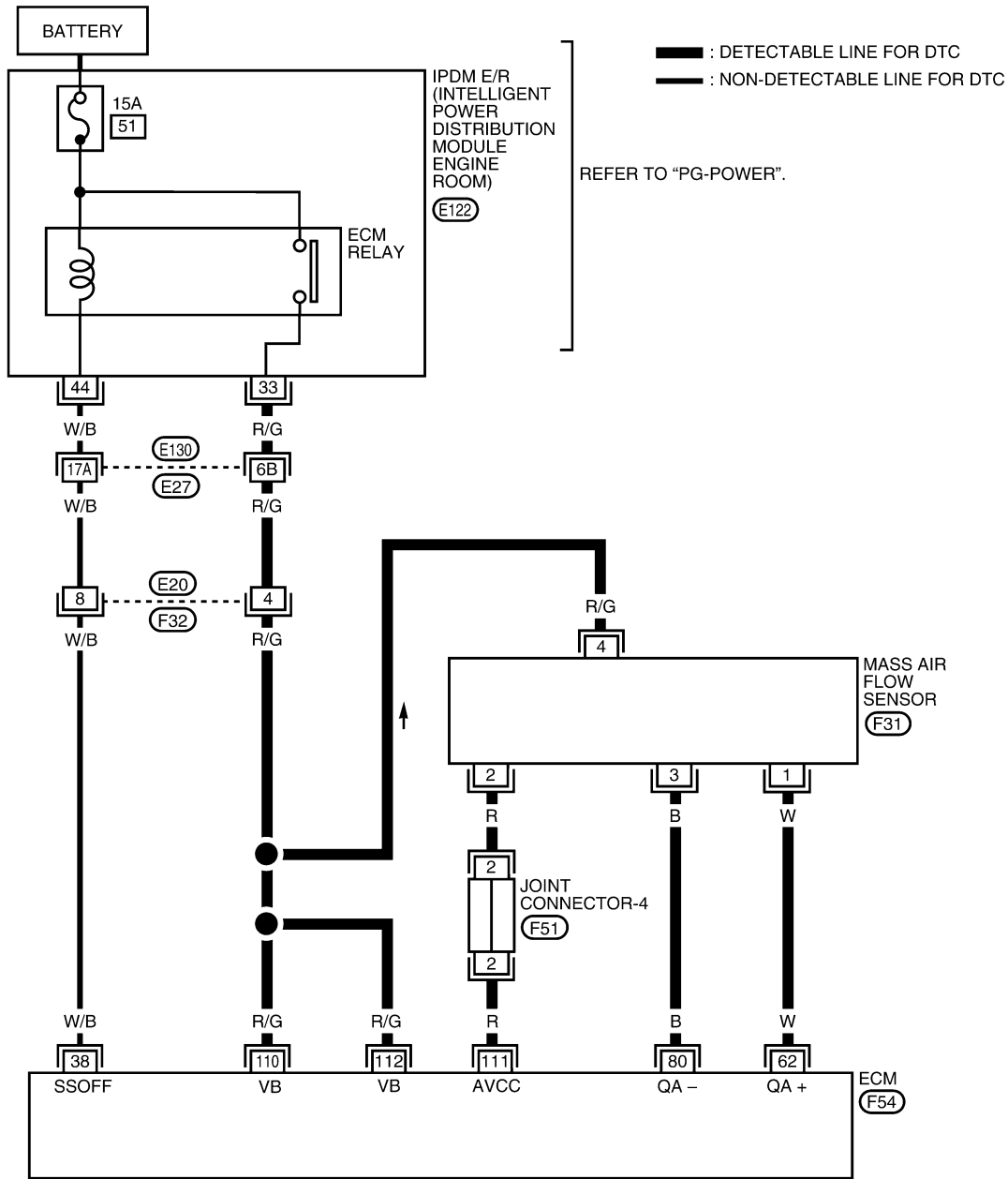
DTC P1102 MAF SENSOR

[VQ]

UBS003EP

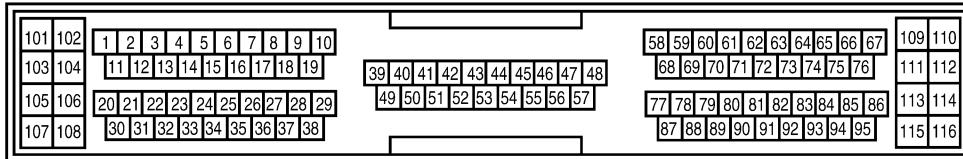
Wiring Diagram

EC-MAFS-01



REFER TO THE FOLLOWING.

- (E130) - SUPER MULTIPLE JUNCTION (SMJ)
- (F51) - JOINT CONNECTOR (J/C)



BBWA0050E

Specification data are reference values and are measured between each terminal and ground.

DTC P1102 MAF SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
38	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For a few seconds after turning ignition switch "OFF"	0 - 1.5V
			[Ignition switch "OFF"] ● a few seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
62	W	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.7 - 2.4V
80	B	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
111	R	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
110 112	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

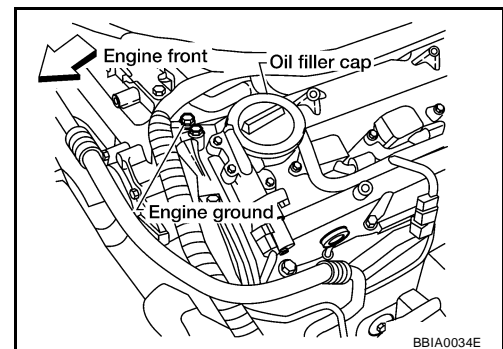
Diagnostic Procedure

UBS003EQ

1. RETIGHTEN GROUND SCREWS

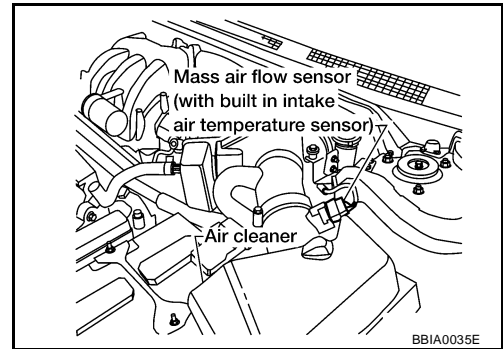
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

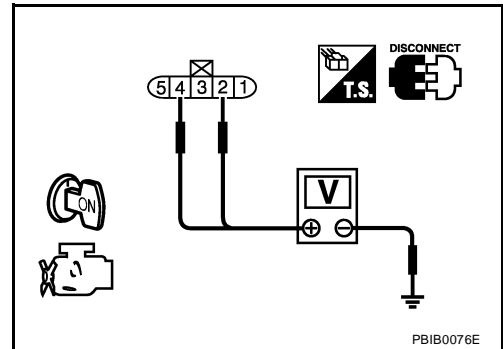


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector E130, E27
- Harness connectors E20, F32
- Joint connector-4
- 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 harness or connectors.

4. 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 80. 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 MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 62.
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 MASS AIR FLOW SENSOR

Refer to [EC-1046, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace mass air flow sensor.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection MASS AIR FLOW SENSOR

UBS003ER

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0

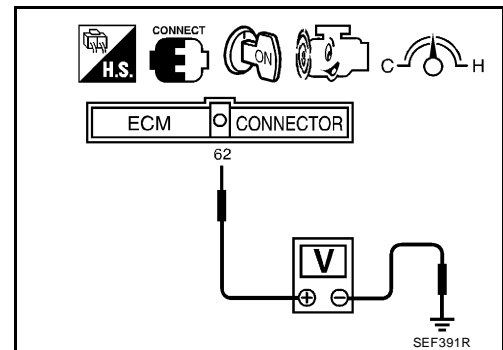
*: Check for liner voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
 - Turn ignition switch "OFF".
 - Disconnect mass air flow sensor harness connector and reconnect it again.
 - Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.

Removal and Installation MASS AIR FLOW SENSOR

UBS003ES

Refer to [EM-110, "AIR CLEANER AND AIR DUCT"](#) .



DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PFP:16119

Component Description

UBS003ET

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

UBS003EU

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121 1121	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 detect the throttle valve is stuck open. This self-diagnosis has the one trip detection logic.	

FAIL-SAFE MODE

When the malfunction A or B is detected, ECM enters in fail-safe mode.
When the malfunction C is detected, ECM enters in fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	The 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, and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

UBS003EV

NOTE:

- Perform "PROCEDURE FOR MALFUNCTION A AND B" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION C".
If there is no problem on "PROCEDURE FOR MALFUNCTION A AND B", 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

With CONSULT-II

1. Turn ignition witch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
5. If 1st trip DTC is detected, go to [EC-1048, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

 **With GST**

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR MALFUNCTION C

 **With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Shift selector lever to "N" or "P" position.
5. Start engine and let it idle for 3 seconds.
6. If DTC is detected, go to [EC-1048, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

 **With GST**

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

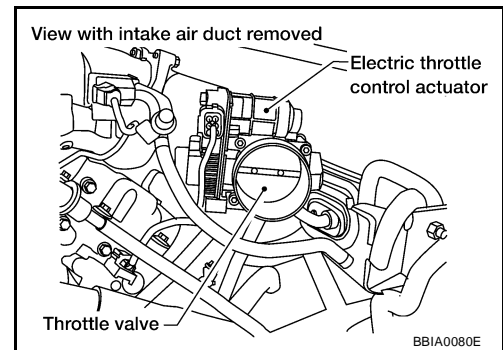
UBS003EW

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 and the housing.

OK or NG

- OK >> GO TO 2.
 NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-669, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

PFP:16119

Description

UBS003EX

NOTE:

If DTC P1122 is displayed with DTC P1121 or 1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to [EC-1047](#) or [EC-1056](#).

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

UBS003EY

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122 1122	Electric throttle control performance problem	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, ECM enters in 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

UBS003EZ

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-1051, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

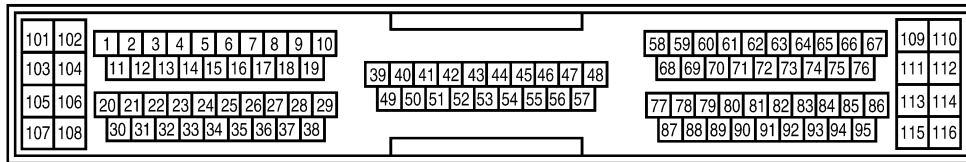
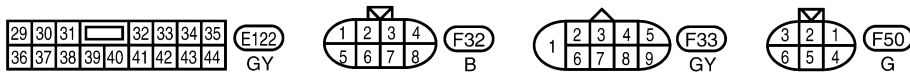
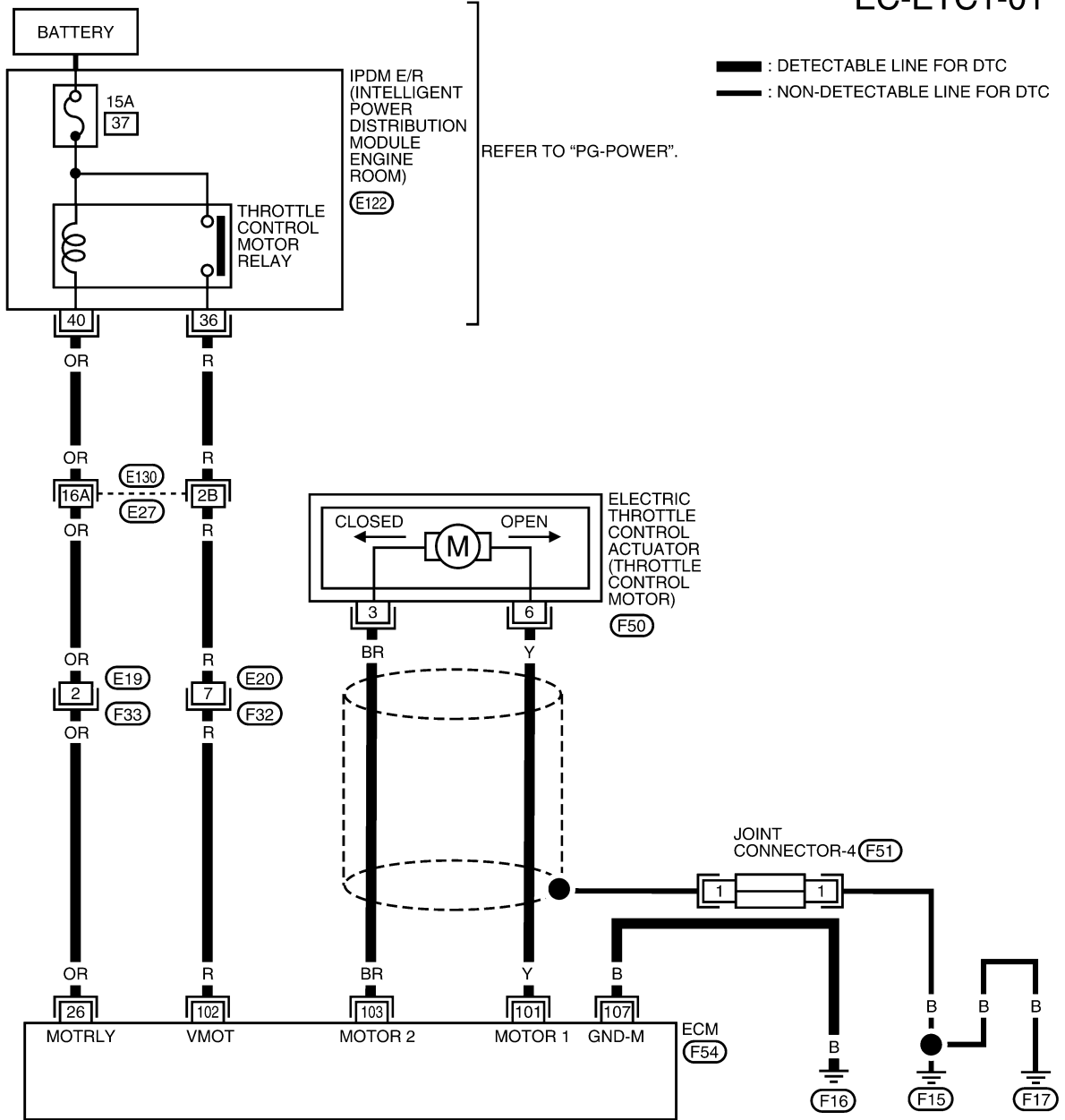
DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[VQ]

UBS003F0

Wiring Diagram

EC-ETC1-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F51) - JOINT CONNECTOR (J/C)



BBWA0095E

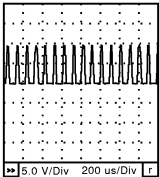
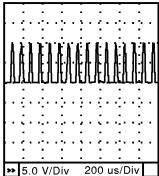
Specification data are reference values and are measured between each terminal and ground.

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
26	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
101	Y	Throttle control motor (Open)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is depressing 	<p>0 - 14V★</p>  <p>SEC037D</p>
102	R	Throttle control motor relay power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
103	BR	Throttle control motor (Close)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is releasing 	<p>0 - 14V★</p>  <p>SEC038D</p>
107	B	Throttle control motor ground	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Idle speed 	Approximately 0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

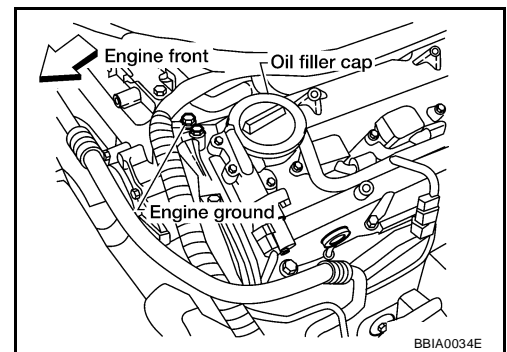
Diagnostic Procedure

UBS003F1

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK THROTTLE CONTROL MOTOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 107 and engine ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 3.
 NG >> Repair open circuit or short to power in harness or connectors.

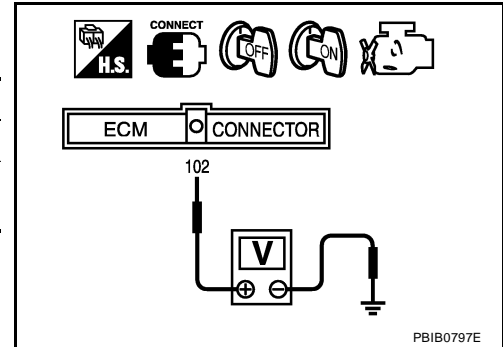
3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Reconnect harness connectors disconnected.
2. Check voltage between ECM terminal 102 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)

OK or NG

- OK >> GO TO 11.
 NG >> GO TO 4.



4. 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 E122.
4. Check continuity between ECM terminal 102 and IPDM E/R terminal 36.
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 6.
 NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- 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.

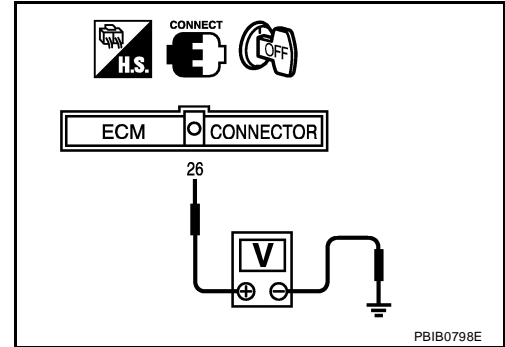
6. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "OFF".
3. Check voltage between ECM terminal 26 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 10.
 NG >> GO TO 7.



7. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E122.
3. Check continuity between ECM terminal 26 and IPDM E/R 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 9.
 NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E19, F33
- 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.

9. CHECK FUSE

1. Disconnect 15A fuse.
2. Check 15A fuse for blown.

OK or NG

- OK >> GO TO 10.
 NG >> Replace 15A fuse.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

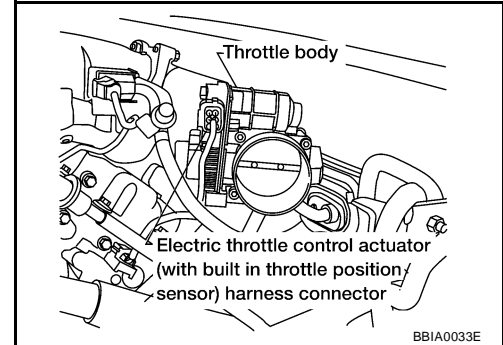
OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .
 NG >> Repair or replace harness or connectors.

11. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	101	Should not exist
	103	Should exist
6	101	Should exist
	103	Should not exist



5. Also check harness for short to ground and short to power.

OK or NG

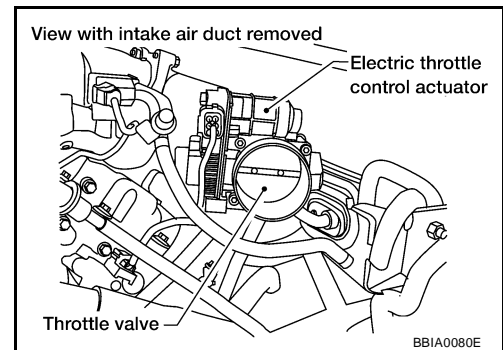
- OK >> GO TO 12.
- NG >> Repair or replace.

12. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve and the housing.

OK or NG

- OK >> GO TO 13.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



13. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-1055, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 14.
- NG >> GO TO 15.

14. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 15.
- NG >> Repair or replace harness or connectors.

15. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-669, "Idle Air Volume Learning"](#) .

>> INSPECTION END

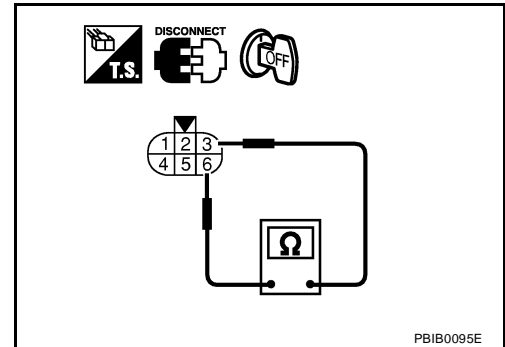
Component Inspection

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 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.
4. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-669, "Idle Air Volume Learning"](#) .



Remove and Installation

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[VQ]

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PF1:16119

Component Description

UBS003F4

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-II Reference Value in Data Monitor Mode

UBS003F5

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

On Board Diagnosis Logic

UBS003F6

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124 1124	Throttle control motor relay circuit short	ECM detect 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
P1126 1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low. This self-diagnosis has the one trip detection logic.	<ul style="list-style-type: none"> ● Harness or connectors (Throttle control motor relay circuit is open) ● Throttle control motor relay

FAIL-SAFE MODE

When the malfunction is detected, ECM enters in fail-safe mode (for DTC P1124).

When the malfunction is detected, ECM enters in fail-safe mode and the MIL lights up (for DTC P1126).

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

UBS003F7

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 P1124

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

④ With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-1059, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[VQ]

With GST

Follow the procedure "With CONSULT-II" above.

PROCEDURE FOR DTC P1126

With CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-1059, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With GST

Follow the procedure "With CONSULT-II" above.

A

EC

C

D

E

F

G

H

I

J

K

L

M

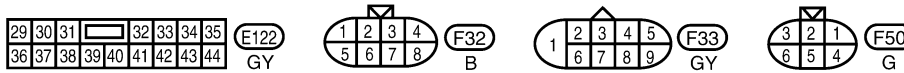
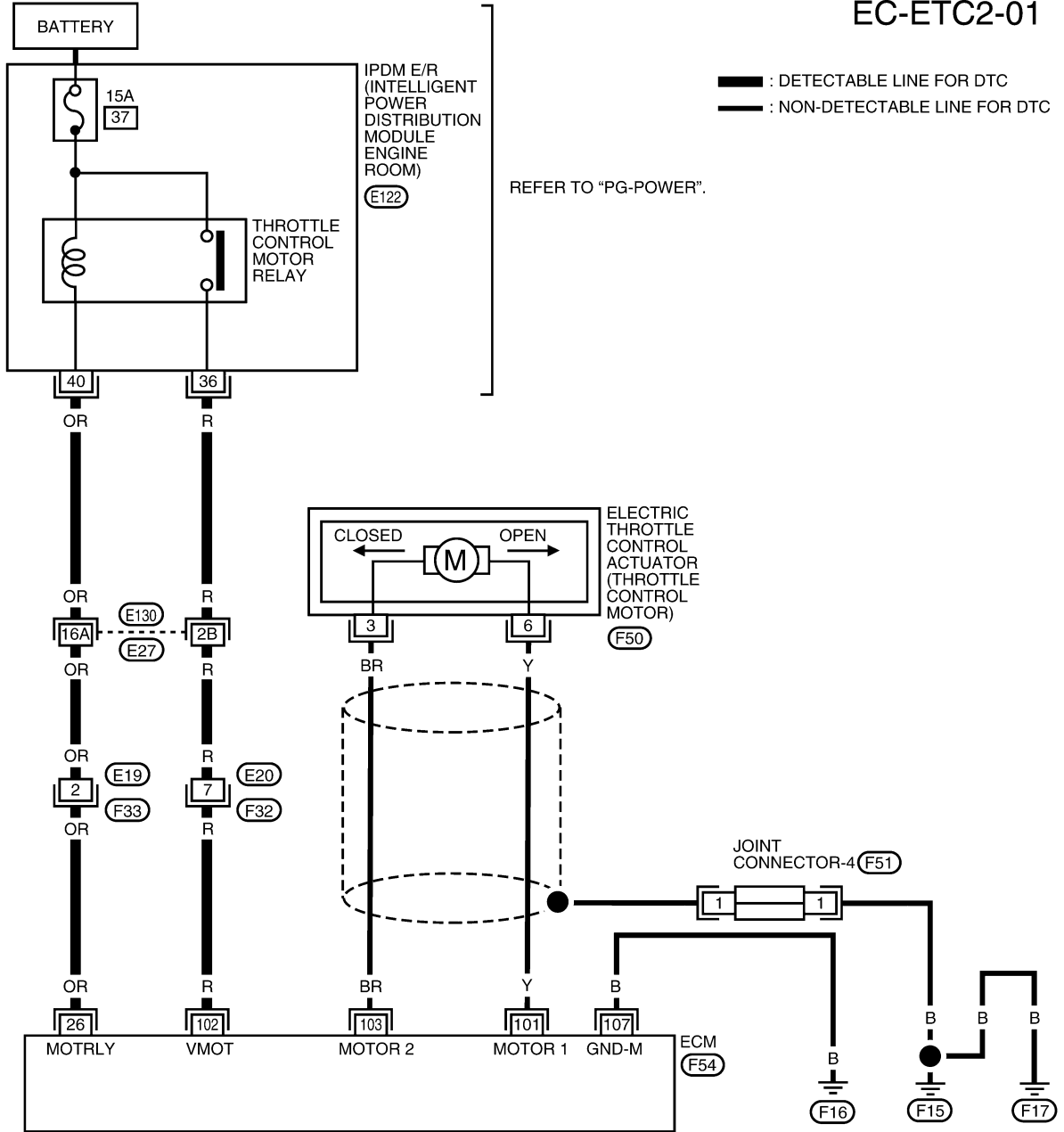
DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[VQ]

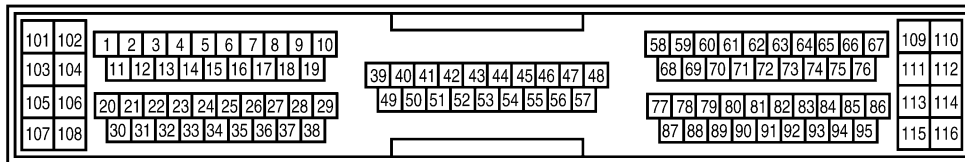
UBS003F8

Wiring Diagram

EC-ETC2-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F51) - JOINT CONNECTOR (J/C)



BBWA0096E

Specification data are reference values and are measured between each terminal and ground.

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
26	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
102	R	Throttle control motor relay power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS003F9

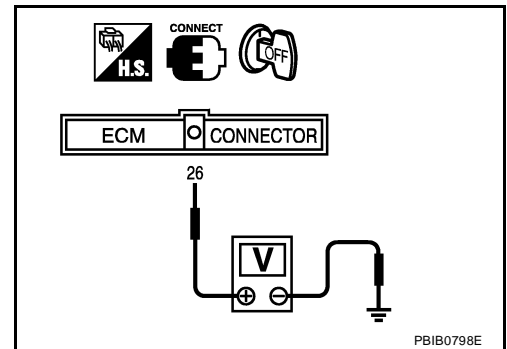
1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

- Turn ignition switch "OFF".
- Check voltage between ECM terminal 26 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 2.



PBIB0798E

2. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

- Disconnect ECM harness connector.
- Disconnect IPDM E/R harness connector E122.
- Check continuity between ECM terminal 26 and IPDM E/R terminal 40. 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.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E19, F33
- 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 15A fuse.
2. Check 15A fuse for blown.

OK or NG

- OK >> GO TO 8.
 NG >> Replace 15A fuse.

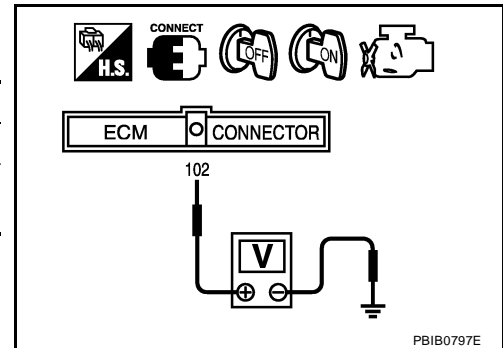
5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Check voltage between ECM terminal 102 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)

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 E122.
4. Check continuity between ECM terminal 102 and IPDM E/R terminal 36. 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 E130, E27
- Harness connectors E20, F32
- 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-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .
 NG >> Repair or replace harness or connectors.

DTC P1128 THROTTLE CONTROL MOTOR

[VQ]

DTC P1128 THROTTLE CONTROL MOTOR

PF16119

Component Description

UBS003FA

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

UBS003FB

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128 1128	Throttle control motor circuit short	ECM detects short 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)

DTC Confirmation Procedure

UBS003FC

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-1063, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

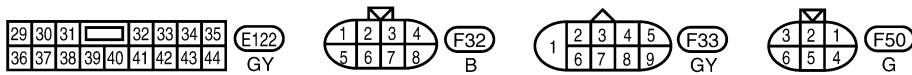
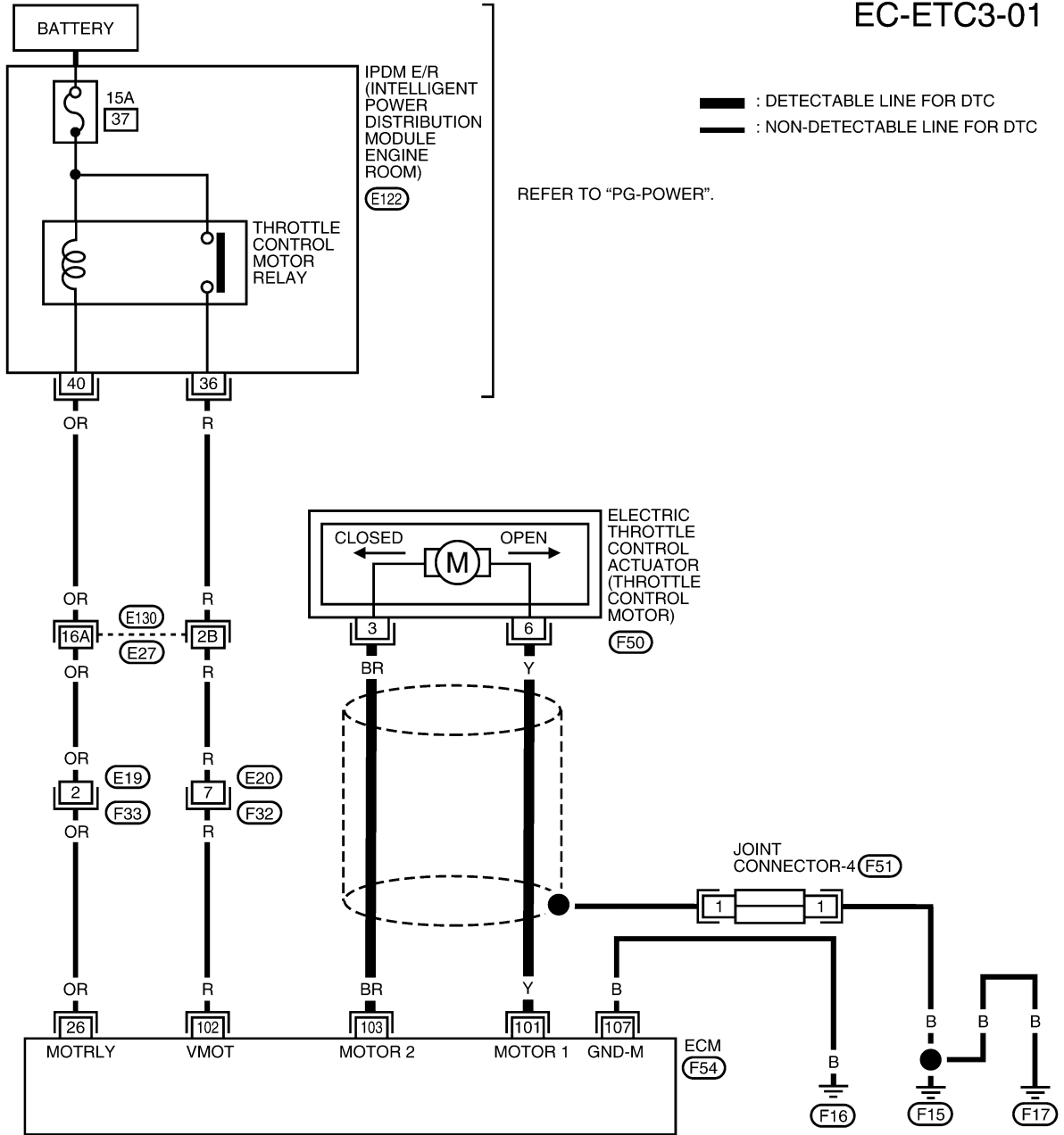
DTC P1128 THROTTLE CONTROL MOTOR

[VQ]

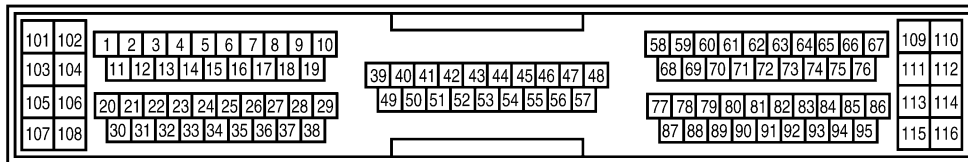
UBS003FD

Wiring Diagram

EC-ETC3-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)
 (F51) - JOINT CONNECTOR (J/C)



BBWA0097E

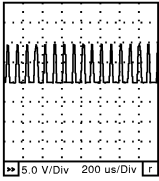
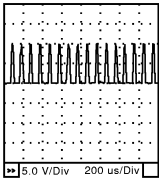
Specification data are reference values and are measured between each terminal and ground.

DTC P1128 THROTTLE CONTROL MOTOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	Y	Throttle control motor (Open)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is depressing 	<p>0 - 14V★</p>  <p>SEC037D</p>
103	BR	Throttle control motor (Close)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is releasing 	<p>0 - 14V★</p>  <p>SEC038D</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

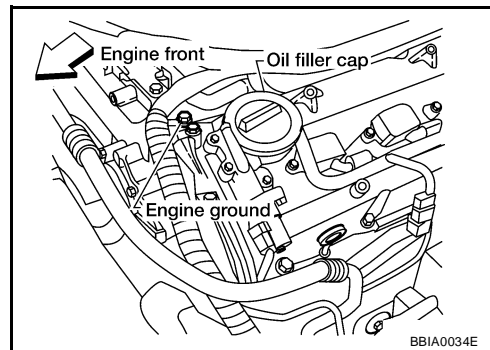
Diagnostic Procedure

UBS003FE

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

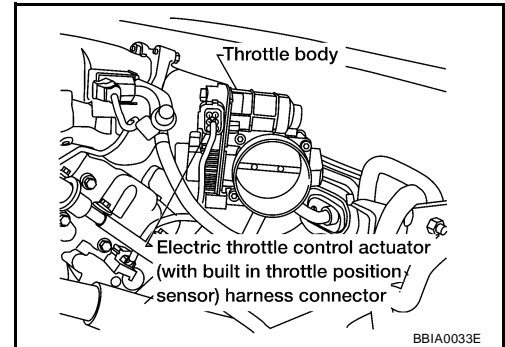
>> GO TO 2.



2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	101	Should not exist
	103	Should exist
6	101	Should exist
	103	Should not exist



5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

3. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-1064, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 5.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.

5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-669, "Idle Air Volume Learning"](#) .

>> INSPECTION END

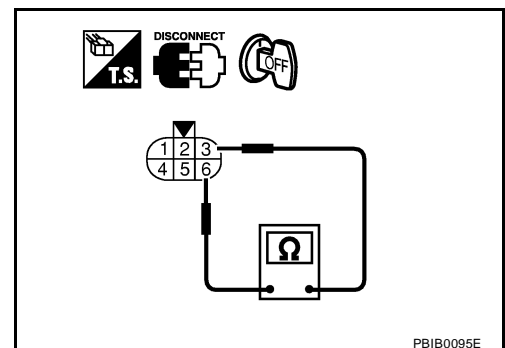
Component Inspection THROTTLE CONTROL MOTOR

UBS003FF

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 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.
4. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-669, "Idle Air Volume Learning"](#) .



Removal and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

UBS003FG

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

A

EC

C

D

E

F

G

H

I

J

K

L

M

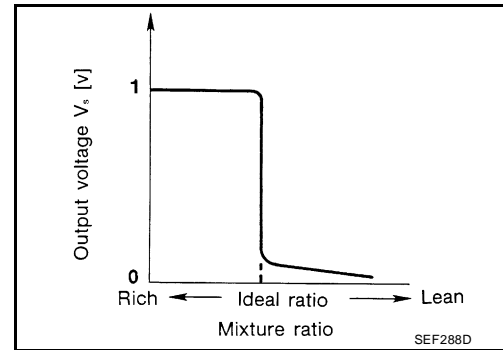
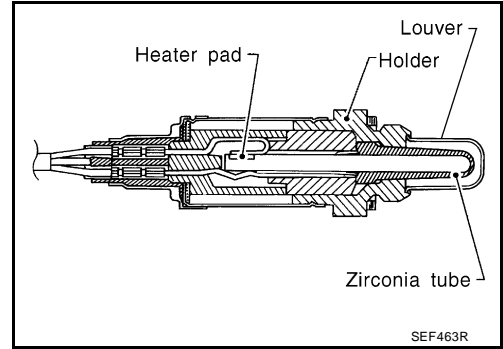
DTC P1143, P1163 HO2S1

PF2:22690

Component Description

UBS003FH

The heated oxygen sensor 1 is placed into the front tube. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



CONSULT-II Reference Value in Data Monitor Mode

UBS003FI

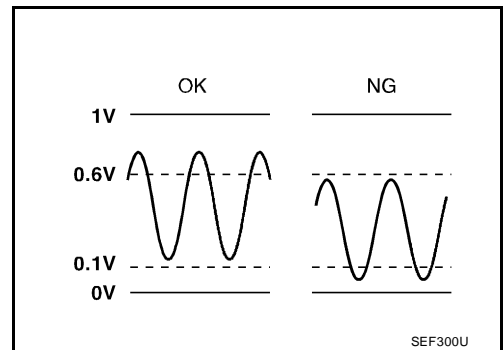
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS003FJ

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high and whether the “lean” output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1143 1143 (Bank 1)	Heated oxygen sensor 1 lean shift monitoring	The maximum and minimum voltage from the sensor are not reached to the specified voltages.	<ul style="list-style-type: none"> ● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Injectors ● Intake air leaks
P1163 1163 (Bank 2)			

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform at a temperature above –10°C (14°F).
- Before performing following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P1143” of “HO2S1” or “HO2S1 (B2) P1163” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

HO2S1 (B1) P1143	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0546E

6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

ENG SPEED	1,200 - 2,600 rpm
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	2.5 - 12.0 msec
Selector lever	Suitable position

HO2S1 (B1) P1143	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0547E

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-1068, "Diagnostic Procedure"](#).

HO2S1 (B1) P1143	
COMPLETED	

SEC769C

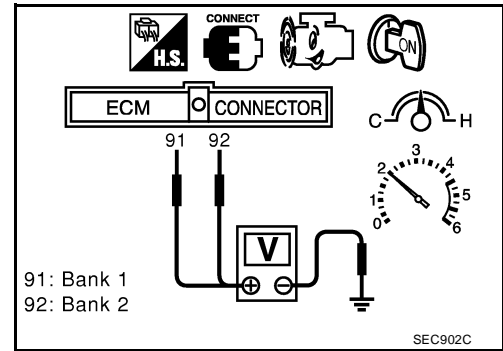
Overall Function Check

Use this procedure to check the overall function of the heated oxygen 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. Set voltmeter probes between ECM terminal 91 [HO2S1(B1) signal] or 92 [HO2S1(B2) signal] and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is over 0.1V at least one time.
4. If NG, go to [EC-1068, "Diagnostic Procedure"](#).



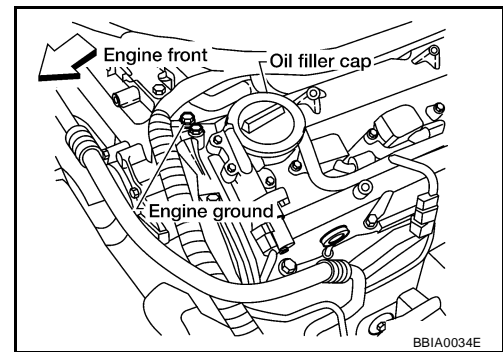
UBS003FM

Diagnostic Procedure

1. RETIGHTEN GROUND SCREWS

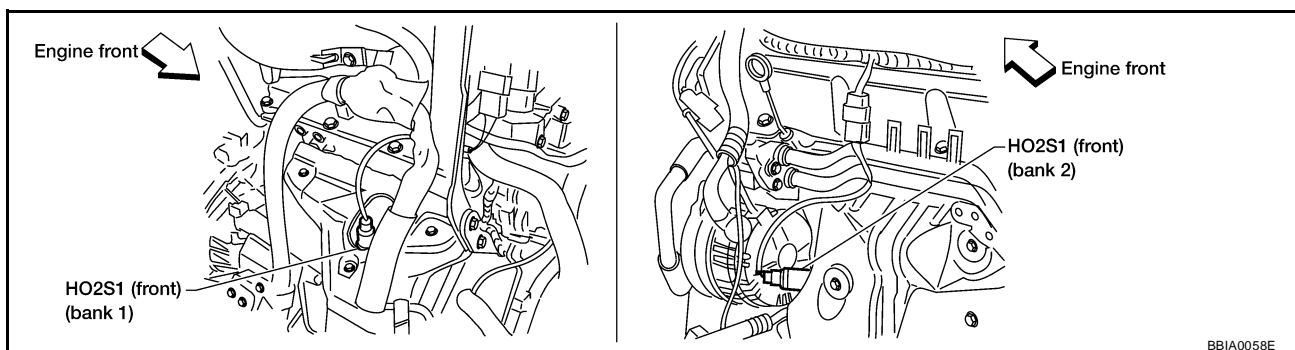
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten corresponding heated oxygen sensor 1.



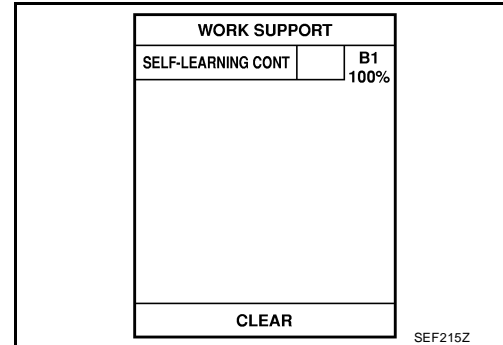
Tightening torque: 40 - 60 N·m (4.1 - 6.2 kg·m, 30 - 44 ft·lb)

>> GO TO 3.

3. CLEAR THE SELF-LEARNING DATA

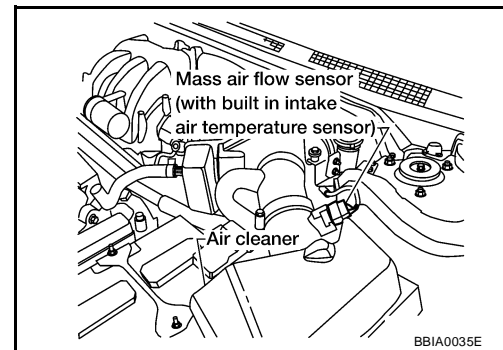
④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 detected?
Is it difficult to start engine?



⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-687, "HOW TO ERASE 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-877](#).
- No >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-780, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace malfunctioning heated oxygen sensor 1.

5. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-1070, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace malfunctioning heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

For circuit, refer to [EC-829, "Wiring Diagram"](#).

>> INSPECTION END

Component Inspection
HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

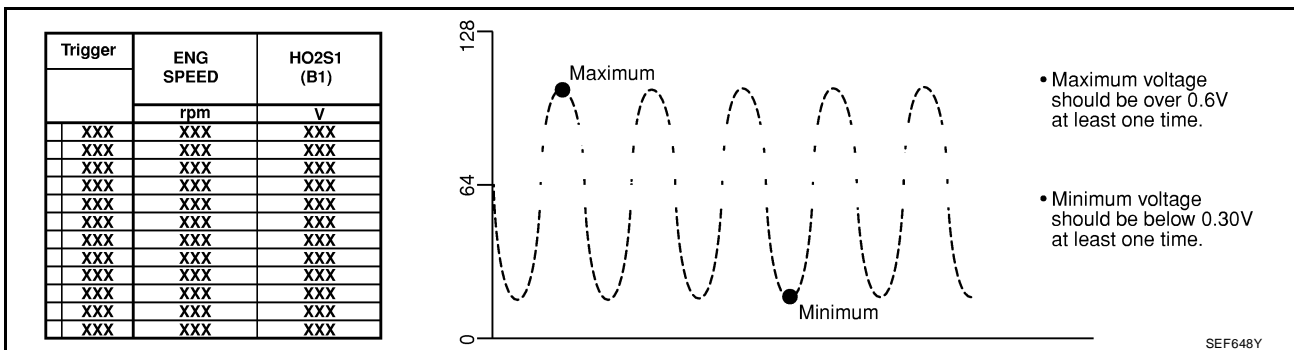
6. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
5 times (cycles) are counted as shown at right.
- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Bank 1	cycle	1	2	3	4	5	
	HO2S1 MNTR (B1)	R	L	R	L	R	L
Bank 2	cycle	1	2	3	4	5	
	HO2S1 MNTR (B2)	R	L	R	L	R	L

R means HO2S1
MNTR (B1)/(B2) indicates RICH
L means HO2S1
MNTR (B1)/(B2) indicates LEAN

SEF647Y



CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

Without CONSULT-II

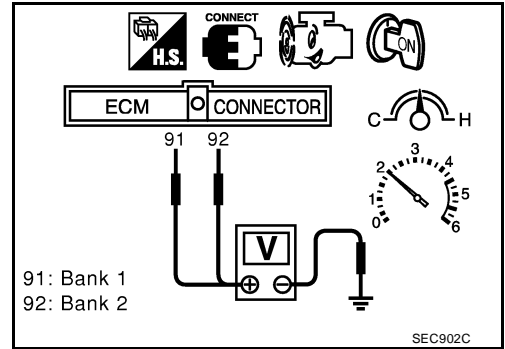
1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 [HO2S1 (B1) signal] or 92 [HO2S1 (B2) signal] and engine ground.

3. Check the following with engine speed held at 2,000 rpm constant under no load.
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is below 0.3V at least one time.
 - The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

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.



**Removal and Installation
 HEATED OXYGEN SENSOR 1**

UBS003FO

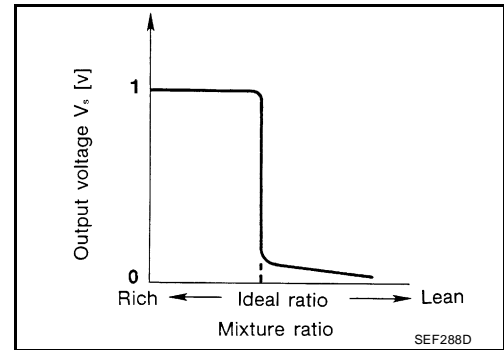
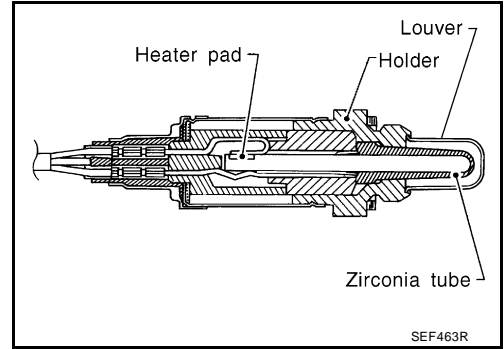
Refer to [EM-116, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P1144, P1164 HO2S1

Component Description

UBS003FP

The heated oxygen sensor 1 is placed into the front tube. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



CONSULT-II Reference Value in Data Monitor Mode

UBS003FO

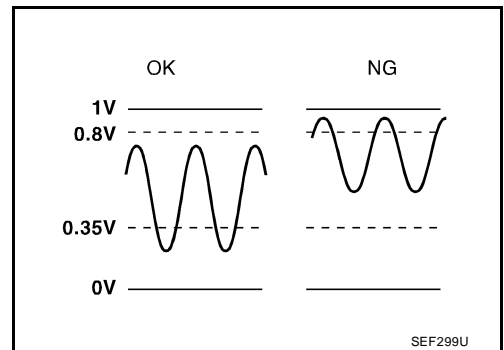
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS003FR

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high. The “lean” output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1144 1144 (Bank 1)	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	<ul style="list-style-type: none"> ● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Injectors
P1164 1164 (Bank 2)			

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

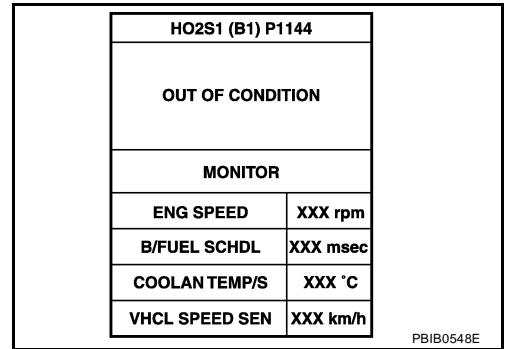
- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 5 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P1144” or “HO2S1 (B2) P1164” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

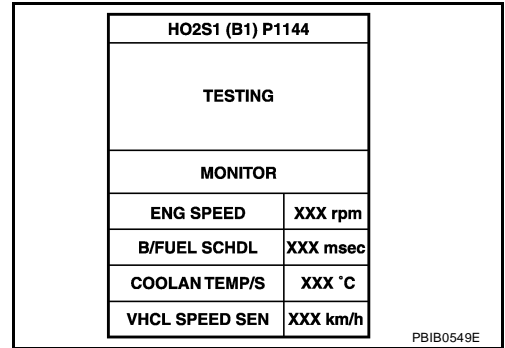
NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.



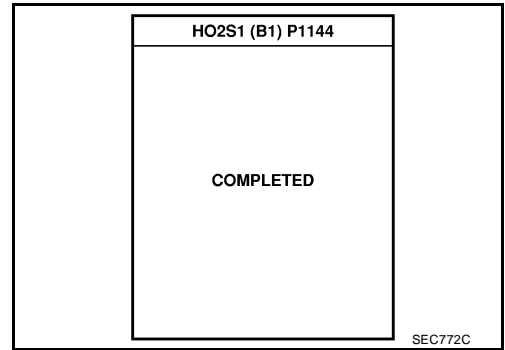
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

ENG SPEED	1,200 - 2,600 rpm
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	2.5 - 12.0 msec
Selector lever	Suitable position



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-1074, "Diagnostic Procedure"](#).



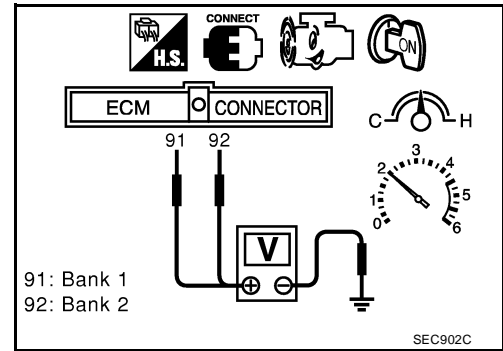
Overall Function Check

Use this procedure to check the overall function of the heated oxygen 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. Set voltmeter probes between ECM terminal 91 [HO2S1(B1) signal] 92 [HO2S1(B2) signal] and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
 - The maximum voltage is below 0.8V at least one time.
 - The minimum voltage is below 0.35V at least one time.
4. If NG, go to [EC-1074, "Diagnostic Procedure"](#) .

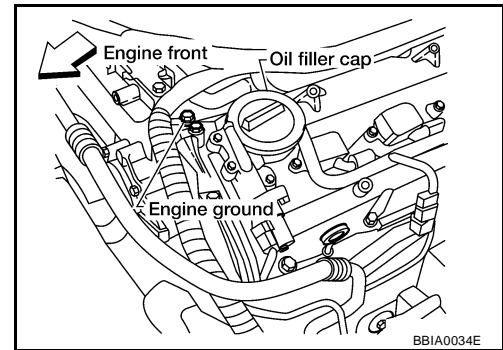


Diagnostic Procedure

1. RETIGHTEN GROUND SCREWS

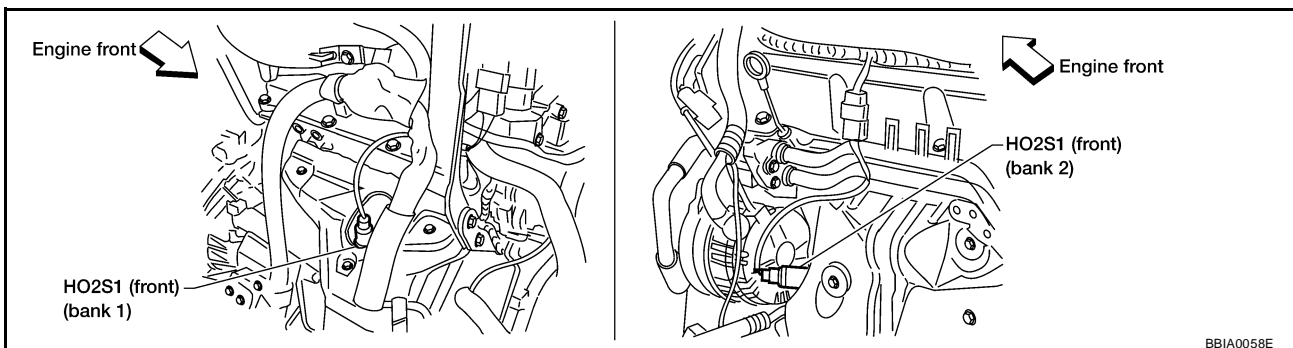
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.



Tightening torque: 40 - 60 N·m (4.1 - 6.2 kg·m, 30 - 44 ft·lb)

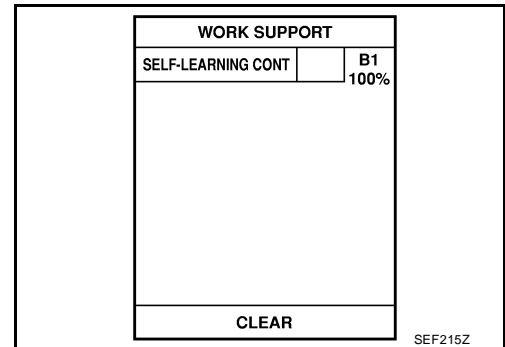
>> GO TO 3.

3. CLEAR THE SELF-LEARNING DATA

④ With CONSULT-II

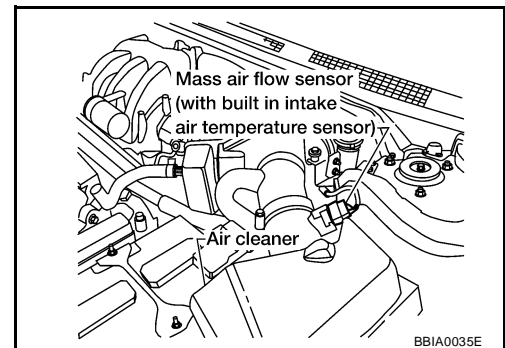
1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.

**Is the 1st trip DTC P0172 detected?
Is it difficult to start engine?**



⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
 2. Turn ignition switch "OFF".
 3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-687. "HOW TO ERASE 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 P0172 detected?
Is it difficult to start engine?**



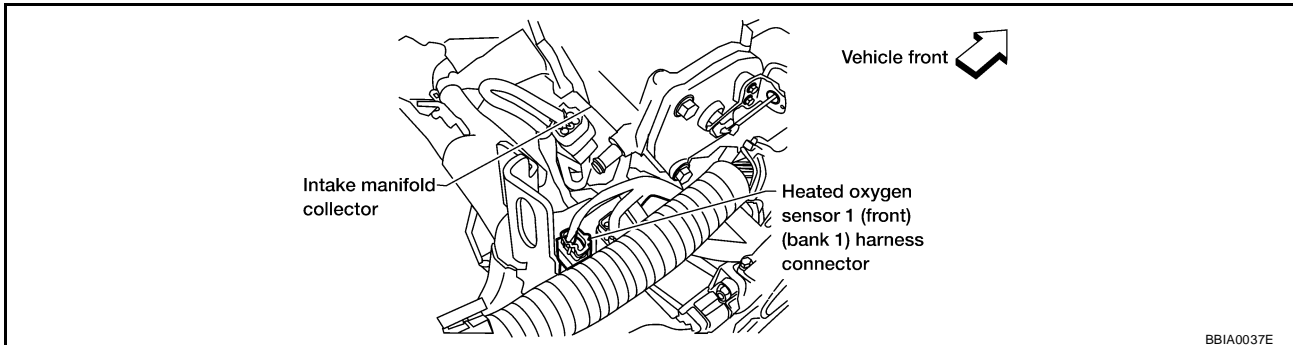
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-885](#).
- No >> GO TO 4.

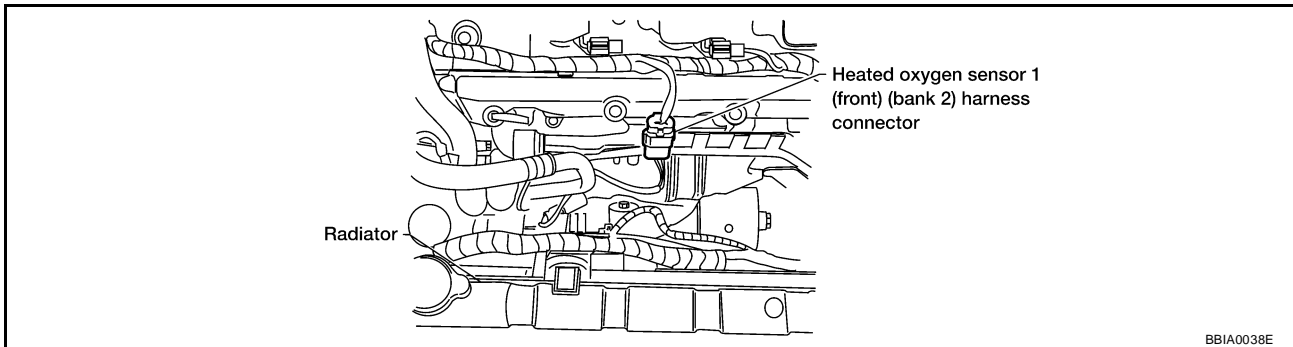
4. CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.

Bank 1



Bank 2



3. Check connectors for water.

Water should not exist.

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-780, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace malfunctioning heated oxygen sensor 1.

6. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-1077, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace malfunctioning heated oxygen sensor 1.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .
 For circuit, refer to [EC-829, "Wiring Diagram"](#) .

>> INSPECTION END

Component Inspection
HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

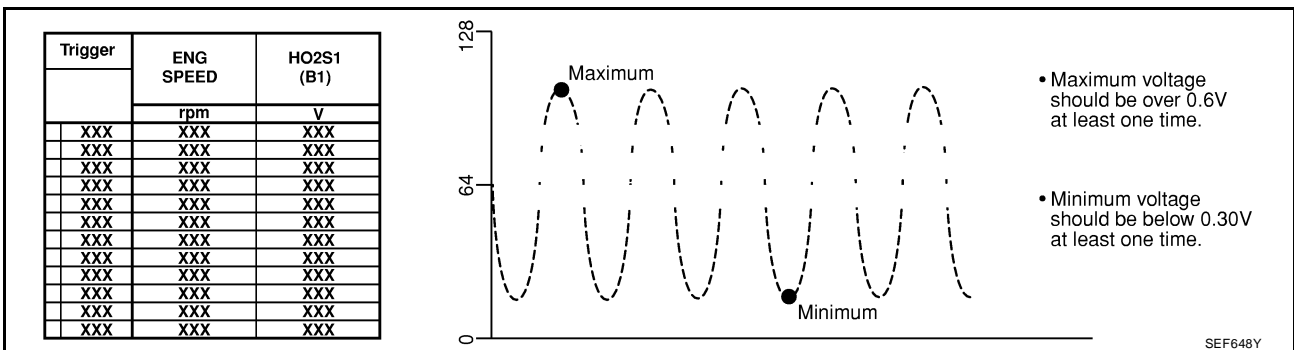
6. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
5 times (cycles) are counted as shown at right.
- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

Bank 1	cycle	1	2	3	4	5		
	HO2S1 MNTR (B1)	R	-L	-R	-L	-R	-L	-R
Bank 2	cycle	1	2	3	4	5		
	HO2S1 MNTR (B2)	R	-L	-R	-L	-R	-L	-R

R means HO2S1
MNTR (B1)/(B2) indicates RICH
L means HO2S1
MNTR (B1)/(B2) indicates LEAN

SEF647Y



CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 [HO2S1 (B1) signal] or 92 [HO2S1 (B2) signal] and engine ground.

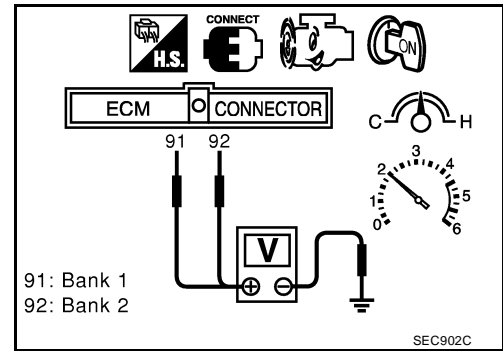
3. Check the following with engine speed held at 2,000 rpm constant under no load.
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is below 0.3V at least one time.
 - The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

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.



**Removal and Installation
HEATED OXYGEN SENSOR 1**

UBS003FW

Refer to [EM-116, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

DTC P1146, P1166 HO2S2

PF2:226A0

Component Description

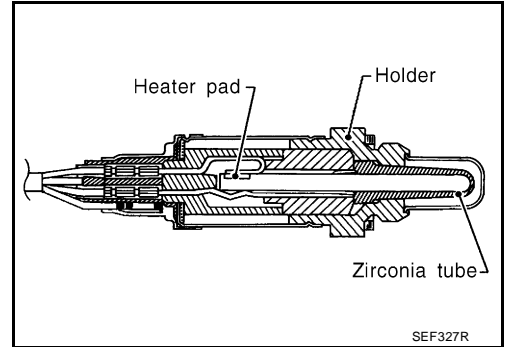
UBS003FX

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen 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 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

UBS003FY

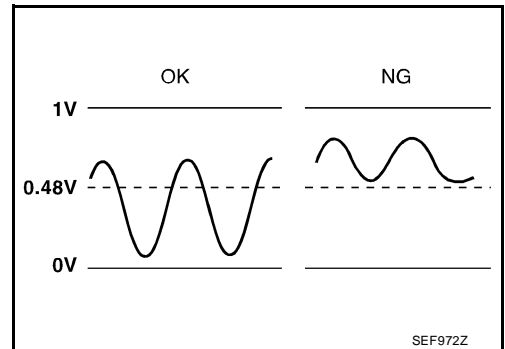
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

On Board Diagnosis Logic

UBS003FZ

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. 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
P1146 1146 (Bank 1)	Heated oxygen sensor 2 minimum voltage monitoring	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors
P1166 1166 (Bank 2)			

DTC Confirmation Procedure

UBS003G0

NOTE:

If "DTC confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

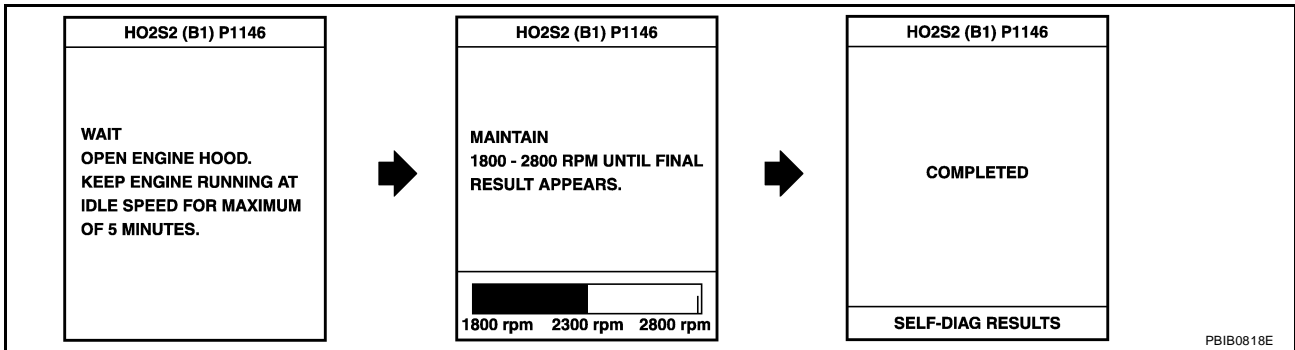
TESTING CONDITION:

Open engine hood before conducting following procedure.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.

5. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
6. Select "HO2S2 (B1) P1146" or "HO2S2 (B2) P1166" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7. Start engine and following the instruction of CONSULT-II.



8. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
 If "NG" is displayed, refer to [EC-1084, "Diagnostic Procedure"](#) .
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
 - b. Turn ignition switch "ON".
 - c. Select "DATA MONITOR" mode with CONSULT-II.
 - d. Start engine.
 - e. Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

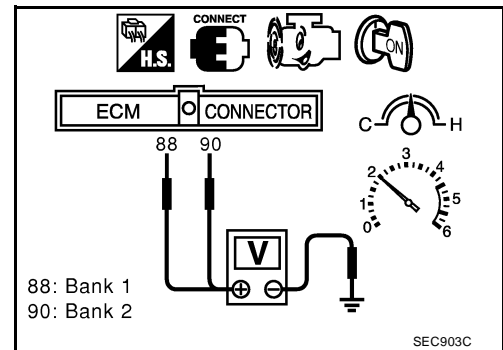
Overall Function Check

UBS003G1

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

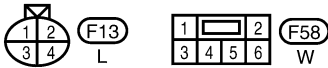
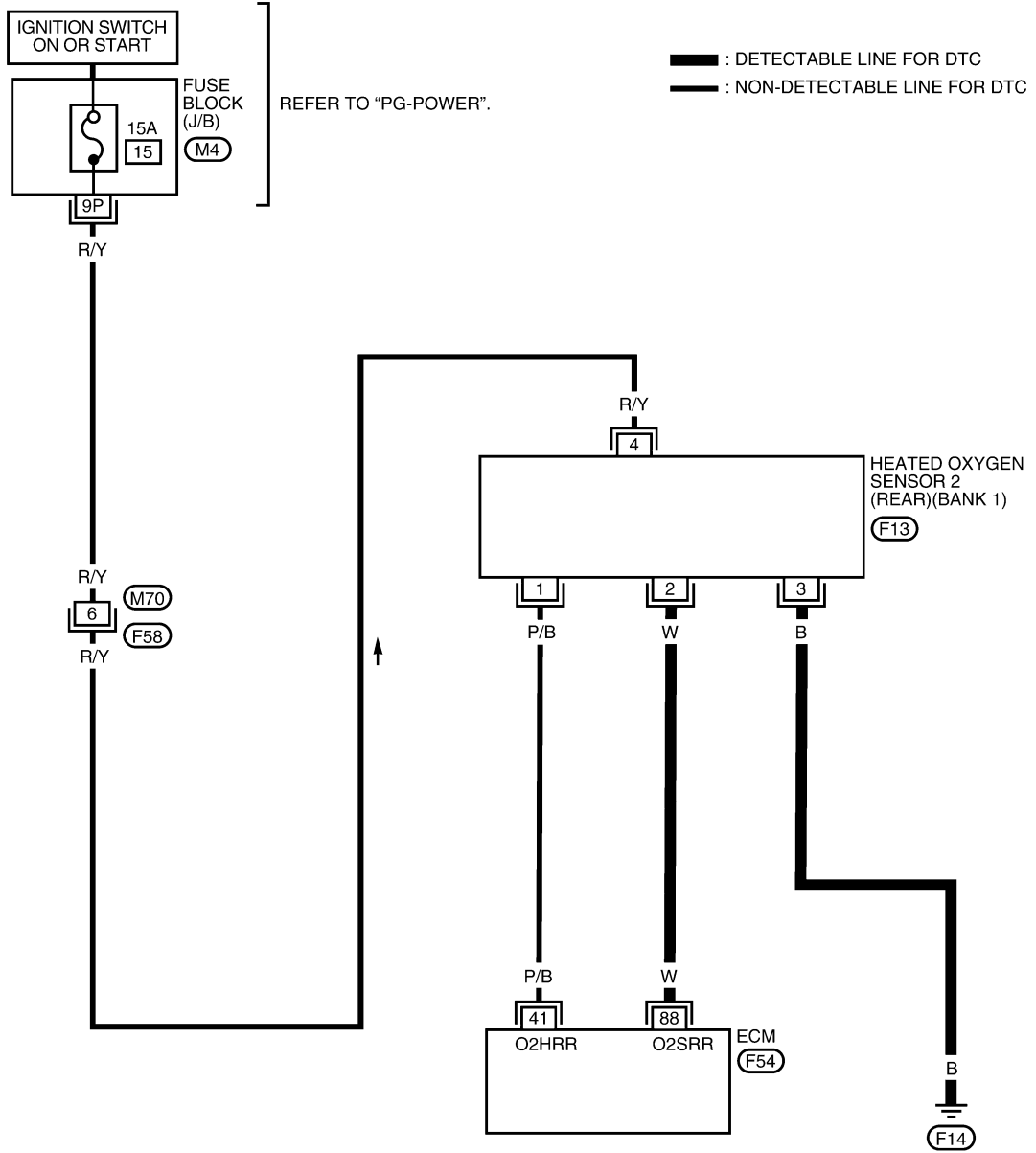
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 [HO2S2 (B1) signal] or 90 [HO2S2 (B2) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should be below 0.48V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
5. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should be below 0.48V at least once during this procedure.
6. If NG, go to [EC-1084, "Diagnostic Procedure"](#) .



Wiring Diagram
BANK 1

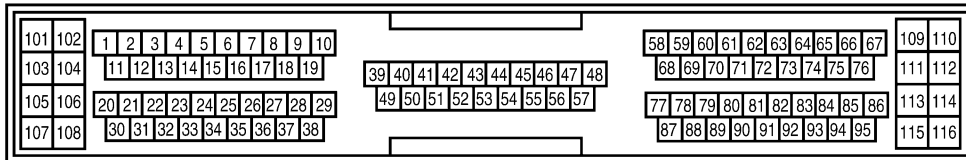
EC-O2S2B1-01

A
EC
C
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)



DTC P1146, P1166 HO2S2

[VQ]

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

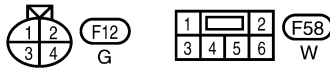
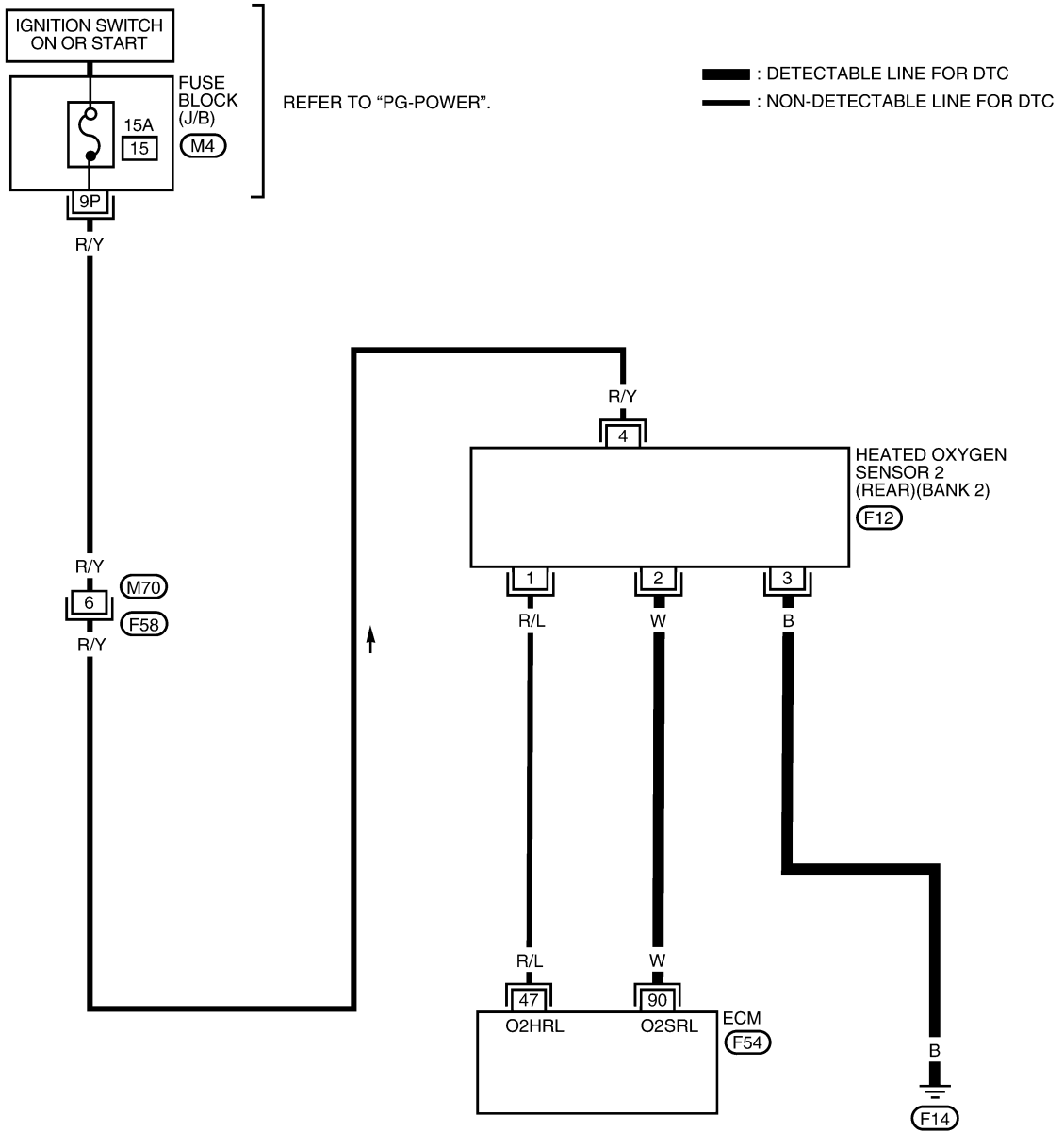
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
88	W	Heated oxygen sensor 2 (bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Engine speed is 2,000 rpm.	0 - Approximately 1.0V

BANK 2

EC-O2S2B2-01

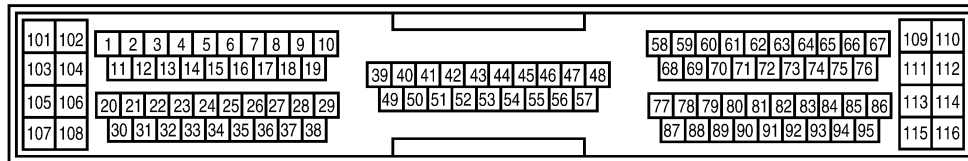
A
EC
C
D
E
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K
L
M



REFER TO THE FOLLOWING.

(M4) - FUSE BLOCK

- JUNCTION BOX (J/B)



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
90	W	Heated oxygen sensor 2 (bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V

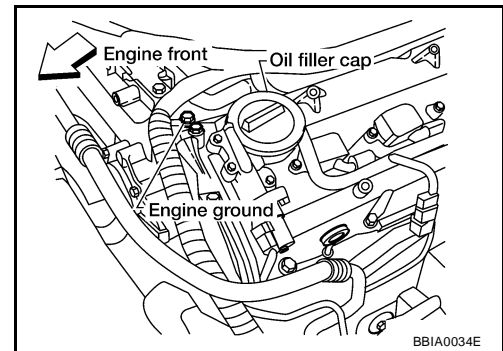
Diagnostic Procedure

UBS003G3

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

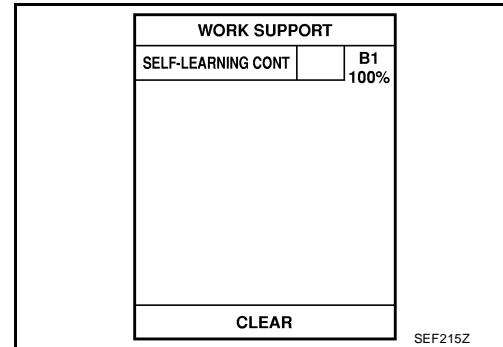
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

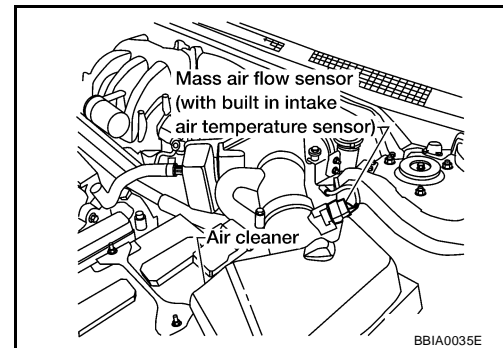
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
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-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-687, "HOW TO ERASE 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 P0172 or P0175 detected?
Is it difficult to start engine?**



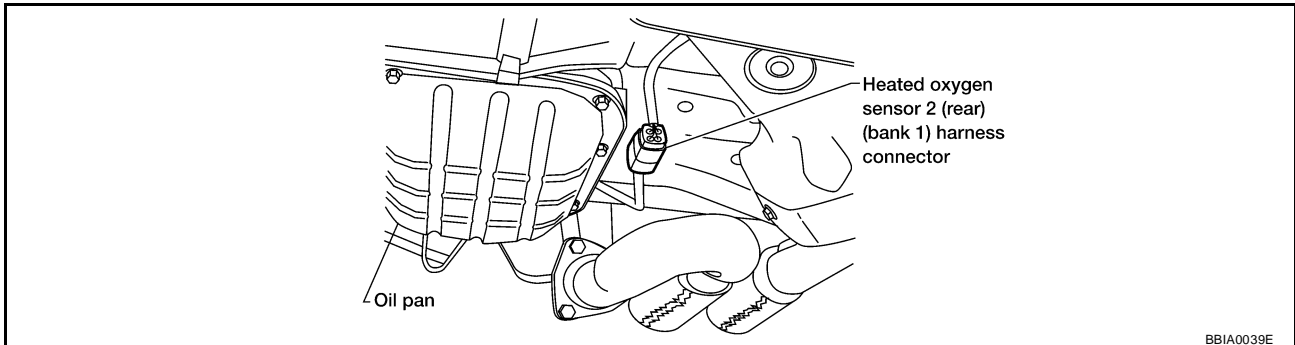
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172, P0175. Refer to [EC-885](#) .
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

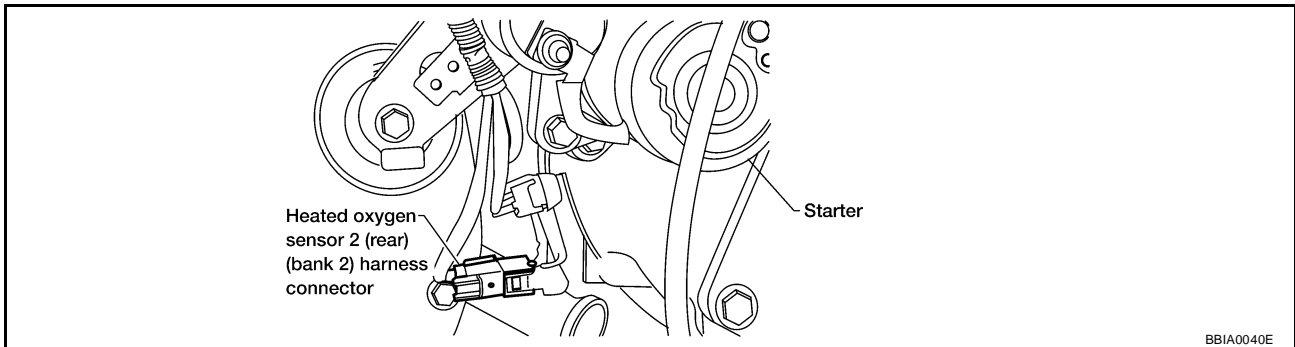
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.

Bank 1



BBIA0039E

Bank 2



BBIA0040E

3. Check harness continuity between HO2S2 terminal 3 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1146	88	2	1
P1166	90	2	2

Continuity should exist.

3. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1146	88	2	1
P1166	90	2	2

Continuity should not exist.

4. Also check harness for short to 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-1087, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace malfunctioning heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection
HEATED OXYGEN SENSOR 2**

UBS003G4

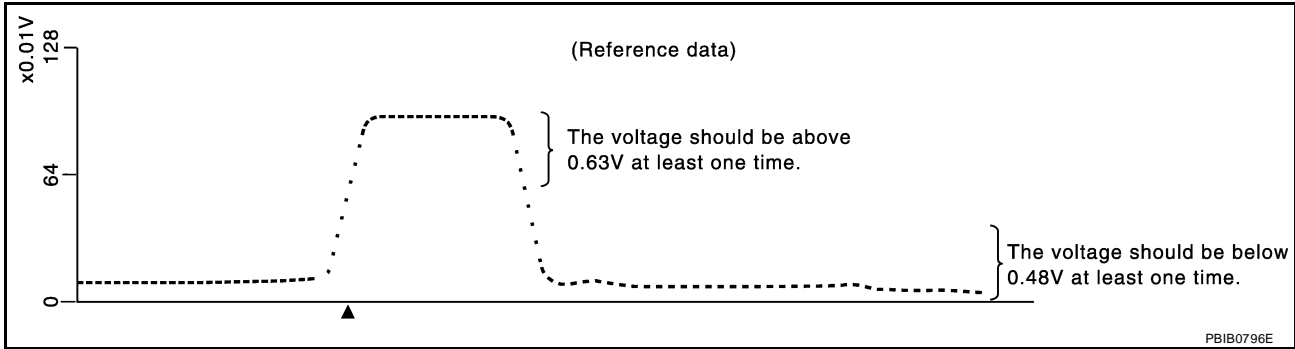
 **With CONSULT-II**

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



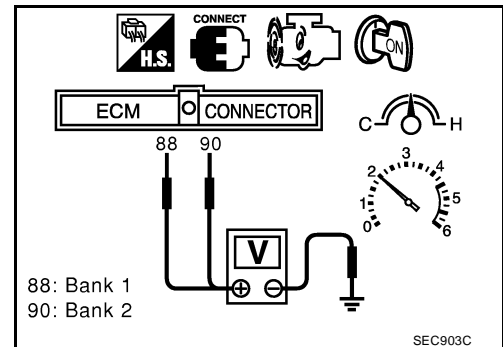
"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.48V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

Without CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 [HO2S2 (B1) signal] or 90 [HO2S2 (B2) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage is above 0.63V at step 4, step 5 is not necessary.
5. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should be below 0.48V at least once during this procedure.
6. If NG, replace heated oxygen sensor 2.



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.

**Removal and Installation
 HEATED OXYGEN SENSOR 2**

UBS003G5

Refer to [EX-6, "EXHAUST SYSTEM \(VQ35DE\)"](#).

DTC P1147, P1167 HO2S2

PF2:226A0

Component Description

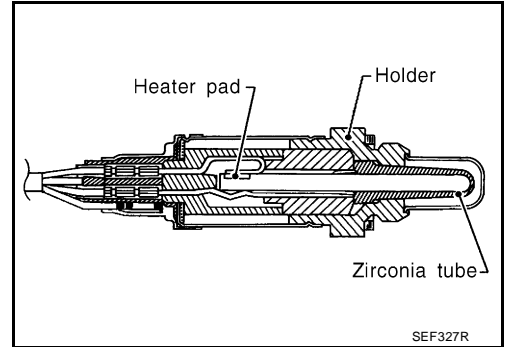
UBS003G6

The heated oxygen sensor 2, after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen 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 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

UBS003G7

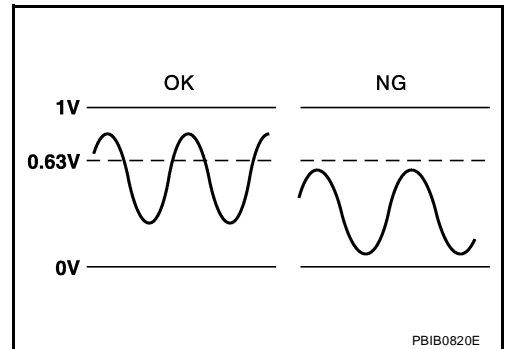
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

On Board Diagnosis Logic

UBS003G8

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst 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
P1147 1147 (Bank 1)	Heated oxygen sensor 2 maximum voltage monitoring	The maximum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors ● Intake air leaks
P1167 1167 (Bank 2)			

DTC Confirmation Procedure

UBS003G9

NOTE:

If "DTC confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

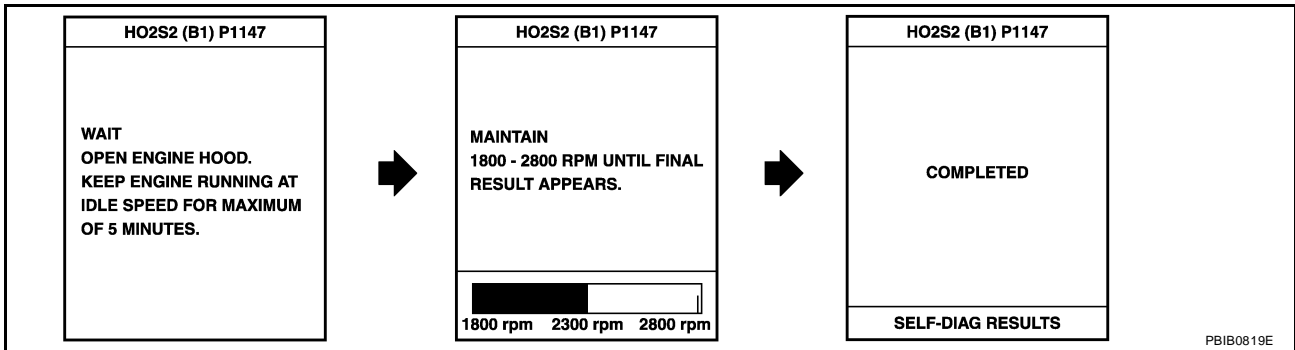
TESTING CONDITION:

Open engine hood before conducting following procedure.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.

5. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
6. Select "HO2S2 (B1) P1147" or "HO2S2 (B2) P1167" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7. Start engine and following the instruction of CONSULT-II.



8. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
 If "NG" is displayed, refer to [EC-1094, "Diagnostic Procedure"](#) .
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
 - b. Turn ignition switch "ON".
 - c. Select "DATA MONITOR" mode with CONSULT-II.
 - d. Start engine.
 - e. Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

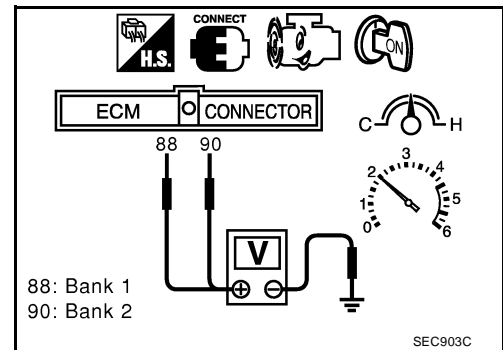
Overall Function Check

UBS003GA

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 drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 [HO2S2 (B1) signal] or 90 [HO2S2 (B2) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
5. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should be above 0.63V at least once during this procedure.
6. If NG, go to [EC-1094, "Diagnostic Procedure"](#) .

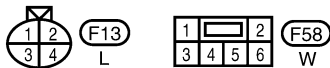
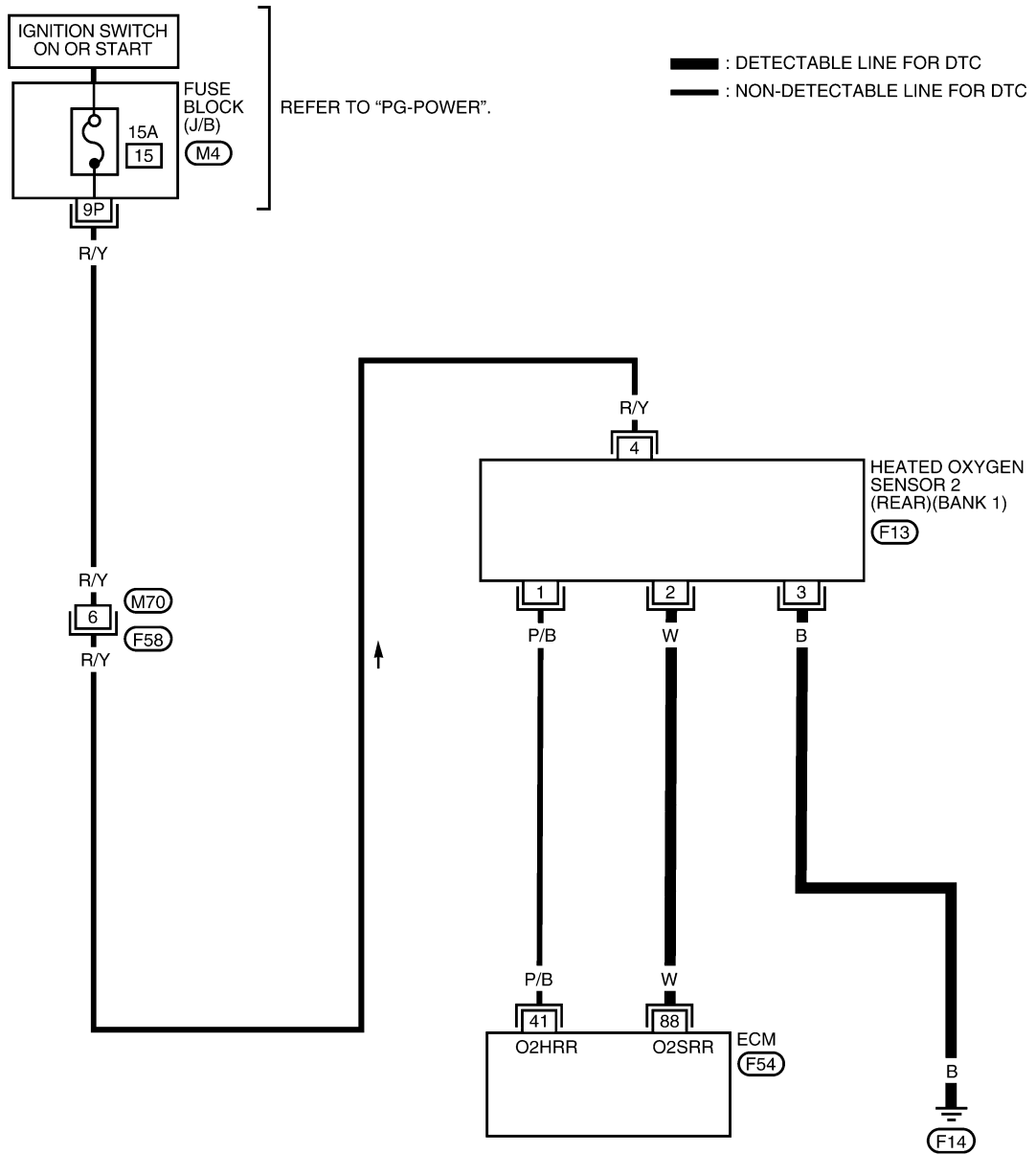


Wiring Diagram
BANK 1

UBS003GB

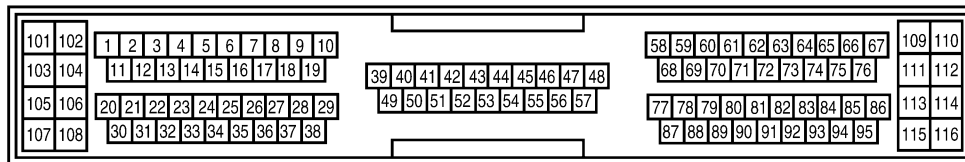
EC-O2S2B1-01

A
EC
C
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)



DTC P1147, P1167 HO2S2

[VQ]

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

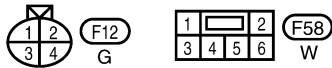
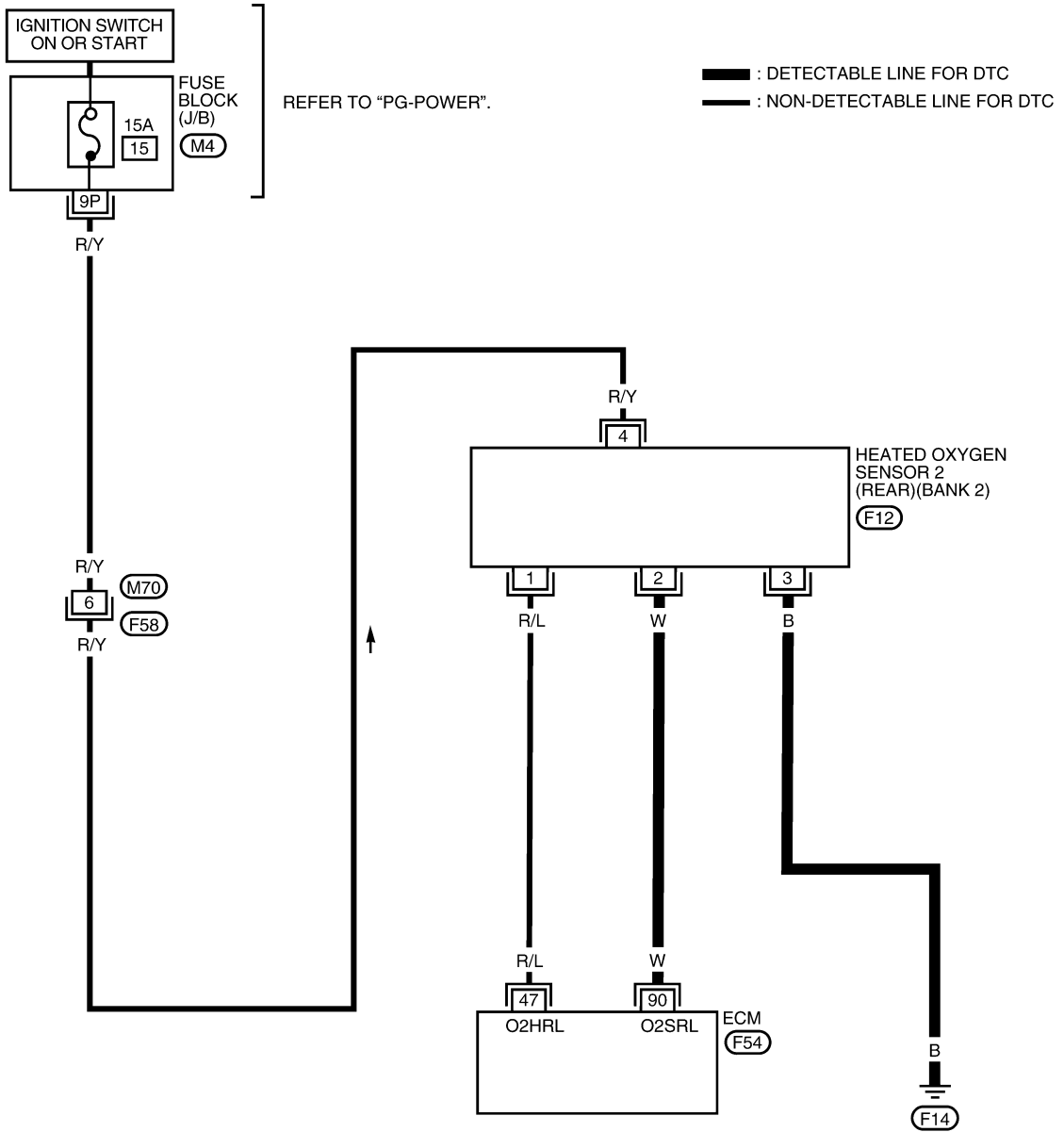
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
88	W	Heated oxygen sensor 2 (bank 1)	[Engine is running] <ul style="list-style-type: none">● Warm-up condition● Engine speed is 2,000 rpm.	0 - Approximately 1.0V

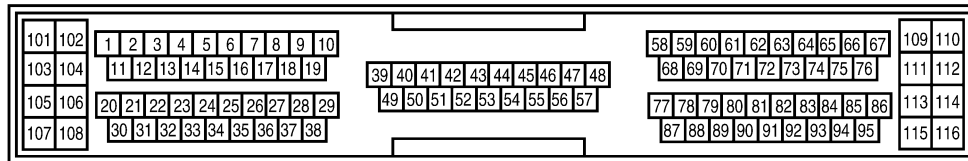
BANK 2

EC-O2S2B2-01

A
EC
C
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.
 (M4) - FUSE BLOCK
 - JUNCTION BOX (J/B)



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
90	W	Heated oxygen sensor 2 (bank 2)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	0 - Approximately 1.0V

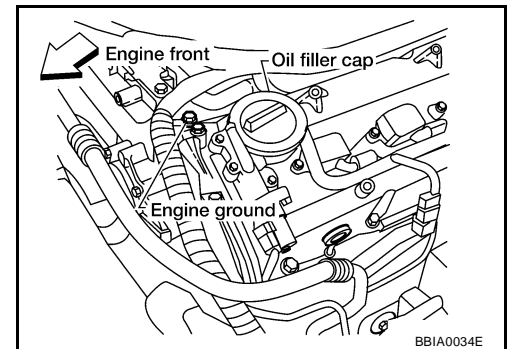
Diagnostic Procedure

UBS003GC

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

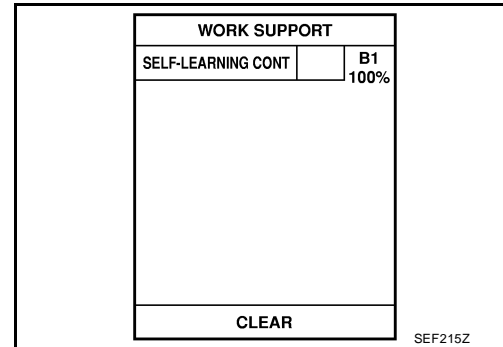
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

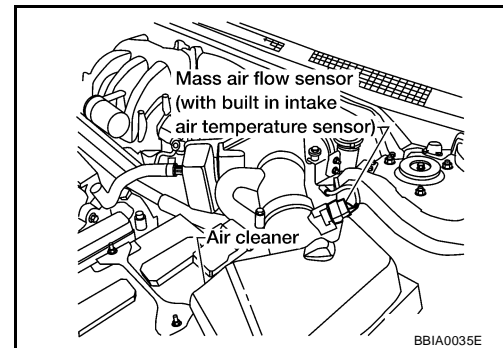
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 or P0174 detected?
Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 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-687, "HOW TO ERASE 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 P0174 detected?
Is it difficult to start engine?



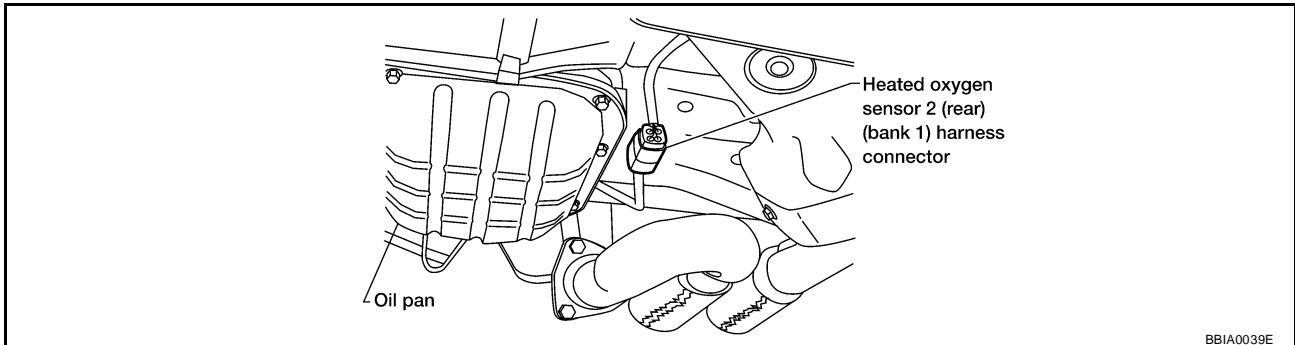
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0174. Refer to [EC-877](#).
- No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

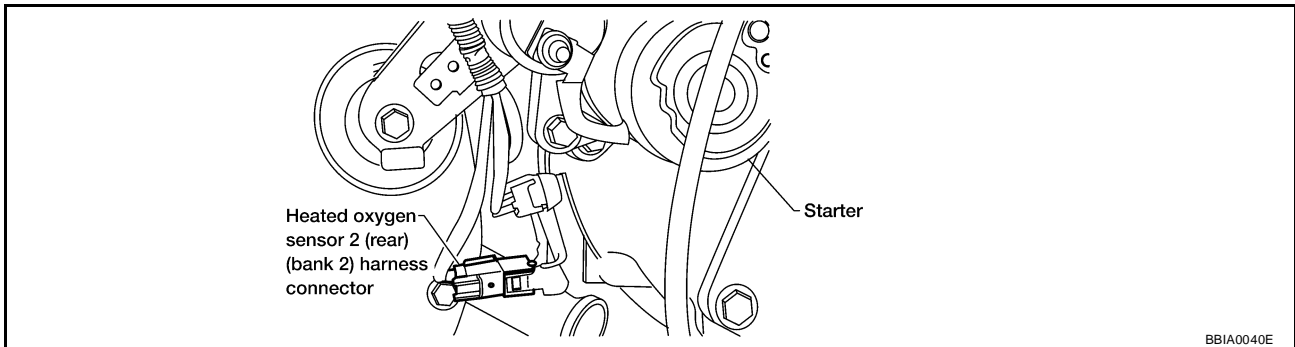
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.

Bank 1



BBIA0039E

Bank 2



BBIA0040E

3. Check harness continuity between HO2S2 terminal 3 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S2 terminal as follows.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1147	88	2	1
P1167	90	2	2

Continuity should exist.

3. Check harness continuity between the following terminals and ground.
Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1147	88	2	1
P1167	90	2	2

Continuity should not exist.

4. Also check harness for short to ground or 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-1097, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace malfunctioning heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection
HEATED OXYGEN SENSOR 2**

UBS003GD

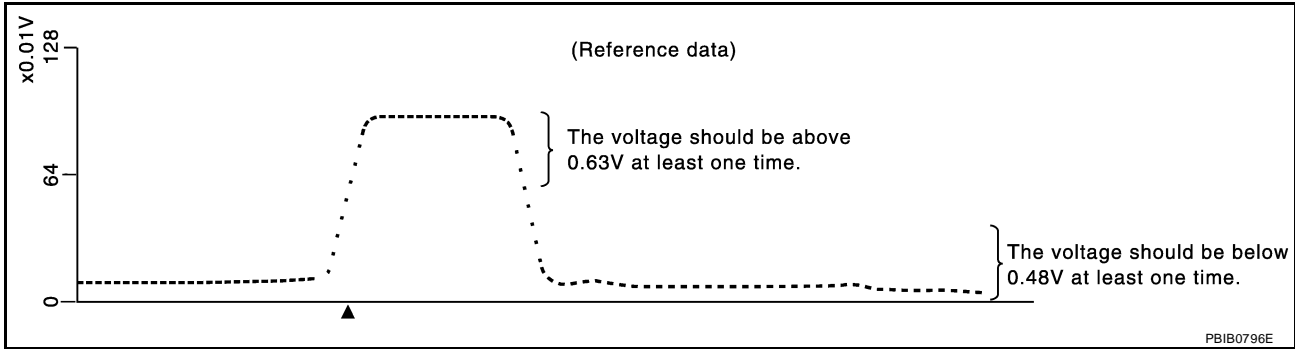
With CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



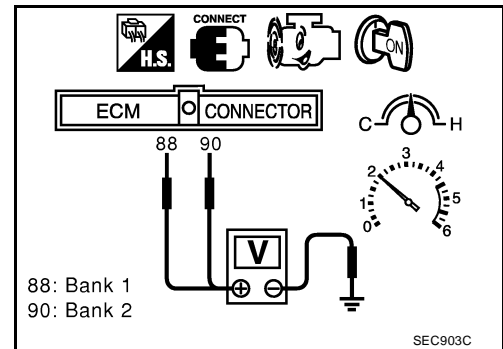
"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.48V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

Without CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 [HO2S2 (B1) signal] or 90 [HO2S2 (B2) signal] and engine ground.
4. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage is above 0.63V at step 4, step 5 is not necessary.
5. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).
The voltage should be below 0.48V at least once during this procedure.
6. If NG, replace heated oxygen sensor 2.



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.

**Removal and Installation
 HEATED OXYGEN SENSOR 2**

UBS003GE

Refer to [EX-6, "EXHAUST SYSTEM \(VQ35DE\)"](#).

DTC P1148, P1168 CLOSED LOOP CONTROL

PFP:22690

On Board Diagnosis Logic

UBS003GF

These self-diagnoses have the one trip detection logic.

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 driving in the specified condition.	<ul style="list-style-type: none"> ● The heated oxygen sensor 1 circuit is open or shorted.
P1168 1168 (Bank 2)		The closed loop control function for bank 2 does not operate even when vehicle is driving in the specified condition.	<ul style="list-style-type: none"> ● Heated oxygen sensor 1 ● Heated oxygen sensor heater

DTC Confirmation Procedure

UBS003GG

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Never raise engine speed above 3,600 rpm during the "DTC Confirmation Procedure". If the engine speed limit is exceeded, retry the procedure from step 2.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Hold engine speed at 2,000 rpm and check one of the following.
 - "HO2S1 (B1)/(B2)" voltage should go above 0.70V at least once.
 - "HO2S1 (B1)/(B2)" voltage should go below 0.21V at least once. If the check result is NG, perform [EC-1100, "Diagnostic Procedure"](#). If the check result is OK, perform the following step.
4. Let engine idle at least 5 minutes.
5. Maintain the following condition at least 50 consecutive seconds.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 (B2)	XXX V

SEC011C

B/FUEL SCHDL	2.5 msec or more
ENG SPEED	More than 1,500 rpm
Selector lever	Suitable position
VHCL SPEED SE	More than 71 km/h (44 MPH)

During this test, P0132 and/or P0152 may be displayed on CONSULT-II screen.

6. If DTC is detected, go to [EC-1100, "Diagnostic Procedure"](#).

Overall Function Check

UBS003GH

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed.

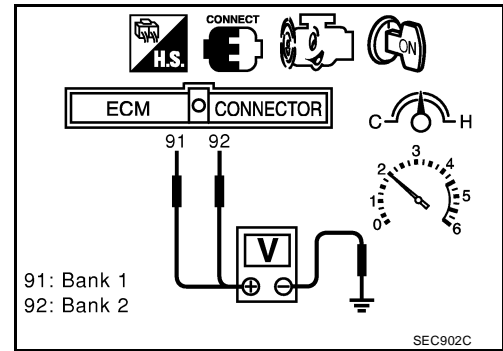
WITH GST

1. Start engine and warm it up to normal operating temperature.

DTC P1148, P1168 CLOSED LOOP CONTROL

[VQ]

2. Set voltmeter probes between ECM terminal 91 [HO2S1 (B1) signal] or 92 [HO2S1 (B2) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no-load.
 - The voltage should go above 0.70V at least once.
 - The voltage should go below 0.21V at least once.
4. If NG, go to [EC-1100, "Diagnostic Procedure"](#) .



Diagnostic Procedure

UBS003G1

Perform trouble diagnosis for "DTC P0133, P0153". Refer to [EC-842, "Diagnostic Procedure"](#) .

DTC P1211 ABS/TCS CONTROL UNIT

[VQ]

DTC P1211 ABS/TCS CONTROL UNIT

PFP:47850

Description

UBS003GJ

The malfunction information related to ABS or ABS/TCS is transferred through the CAN communication line from ABS actuator and electric unit (control unit) to ECM.

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 ABS or ABS/TCS related repair.

On Board Diagnosis Logic

UBS003GK

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
P1211 1211	ABS/TCS control unit	ECM receives a malfunction information from ABS actuator and electric unit (Control unit).	<ul style="list-style-type: none">● ABS actuator and electric unit (control unit)● ABS or ABS/TCS related parts

DTC Confirmation Procedure

UBS003GL

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 60 seconds.
4. If 1st trip DTC is detected, go to [EC-1101, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS003GM

Go to [BRC-7, "TROUBLE DIAGNOSIS"](#) or [BRC-50, "TROUBLE DIAGNOSIS"](#).

DTC P1212 ABS/TCS COMMUNICATION LINE

PFP:47850

Description

UBS003GN

NOTE:

If DTC P1212 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-763, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

This CAN communication line is used to control the smooth engine operation during the ABS or 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 ABS or ABS/TCS related repair.

On Board Diagnosis Logic

UBS003GO

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	ABS/TCS communication line	ECM can not receive the information from ABS/TCS 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

UBS003GP

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

Ⓜ **WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 10 seconds.
4. If a 1st trip DTC is detected, go to [EC-1102, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

Ⓜ **WITH GST**

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS003GO

1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) FUNCTION

Refer to [BRC-7, "TROUBLE DIAGNOSIS"](#) or [BRC-50, "TROUBLE DIAGNOSIS"](#).

>> INSPECTION END

DTC P1217 ENGINE OVER TEMPERATURE

[VQ]

DTC P1217 ENGINE OVER TEMPERATURE

PFP:00000

System Description

UBS003GR

NOTE:

If DTC P1217 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000 or U1001. Refer to [EC-763, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

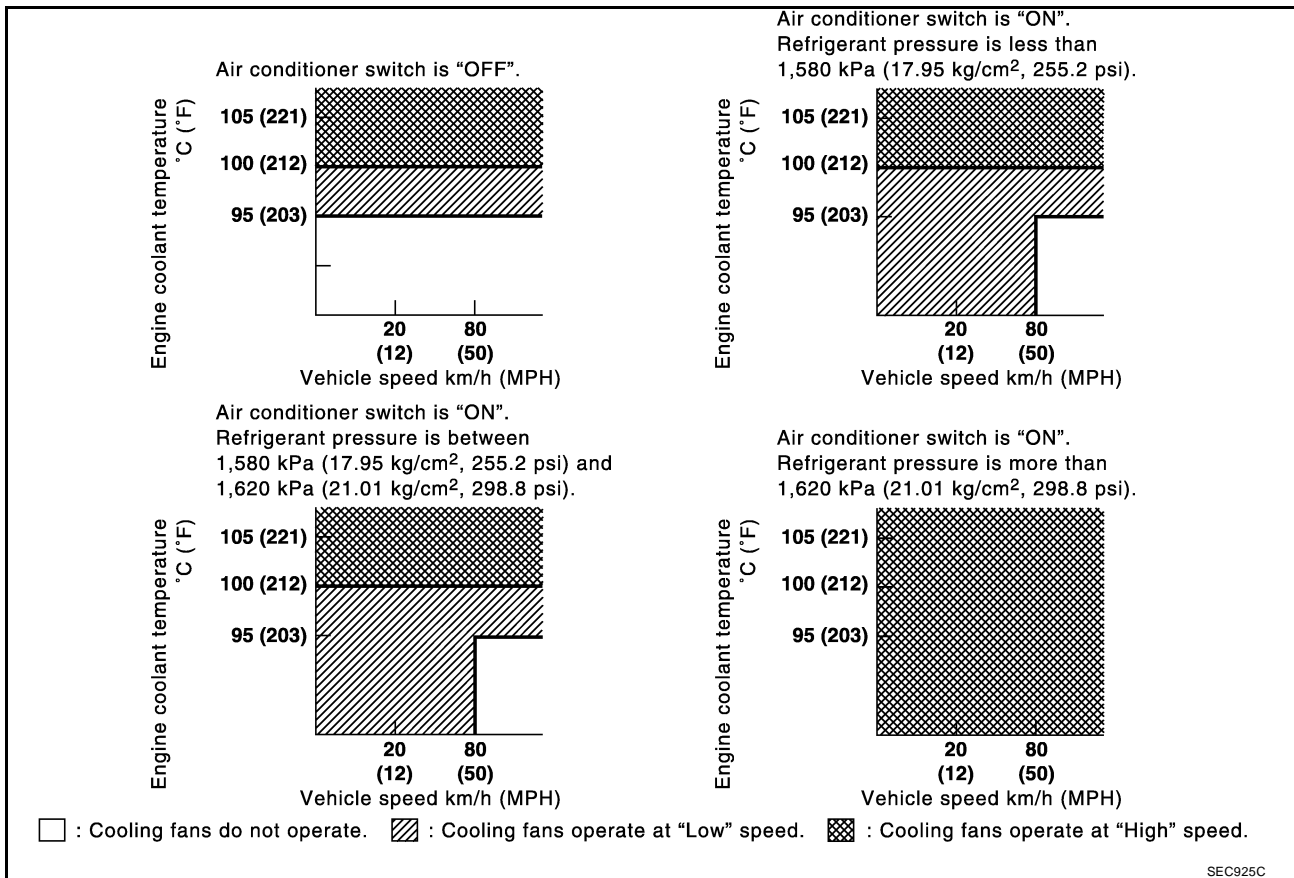
COOLING FAN CONTROL

Sensor	Input Signal to ECM	ECM function	Actuator
USP sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal*		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

*: These signals are 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]. The ECM controls cooling fan relays through CAN communication line.

OPERATION



CONSULT-II Reference Value in Data Monitor Mode

UBS003GS

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF
		Air conditioner switch: ON (Compressor operates.)

DTC P1217 ENGINE OVER TEMPERATURE

[VQ]

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine ● Air conditioner switch: OFF 	Engine coolant temperature is 99°C (210°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH

On Board Diagnosis Logic

UBS003GT

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 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. 	<ul style="list-style-type: none"> ● Harness or connectors (The cooling fan circuit is open or shorted.) ● Cooling fan ● Radiator hose ● Radiator ● Radiator cap ● Water pump ● Thermostat <p>For more information, refer to EC-1113, "Main 12 Causes of Overheating".</p>

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [EC-1102, "Description"](#). Also, replace the engine oil. Refer to [EC-1101, "Description"](#).

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-13, "ANTI-FREEZE COOLANT MIXTURE RATIO"](#).
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

Overall Function Check

UBS003GU

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

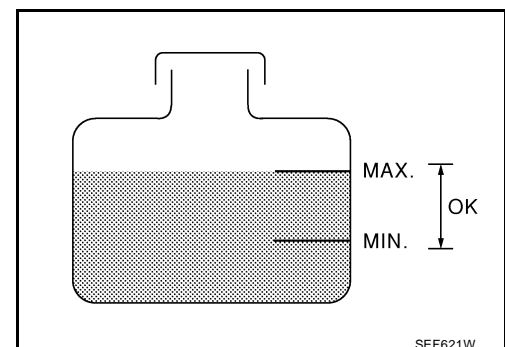
WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

④ WITH CONSULT-II

1. Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-1107, "Diagnostic Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-1107, "Diagnostic Procedure"](#).
3. Turn ignition switch "ON".



SEF621W

DTC P1217 ENGINE OVER TEMPERATURE

[VQ]

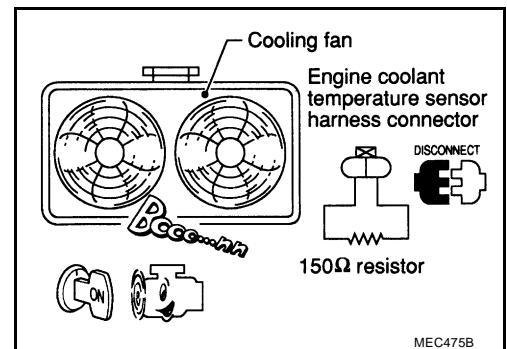
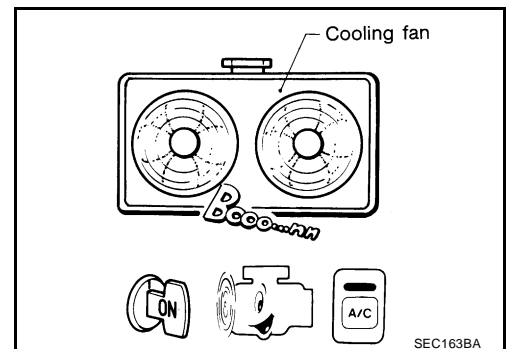
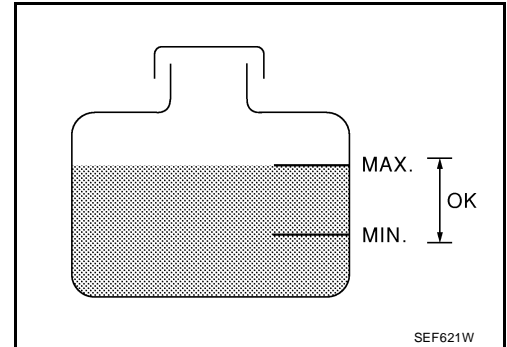
4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
5. If the results are NG, go to [EC-1107, "Diagnostic Procedure"](#).

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLANT TEMP/S	XXX °C

SEF646X

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-1107, "Diagnostic Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-1107, "Diagnostic Procedure"](#).
3. Start engine.
Be careful not to overheat engine.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fan operates at low speed.
If NG, go to [EC-1107, "Diagnostic Procedure"](#).
If OK, go to the following step.
7. Turn ignition switch "OFF".
8. Turn air conditioner switch and blower fan switch "OFF".
9. Disconnect engine coolant temperature sensor harness connector.
10. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
11. Restart engine and make sure that cooling fan operates at higher speed than low speed.
Be careful not to overheat engine.
12. If NG, go to [EC-1107, "Diagnostic Procedure"](#).



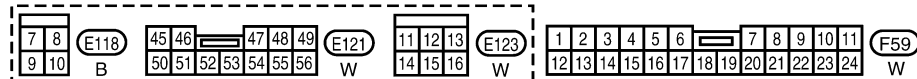
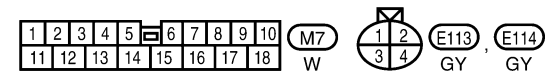
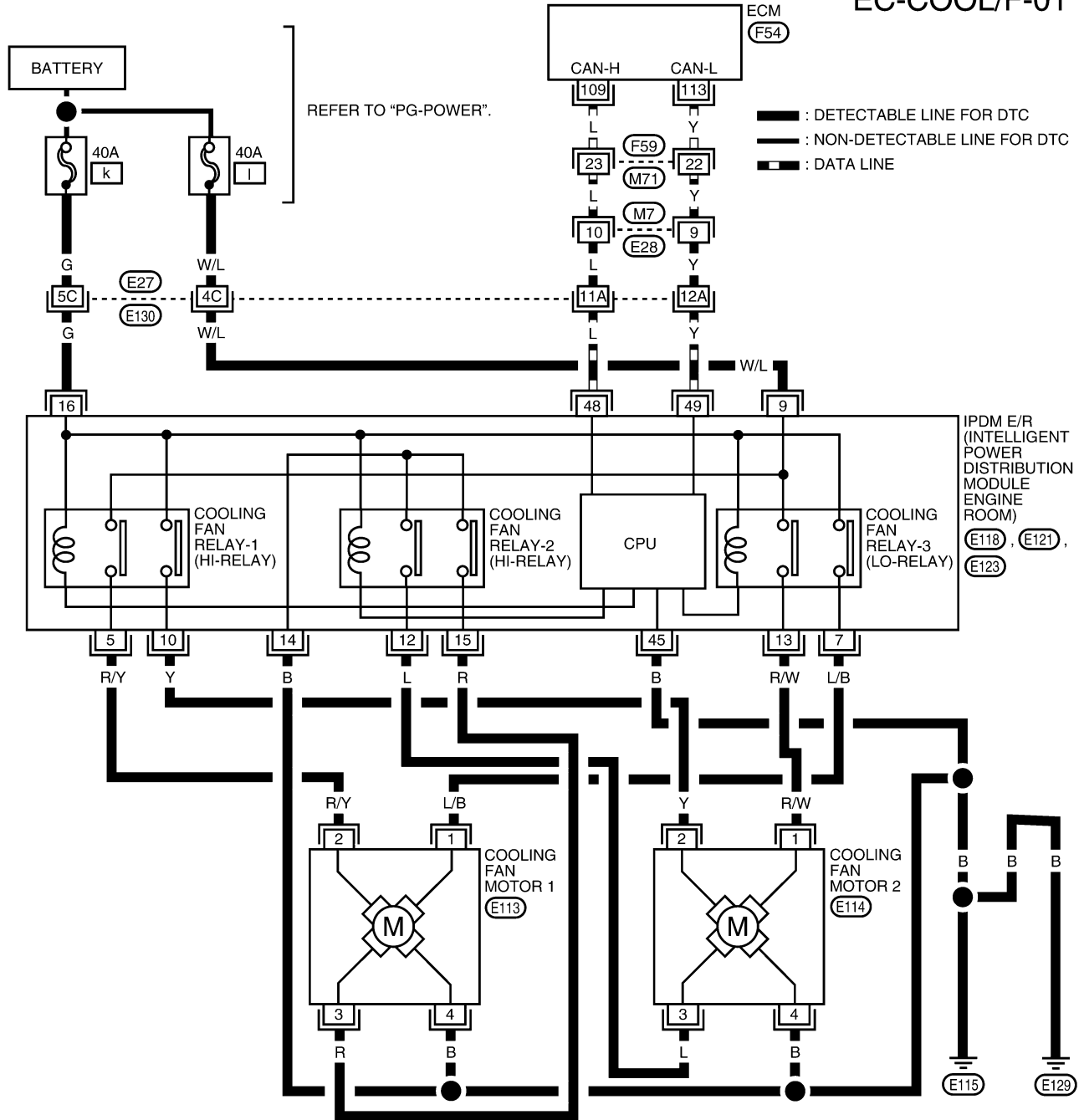
DTC P1217 ENGINE OVER TEMPERATURE

[VQ]

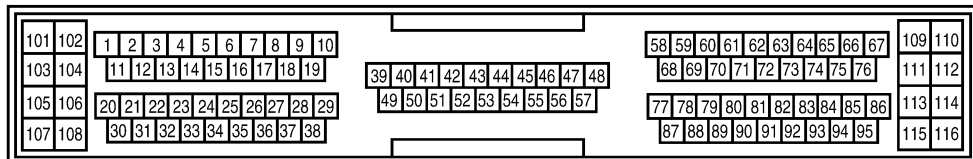
Wiring Diagram

UBS003GV

EC-COOL/F-01



REFER TO THE FOLLOWING.
E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0065E

Diagnostic Procedure

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.

2. CHECK COOLING FAN LOW SPEED OPERATION

With CONSULT-II

1. Start engine and let it idle.
2. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II and touch "LOW" on the CONSULT-II screen.
3. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

- OK >> GO TO 3.
- NG >> Check cooling fan low speed control circuit. (Go to [EC-1110, "PROCEDURE A"](#) .)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

3. CHECK COOLING FAN HIGH SPEED OPERATION

With CONSULT-II

1. Touch "HIGH" on the CONSULT-II screen.
2. Make sure that cooling fans-1 and -2 operate at higher speed than low speed.

OK or NG

- OK >> GO TO 6.
- NG >> Check cooling fan high speed control circuit. (Go to [EC-1112, "PROCEDURE B"](#) .)

ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

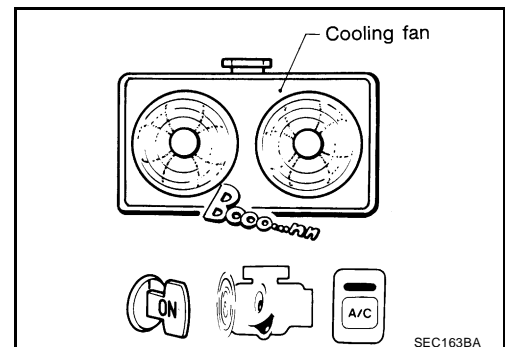
4. CHECK COOLING FAN LOW SPEED OPERATION

Without CONSULT-II

1. Start engine and let it idle.
2. Turn air conditioner switch "ON".
3. Turn blower fan switch "ON".
4. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

- OK >> GO TO 5.
- NG >> Check cooling fan low speed control circuit. (Go to [EC-1110, "PROCEDURE A"](#) .)



5. CHECK COOLING FAN HIGH SPEED OPERATION

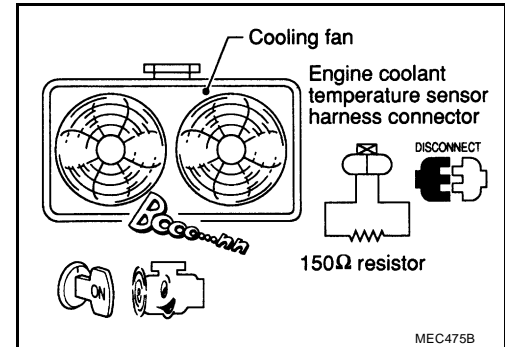
⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Turn air conditioner switch and blower fan switch "OFF".
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fans-1 and -2 operate at higher speed than low speed.

OK or NG

OK >> GO TO 6.

NG >> Check cooling fan high speed control circuit. (Go to [EC-1112, "PROCEDURE B"](#).)



6. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

Testing pressure: 157 kPa (1.6 kg/cm² , 23 psi)

CAUTION:

Higher than the specified pressure may cause radiator damage. Pressure should not drop.

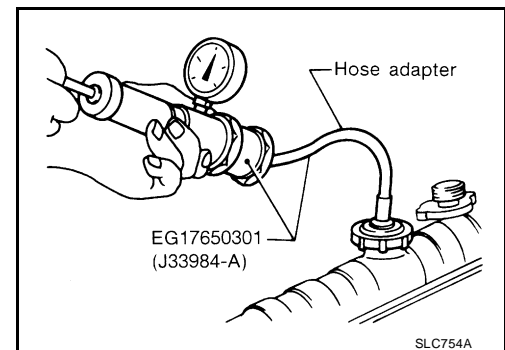
OK or NG

OK >> GO TO 7.

NG >> Check the following for leak

- Hose
- Radiator
- Water pump

Refer to [CO-41, "WATER PUMP"](#).



7. CHECK RADIATOR CAP

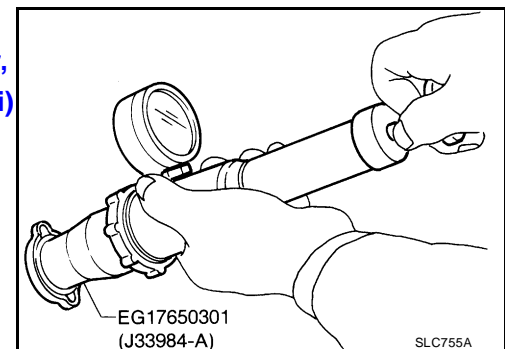
Apply pressure to cap with a tester.

Radiator cap relief pressure: 59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm² , 9 - 14 psi)

OK or NG

OK >> GO TO 8.

NG >> Replace radiator cap.



8. CHECK THERMOSTAT

1. Check valve seating condition at normal room temperatures.
It should seat tightly.
2. Check valve opening temperature and valve lift.

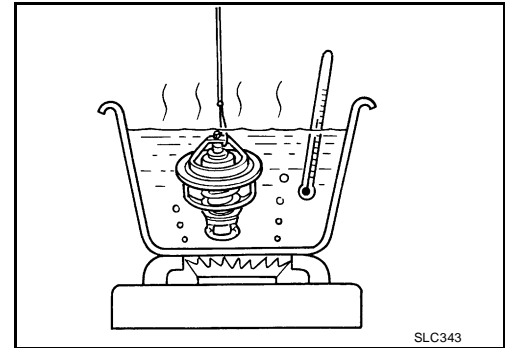
Valve opening temperature: 82°C (180°F) [standard]

Valve lift: More than 8.6 mm/95°C (0.339 in/203°F)

3. Check if valve is closed at 5°C (9°F) below valve opening temperature.
For details, refer to [CO-45, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

OK or NG

- OK >> GO TO 9.
NG >> Replace thermostat

**9. CHECK ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EC-815, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
NG >> Replace engine coolant temperature sensor.

10. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to [EC-1113, "Main 12 Causes of Overheating"](#).

>> INSPECTION END

PROCEDURE A

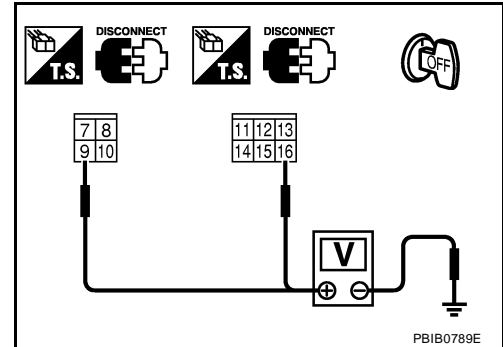
1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect IPDM E/R harness connectors E118 and E123.
3. Check voltage between IPDM E/R terminals 9, 16 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

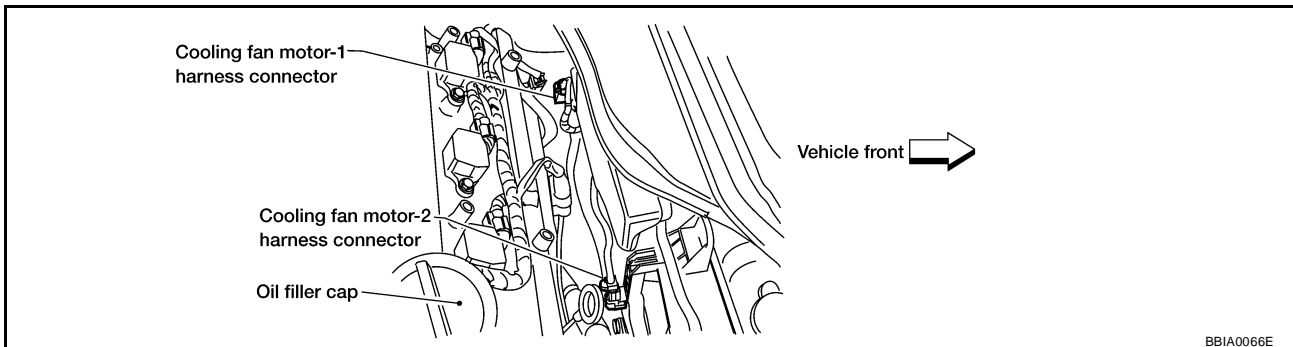
Check the following.

- 40A fusible links
- Harness connectors E27, E130
- 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 MOTORS CIRCUIT

1. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.



2. Check harness continuity between cooling fan motor-1 terminal 1 and IPDM E/R terminal 7, cooling fan motor-1 terminal 4 and body ground. Refer to wiring diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.
4. Check harness continuity between cooling fan motor-2 terminal 1 and IPDM E/R terminal 13, cooling fan motor-2 terminal 4 and body ground. 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.

DTC P1217 ENGINE OVER TEMPERATURE

[VQ]

4. CHECK COOLING FAN MOTORS

Refer to [EC-1113, "COOLING FAN MOTORS-1 AND -2"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace cooling fan motors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .

NG >> Repair or replace harness or connector.

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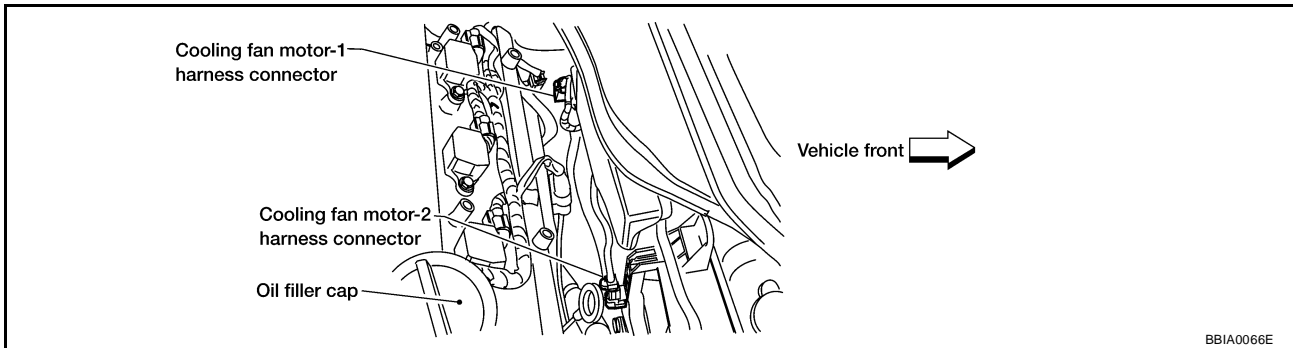
L

M

PROCEDURE B

1. CHECK COOLING FAN MOTORS CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.



3. Check harness continuity between the following; cooling fan motor-1 terminal 2 and IPDM E/R terminal 5, cooling fan motor-1 terminal 3 and IPDM E/R terminal 15, IPDM E/R terminal 14 and body ground. Refer to wiring diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.
5. Check harness continuity between the following; cooling fan motor-2 terminal 2 and IPDM E/R terminal 10, cooling fan motor-2 terminal 3 and IPDM E/R terminal 12, IPDM E/R terminal 14 and body ground. Refer to wiring diagram.

Continuity should exist.

6. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK COOLING FAN MOTORS

Refer to [EC-1113, "COOLING FAN MOTORS-1 AND -2"](#) .

OK or NG

OK >> GO TO 3.

NG >> Replace cooling fan motors.

3. CHECK INTERMITTENT INCIDENT

Perform [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .

NG >> Repair or replace harness connectors.

DTC P1217 ENGINE OVER TEMPERATURE

[VQ]

Main 12 Causes of Overheating

UBS003GX

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 	50 - 50% coolant mixture	MA-12
	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	MA-22
	4	<ul style="list-style-type: none"> Radiator cap 	<ul style="list-style-type: none"> Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	CO-33
ON*2	5	<ul style="list-style-type: none"> Coolant leaks 	<ul style="list-style-type: none"> Visual 	No leaks	CO-32
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	CO-45
ON*1	7	<ul style="list-style-type: none"> Cooling fan 	<ul style="list-style-type: none"> CONSULT-II 	Operating	See trouble diagnosis for DTC P1217 (EC-1103).
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	—
ON*3	9	<ul style="list-style-type: none"> Coolant temperature gauge 	<ul style="list-style-type: none"> Visual 	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> Coolant overflow to reservoir tank 	<ul style="list-style-type: none"> Visual 	No overflow during driving and idling	MA-22
OFF*4	10	<ul style="list-style-type: none"> Coolant return from reservoir tank to radiator 	<ul style="list-style-type: none"> Visual 	Should be initial level in reservoir tank	MA-22
OFF	11	<ul style="list-style-type: none"> Cylinder head 	<ul style="list-style-type: none"> Straight gauge feeler gauge 	0.1 mm (0.004 in) Maximum distortion (warping)	EM-178
	12	<ul style="list-style-type: none"> Cylinder block and pistons 	<ul style="list-style-type: none"> Visual 	No scuffing on cylinder walls or piston	EM-194

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to [CO-29, "OVERHEATING CAUSE ANALYSIS"](#).

Component Inspection

UBS003GY

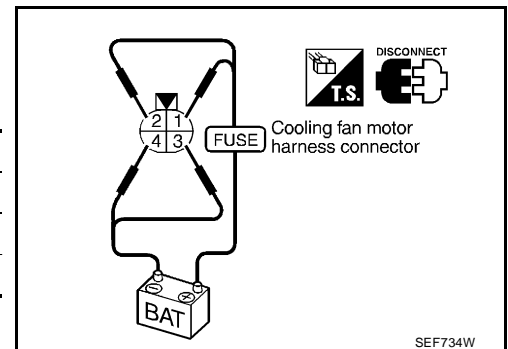
COOLING FAN MOTORS-1 AND -2

- Disconnect cooling fan motor harness connectors.
- Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
	High	1, 2	3, 4

Cooling fan motor should operate.

If NG, replace cooling fan motor.



DTC P1223, P1224 TP SENSOR

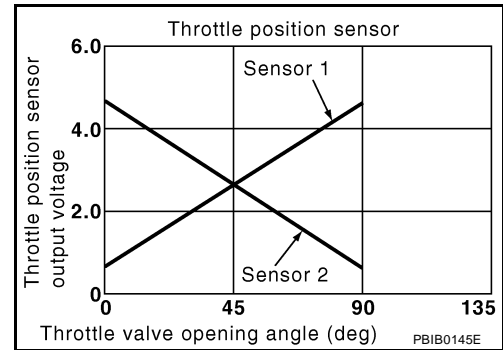
PF16119

Component Description

UBS003GZ

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 the 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-II Reference Value in Data Monitor Mode

UBS003H0

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL SEN2	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) 	Accelerator pedal: Fully released More than 0.36V
	<ul style="list-style-type: none"> Shift lever: D (A/T model) 1st (M/T model) 	Accelerator pedal: Fully depressed Less than 4.75V

On Board Diagnosis Logic

UBS003H1

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1223 1223	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 (The TP sensor 2 circuit is open or shorted.) Electric throttle control actuator (TP sensor 2)
P1224 1224	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 in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS003H2

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P1223, P1224 TP SENSOR

[VQ]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1117, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P1223, P1224 TP SENSOR

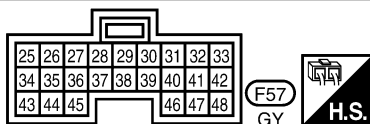
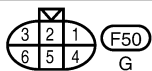
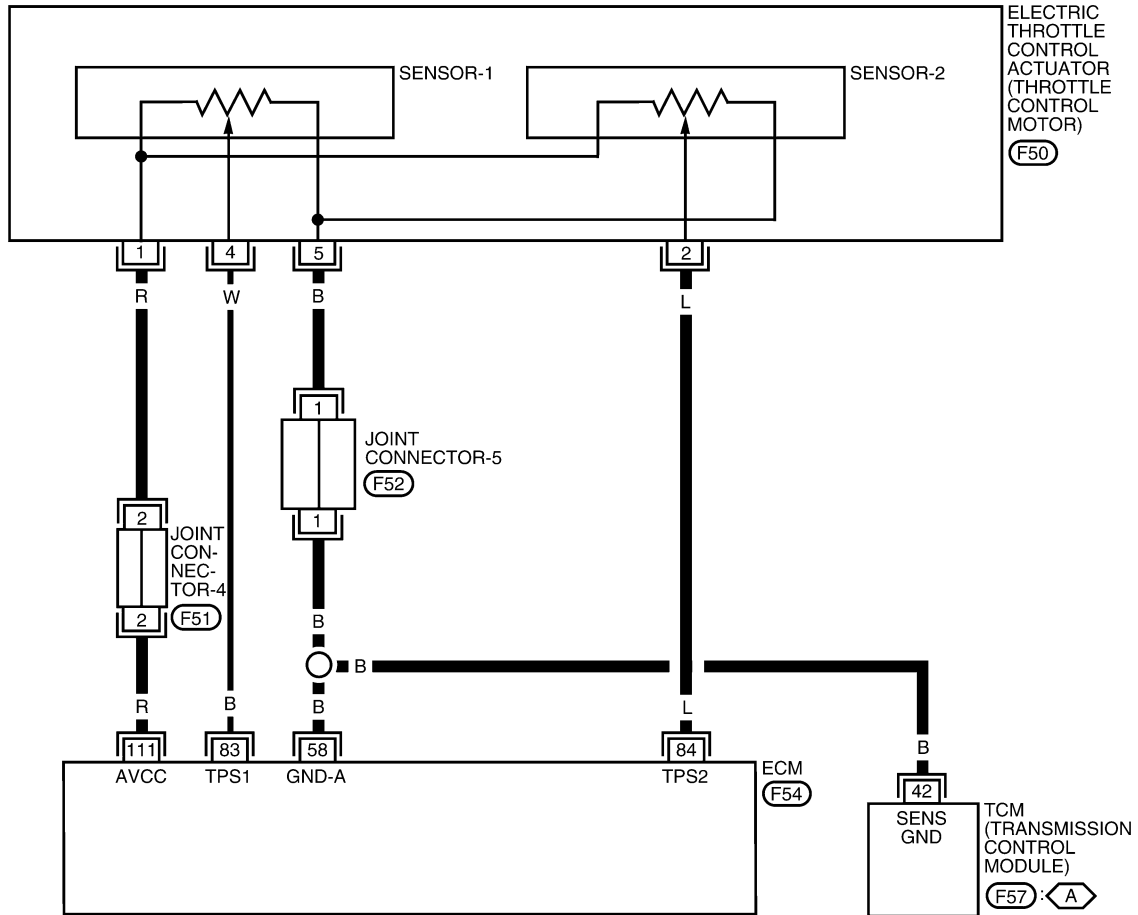
[VQ]

Wiring Diagram

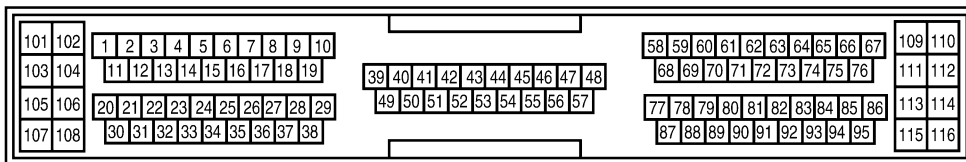
UBS003H3

EC-TPS2-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ◊** : WITH A/T



REFER TO THE FOLLOWING.
 (F51), (F52) - JOINT CONNECTOR (J/C)



BBWA0194E

Specification data are reference values and are measured between each terminal and ground.

DTC P1223, P1224 TP SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
83	W	Throttle position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully released 	More than 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully depressed 	Less than 4.75V
84	L	Throttle position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully released 	Less than 4.75V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position: "D" (A/T models) ● Gear position: "1st" (M/T models) ● Accelerator pedal fully depressed 	More than 0.36V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

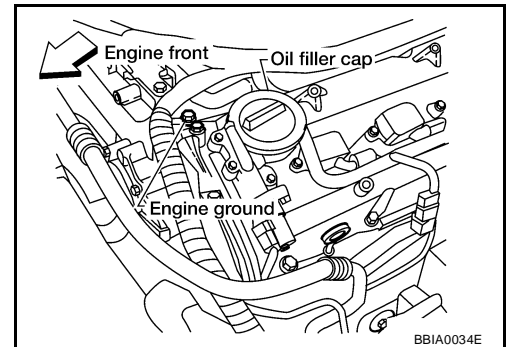
Diagnostic Procedure

UBS003H4

1. RETIGHTEN GROUND SCREWS

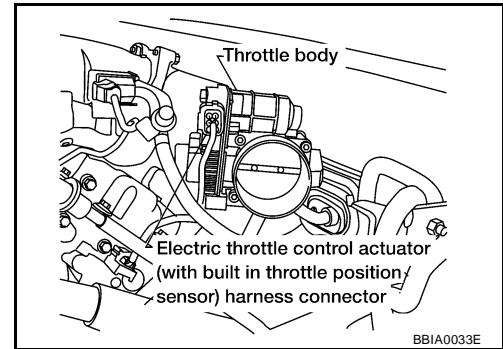
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

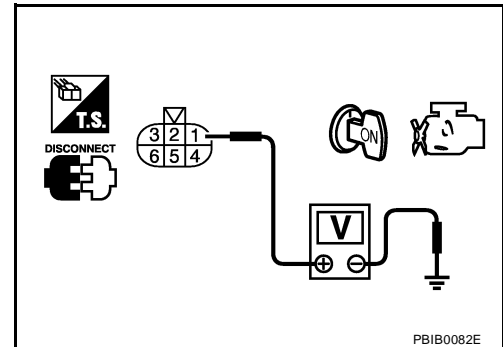


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

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. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. 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 5.
 NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-5
- Harness for open or short between electric throttle control actuator and ECM
- Harness for open or short between electric throttle control actuator and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 84 and electric throttle control actuator 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 THROTTLE POSITION SENSOR

Refer to [EC-1119, "Component Inspection"](#).

OK or NG

OK >> GO TO 8.

NG >> GO TO 7.

7. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#).
3. Perform [EC-669, "Idle Air Volume Learning"](#).

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

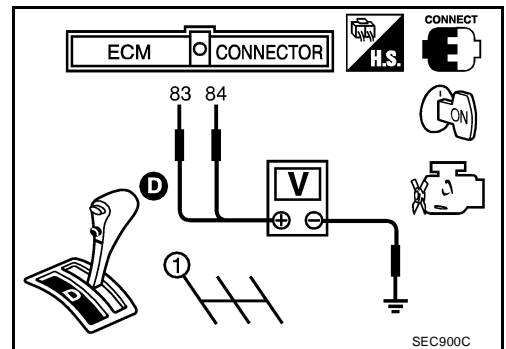
**Component Inspection
THROTTLE POSITION SENSOR**

UBS003H5

1. Reconnect all harness connectors disconnected.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#).
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 83 (TP sensor 1 signal), 84 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
84 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-669, "Throttle Valve Closed Position Learning"](#).
8. Perform [EC-669, "Idle Air Volume Learning"](#).



Removal and Installation
ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

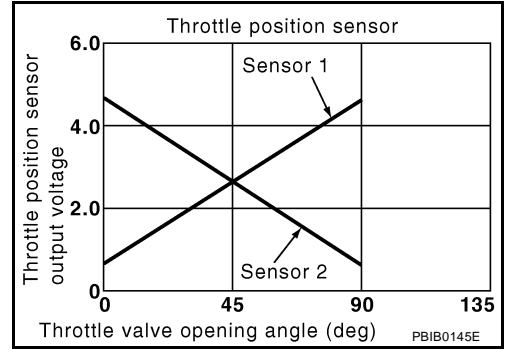
DTC P1225 TP SENSOR

PFP:16119

Component Description

UBS003H7

Electric Throttle Control Actuator consists of throttle control motor, acceleration pedal position sensor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement. The throttle position sensor has the 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

UBS003H8

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance problem	Closed throttle position learning value is excessively low.	● Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

UBS003H9

NOTE:

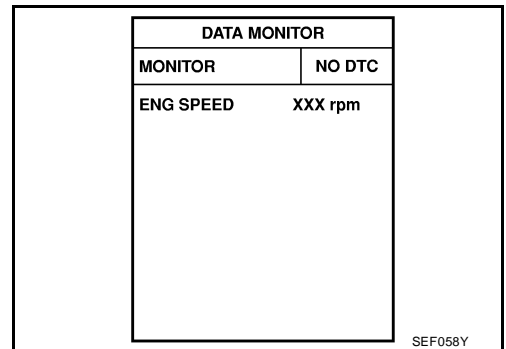
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Turn ignition switch "ON".
5. If 1st trip DTC is detected, go to [EC-1122, "Diagnostic Procedure"](#).



WITH GST

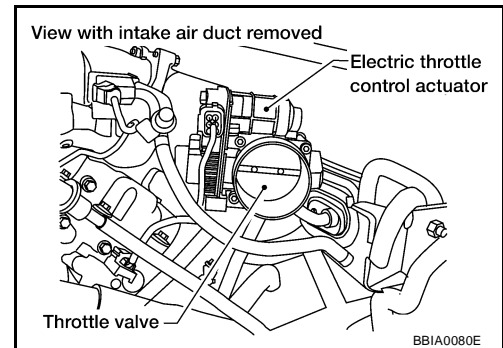
Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure**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 and the housing.

OK or NG

- OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-669, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**Removal and Installation
ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

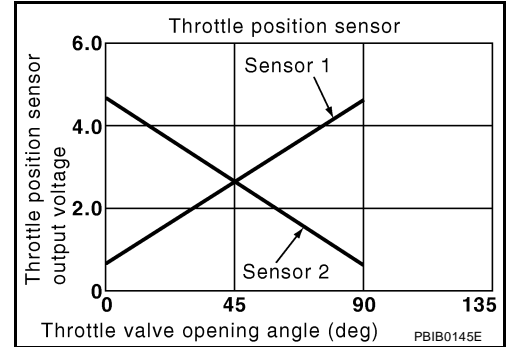
DTC P1226 TP SENSOR

PFP:16119

Component Description

UBS003HC

Electric Throttle Control Actuator consists of throttle control motor, acceleration pedal position sensor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement. The throttle position sensor has the 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

UBS003HD

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance problem	Closed throttle position learning is not performed successfully, repeatedly.	<ul style="list-style-type: none"> ● Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

UBS003HE

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch “OFF”, wait at least 10 seconds.
4. Turn ignition switch "ON".
5. Repeat steps 3 and 4, 32 times.
6. If 1st trip DTC is detected, go to [EC-1124, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

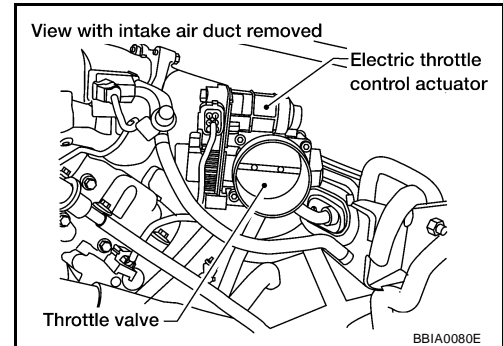
Follow the procedure “With CONSULT-II” above.

Diagnostic Procedure**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 and the housing.

OK or NG

- OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-669, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**Removal and Installation
ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

DTC P1227, P1228 APP SENSOR

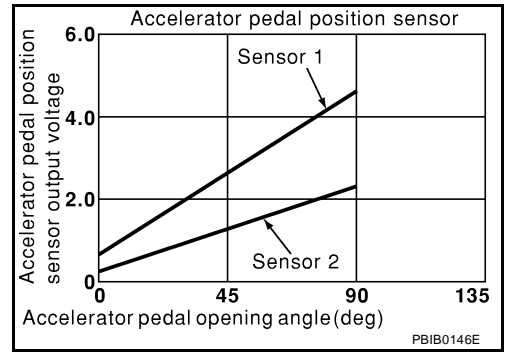
Component Description

UBS003HH

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-II Reference Value in Data Monitor Mode

UBS003HI

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1 ACCEL SEN2	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
CLSD THL POS	● Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

UBS003HJ

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1227 1227	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	● Harness or connectors (The APP sensor 2 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2)
P1228 1228	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 in 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 an opening speed of approx. 5 seconds to an opening of 10 degrees.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS003HK

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

DTC P1227, P1228 APP SENSOR

[VQ]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1128, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



WITH GST

Follow the procedure "With CONSULT-II" above.

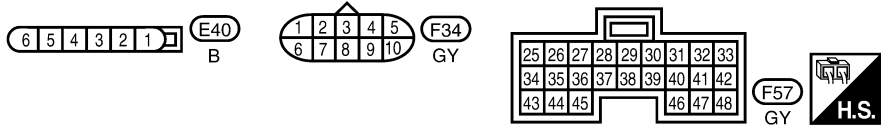
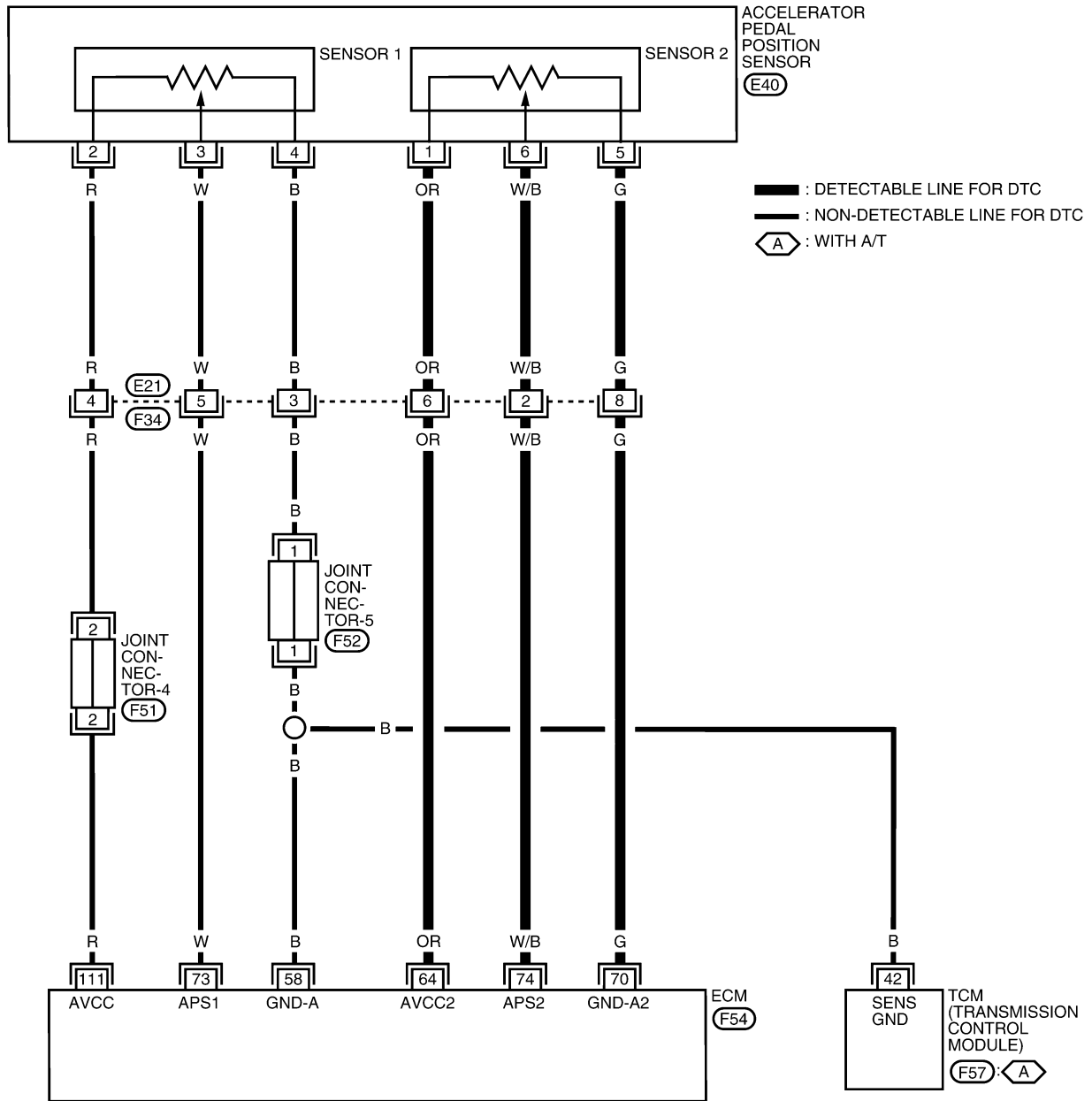
DTC P1227, P1228 APP SENSOR

[VQ]

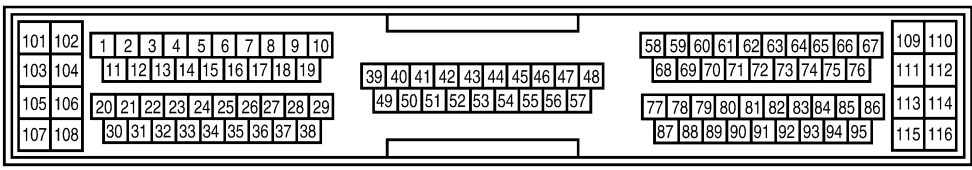
Wiring Diagram

UBS003HL

EC-APPS2-01



REFER TO THE FOLLOWING.
 (F51), (F52) - JOINT CONNECTOR (J/C)



BBWA0198E

Specification data are reference values and are measured between each terminal and ground.

DTC P1227, P1228 APP SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V
70	G	Accelerator pedal position sensor 2 ground	[Ignition switch "ON"]	Approximately 0V
73	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] ● Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 4.2V
74	W/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] ● Accelerator pedal fully released	0.21 - 0.36V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 2.1V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

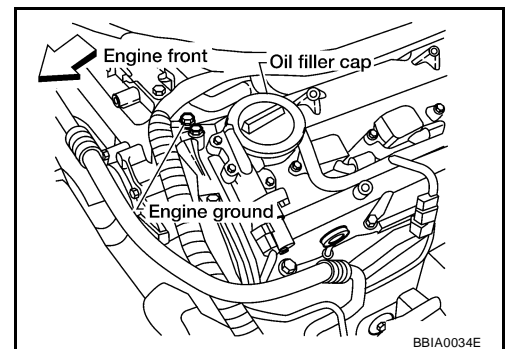
Diagnostic Procedure

UBS003HM

1. RETIGHTEN GROUND SCREWS

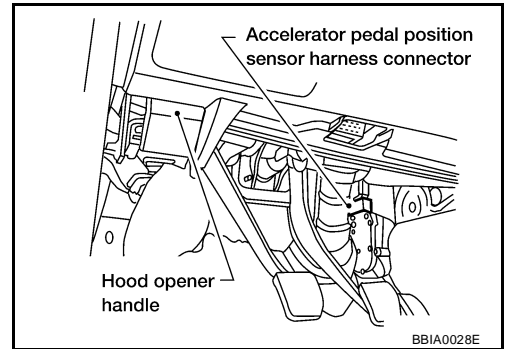
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

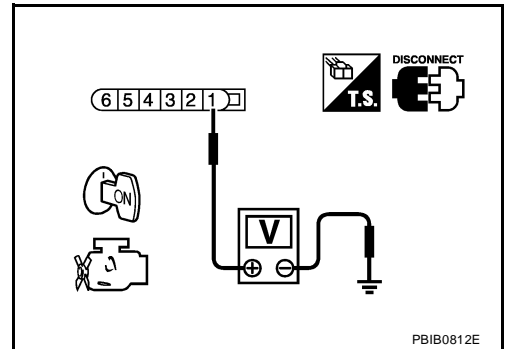


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 2.5V

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminal 5 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 74 and APP sensor terminal 6.
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 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to [EC-1130, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

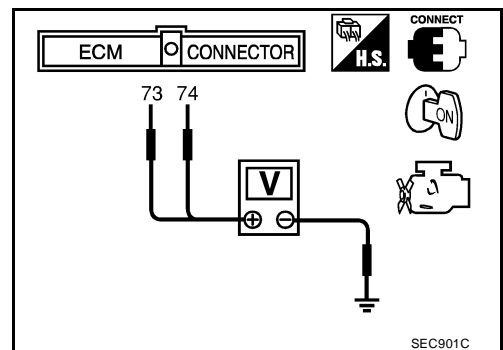
>> **INSPECTION END**

Component Inspection ACCELERATOR PEDAL POSITION SENSOR

UBS003HN

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 73 (APP sensor 1 signal), 74 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 4.2V
74 (Accelerator pedal position sensor 2)	Fully released	0.21 - 0.36V
	Fully depressed	More than 2.1V



4. If NG, replace accelerator pedal assembly.

Removal and Installation ACCELERATOR PEDAL

UBS003HO

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

DTC P1229 SENSOR POWER SUPPLY

[VQ]

DTC P1229 SENSOR POWER SUPPLY

PFP:16119

On Board Diagnosis Logic

UBS003HP

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229 1229	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 (The TP sensor 1 and 2 circuit is shorted.) (APP sensor 1 circuit is shorted.) (MAF sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Power steering pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) ● Electric throttle control actuator (TP sensor 1 and 2) ● Accelerator pedal position sensor (APP sensor 1) ● MAF sensor ● EVAP control system pressure sensor ● Power steering pressures sensor ● Refrigerant pressures sensor ● ECM pin terminal

FAIL-SAFE MODE

When the malfunction is detected, ECM enters in 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

UBS003HQ

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1133, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P1229 SENSOR POWER SUPPLY

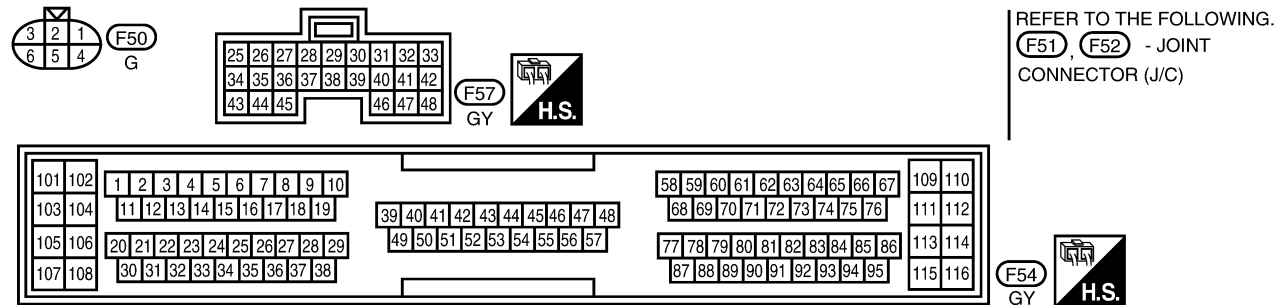
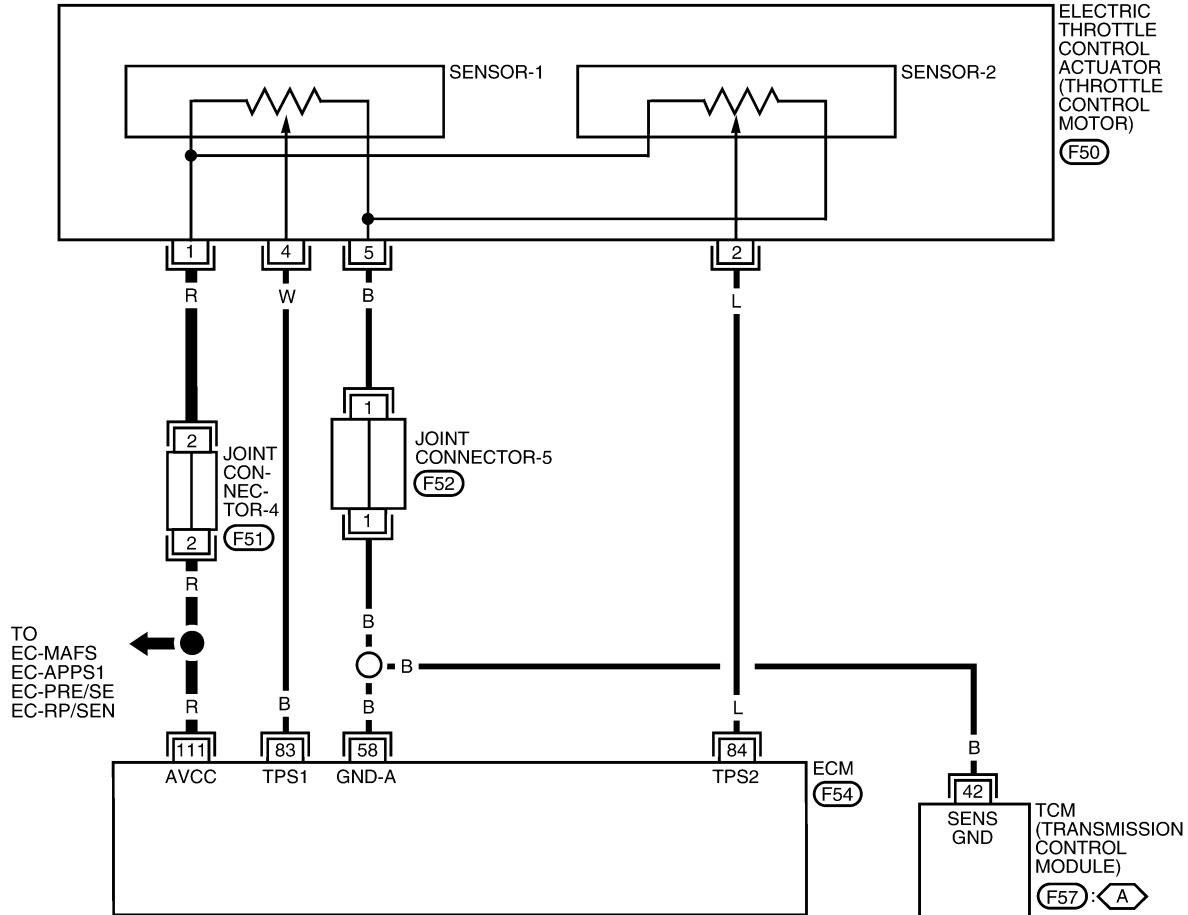
[VQ]

Wiring Diagram

UBS003HR

EC-SEN/PW-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- A** : WITH A/T



WBWA0005E

Specification data are reference values and are measured between each terminal and ground.

DTC P1229 SENSOR POWER SUPPLY

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

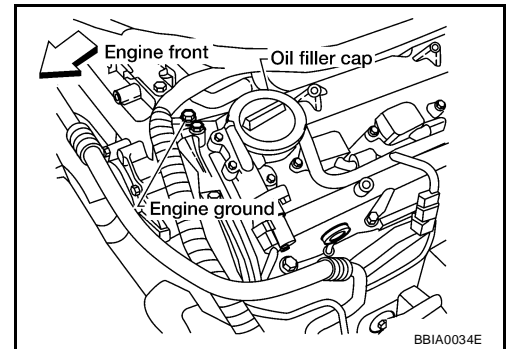
Diagnostic Procedure

UBS003HS

1. RETIGHTEN GROUND SCREWS

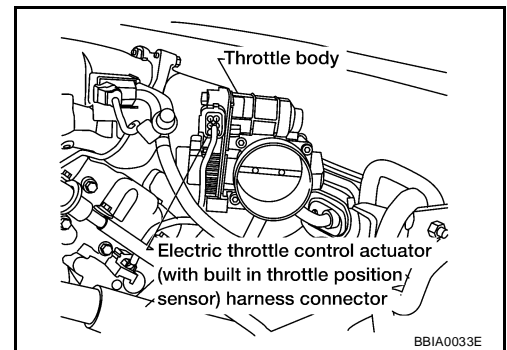
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

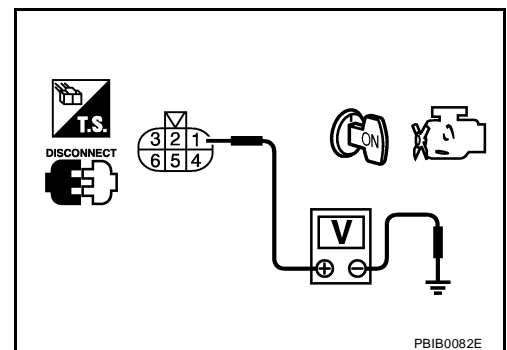


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 3.



3. CHECK SENSOR POWER SUPPLY CIRCUITS

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminals	Reference Wiring Diagram
111	Electric throttle control actuator terminal 1	EC-1132
	APP sensor terminal 2	EC-1127
	MAF sensor terminal 2	EC-800
	EVAP control system pressure sensor terminal 1	EC-987
	Power steering pressure sensor terminal 3	EC-1026
	Refrigerant pressure sensor terminal 1	EC-1253

- ECM pin terminal.

OK or NG

OK >> GO TO 4.

NG >> Repair short to ground or short to power in harness or connectors.

4. CHECK COMPONENTS

Check the following.

- Accelerator pedal position sensor (Refer to [EC-1130](#) "Component Inspection".)
- Mass air flow sensor (Refer to [EC-796](#) "Component Inspection".)
- EVAP control system pressure sensor (Refer to [EC-990](#) "Component Inspection".)
- Power steering pressure sensor (Refer to [EC-1028](#) "Component Inspection".)
- Refrigerant pressure sensor (Refer to [EC-1254](#) "Component Inspection".)

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning component.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-906](#) "Component Inspection".

OK or NG

OK >> GO TO 7.

NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform [EC-669, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-669, "Idle Air Volume Learning"](#) .

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ]

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

Description SYSTEM DESCRIPTION

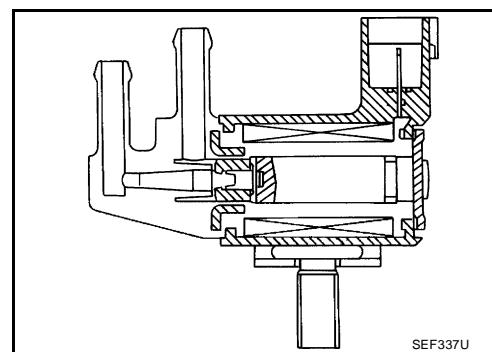
UBS003HT

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	EVAP canister purge flow control	EVAP canister purge vol- ume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Accelerator pedal position switch	Accelerator pedal position		
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed signal (CAN communication line)	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

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-II Reference Value in Data Monitor Mode

UBS003HU

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Air conditioner switch "OFF" ● Shift lever: "N" ● No-load	Idle (Vehicle stopped)
		2,000 rpm
		0%
		—

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ]

On Board Diagnosis Logic

UBS003HV

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1444 1444	EVAP canister purge volume control solenoid valve	The canister purge flow is detected during the specified driving conditions, 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 (The valve is stuck open.) ● EVAP canister vent control valve ● EVAP canister ● Hoses (Hoses are connected incorrectly or clogged.)

DTC Confirmation Procedure

UBS003HW

NOTE:

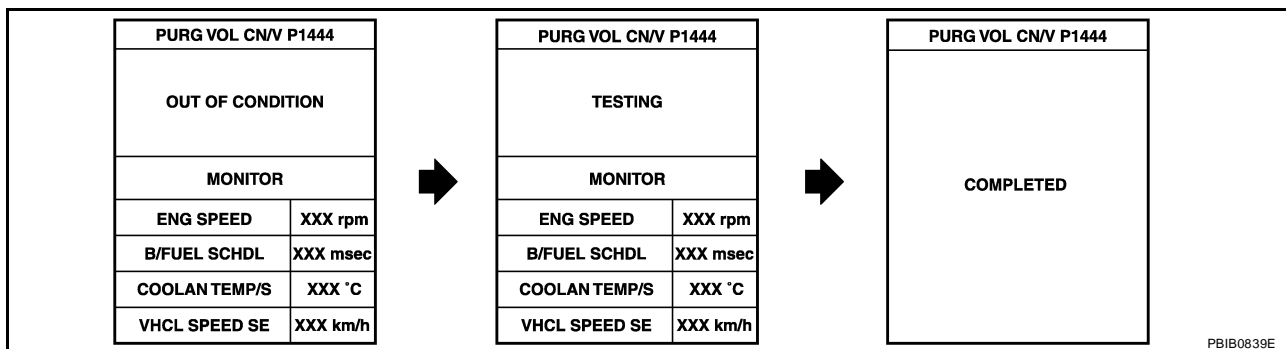
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Turn ignition switch “ON”.
4. Select “PURG VOL CN/V P1444” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
5. Touch “START”.



6. Start engine and let it idle until “TESTING” on CONSULT-II changes to “COMPLETED”. (It will take 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-1138, "Diagnostic Procedure"](#).

WITH GST

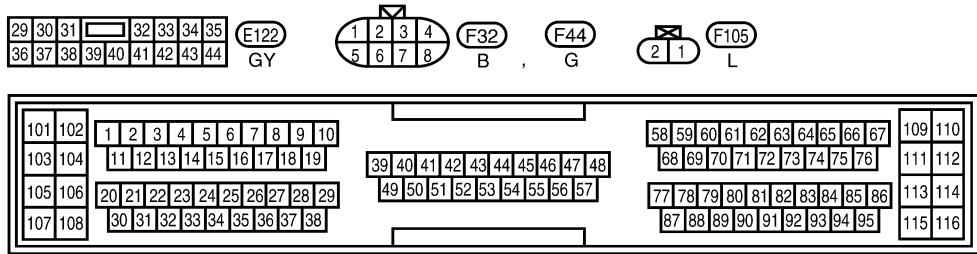
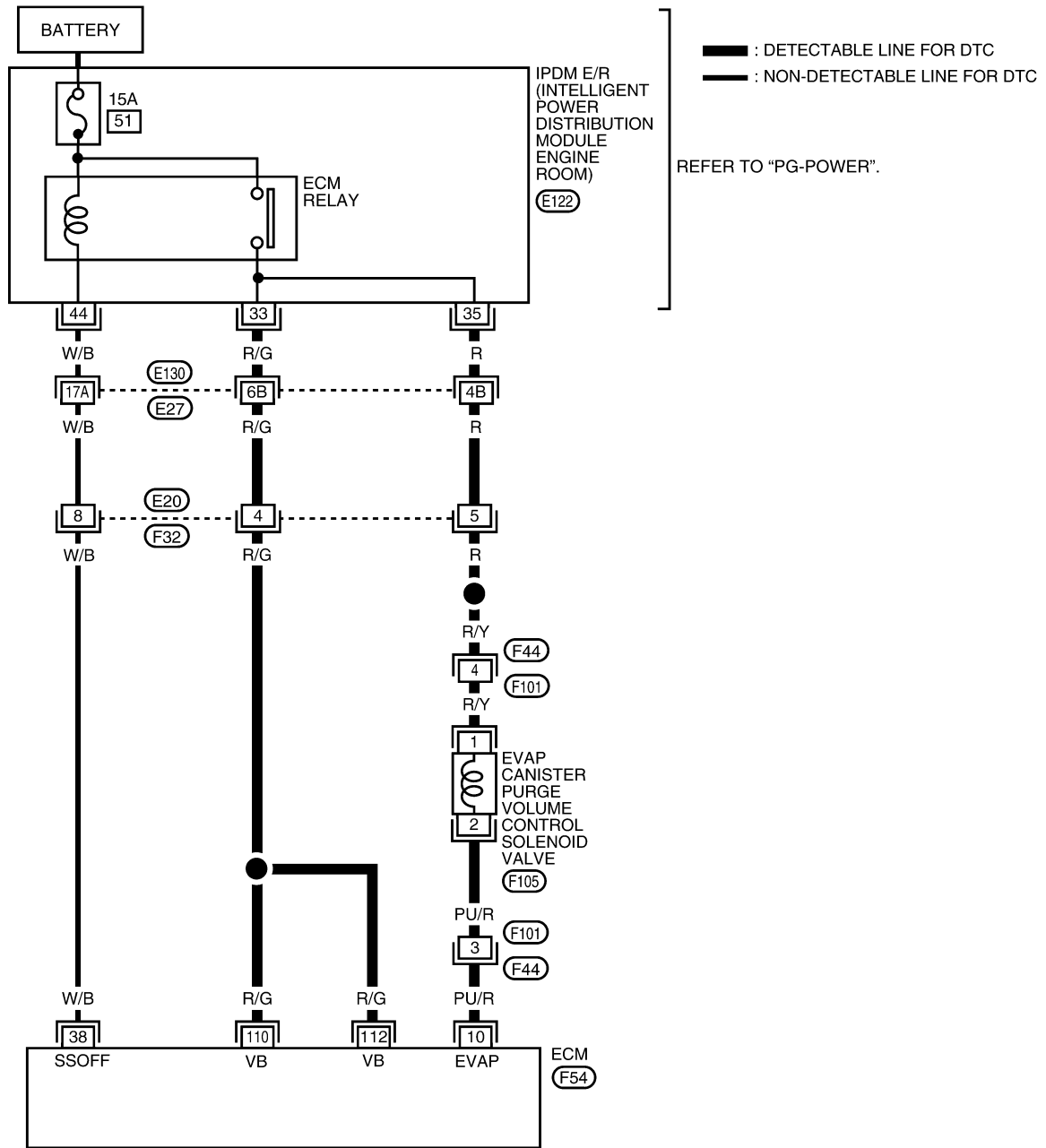
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Select “MODE 7” with GST.
5. If 1st trip DTC is detected, go to [EC-1138, "Diagnostic Procedure"](#).

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [VQ]

UBS003HX

Wiring Diagram

EC-PGC/V-01



REFER TO THE FOLLOWING.
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0068E

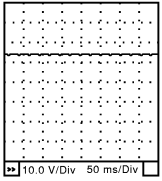
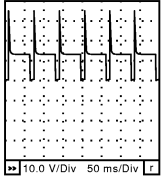
Specification data are reference values and are measured between each terminal and ground.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
10	PU/R	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC990C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine). 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC991C</p>

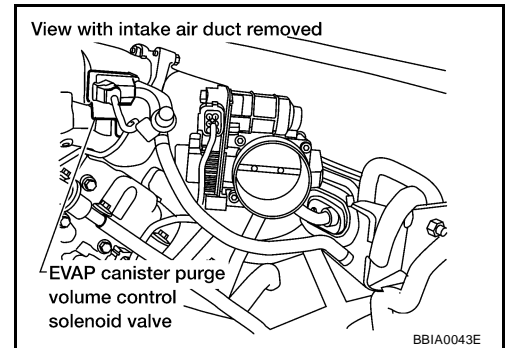
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS003HY

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 harness connector.
3. Turn ignition switch "ON".

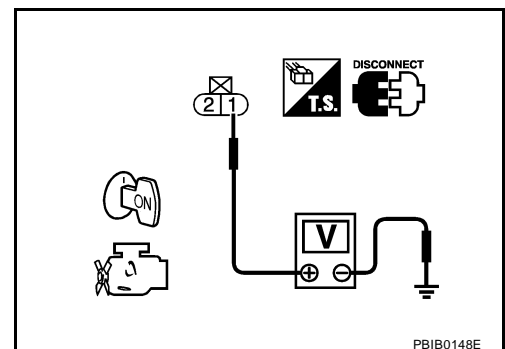


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [VQ]

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Harness connectors F44, F101
- IPDM E/R harness connector E122
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between ECM and IPDM E/R

>> Repair 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 10 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 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F44, F101
- 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.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 6.
- NG >> Repair it.

6. 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 7.
- NG >> Replace EVAP control system pressure sensor.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ]

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-990, "Component Inspection"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 8.
- OK (Without CONSULT-II)>>GO TO 9.
- NG >> Replace EVAP control system pressure sensor.

8. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

 **With CONSULT-II**

1. Turn ignition switch "OFF".
2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 9.

ACTIVE TEST	
PURG VOL CONT/V	0 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %

PBIB0147E

9. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1142, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP canister purge volume control solenoid valve.

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 EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-983, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.
- NG >> Replace EVAP canister vent control valve.

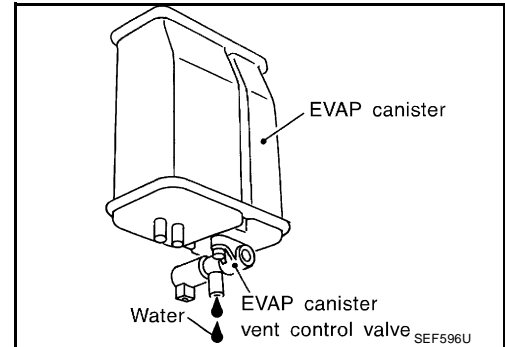
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [VQ]

12. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 13.
No >> GO TO 16.



13. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

- OK >> GO TO 15.
NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

15. CHECK WATER SEPARATOR

Refer to [EC-970, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.
NG >> Clean or replace water separator.

16. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [VQ]

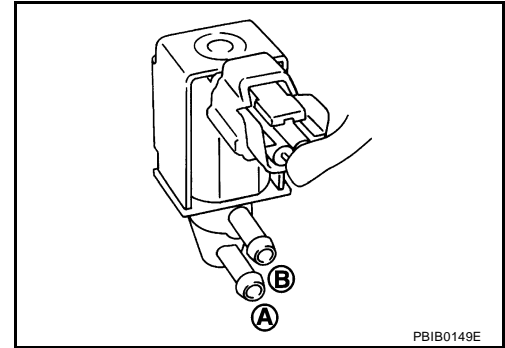
UBS003HZ

Component Inspection EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100.0%	Yes
0.0%	No

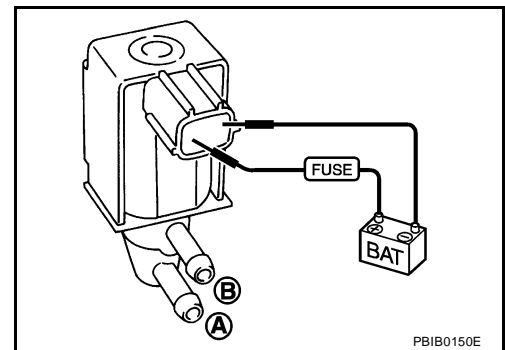


PBIB0149E

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



PBIB0150E

Removal and Installation EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS00310

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

PFV:14935

UBS00311

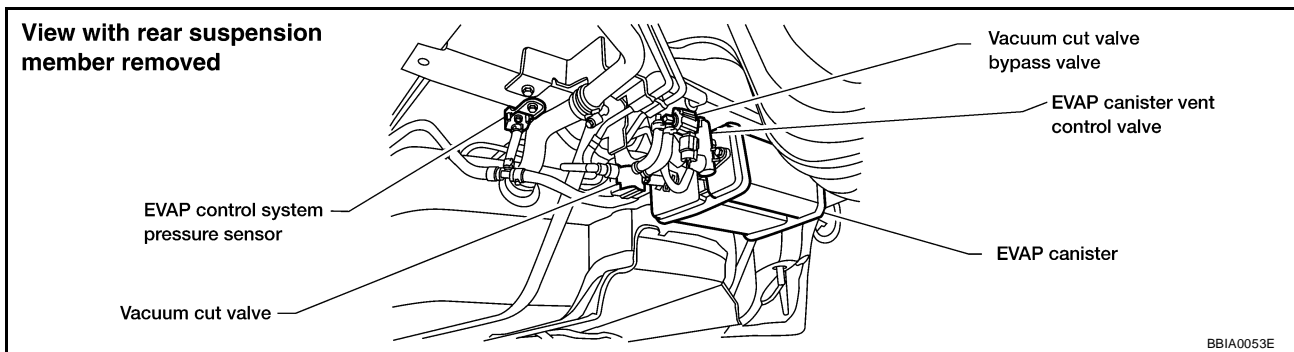
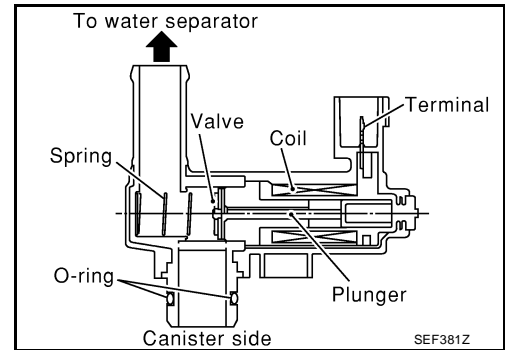
Component Description

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

UBS00312

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS00313

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1446 1446	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 ● Water separator ● EVAP canister is saturated with water

DTC Confirmation Procedure

UBS00314

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine.

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[VQ]

4. Drive vehicle at a speed of approximately 80 km/h (50 MPH) for a maximum of 15 minutes.

NOTE:

If a malfunction exists, NG result may be displayed quicker.

5. If 1st trip DTC is detected, go to [EC-1146, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

 **WITH GST**

Follow the procedure "WITH CONSULT-II" above.

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

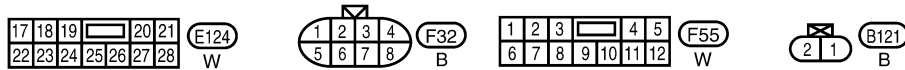
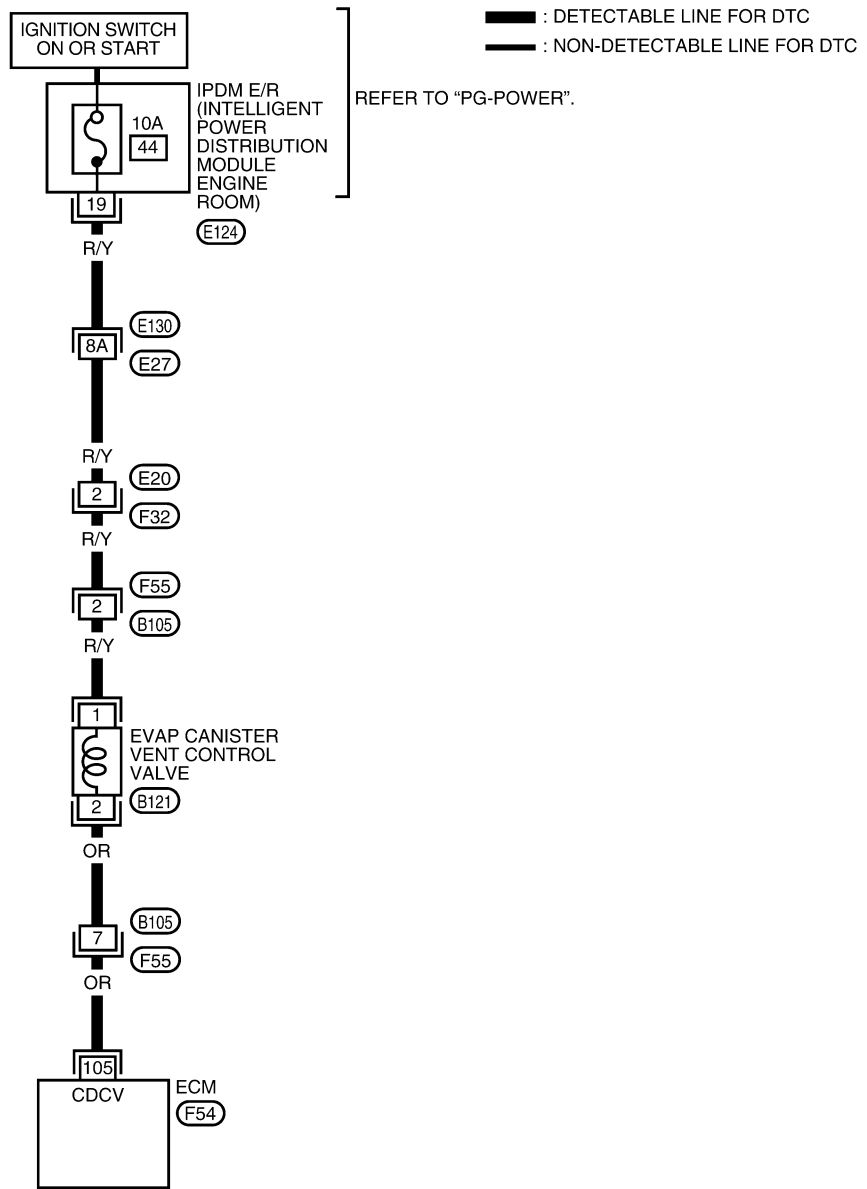
[VQ]

Wiring Diagram

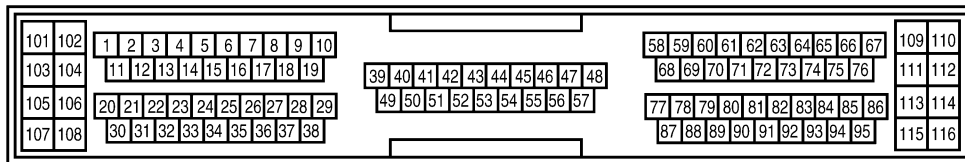
UBS00315

EC-VENT/V-01

A
EC
C
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.
E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0069E

Specification data are reference values and are measured between each terminal and ground.

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

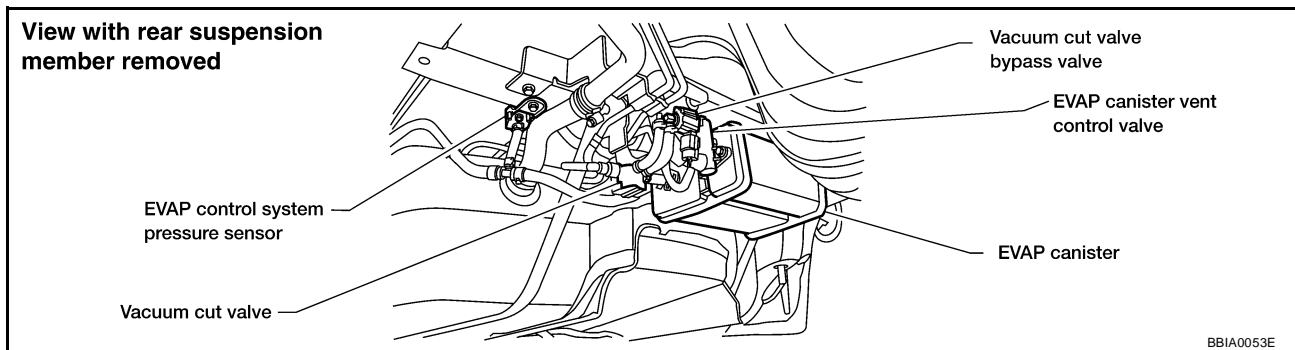
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
105	OR	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS00316

1. CHECK RUBBER TUBE

1. Turn ignition switch "OFF".
2. Disconnect rubber tube connected to EVAP canister vent control valve.



3. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 2.
- NG >> Clean rubber tube using an air blower.

2. CHECK WATER SEPARATOR

Refer to [EC-970, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Clean or replace water separator.

3. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1147, "EVAP CANISTER VENT CONTROL VALVE"](#) .

OK or NG

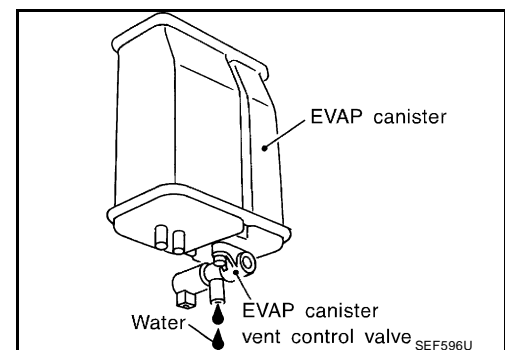
- OK >> GO TO 4.
- NG >> Replace EVAP canister vent control valve.

4. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will 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 attached.
The weight should be less than 1.8 kg (4.0 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 water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 8.
- NG >> Repair it.

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.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-990, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection

EVAP CANISTER VENT CONTROL VALVE

UBS00317

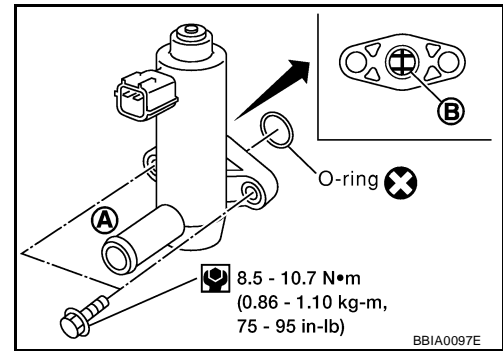
 **With CONSULT-II**

1. Remove EVAP canister vent control valve from EVAP canister.

DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[VQ]

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.
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.

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.
If OK, go to next step.

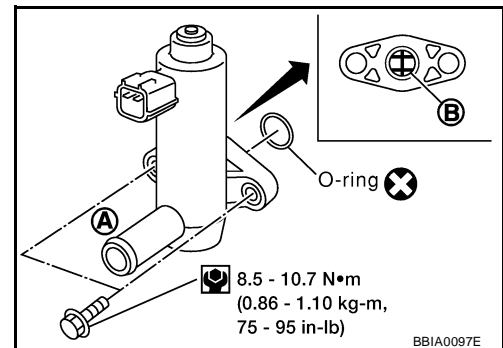
7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 (B1)	XXX V
HO2S1 (B2)	XXX V

PBIB0151E

⊗ Without CONSULT-II

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.

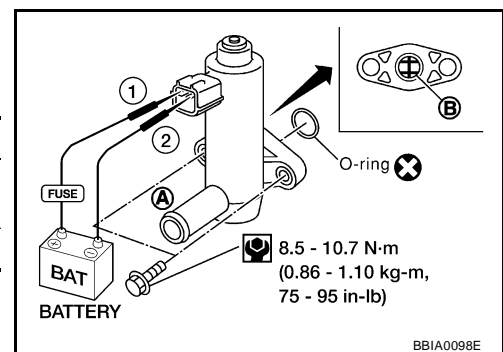
Make sure new O-ring is installed properly.

Condition	Air passage continuity between A and B
12V 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.
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 P1448 EVAP CANISTER VENT CONTROL VALVE

PFP:14935

Component Description

UBS00318

NOTE:

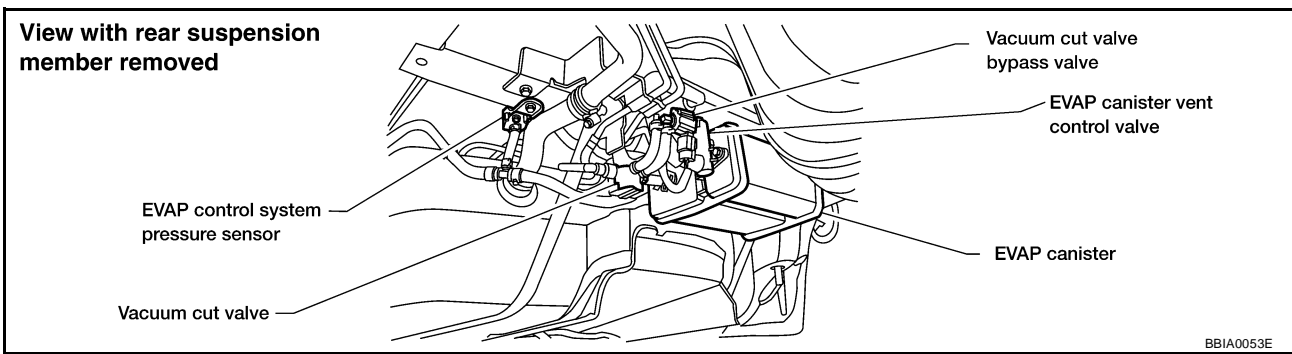
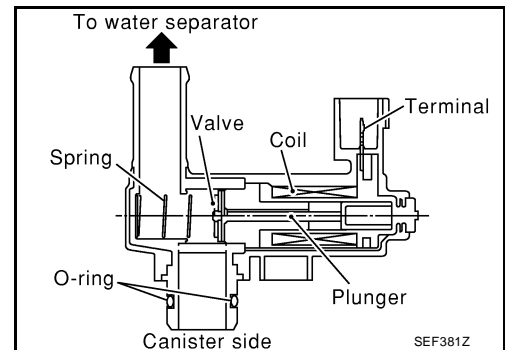
If DTC P1448 is displayed with P0442, perform trouble diagnosis for DTC P1448 first.

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

UBS00319

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS0031A

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1448 1448	EVAP canister vent control valve open	EVAP canister vent control valve remains opened 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 ● Water separator ● EVAP canister is saturated with water ● Vacuum cut valve

DTC Confirmation Procedure

UBS0031B

NOTE:

- If DTC P1448 is displayed with P0442, perform trouble diagnosis for DTC P1448 first.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.

DTC P1448 EVAP CANISTER VENT CONTROL VALVE

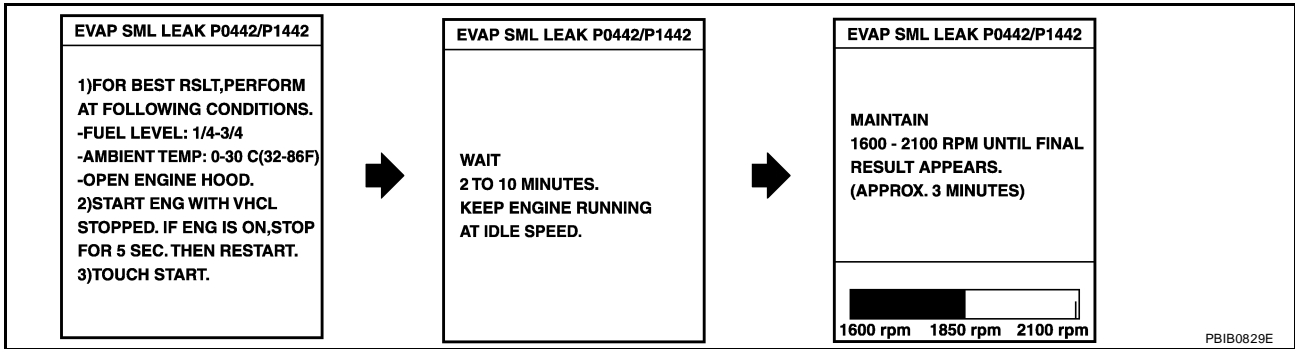
[VQ]

- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

- Turn ignition switch "ON".
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Make sure that the following conditions are met.

COOLANT TEMP/S	0 - 70°C (32 - 158°F)
INT/A TEMP SE	0 - 30°C (32 - 86°F)

- Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
Follow the instruction displayed.



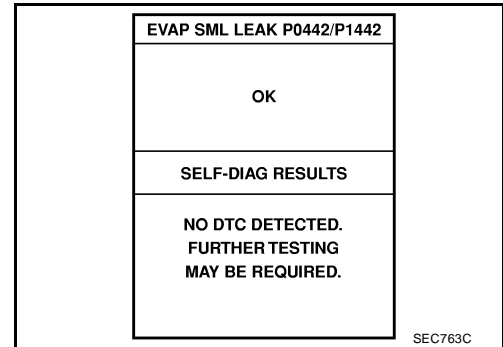
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-705, "Basic Inspection"](#).

- Make sure that "OK" is displayed.
If "NG" is displayed, go to the following step.

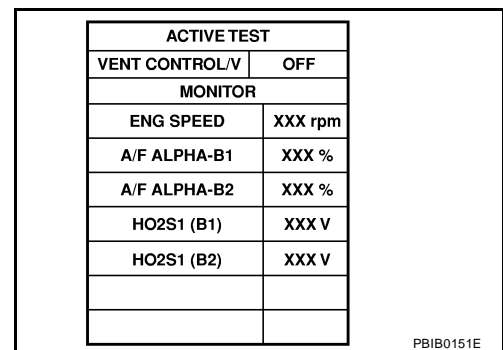
NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

- Stop engine and wait at least 10 seconds, then turn "ON".
- Disconnect hose from water separator.



- Select "VENT CONTROL/V" of "ACTIVE TEST" mode with CONSULT-II.
- Touch "ON" and "OFF" alternately.



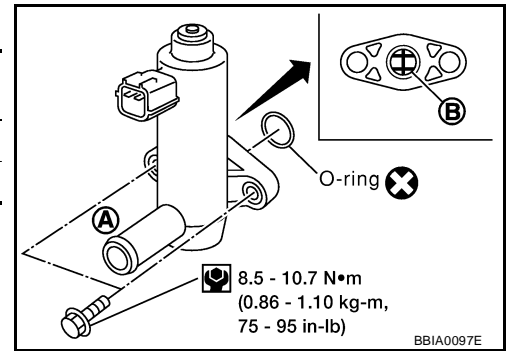
DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[VQ]

11. Make sure the following.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

If the result is NG, go to [EC-1153, "Diagnostic Procedure"](#) .
If the result is OK, go to "Diagnostic Procedure" for DTC P0442, [EC-965](#) .



UBS0031C

Overall Function Check

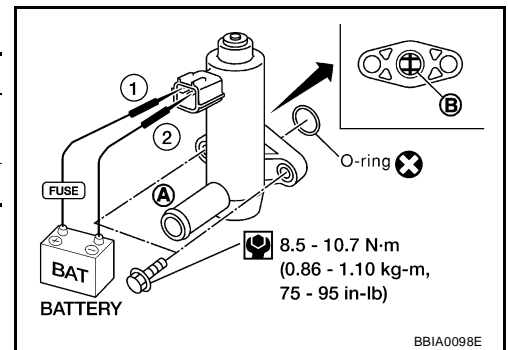
Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a DTC might not be confirmed.

WITH GST

1. Disconnect hose from water separator.
2. Disconnect EVAP canister vent control valve harness connector.
3. Verify the following.

Condition	Air passage continuity
12V direct current supply between terminals 1 and 2	No
No supply	Yes

If the result is NG, go to [EC-1153, "Diagnostic Procedure"](#) .
If the result is OK, go to "Diagnostic Procedure" for DTC P0442, [EC-965](#) .



DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

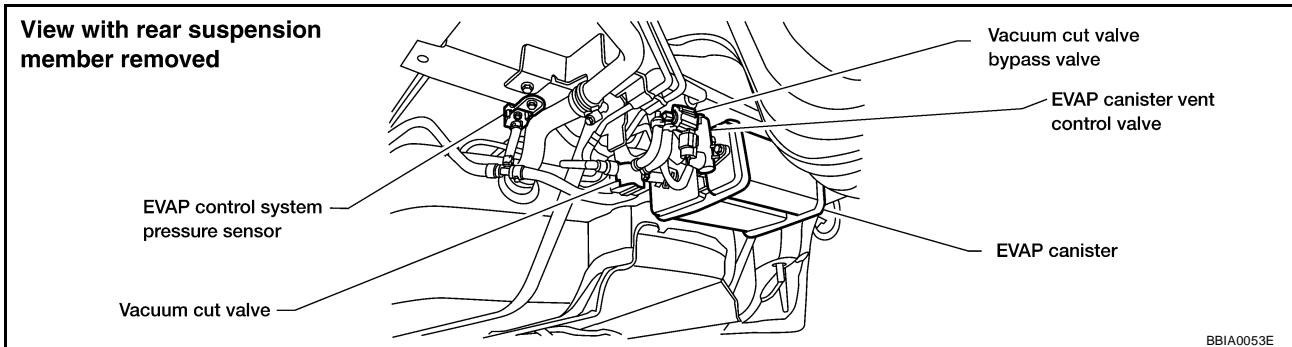
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
105	OR	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS0031E

1. CHECK RUBBER TUBE

1. Turn ignition switch "OFF".
2. Disconnect rubber tube connected to EVAP canister vent control valve.



3. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 2.
- NG >> Clean rubber tube using an air blower.

2. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1155, "EVAP CANISTER VENT CONTROL VALVE"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace EVAP canister vent control valve.

3. CHECK VACUUM CUT VALVE

Refer to [EC-1173, "Component Inspection"](#).

OK or NG

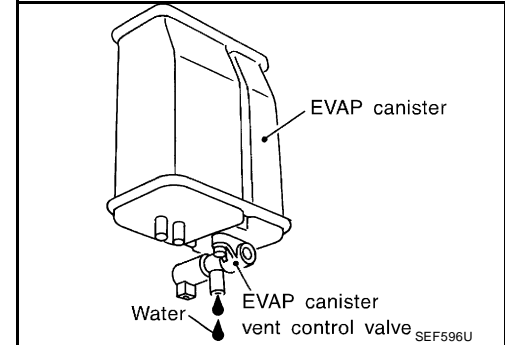
- OK >> GO TO 6.
- NG >> Replace vacuum cut valve.

4. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will 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 attached.

The weight should be less than 1.8 kg (4.0 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 water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 8.
NG >> Repair it.

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.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-990, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
NG >> Replace EVAP control system pressure sensor.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

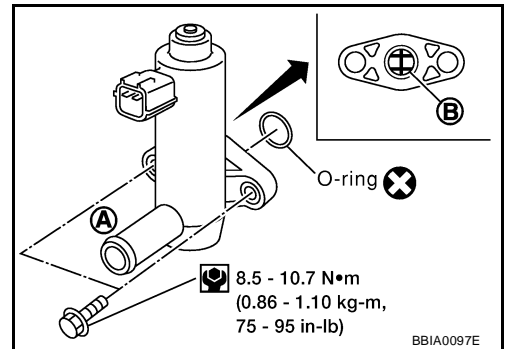
>> INSPECTION END

Component Inspection
EVAP CANISTER VENT CONTROL VALVE

UBS0031F

With CONSULT-II

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.
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.

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.
If OK, go to next step.

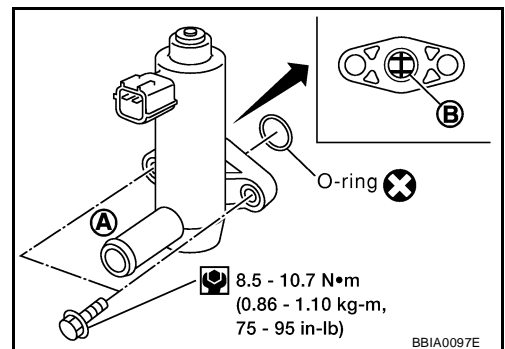
7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 (B1)	XXX V
HO2S1 (B2)	XXX V

PBIB0151E

Without CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[VQ]

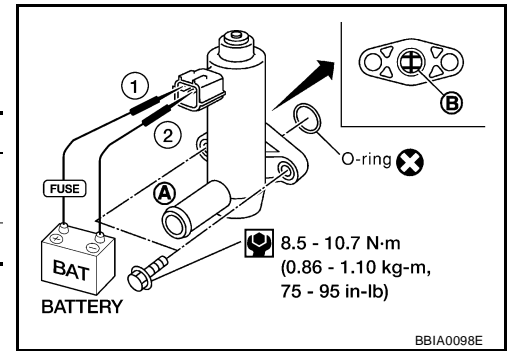
3. Check air passage continuity and operation delay time under the following conditions.
Make sure new O-ring is installed properly.

Condition	Air passage continuity between A and B
12V 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.
 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 P1464 FUEL LEVEL SENSOR

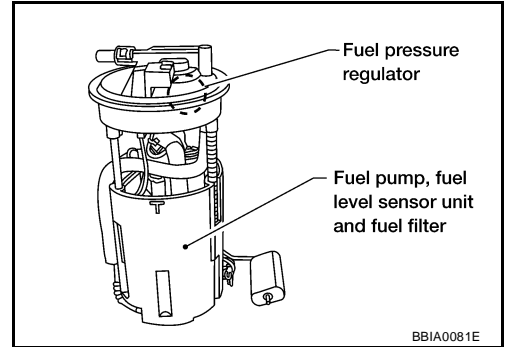
PFP:25060

Component Description

UBS003IG

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



UBS003IH

On Board Diagnosis Logic

ECM receives two signals from the fuel level sensor.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the latter to detect open circuit malfunction.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1464 1464	Fuel level sensor circuit ground signal	A high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted)

DTC Confirmation Procedure

UBS003II

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

- Turn ignition switch "ON".
- Select "DATA MONITOR" mode with CONSULT-II.
- Wait at least 5 seconds.
- If 1st trip DTC is detected, go to [EC-1159, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

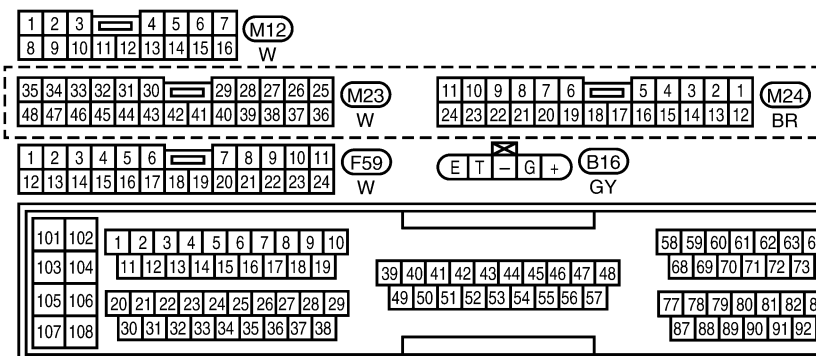
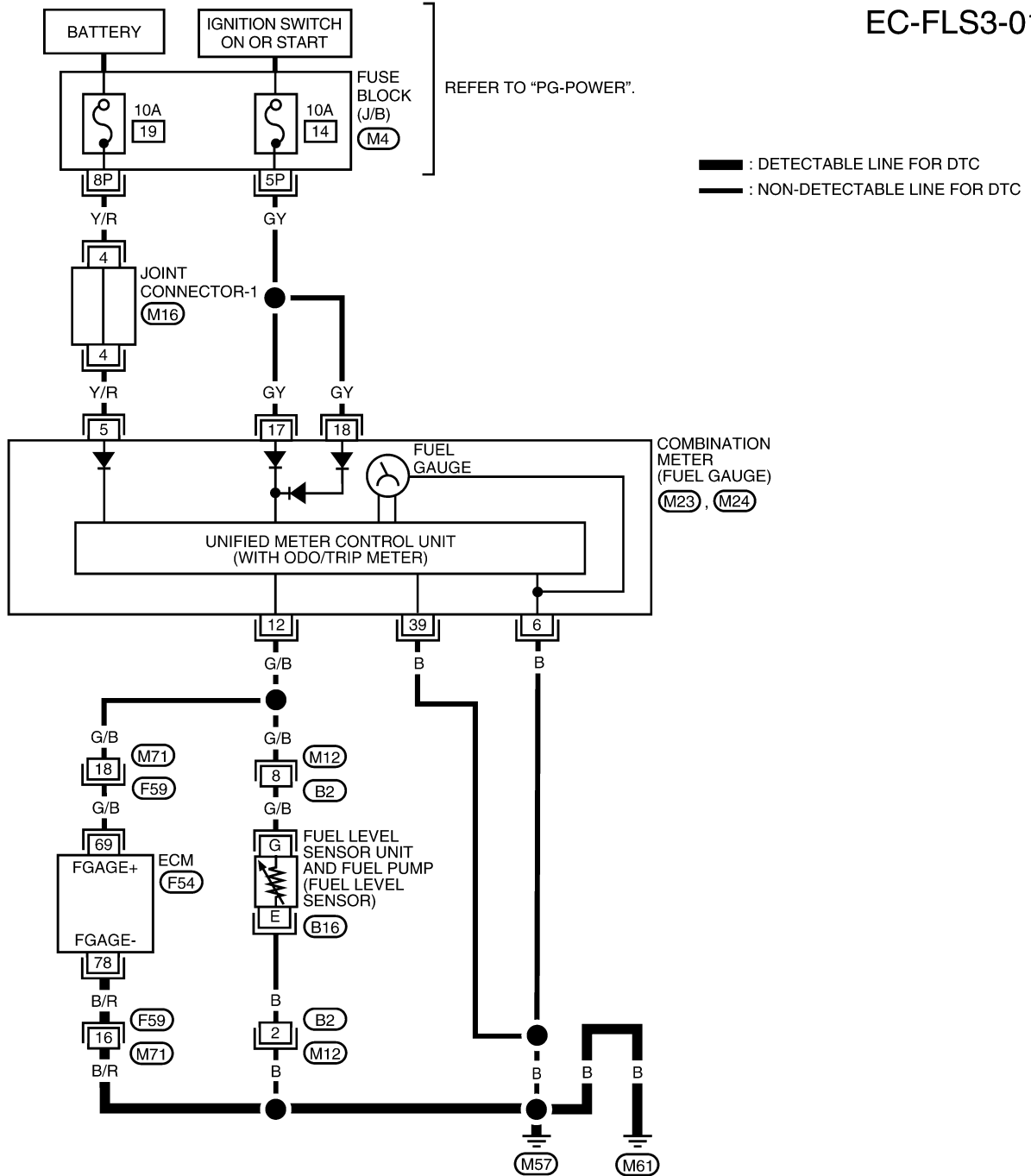
DTC P1464 FUEL LEVEL SENSOR

[VQ]

UBS003J

Wiring Diagram

EC-FLS3-01



DTC P1464 FUEL LEVEL SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
69	G/B	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
78	B	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V

Diagnostic Procedure

UBS0031K

1. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 78 and body ground.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F59, M71
- Harness for open and short between ECM and body ground

>> Replace open circuit or short to power in harness or connectors.

3. CHECK FUEL LEVEL SENSOR

Refer to [DI-21, "Electrical Components Inspection"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Replace fuel level sensor unit.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Removal and Installation FUEL LEVEL SENSOR

UBS0031L

Refer to [FL-5, "Removal and Installation"](#) .

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

PFP:17372

Description COMPONENT DESCRIPTION

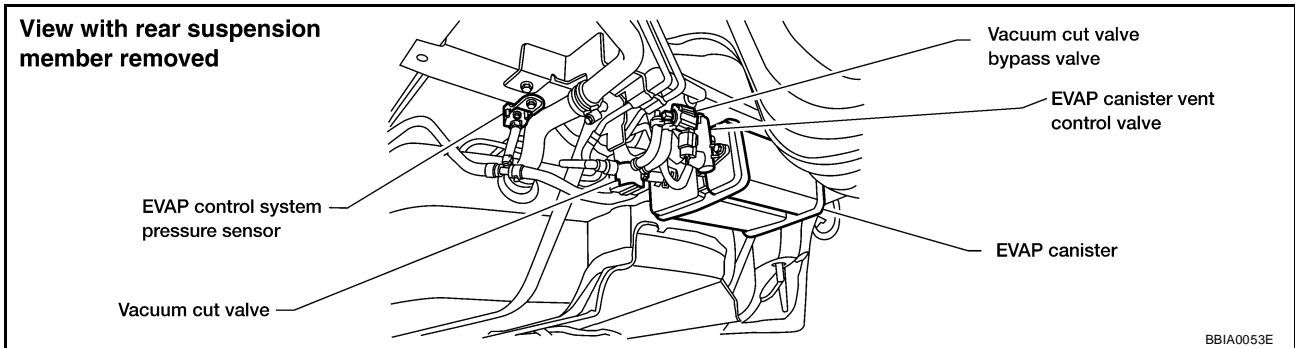
UBS0031M

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

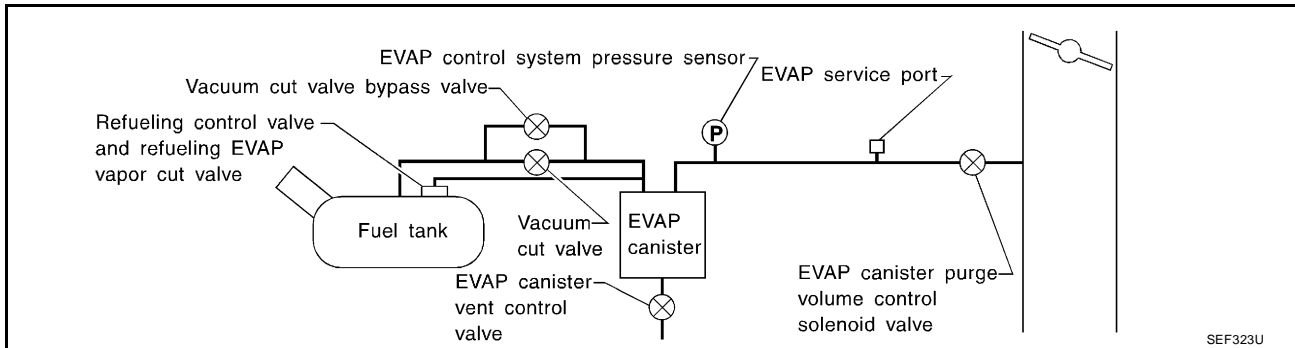
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.



EVAPORATIVE EMISSION SYSTEM DIAGRAM



CONSULT-II Reference Value in Data Monitor Mode

UBS0031N

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPAS S/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS0031O

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1490 1490	Vacuum cut valve bypass valve circuit	An improper voltage signal is sent to ECM through vacuum cut valve bypass valve.	<ul style="list-style-type: none"> ● Harness or connectors (The vacuum cut valve bypass valve circuit is open or shorted) ● Vacuum cut valve bypass valve

DTC Confirmation Procedure

UBS0031P

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle speed.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1163, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

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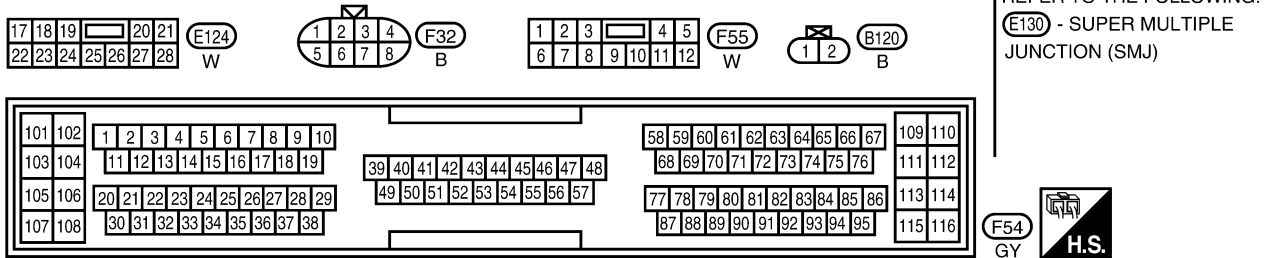
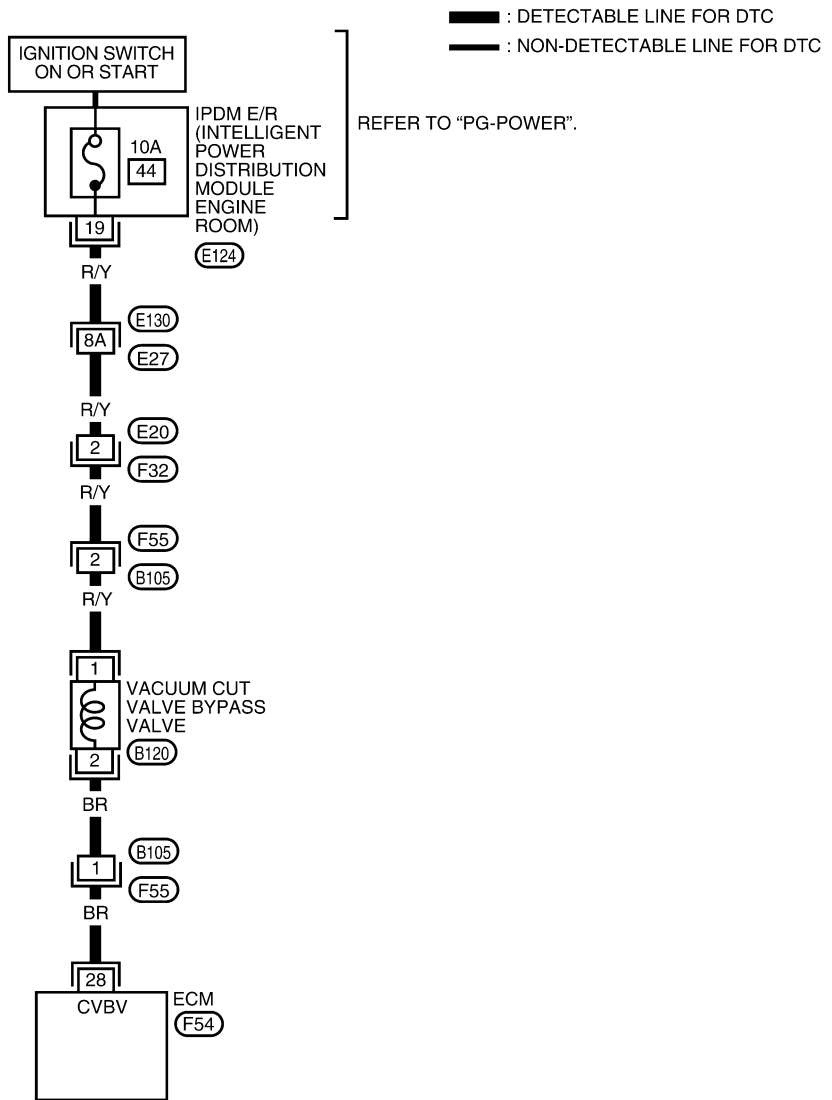
DTC P1490 VACUUM CUT VALVE BYPASS VALVE

[VQ]

Wiring Diagram

UBS0031Q

EC-BYPS/V-01



Specification data are reference values and are measured between each terminal and ground.

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
28	BR	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS0031R

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

2. CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT

 **With CONSULT-II**

1. Turn ignition switch "OFF" and then "ON".
2. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II.
3. Touch "ON/OFF" on CONSULT-II screen.
4. Make sure that clicking sound is heard from the vacuum cut valve bypass valve.

OK or NG

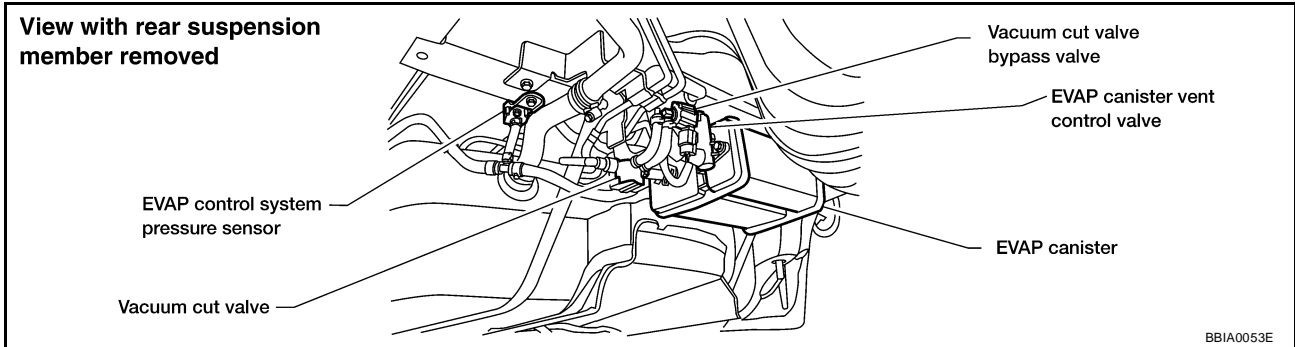
- OK >> GO TO 7.
- NG >> GO TO 3.

ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN

PBIB0157E

3. CHECK VACUUM CUT VALVE BYPASS VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect vacuum cut valve bypass valve harness connector.

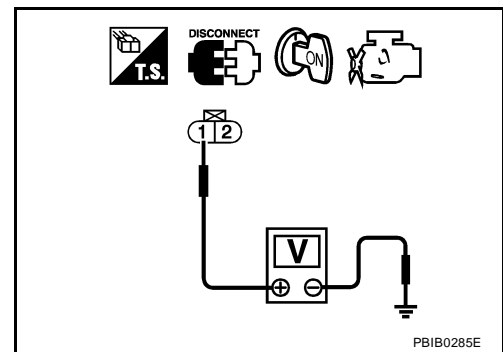


3. Turn ignition switch "ON".
4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Harness connectors F55, B105
- IPDM E/R connector E124
- 10A fuse
- Harness for open or short between vacuum cut valve bypass valve and fuse

>> Repair harness or connectors.

5. CHECK VACUUM CUT VALVE BYPASS 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 vacuum cut valve bypass 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 B105, F55
- Harness for open or short between vacuum cut valve bypass valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK VACUUM CUT VALVE BYPASS VALVE

Refer to [EC-1165, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace vacuum cut valve bypass valve.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection
VACUUM CUT VALVE BYPASS VALVE**

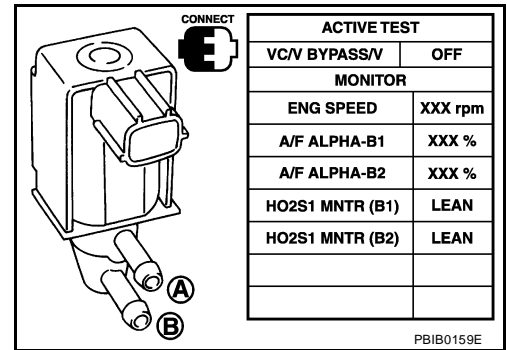
UBS003IS

Ⓟ With CONSULT-II

1. Reconnect harness disconnected connectors.
2. Turn ignition switch ON.
3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.

Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

Operation takes less than 1 second.

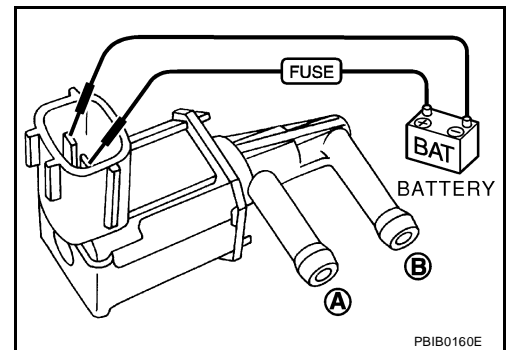


ⓧ Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

Operation takes less than 1 second.



DTC P1491 VACUUM CUT VALVE BYPASS VALVE

PFP:17372

Description COMPONENT DESCRIPTION

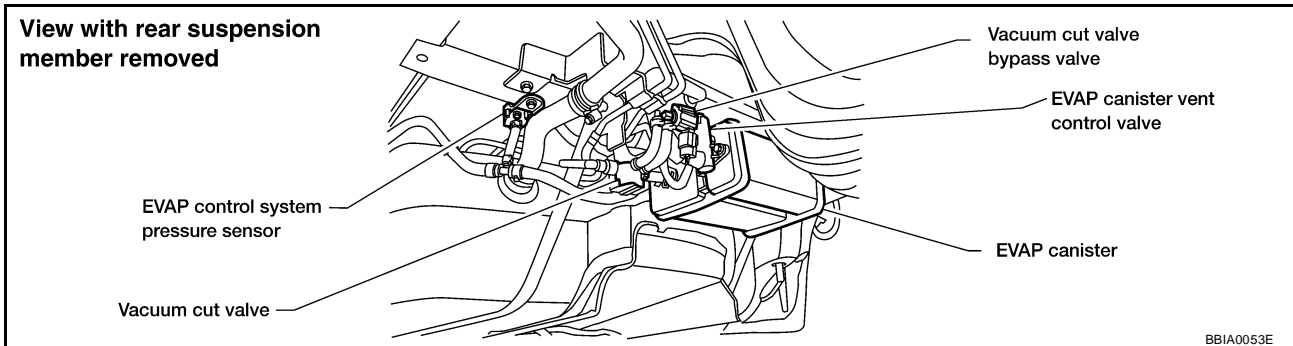
UBS0031T

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

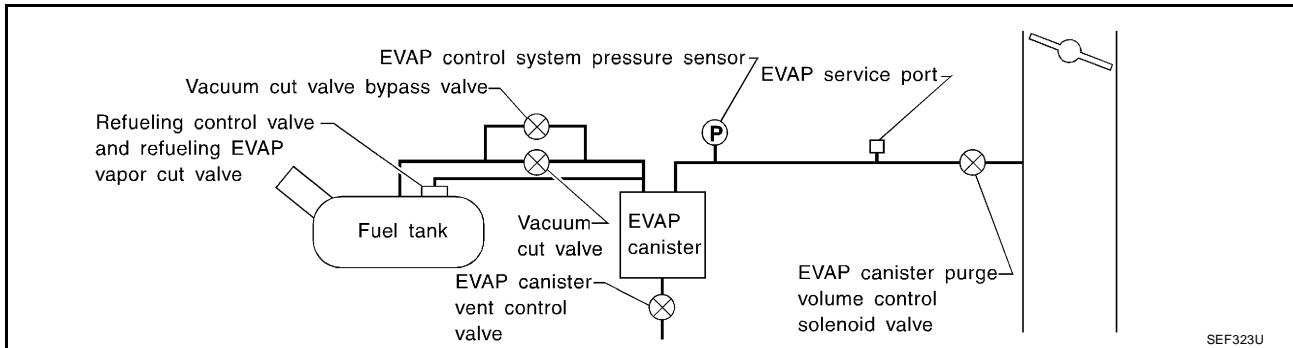
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.



EVAPORATIVE EMISSION SYSTEM DIAGRAM



CONSULT-II Reference Value in Data Monitor Mode

UBS0031U

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPAS S/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS0031V

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1491 1491	Vacuum cut valve bypass valve	Vacuum cut valve bypass valve does not operate properly.	<ul style="list-style-type: none"> ● Vacuum cut valve bypass valve ● Vacuum cut valve ● Bypass hoses for clogging ● EVAP control system pressure sensor and circuit ● EVAP canister vent control valve ● Hose between fuel tank and vacuum cut valve clogged ● Hose between vacuum cut valve and EVAP canister clogged ● EVAP canister ● EVAP purge port of fuel tank for clogging

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

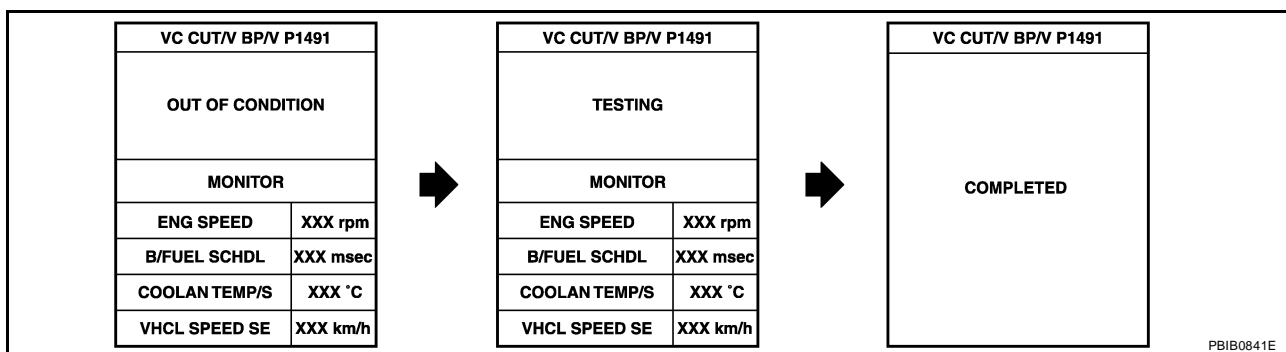
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of more than 0°C (32°F).

WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch “OFF” and wait at least 10 seconds.
4. Start engine and let it idle for at least 70 seconds.
5. Select “VC CUT/V BP/V P1491” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
6. Touch “START”.



7. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take at least 30 seconds.)

ENG SPEED	More than 1,000 rpm
Selector lever	Suitable position
Vehicle speed	More than 37 km/h (23 MPH)
B/FUEL SCHDL	1.0 - 10.0 msec

If “TESTING” is not displayed after 5 minutes, retry from step 3.

8. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-1170, "Diagnostic Procedure"](#).

Overall Function Check

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

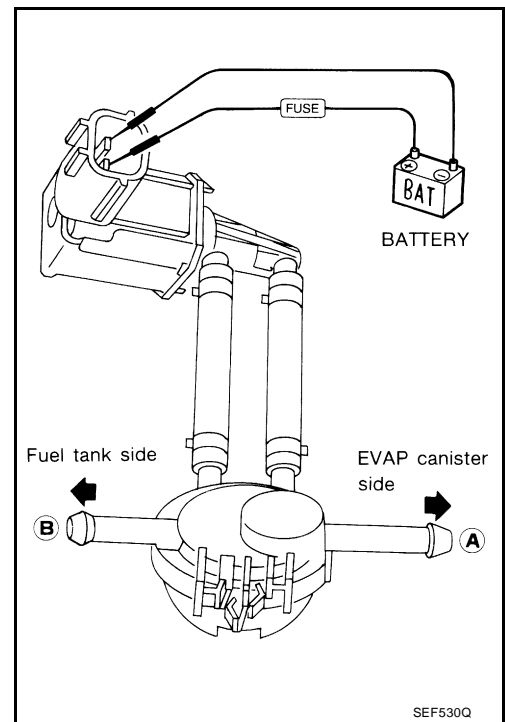
WITH GST

1. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[VQ]

2. Apply vacuum to port **A** and check that there is no suction from port **B**.
3. Apply vacuum to port **B** and check that there is suction from port **A**.
4. Blow air in port **B** and check that there is a resistance to flow out of port **A**.
5. Supply battery voltage to the terminal.
6. Blow air in port **A** and check that air flows freely out of port **B**.
7. Blow air in port **B** and check that air flows freely out of port **A**.
8. If NG, go to [EC-1170, "Diagnostic Procedure"](#).



DTC P1491 VACUUM CUT VALVE BYPASS VALVE

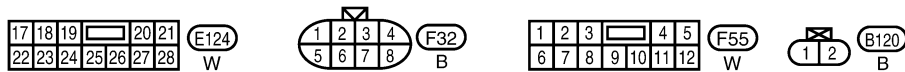
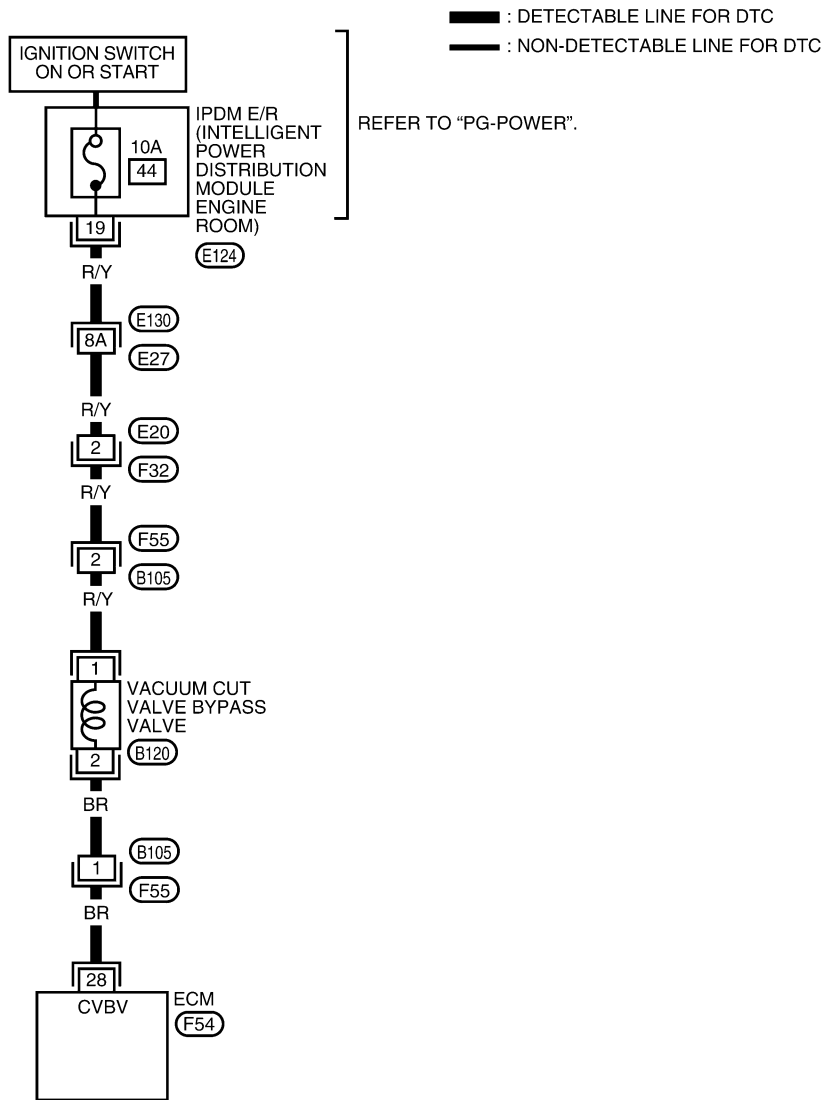
[VQ]

Wiring Diagram

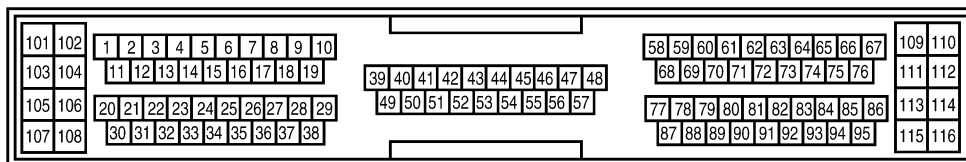
UBS0031Y

EC-BYPS/V-01

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REFER TO THE FOLLOWING.
E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0086E

Specification data are reference values and are measured between each terminal and ground.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
28	BR	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS003IZ

1. INSPECTION START

Do you have CONSULT-II?

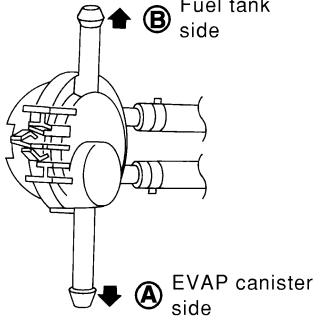
Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

2. CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION

With CONSULT-II

1. Turn ignition switch "OFF".
2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
3. Apply vacuum to port A and check that there is no suction from port B.
4. Apply vacuum to port B and check that there is suction from port A.
5. Blow air in port B and check that there is a resistance to flow out of port A.
6. Turn ignition switch "ON".
7. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II and touch "ON".
8. Blow air in port A and check that air flows freely out of port B.
9. Blow air in port B and check that air flows freely out of port A.



ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN

PBIB0161E

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 5.

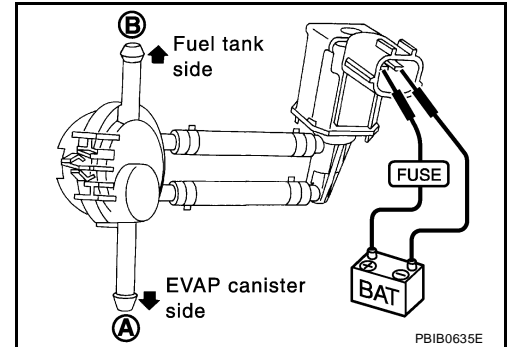
3. CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
3. Apply vacuum to port A and check that there is no suction from port B.
4. Apply vacuum to port B and check that there is suction from port A.
5. Blow air in port B and check that there is a resistance to flow out of port A.
6. Disconnect vacuum cut valve bypass valve harness connector.
7. Supply battery voltage to the terminal.
8. Blow air in port A and check that air flows freely out of port B.
9. Blow air in port B and check that air flows freely out of port A.

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 7.



4. CHECK EVAP PURGE LINE

Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection.

OK or NG

- OK >> GO TO 5.
 NG >> Repair it.

5. CHECK EVAP PURGE PORT

Check EVAP purge port of fuel tank for clogging.

OK or NG

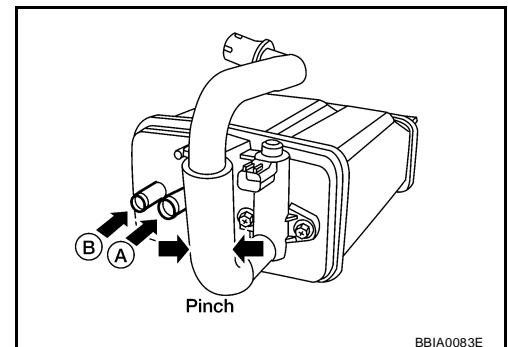
- OK >> GO TO 6.
 NG >> Clean EVAP purge port.

6. CHECK EVAP CANISTER

1. Pinch the fresh air hose.
2. Blow air into port A and check that it flows freely out of port B.

OK or NG

- OK >> GO TO 12.
 NG >> Replace EVAP canister.



7. CHECK BYPASS HOSE

Check bypass hoses for clogging.

OK or NG

- OK >> GO TO 8.
 NG >> Repair or replace hoses.

8. CHECK VACUUM CUT VALVE BYPASS VALVE

Refer to [EC-1173, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace vacuum cut valve bypass valve.

9. CHECK VACUUM CUT VALVE

Refer to [EC-1173, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace vacuum cut valve.

10. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

1. Turn ignition switch "OFF".
2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 11.
- NG >> Repair or replace.

11. 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 12.
- NG >> Replace EVAP control system pressure sensor.

12. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-990, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 13.
- NG >> Replace EVAP control system pressure sensor.

13. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 14.
- NG >> Clean the rubber tube using an air blower.

14. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-983, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 15.
- NG >> Replace EVAP canister vent control valve.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection
VACUUM CUT VALVE BYPASS VALVE

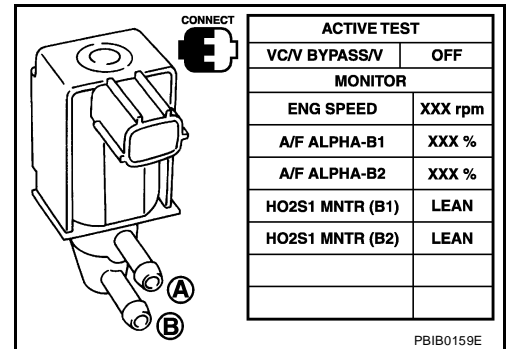
UBS003J0

With CONSULT-II

1. Reconnect harness disconnected connectors.
2. Turn ignition switch ON.
3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.

Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

Operation takes less than 1 second.

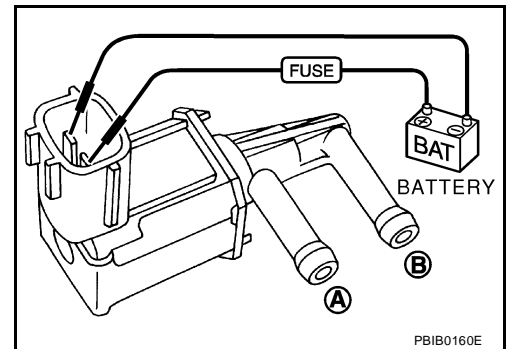


With GST

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

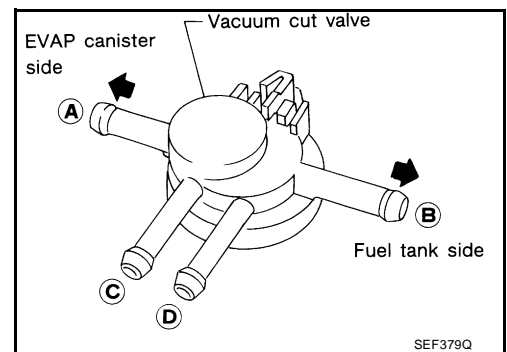
Operation takes less than 1 second.



VACUUM CUT VALVE

Check vacuum cut valve as follows:

- Plug port **C** and **D** with fingers.
- Apply vacuum to port **A** and check that there is no suction from port **B** .
- Apply vacuum to port **B** and check that there is suction from port **A** .
- Blow air in port **B** and check that there is a resistance to flow out of port **A** .
- Open port **C** and **D** .
- Blow air in port **A** check that air flows freely out of port **C** .
- Blow air in port **B** check that air flows freely out of port **D** .



DTC P1564 ASCD STEERING SWITCH

[VQ]

PF2:25551

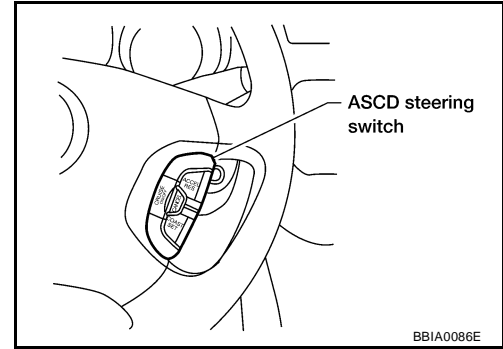
DTC P1564 ASCD STEERING SWITCH

Component Description

UBS003J1

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.

Refer to [EC-1286, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

UBS003J2

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	● Ignition switch: ON	● CRUISE switch pressed	ON
		● CRUISE switch released	OFF
CANCEL	● Ignition switch: ON	● CANCEL switch pressed	ON
		● CANCEL switch released	OFF
RESUME/ACC	● Ignition switch: ON	● ACCEL/RES switch pressed	ON
		● ACCEL/RES switch released	OFF
SET SW	● Ignition switch: ON	● COAST/SET switch pressed	ON
		● COAST/SET switch released	OFF

On Board Diagnosis Logic

UBS003J3

NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1030](#).

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 (The switch circuit is open or shorted.) ● ASCD steering switch ● ECM

DTC Confirmation Procedure

UBS003J4

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

④ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
4. Press "CRUISE" switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press "ACCEL/RES" switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press "COAST/SET" switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Press "CANCEL" switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If 1st trip DTC is detected, go to [EC-1178, "Diagnostic Procedure"](#).

DTC P1564 ASCD STEERING SWITCH

[VQ]



WITH GST

Follow the procedure "WITH CONSULT-II" above.

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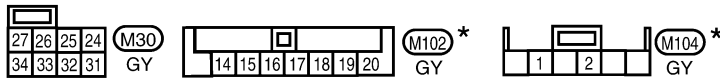
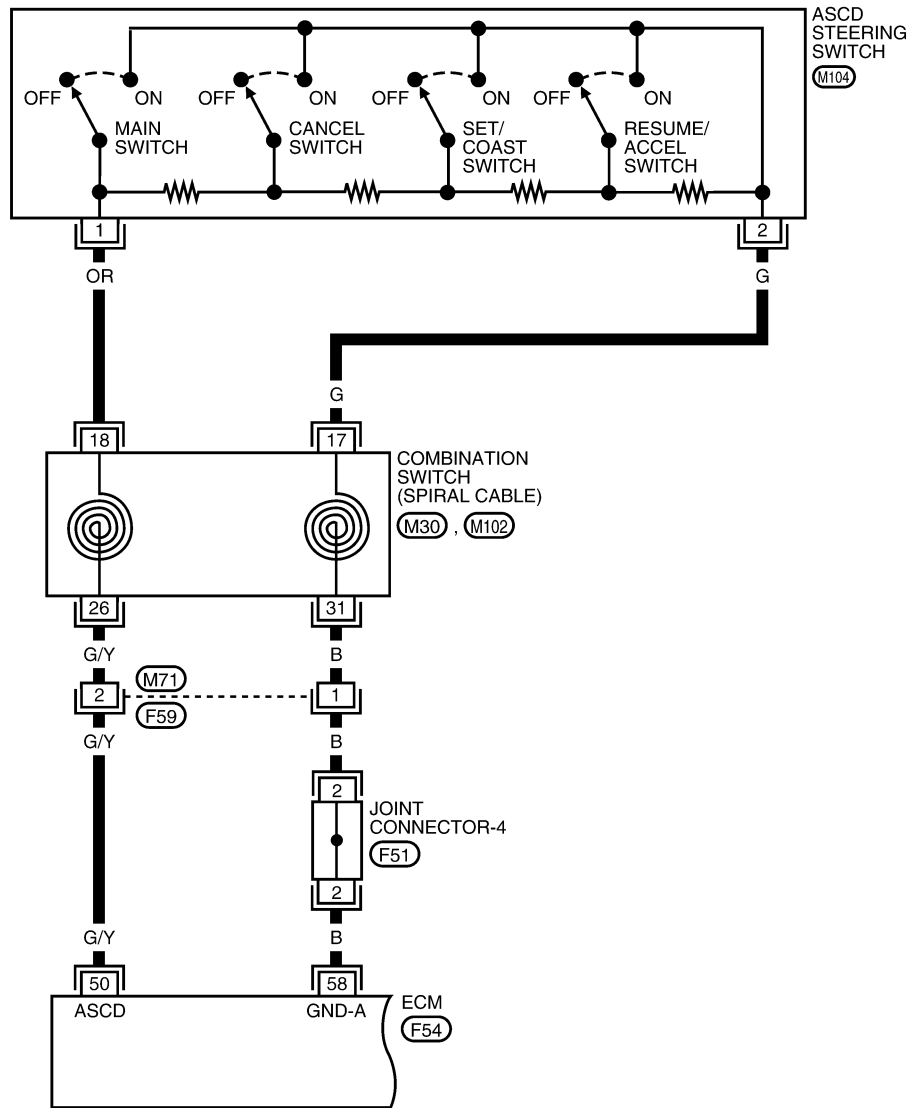
DTC P1564 ASCD STEERING SWITCH

[VQ]

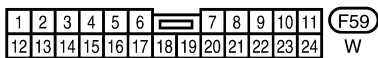
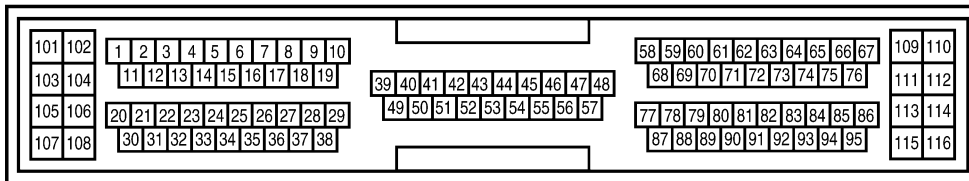
Wiring Diagram

UBS003J5

EC-ASC/SW-01



REFER TO THE FOLLOWING.
 (F51) - JOINT CONNECTOR (J/C)



*: This connector is not shown in "HARNESS LAYOUT" of PG section.

B8IA0227E

Specification data are reference values and are measured between each terminal and ground.

DTC P1564 ASCD STEERING SWITCH

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
50	G/Y	ASCD steering switch	[Ignition switch "ON"] ● ASCD steering switch is "OFF".	Approximately 4.0V
			[Ignition switch "ON"] ● CRUISE switch is "ON".	Approximately 0V
			[Ignition switch "ON"] ● CANCEL switch is "ON".	Approximately 1V
			[Ignition switch "ON"] ● COAST/SET switch is "ON".	Approximately 2V
			[Ignition switch "ON"] ● ACCEL/RES switch is "ON".	Approximately 3V
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

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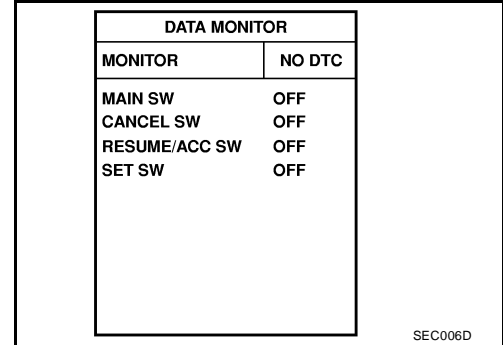
Diagnostic Procedure

1. CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "MAIN SW", "RESUME/ACC SW", "SET SW" and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-II.
3. Check each item indication under the following conditions.

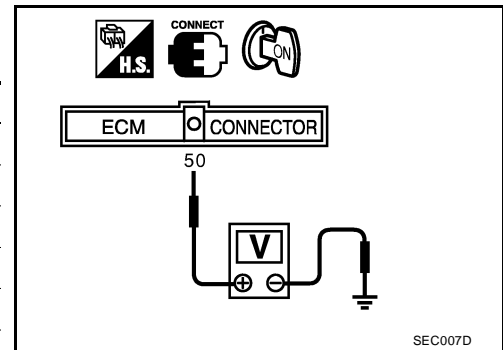
Switch	Monitor item	Condition	Indication
CRUISE	MAIN SW	Pressed	ON
		Released	OFF
COAST/SET	SET SW	Pressed	ON
		Released	OFF
ACCEL/RES	RESUME/ACC SW	Pressed	ON
		Released	OFF
CANCEL	CANCEL SW	Pressed	ON
		Released	OFF



Without CONSULT-II

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 50 and ground with pressing each button.

Switch	Condition	Voltage [V]
CRUISE SW	Pressed	Approx. 0.5
	Released	Approx. 4.0
COAST/SET SW	Pressed	Approx. 2.0
	Released	Approx. 4.0
ACCEL/RES SW	Pressed	Approx. 3.0
	Released	Approx. 4.0
CANCEL SW	Pressed	Approx. 1.0
	Released	Approx. 4.0



OK or NG

- OK >> GO TO 7.
- NG >> GO TO 2.

2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

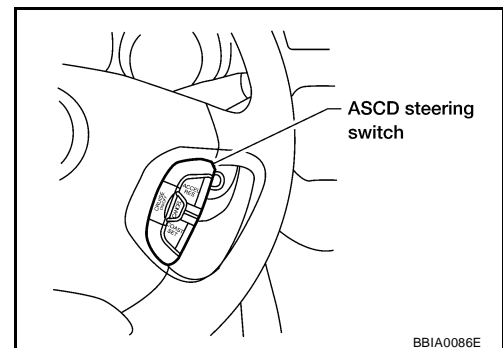
1. Turn ignition switch "OFF".
2. Disconnect ASCD steering harness connector.
3. Check harness continuity between switch terminal 2 and ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, F59
- Joint connector-4
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to power in harness or connectors.

4. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 50 and ASCD steering switch 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 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, F59
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD STEERING SWITCH

Refer to [EC-1180, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace ASCD steering switch.

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

DTC P1564 ASCD STEERING SWITCH

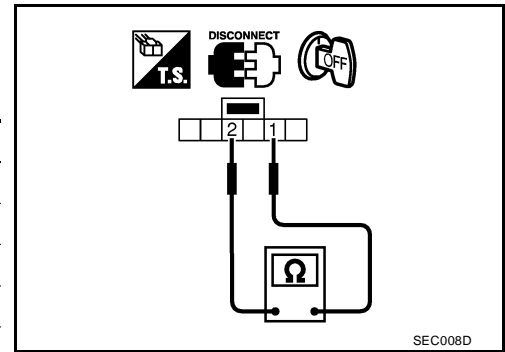
[VQ]

UBS003J7

Component Inspection ASCD STEERING SWITCH

1. Disconnect ASCD steering switch.
2. Check continuity between ASCD steering switch terminals 1 and 2 with pushing each switch.

Switch	Condition	Resistance [Ω]
CRUISE SW	Pressed	Approx. 0
	Released	Approx. 4,000
COAST/SET SW	Pressed	Approx. 660
	Released	Approx. 4,000
ACCEL/RES SW	Pressed	Approx. 1,480
	Released	Approx. 4,000
CANCEL SW	Pressed	Approx. 250
	Released	Approx. 4,000



DTC P1572 ASCD BRAKE SWITCH

[VQ]

DTC P1572 ASCD BRAKE SWITCH

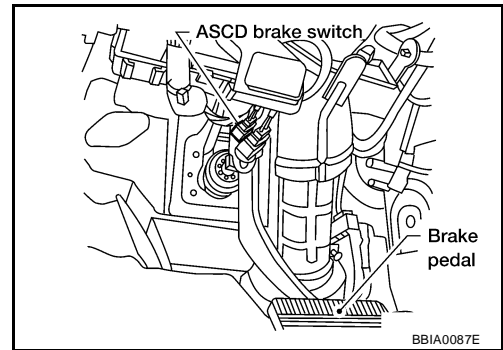
PFP:25320

Component Description

UBS003J8

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).

Refer to [EC-1286, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

UBS003J9

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal fully released	ON
		● Brake pedal depressed	OFF
BRAKE SW 2 (stop lamp switch)	● Ignition switch: ON	● Brake pedal fully released	OFF
		● Brake pedal depressed	ON

On Board Diagnosis Logic

UBS003JA

NOTE:

If DTC P 1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1030](#)

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1572 1572	ASCD brake switch	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the ECM at the same time.	<ul style="list-style-type: none"> ● Harness or connectors (The stop lamp switch circuit is open or shorted.) ● Harness or connectors (The ASCD brake switch circuit is open or shorted.) ● Harness or connectors (The ASCD clutch switch circuit is open or shorted.) ● Stop lamp switch ● ASCD brake switch ● ASCD clutch switch ● Incorrect stop lamp switch installation ● Incorrect ASCD brake switch installation ● Incorrect ASCD clutch switch installation ● ECM

DTC confirmation Procedure

UBS003JB

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:

Steps 3 and 4 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.

DTC P1572 ASCD BRAKE SWITCH

[VQ]

WITH CONSULT-II

1. Start engine (TCS switch "OFF").
2. Select "DATA MONITOR" mode with CONSULT-II.
3. 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

If 1st trip DTC is detected, go to [EC-1184, "Diagnostic Procedure"](#) .
If 1st trip DTC is not detected, go to the following step.

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
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned condition.

5. If 1st trip DTC is detected, go to [EC-1184, "Diagnostic Procedure"](#) .

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P1572 ASCD BRAKE SWITCH

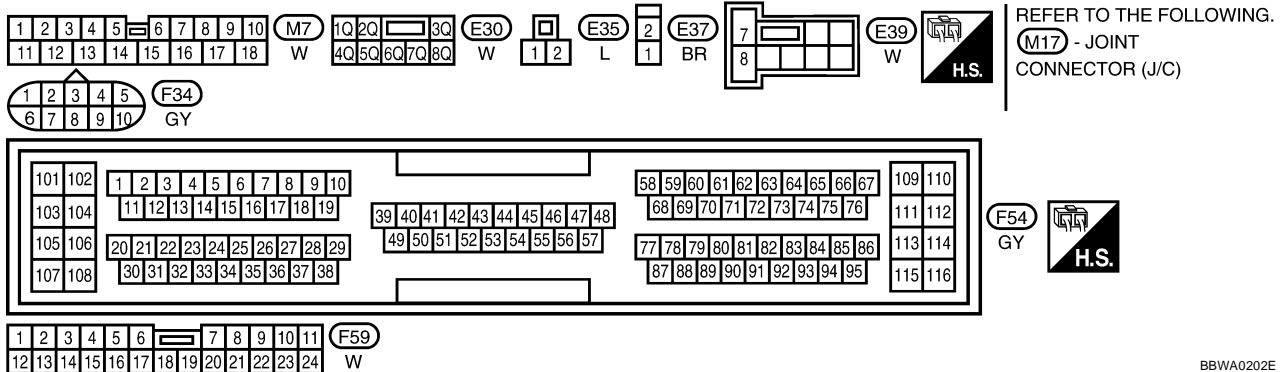
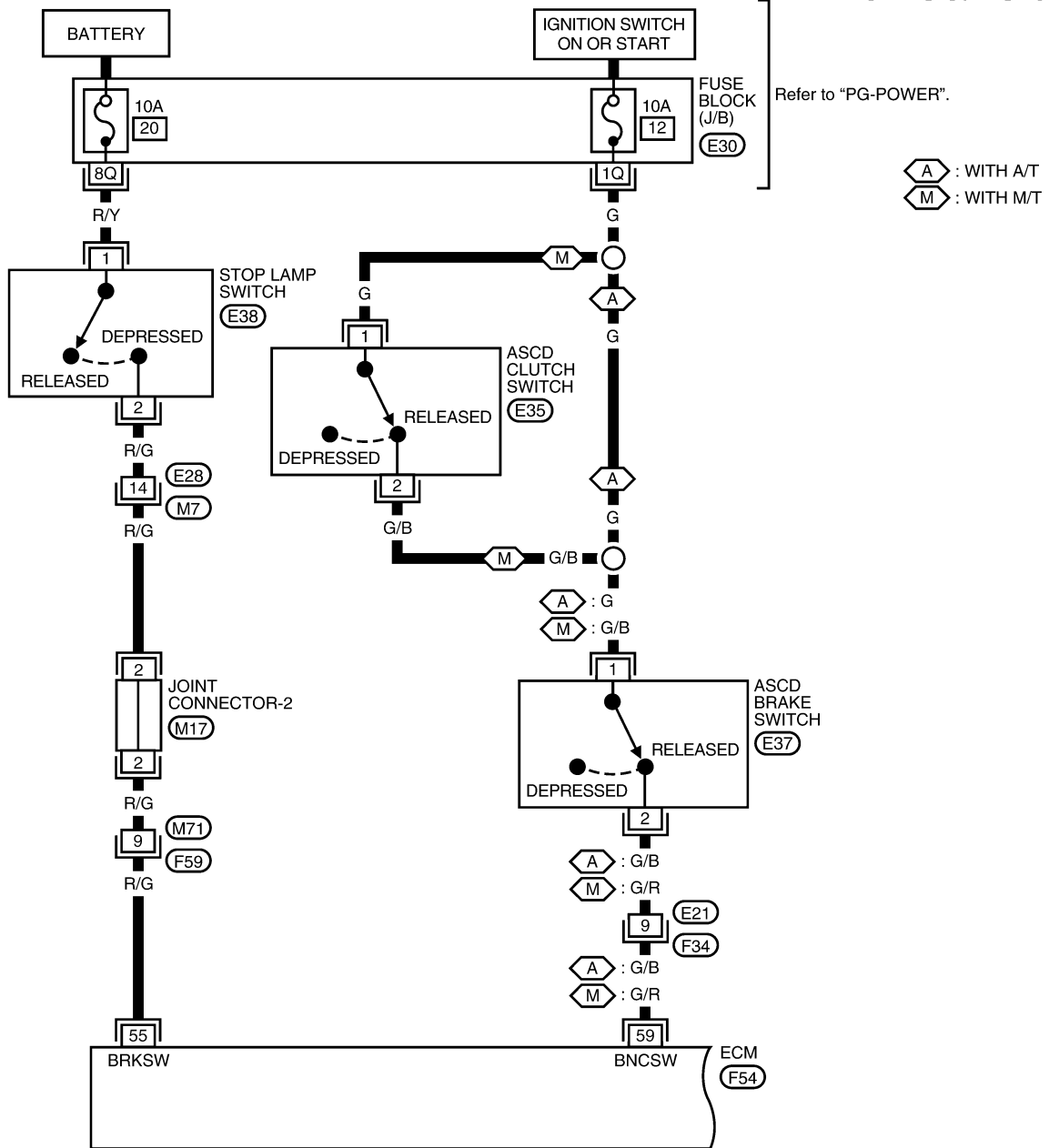
[VQ]

UBS003JC

Wiring Diagram

EC-ASC/BS-01

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Specification data are reference values and are measured between each terminal and ground.

DTC P1572 ASCD BRAKE SWITCH

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	R/G	Stop lamp switch	[Ignition switch "ON"] ● Brake pedal is fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
59	G/B (A/T) G/R (M/T)	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V

Diagnostic Procedure

UBS003JD

1. CHECK OVERALL FUNCTION-I

With CONSULT-II

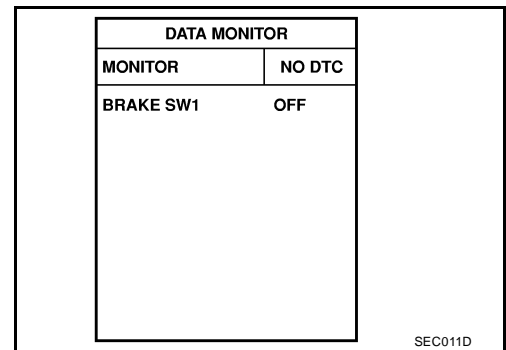
1. Turn ignition switch "ON".
2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
3. Check "BRAKE SW1" indication under the following conditions.

A/T models

CONDITION	INDICATION
When brake pedal is depress	OFF
When brake pedal is fully released	ON

M/T models

CONDITION	INDICATION
When clutch pedal or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON



Without CONSULT-II

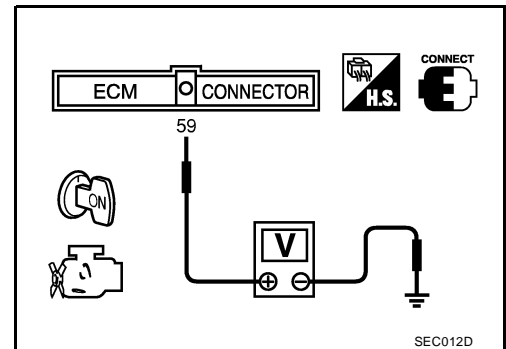
1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 59 and ground under the following conditions.

A/T models

CONDITION	VOLTAGE
When brake pedal is depress	Approximately 0V
When brake pedal is fully released	Battery voltage

M/T models

CONDITION	VOLTAGE
When clutch pedal or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
- NG (M/T models) >>GO TO 3.
- NG (A/T models) >>GO TO 8.

DTC P1572 ASCD BRAKE SWITCH

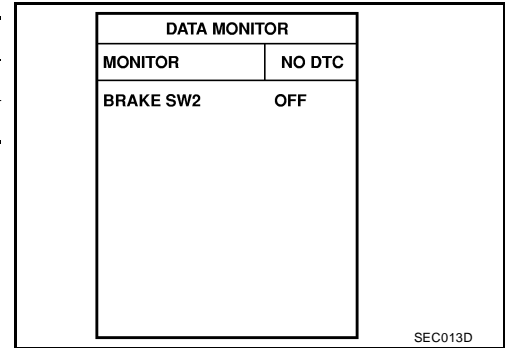
[VQ]

2. CHECK OVERALL FUNCTION-II

With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

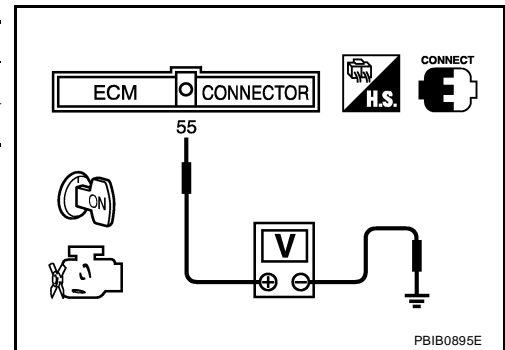
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



Without CONSULT-II

Check voltage between ECM terminal 55 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

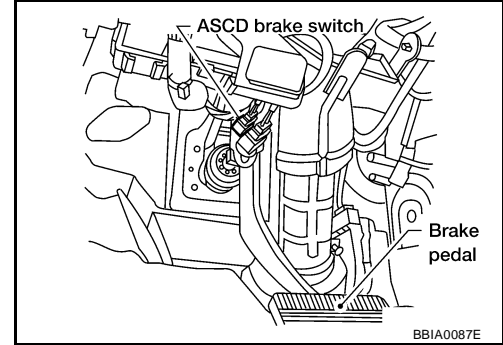


OK or NG

- OK >> GO TO 18.
- NG >> GO TO 13.

3. CHECK ASCD CLUTCH SWITCH CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

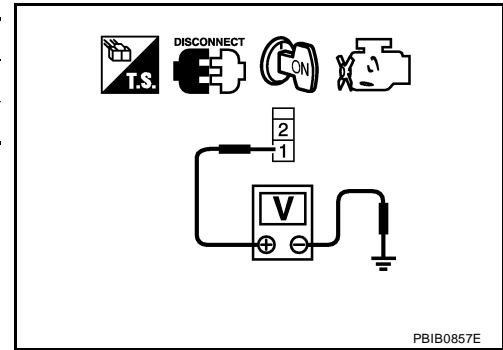


4. Check voltage between ASCD brake switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When clutch pedal is released	Battery voltage
When clutch pedal is depressed	Approx. 0V

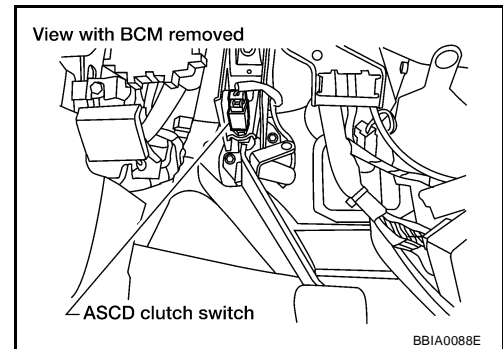
OK or NG

- OK >> GO TO 10.
 NG >> GO TO 4.



4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".

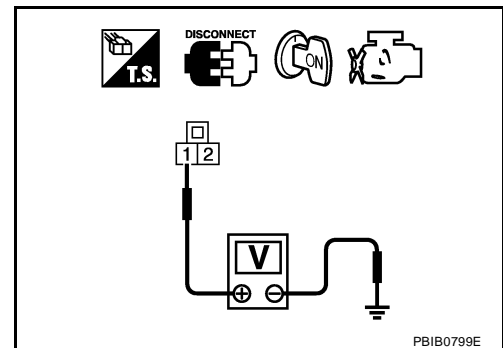


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 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. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD clutch switch terminal 2 and ASCD brake switch 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 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH

Refer to [EC-1190, "Component Inspection"](#)

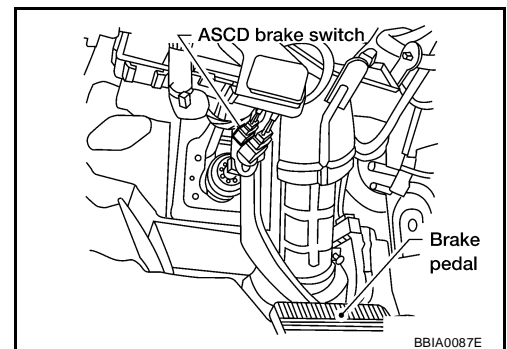
OK or NG

OK >> GO TO 18.

NG >> Replace ASCD clutch switch.

8. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".



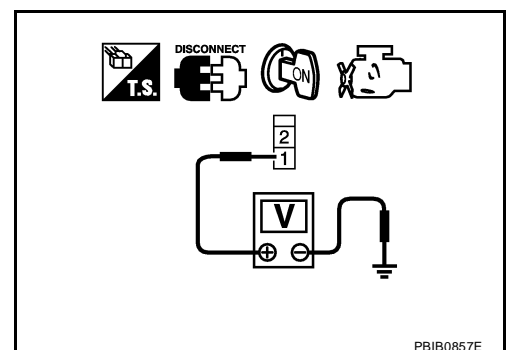
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.



9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 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.

10. 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 59 and ASCD brake switch terminal 2.
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 12.
NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ASCD BRAKE SWITCH

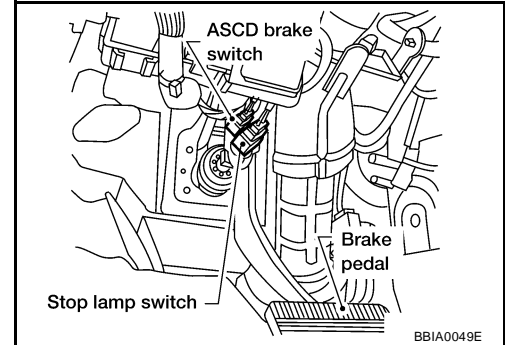
Refer to [EC-1190, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.
NG >> Replace ASCD brake switch.

13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.

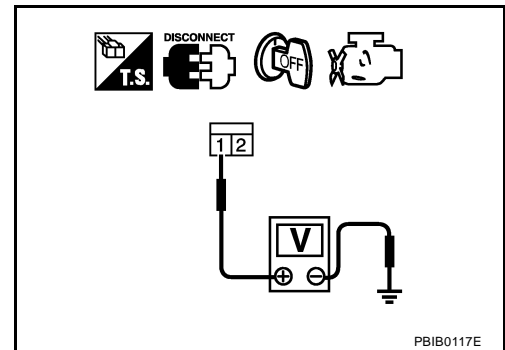


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.



14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 55 and stop lamp 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 17.
- NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E28, M7
- Harness connectors M71, F59
- Joint connector-2
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

17. CHECK STOP LAMP SWITCH

Refer to [EC-1190, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.
- NG >> Replace stop lamp switch.

18. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

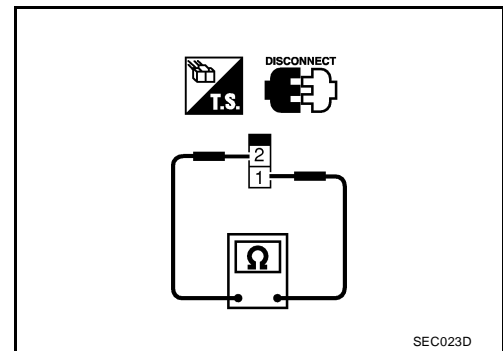
Component Inspection ASC D BRAKE SWITCH

UBS003JE

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Check harness continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should exist.
When brake pedal is depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-6, "BRAKE PEDAL"](#) , and perform step 3 again.

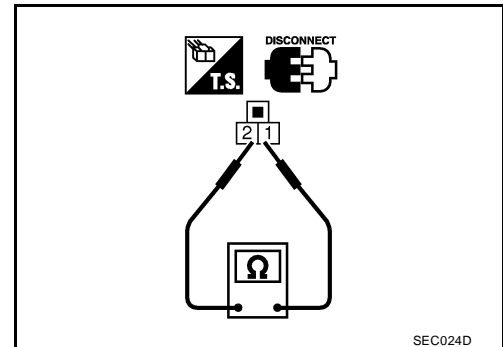


ASC D CLUTCH SWITCH (FOR M/T MODELS)

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Check harness continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When clutch pedal is fully released.	Should exist.
When clutch pedal is depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-5, "CLUTCH PEDAL"](#) , and perform step 3 again.

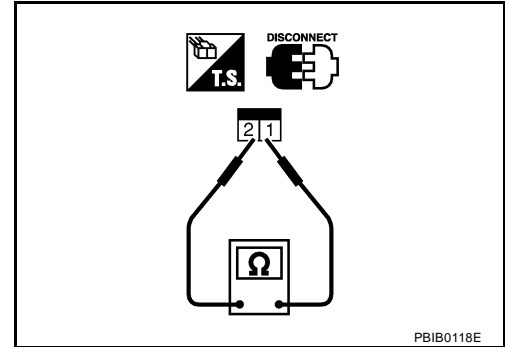


STOP LAMP SWITCH

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.
3. Check harness continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-6](#), "[BRAKE PEDAL](#)", and perform step 3 again.



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DTC P1574 ASCD VEHICLE SPEED SENSOR

[VQ]

DTC P1574 ASCD VEHICLE SPEED SENSOR

PF3:31036

Component Description

UBS003JF

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-1286, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for ASCD functions.

On Board Diagnosis Logic

UBS003JG

NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-763, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-1019, "DTC P0500 VSS"](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1030, "DTC P0605 ECM"](#).

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 (The CAN communication line is open or shorted.) ● Harness or connectors (The combination meter circuit is open or shorted.) ● Combination meter ● Vehicle speed sensor ● TCM ● ECM

DTC Confirmation Procedure

UBS003JH

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-II

1. Start engine (TCS switch "OFF").
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Drive the vehicle at more than 40 km/h (25 MPH).
4. If 1st trip DTC is detected, go to [EC-1193, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [AT-36, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION"](#).

OK or NG

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated.

2. CHECK VEHICLE SPEED SENSOR CIRCUIT

Refer to [DI-19, "Vehicle Speed System"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3. CHECK COMBINATION METER

Check combination meter function.

Refer to [DI-4, "COMBINATION METERS"](#).

>> INSPECTION END

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DTC P1706 PNP SWITCH

PFP:32006

Component Description

UBS003JJ

When the gear position is “P” (A/T models only) or “N”, park/neutral position (PNP) switch is “ON”. ECM detects the position because the continuity of the line (the “ON” signal) exists.

CONSULT-II Reference Value in Data Monitor Mode

UBS003JK

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
P/N POSI SW	● Ignition switch: ON	ON
	Shift lever: P or N (A/T model) N (M/T model)	OFF
	Shift lever: Except above	OFF

On Board Diagnosis Logic

UBS003JL

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706 1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	<ul style="list-style-type: none"> ● Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] ● Park/neutral position (PNP) switch

DTC Confirmation Procedure

UBS003JM

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-II

1. Turn ignition switch “ON”.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II. Then check the “P/N POSI SW” signal under the following conditions.

Position (Selector lever)	Known-good signal
“N” and “P” position	ON
Except the above position	OFF

If NG, go to [EC-1197, "Diagnostic Procedure"](#) .

If OK, go to following step.

3. Select “DATA MONITOR” mode with CONSULT-II.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,400 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	More than 2.0 msec
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position (A/T) 5th position (M/T)

6. If 1st trip DTC is detected, go to [EC-1197, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
P/N POSI SW	ON

SEF212Y

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

Overall Function Check

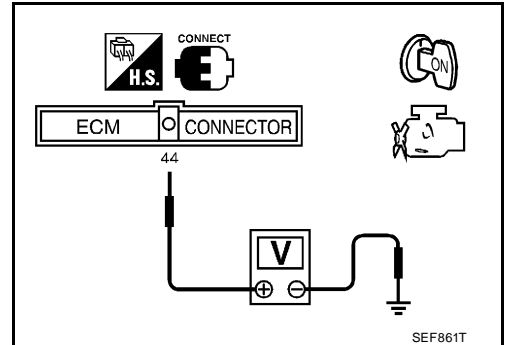
Use this procedure to check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 44 (PNP switch signal) and body ground under the following conditions.

Condition (Gear position)	Voltage V (Known good data)
"P" (A/T models only) and "N" position	Approx. 0
Except the above position	A/T models BATTERY VOLTAGE (11 - 14V)
	M/T Approximately 5V

3. If NG, go to [EC-1197, "Diagnostic Procedure"](#) .



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CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

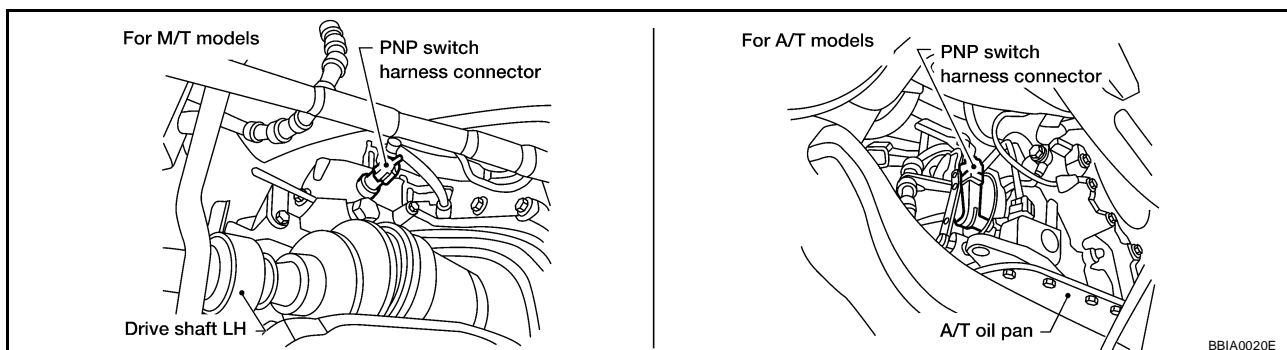
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
44	G/R (A/T) G/W (M/T)	PNP switch	[Ignition switch "ON"] ● Shift lever position is "P" or "N" (A/T models), "Neutral" (M/T models).	Approximately 0V
			[Ignition switch "OFF"] ● Except the above position	A/T models BATTERY VOLTAGE (11 - 14V) M/T models Approximately 5V

Diagnostic Procedure

UBS003JP

1. CHECK GROUND CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect PNP switch harness connector.



3. Check harness continuity between PNP switch terminal 2 and body ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to power in harness or connectors.

2. CHECK INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 44 and PNP switch 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 short to power in harness or connectors.

3. CHECK PNP SWITCH

Refer to [AT-106](#) (A/T models) or [MT-12](#) (M/T models).

OK or NG

OK >> GO TO 4.

NG >> Replace PNP switch.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

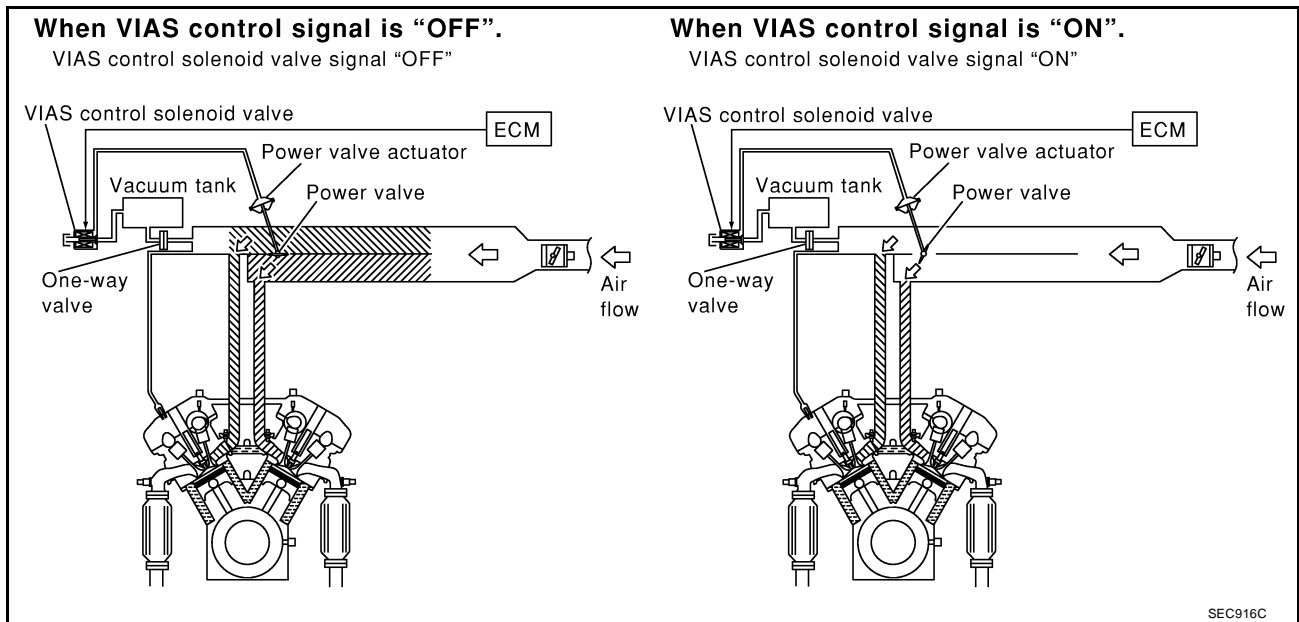
DTC P1800 VIAS CONTROL SOLENOID VALVE

PFP:14955

Description SYSTEM DESCRIPTION

UBS003JQ

Sensor	Input Signal to ECM	ECM function	Actuator
Mass air flow sensor	Amount of intake air	VIAS control	VIAS control solenoid valve
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Ignition switch	Start signal		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		



When the engine is running at low or medium speed, the power valve is fully closed. Under this condition, the effective suction port length is equivalent to the total length of the intake manifold collector's suction port including the intake valve. This long suction port provides increased air intake which results in improved suction efficiency and higher torque generation.

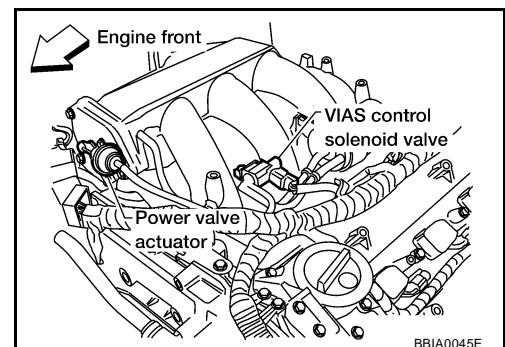
The surge tank and one-way valve are provided. When engine is running at high speed, the ECM sends the signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore opens the power valve to two suction passages together in the collector.

Under this condition, the effective port length is equivalent to the length of the suction port provided independently for each cylinder. This shortened port length results in enhanced engine output with reduced suction resistance under high speeds.

COMPONENT DESCRIPTION

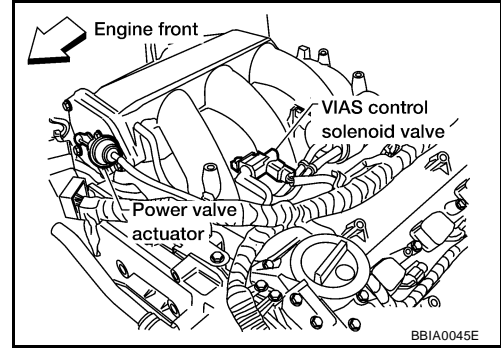
Power Valve

The power valve is installed in intake manifold collector and used to control the suction passage of the variable induction air control system. It is set in the fully closed or fully opened position by the power valve actuator operated by the vacuum stored in the surge tank. The vacuum in the surge tank is controlled by the VIAS control solenoid valve.



VIAS Control Solenoid Valve

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve control. It responds to ON/OFF signals from the ECM. When the solenoid is off, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and feeds the vacuum signal to the power valve actuator.



On Board Diagnosis Logic

UBS003JR

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1800 1800	VIAS control solenoid valve circuit	An excessively low or high voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> ● Harness or connectors (The solenoid valve circuit is open or shorted.) ● VIAS control solenoid valve

CONSULT-II Reference Value in Data Monitor Mode

UBS003JS

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
VIAS S/V	● Engine: After warming up	1,800 - 3,600 rpm	ON
		Except the above condition	OFF

DTC Confirmation Procedure

UBS003JT

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 11V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1202, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

DTC P1800 VIAS CONTROL SOLENOID VALVE

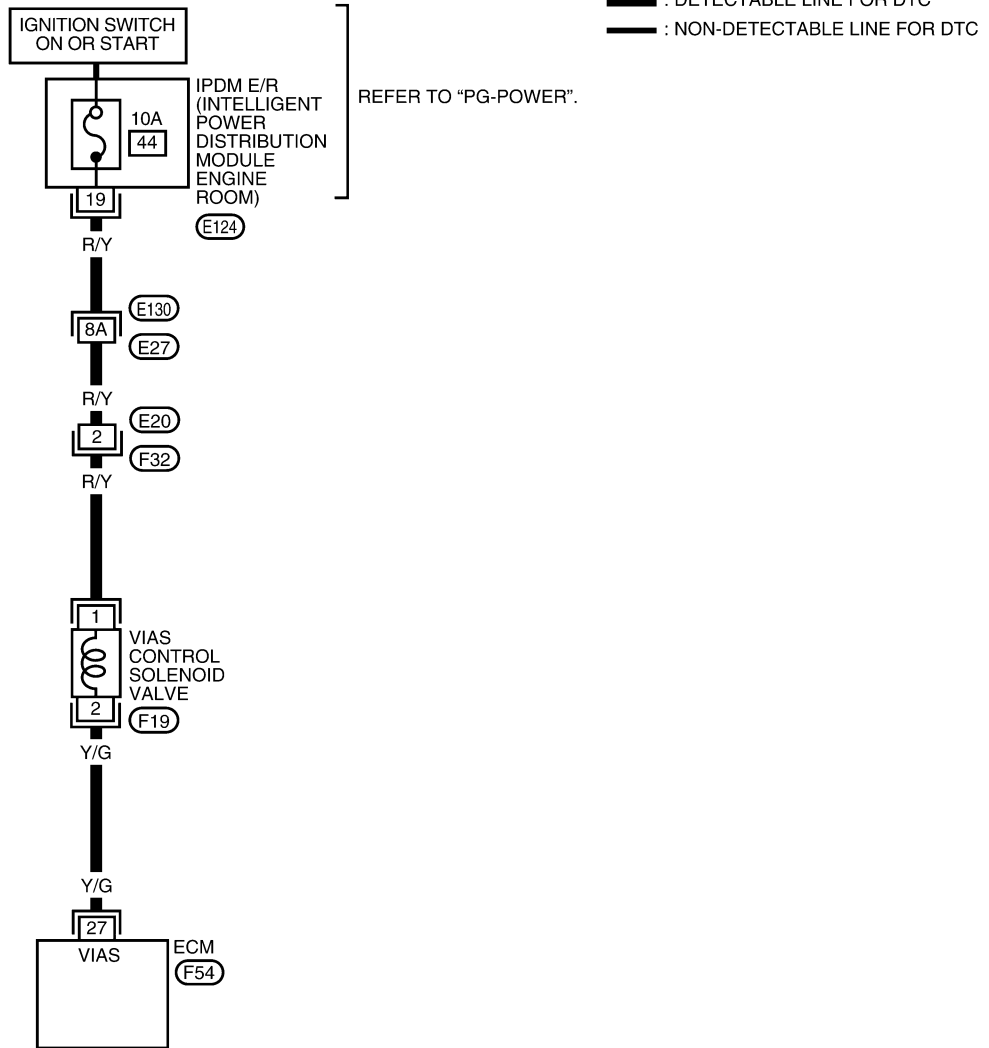
[VQ]

Wiring Diagram

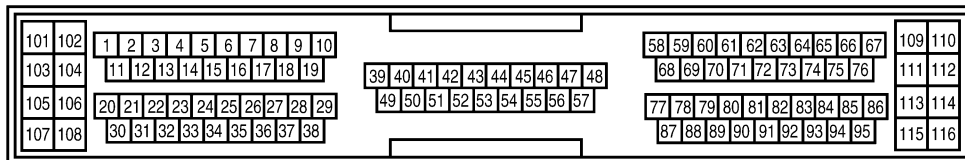
UBS003JU

EC-VIAS/V-01

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REFER TO THE FOLLOWING.
E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0088E

Specification data are reference values and are measured between each terminal and ground.

DTC P1800 VIAS CONTROL SOLENOID VALVE

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

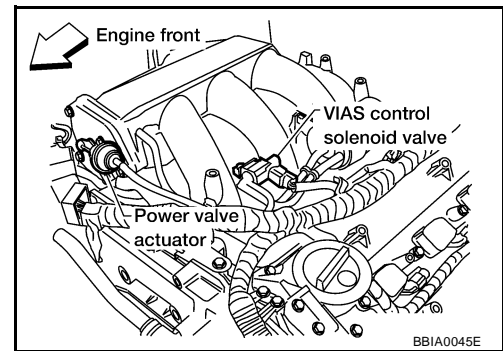
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
27	Y/G	VIAS control solenoid valve	[Engine is running] ● Engine speed is 1,800 - 3,600 rpm	0 - 1.0V
			[Engine is running] ● Except the above condition	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS003JV

1. CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect VIAS control solenoid valve harness connector.
3. Turn ignition switch "ON".

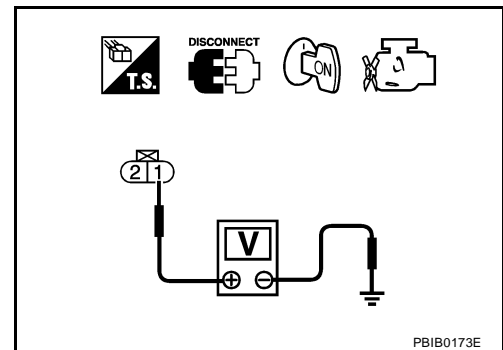


4. Check voltage between terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- IPDM E/R connector E124
- 10A fuse
- Harness continuity between fuse and VIAS control solenoid valve

>> Repair harness or connectors.

3. CHECK VIAS 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 27 and VIAS 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 VIAS CONTROL SOLENOID VALVE

Refer to [EC-1203, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace VIAS control solenoid valve.

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection VIAS CONTROL SOLENOID VALVE

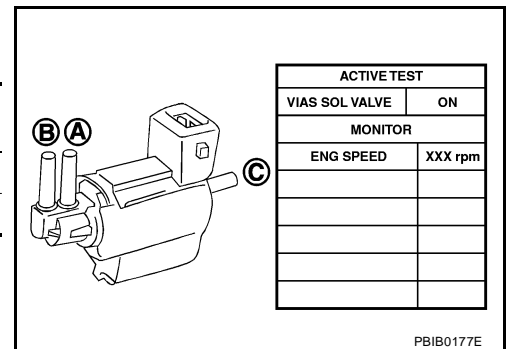
UBS003JW

With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch ON.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.

Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.

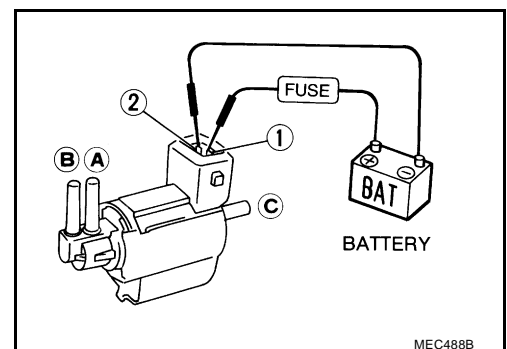


With GST

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B	Air passage continuity between A and C
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

Operation takes less than 1 second.



Removal and Installation VIAS CONTROL SOLENOID VALVE

Refer to [EM-112, "INTAKE MANIFOLD"](#) .

DTC P1805 BRAKE SWITCH

[VQ]

DTC P1805 BRAKE SWITCH

PF:25320

Description

UBS003JY

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-II Reference Value in Data Monitor Mode

UBS003JZ

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

UBS003K0

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for an 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

DTC Confirmation Procedure

UBS003K1

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-II.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. If 1st trip DTC is detected, go to [EC-1207, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH GST

Follow the procedure "WITH CONSULT-II" above.

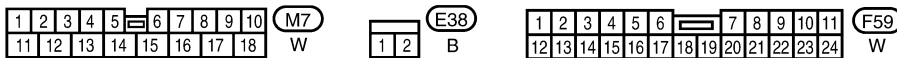
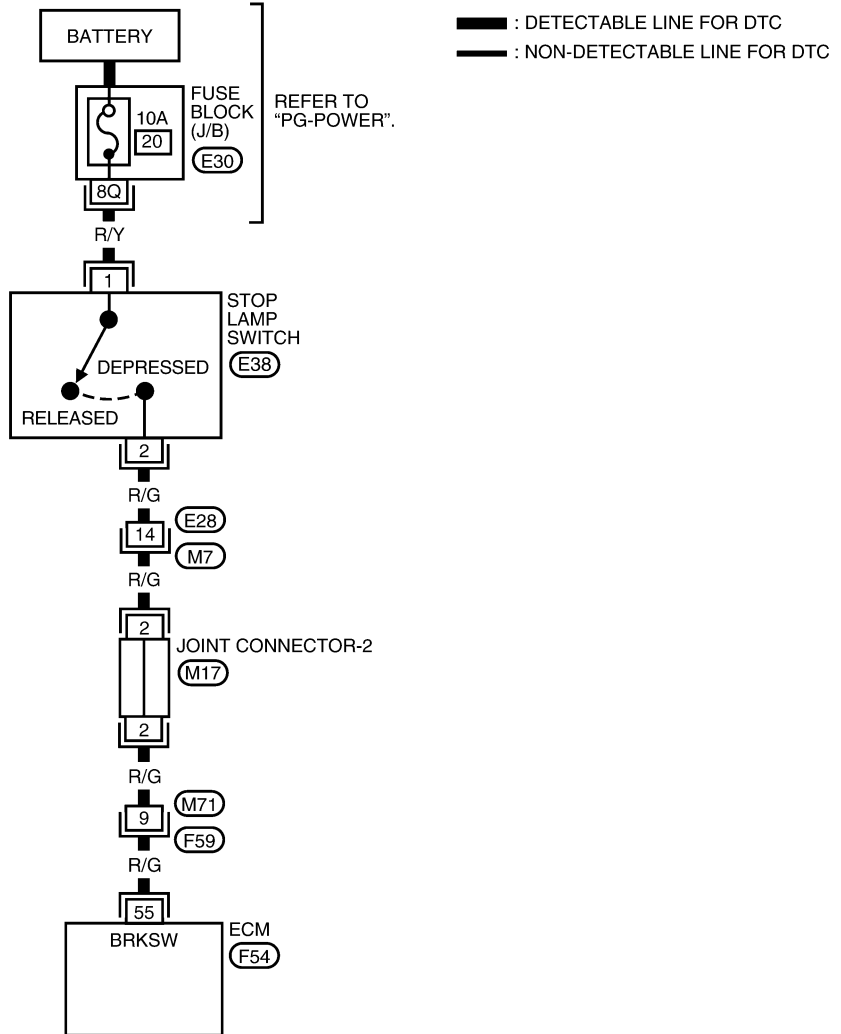
DTC P1805 BRAKE SWITCH

[VQ]

Wiring Diagram

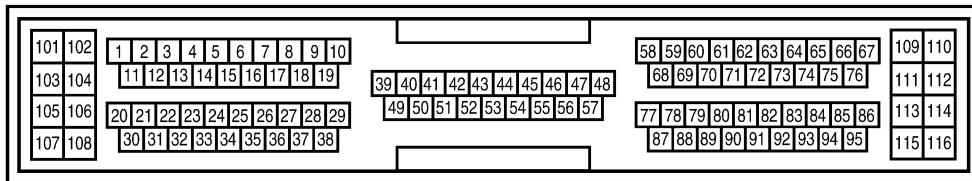
UBS003K2

EC-BRK/SW-01



REFER TO THE FOLLOWING.

- (M17) - JOINT CONNECTOR (J/C)
- (E30) - FUSE BLOCK - JUNCTION BOX (J/B)



BBWA0206E

Specification data are reference values and are measured between each terminal and ground.

DTC P1805 BRAKE SWITCH

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	R/G	Stop lamp switch	[Engine is running] ● Brake pedal fully released	Approximately 0V
			[Engine is running] ● Brake pedal fully depressed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

UBS003K3

1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch "OFF".
2. Check the stop lamp when depressing and releasing the brake pedal.

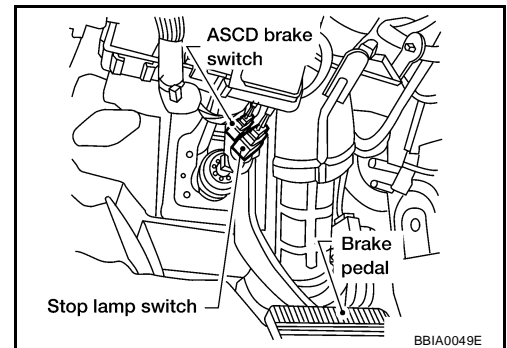
Brake pedal	Stop lamp
Fully released	Not illuminated
Depressed	Illuminated

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.

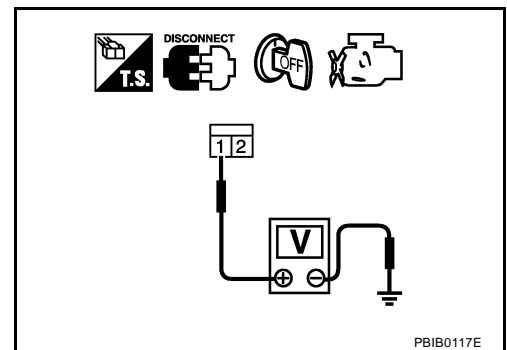


2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector E30
- Harness for open and short between stop lamp switch and battery

>> 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

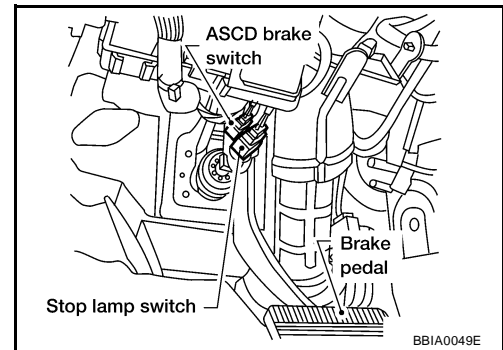
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Disconnect stop lamp switch harness connector.
4. Check harness continuity between ECM terminal 55 and stop lamp switch terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E28, M7
- Harness connectors M71, F59
- Joint connector-2
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK STOP LAMP SWITCH

Refer to [EC-1209, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
NG >> Replace stop lamp switch.

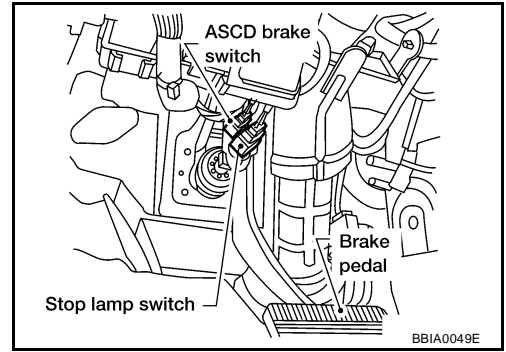
7. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

Component Inspection STOP LAMP SWITCH

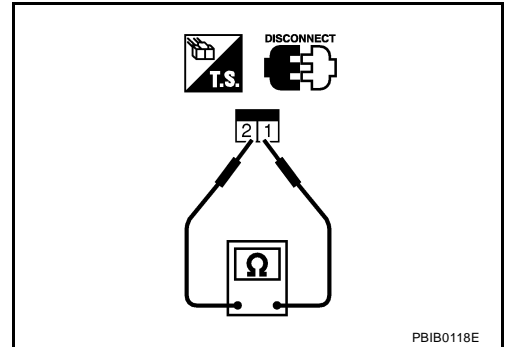
1. Disconnect stop lamp switch harness connector.



2. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Conditions	Continuity
Brake pedal fully released	Should not exist.
Brake pedal depressed	Should exist.

3. If NG, replace stop lamp switch.



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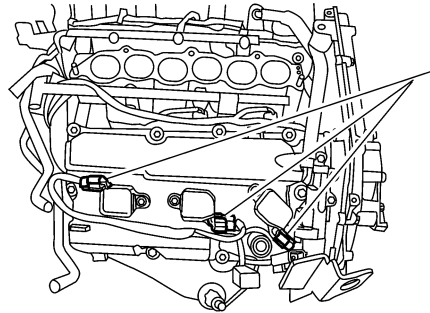
IGNITION SIGNAL

Component Description 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.

Bank 1

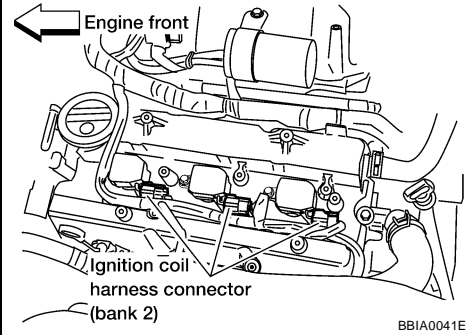
View with intake manifold collector removed



Ignition coil
harness connector
(bank 1)

BBIA0068E

Bank 2



Ignition coil
harness connector
(bank 2)

BBIA0041E

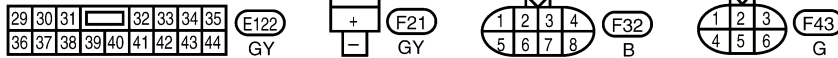
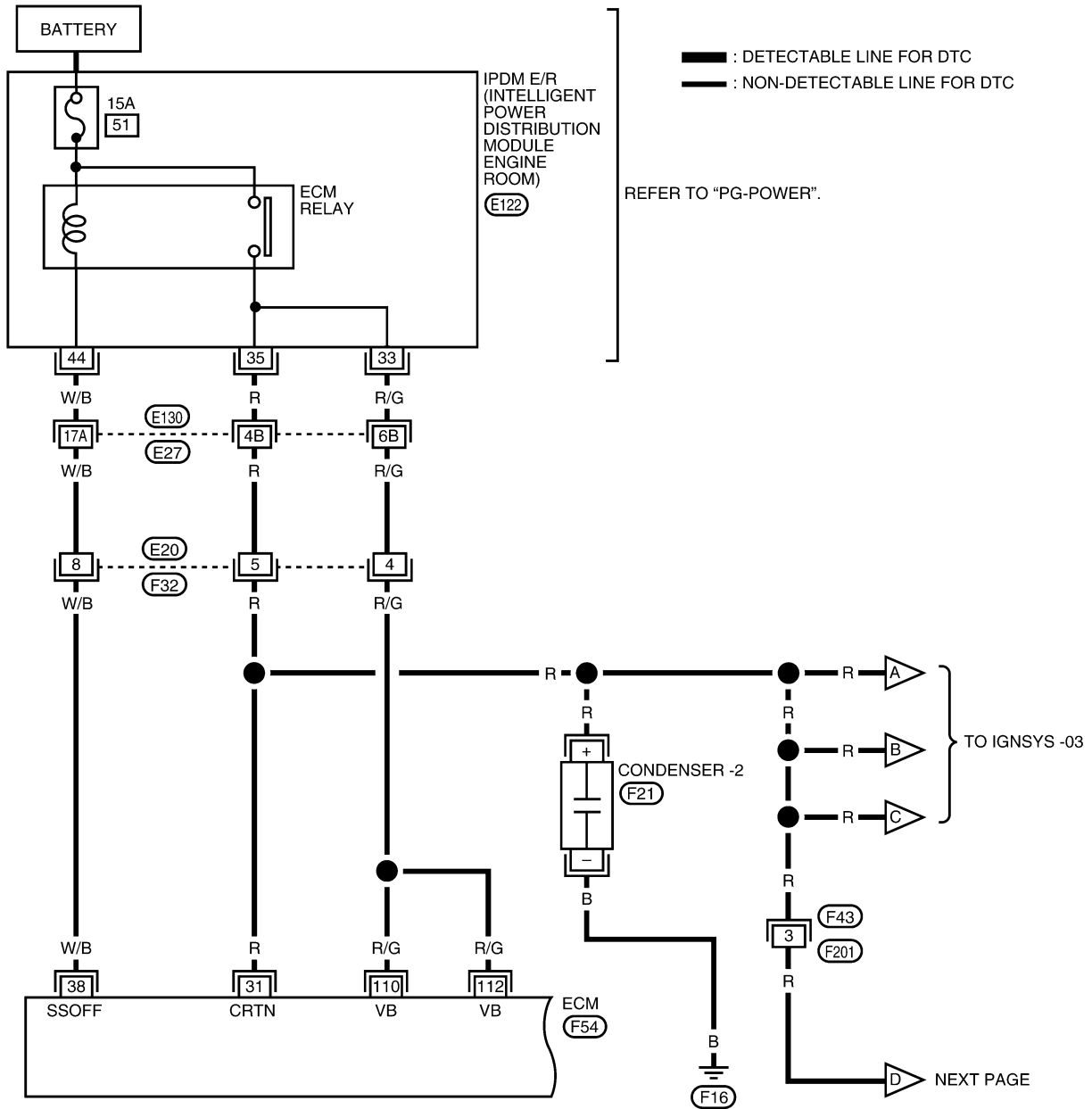
IGNITION SIGNAL

[VQ]

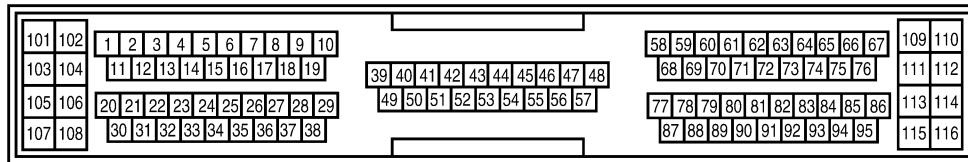
Wiring Diagram

UBS003K6

EC-IGNSYS-01



REFER TO THE FOLLOWING.
 E130 - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0081E

Specification data are reference values and are measured between each terminal and ground.

IGNITION SIGNAL

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

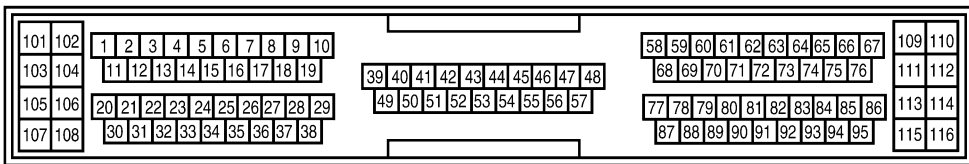
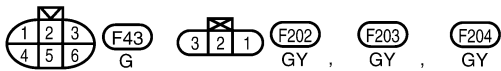
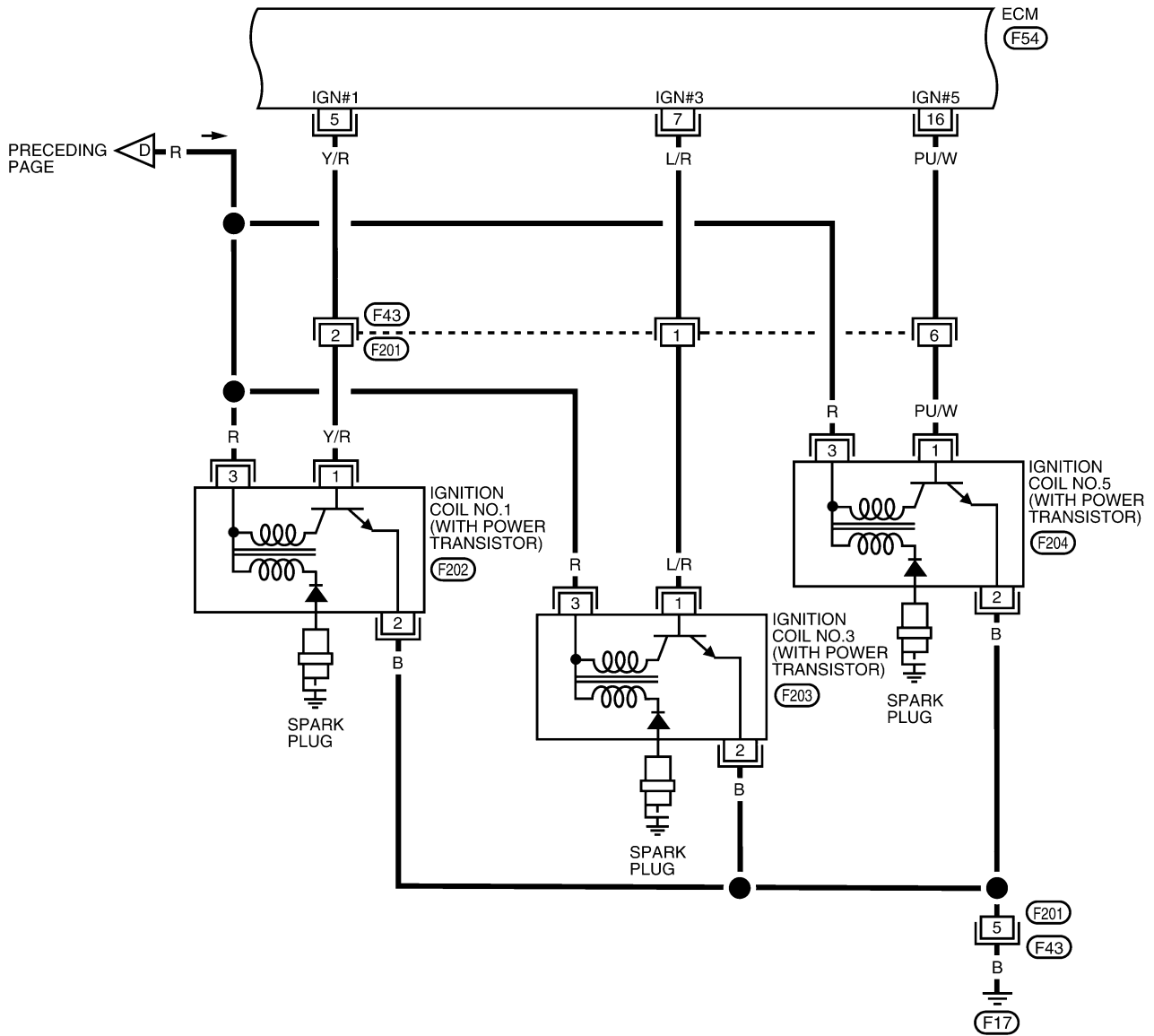
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
31	R	Counter current return	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
38	W/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For a few seconds after turning ignition switch "OFF"	0 - 1.5V
			[Ignition switch "OFF"] ● A few seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
110 112	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

IGNITION SIGNAL

[VQ]

EC-IGNSYS-02

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA0082E

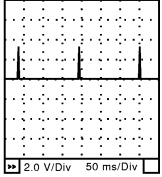
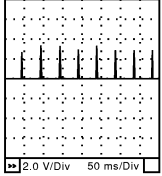
Specification data are reference values and are measured between each terminal and ground.

IGNITION SIGNAL

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5 7 16	Y/R L/R PU/W	Ignition signal No. 1 Ignition signal No. 3 Ignition signal No. 5	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>0 - 0.2V★</p>  <p style="text-align: right; font-size: small;">SEC986C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	<p>0.1 - 0.3V★</p>  <p style="text-align: right; font-size: small;">SEC987C</p>

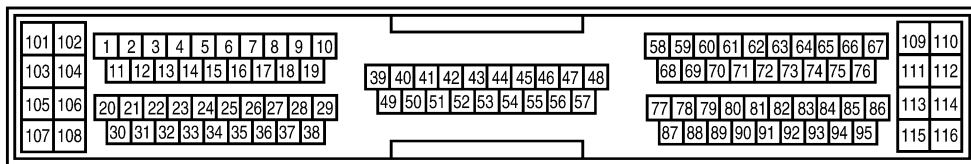
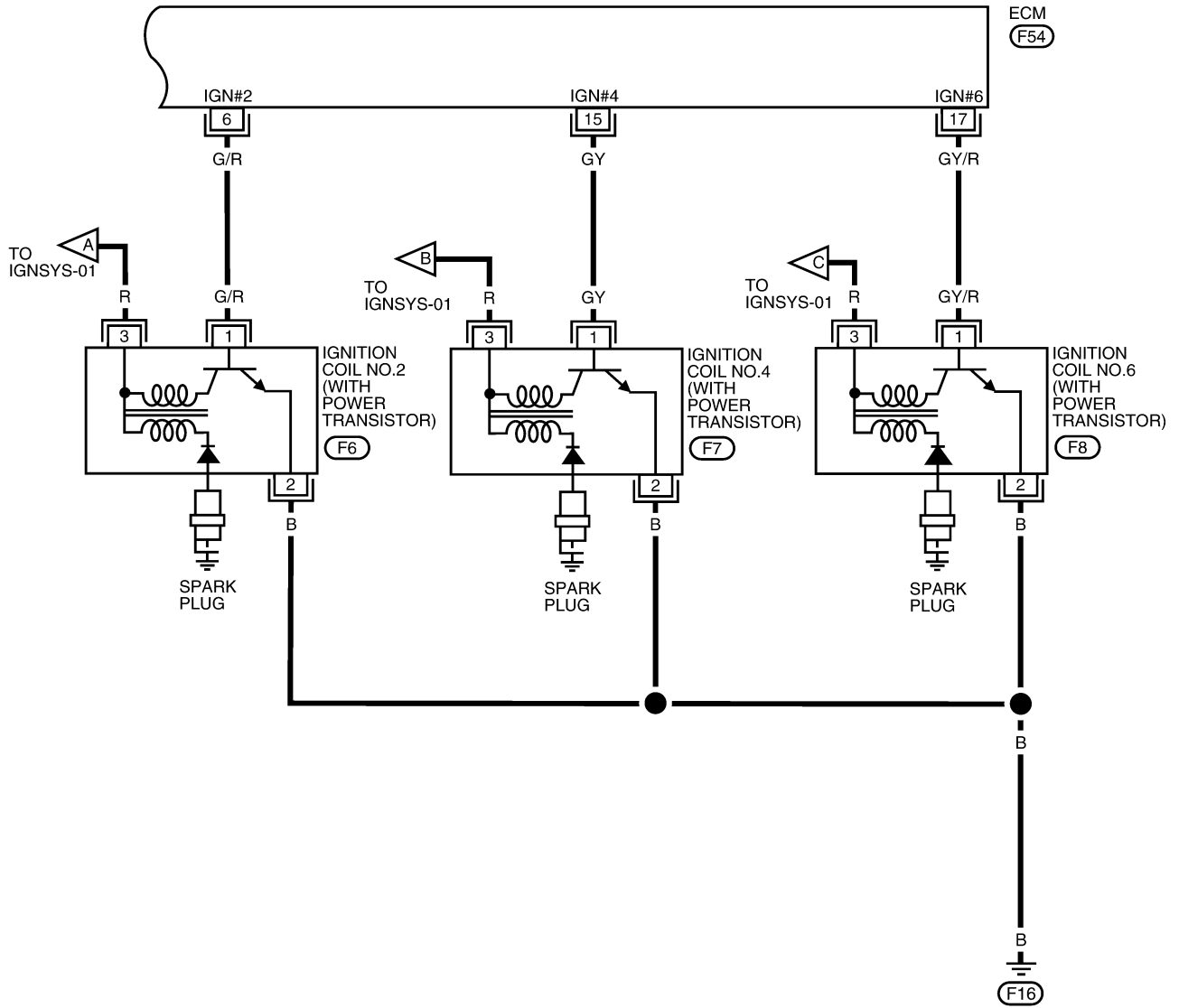
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

IGNITION SIGNAL

[VQ]

EC-IGNSYS-03

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA0083E

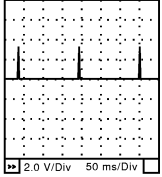
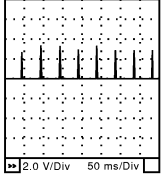
Specification data are reference values and are measured between each terminal and ground.

IGNITION SIGNAL

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
6 15 17	G/R GY GY/R	Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 6	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>0 - 0.2V★</p>  <p>SEC986C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm. 	<p>0.1 - 0.3V★</p>  <p>SEC987C</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS003K7

1. CHECK ENGINE START

Turn ignition switch "OFF", and restart engine.

Is engine running?

Yes or No

- Yes (With CONSULT-II)>>GO TO 2.
- Yes (Without CONSULT-II)>>GO TO 3.
- No >> GO TO 4.

2. CHECK OVERALL FUNCTION

④ **With CONSULT-II**

- Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
- Make sure that each circuit produces a momentary engine speed drop.

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 10.

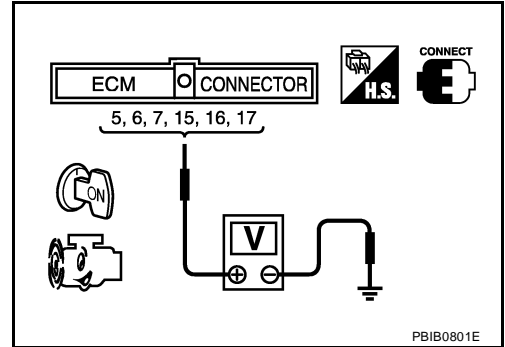
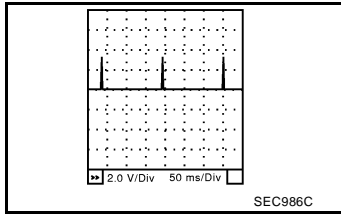
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

3. CHECK OVERALL FUNCTION

⊗ **Without CONSULT-II**

1. Let engine idle.
2. Read the voltage signal between ECM terminals 5, 6, 7, 15, 16, 17 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.



OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 10.

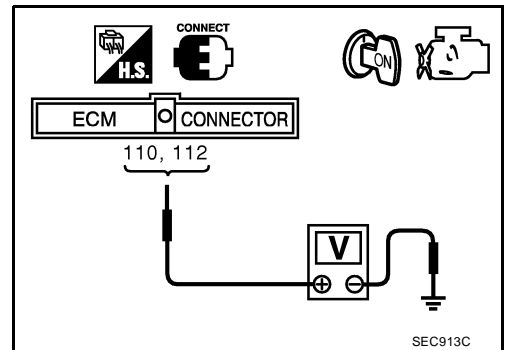
4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
 NG >> Go to [EC-757, "POWER SUPPLY CIRCUIT FOR ECM"](#)



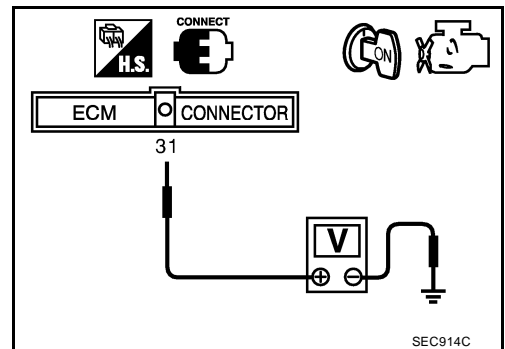
5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

Check voltage between ECM terminal 31 and ground with CONSULT-II 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 ECM harness connector.
3. Disconnect IPDM E/R harness connector.
4. Check harness continuity between ECM terminal 31 and IPDM E/R terminal 35. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> Replace IPDM E/R.

NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector E130, E27
- Harness or connectors E20, F32
- Harness for open and short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK CONDENSER CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 31 and condenser terminal +, condenser terminal – and engine ground. Refer to Wiring Diagram.

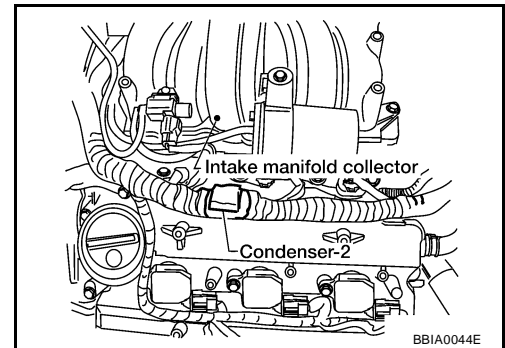
Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



9. CHECK CONDENSER

Refer to [EC-1220, "Component Inspection"](#) .

OK or NG

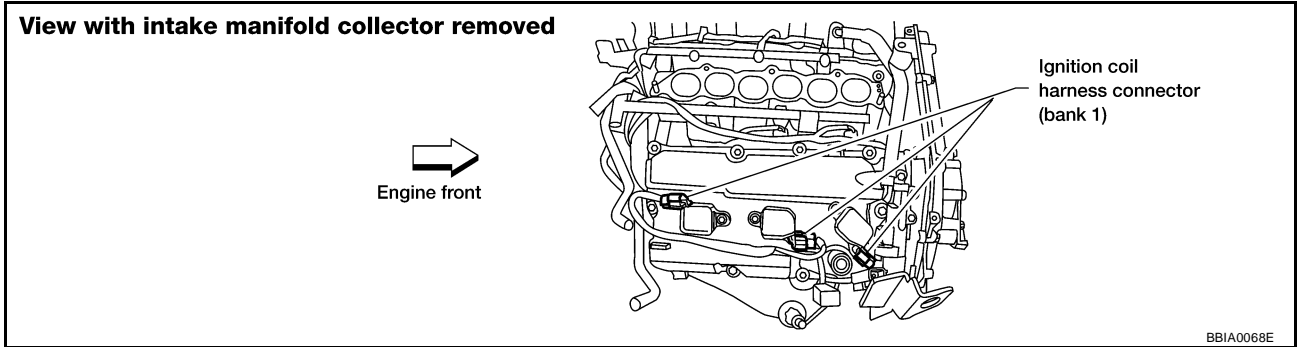
OK >> GO TO 10.

NG >> Replace condenser.

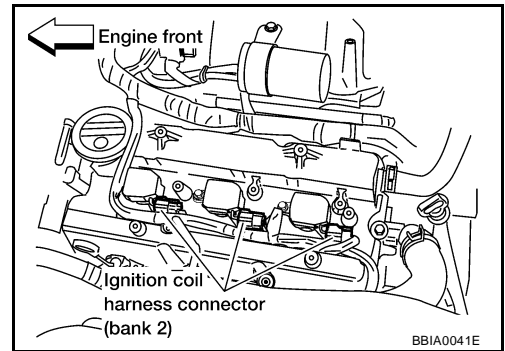
10. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.

Bank 1



Bank 2

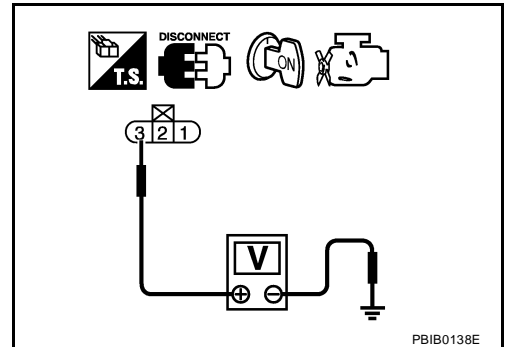


4. Turn ignition switch ON.
5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 12.
- NG >> GO TO 11.



11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F43, F201
- Harness for open or short between ignition coil and ECM
- Harness for open or short between ignition coil and harness connector F32

>> Repair or replace harness or connectors.

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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 engine ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 14.
- NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F43, F201
- Harness for open or short between ignition coil and engine ground

>> Repair open circuit or short to power in harness or connectors.

14. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 5, 6, 7, 15, 16, 17 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 16.
- NG >> GO TO 15.

15. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F43, F201
- Harness for open or short between ignition coil and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

16. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-1220, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.
- NG >> Replace ignition coil with power transistor.

17. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

Component Inspection IGNITION COIL WITH POWER TRANSISTOR

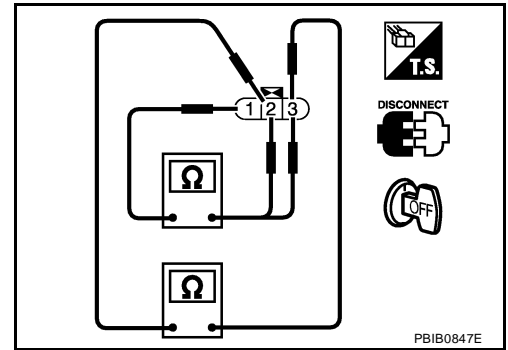
1. Turn ignition switch "OFF".

IGNITION SIGNAL

[VQ]

- Disconnect ignition coil harness connector.
- Check resistance between ignition coil terminals as follows.

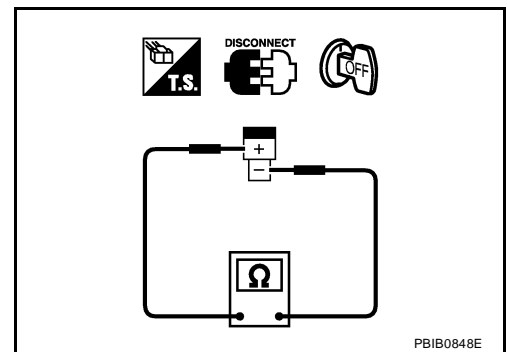
Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 and 2	Except 0 or ∞
1 and 3	Except 0
2 and 3	



CONDENSER

- Turn ignition switch "OFF".
- Disconnect condenser harness connector.
- Check resistance between condenser terminals + and -.

Resistance	Above 1 M Ω at 25°C (77°F)



Removal and Installation IGNITION COIL WITH POWER TRANSISTOR

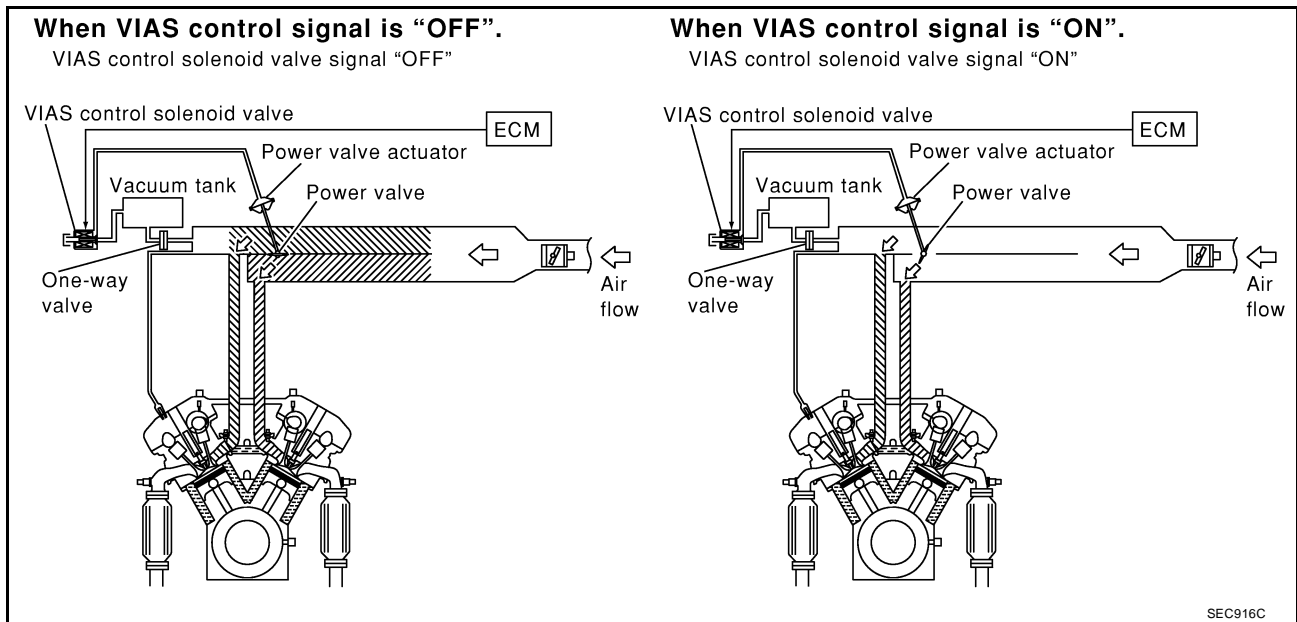
Refer to [EM-126, "IGNITION COIL"](#) .

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VIAS

**Description
SYSTEM DESCRIPTION**

Sensor	Input Signal to ECM	ECM function	Actuator
Mass air flow sensor	Amount of intake air	VIAS control	VIAS control solenoid valve
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Ignition switch	Start signal		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		



SEC916C

When the engine is running at low or medium speed, the power valve is fully closed. Under this condition, the effective suction port length is equivalent to the total length of the intake manifold collector's suction port including the intake valve. This long suction port provides increased air intake which results in improved suction efficiency and higher torque generation.

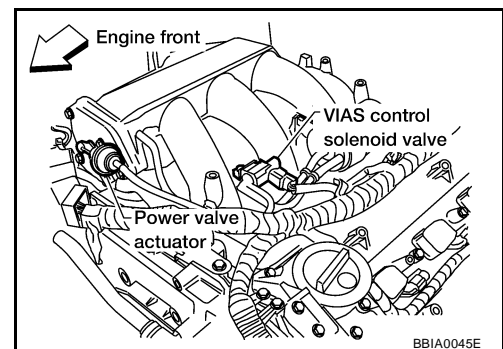
The surge tank and one-way valve are provided. When engine is running at high speed, the ECM sends the signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore opens the power valve to two suction passages together in the collector.

Under this condition, the effective port length is equivalent to the length of the suction port provided independently for each cylinder. This shortened port length results in enhanced engine output with reduced suction resistance under high speeds.

COMPONENT DESCRIPTION

Power Valve

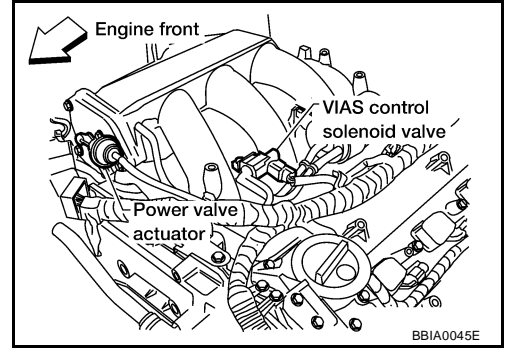
The power valve is installed in intake manifold collector and used to control the suction passage of the variable induction air control system. It is set in the fully closed or fully opened position by the power valve actuator operated by the vacuum stored in the surge tank. The vacuum in the surge tank is controlled by the VIAS control solenoid valve.



BBA0045E

VIAS Control Solenoid Valve

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve control. It responds to ON/OFF signals from the ECM. When the solenoid is off, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and feeds the vacuum signal to the power valve actuator.



CONSULT-II Reference Value in Data Monitor Mode

UBS003KB

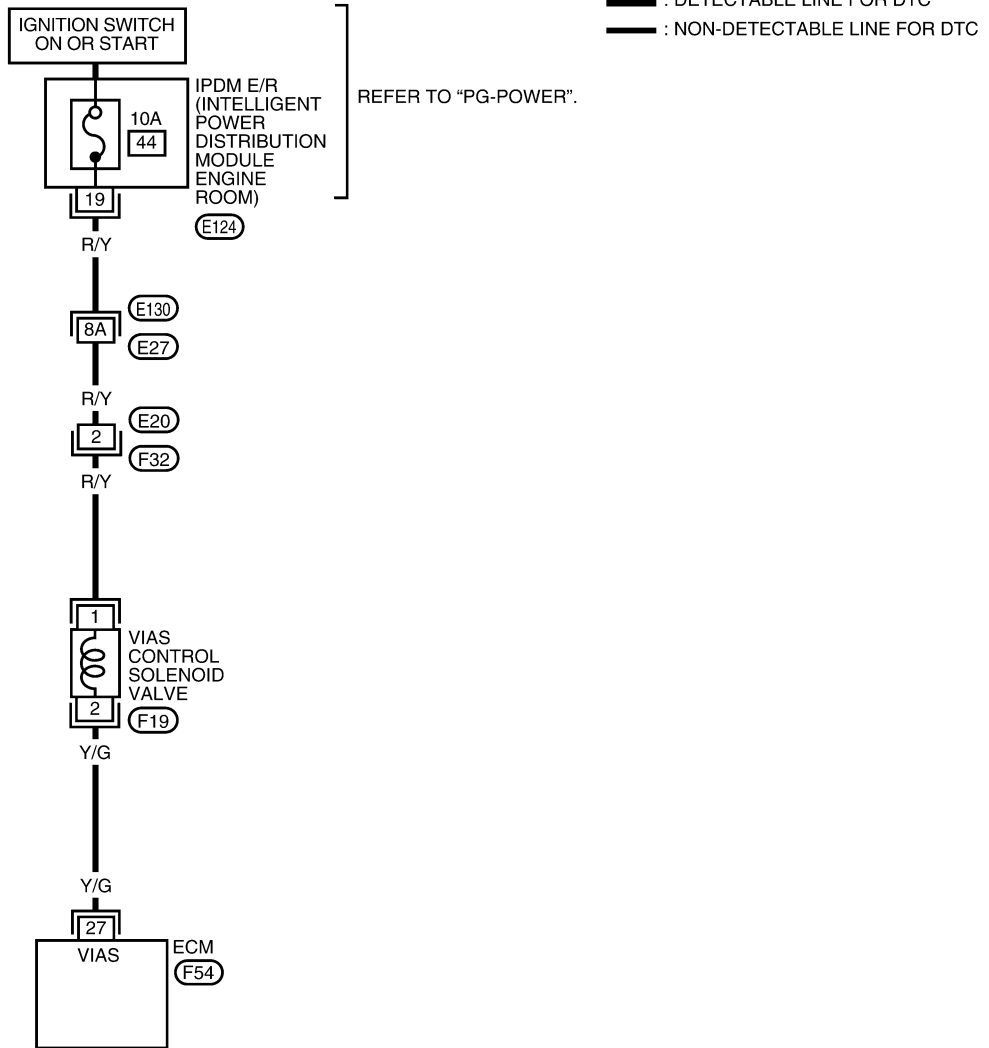
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
VIAS S/V	● Engine: After warming up	1,800 - 3,600 rpm	OFF
		Except the above condition	ON

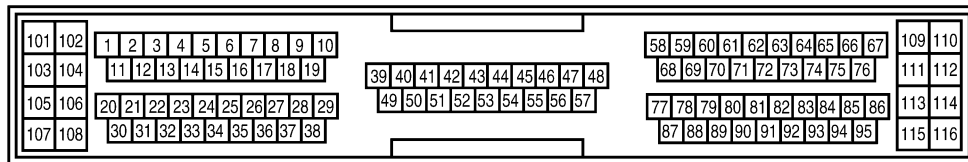
Wiring Diagram

UBS003KC

EC-VIAS-01



REFER TO THE FOLLOWING.
E130 - SUPER MULTIPLE JUNCTION (SMJ)



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
27	Y/G	VIAS control solenoid valve	[Engine is running] ● Engine speed is 1,800 - 3,600 rpm	0 - 1.0V
			[Engine is running] ● Except the above condition	BATTERY VOLTAGE (11 - 14V)

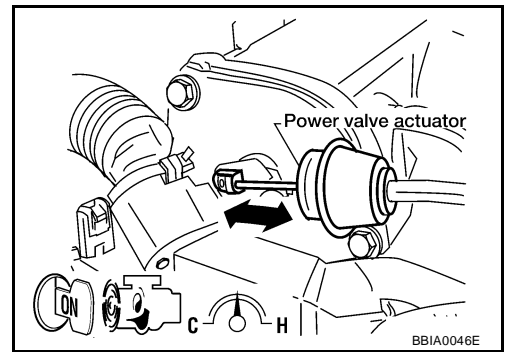
Diagnostic Procedure

UBS003KD

1. CHECK OVERALL FUNCTION

Ⓜ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT-II.
3. Turn VIAS control solenoid valve "ON" and "OFF", and make sure that power valve actuator rod moves.



ⓧ Without CONSULT-II

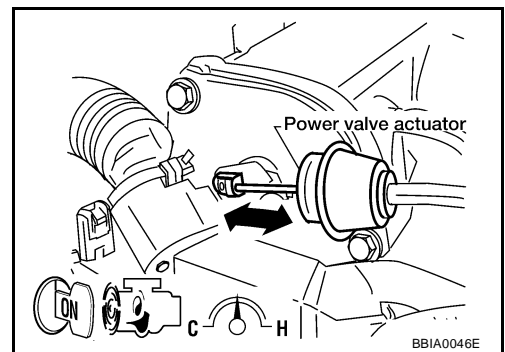
1. Start engine and warm it up to normal operating temperature.
2. Rev engine quickly up to above 5,000 rpm and make sure that power valve actuator rod moves.

OK or NG

OK >> **INSPECTION END**

NG (With CONSULT-II) >>GO TO 2.

NG (Without CONSULT-II) >>GO TO 3.

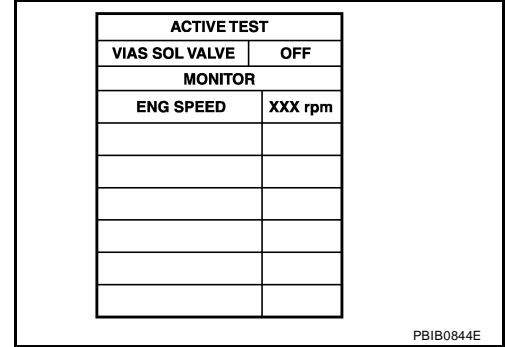


2. CHECK VACUUM EXISTENCE

With CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Start engine and let it idle.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT-II.
4. Turn VIAS control solenoid valve "ON" and "OFF", and check vacuum existence under the following conditions.

VIAS SOL VALVE	Vacuum
ON	Should exist.
OFF	Should not exist.



PBIB0844E

OK or NG

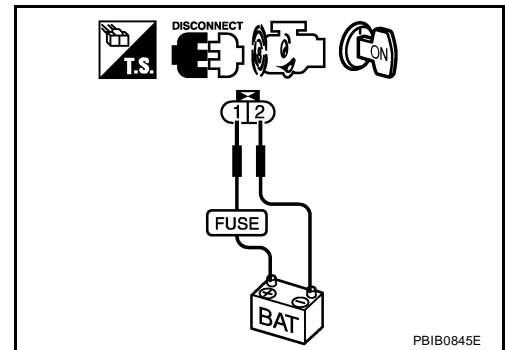
- OK >> Repair or replace power valve actuator.
- NG >> GO TO 4.

3. CHECK VACUUM EXISTENCE

Without CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Disconnect VIAS control solenoid valve harness connector.
3. Start engine and let it idle.
4. Apply 12V of direct current between VIAS control solenoid valve terminals 1 and 2.
5. Check vacuum existence under the following conditions.

Condition	Vacuum
12V direct current supply	Should exist.
No supply	Should not exist.



PBIB0845E

OK or NG

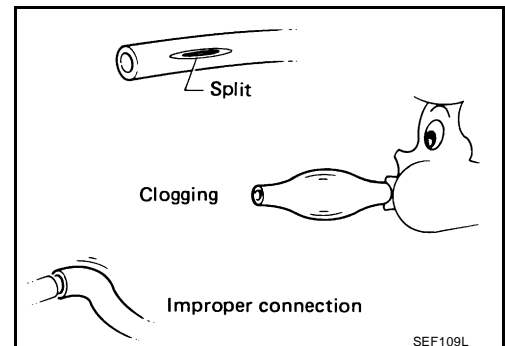
- OK >> Repair or replace power valve actuator.
- NG >> GO TO 4.

4. CHECK VACUUM HOSE

1. Stop engine.
2. Check hoses and tubes between intake manifold and power valve actuator for crack, clogging, improper connection or disconnection. Refer to [EC-647, "Vacuum Hose Drawing"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Repair hoses or tubes.



SEF109L

5. CHECK VACUUM TANK

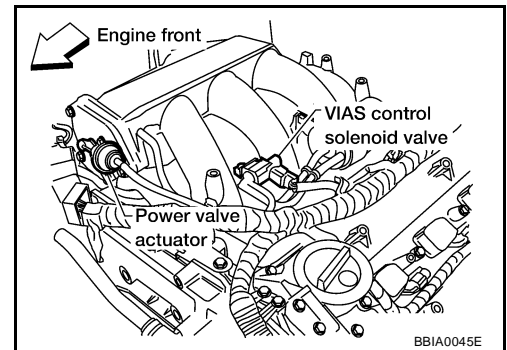
Refer to [EC-1228, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
 NG >> Replace vacuum tank.

6. CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect VIAS control solenoid valve harness connector.
3. Turn ignition switch "ON".

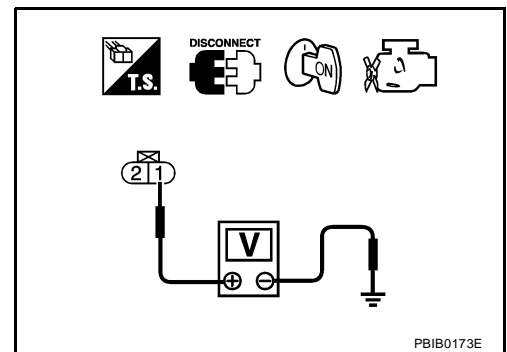


4. Check voltage between terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
 NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- IPDM E/R connector E124
- 10A fuse
- Harness continuity between fuse and VIAS control solenoid valve

>> Repair harness or connectors.

8. CHECK VIAS 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 27 and VIAS 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 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK VIAS CONTROL SOLENOID VALVE

Refer to [EC-1228, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace VIAS control solenoid valve.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection
VIAS CONTROL SOLENOID VALVE**

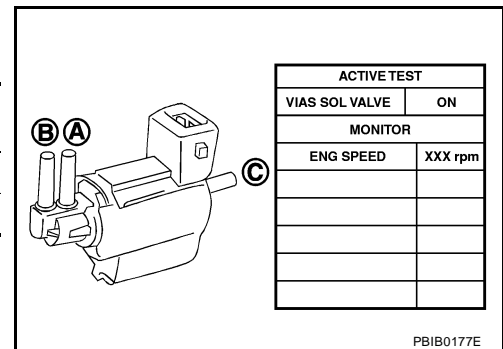
UBS003KE

Ⓜ With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch ON.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.

Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.

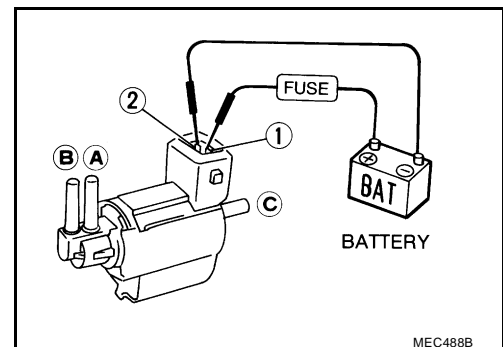


ⓧ Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

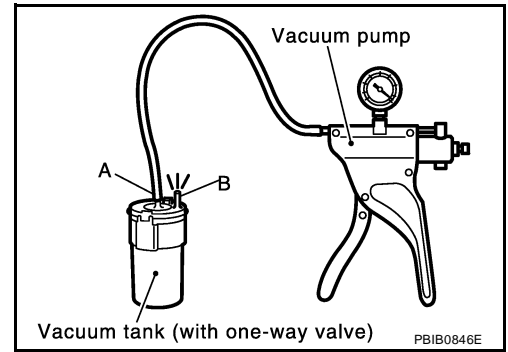
Condition	Air passage continuity between A and B	Air passage continuity between A and C
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

Operation takes less than 1 second.



VACUUM TANK

1. Disconnect vacuum hose connected to vacuum tank.
2. Connect a vacuum pump to the center port of vacuum tank.
3. Apply vacuum and make sure that vacuum exists at the other port.



UBS003KF

**Removal and Installation
VIAS CONTROL SOLENOID VALVE**Refer to [EM-112, "INTAKE MANIFOLD"](#) .

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INJECTOR CIRCUIT

[VQ]

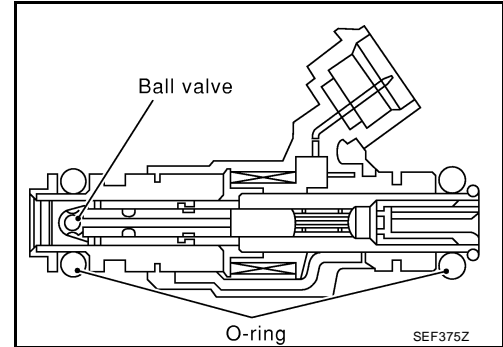
PFV:16600

INJECTOR CIRCUIT

Component Description

UBS003KG

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



CONSULT-II Reference Value in Data Monitor Mode

UBS003KH

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
B/FUEL SCHDL	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load 	Idle	2.3 - 2.9 msec
		2,000 rpm	2.3 - 2.9 msec
INJ PULSE-B1 INJ PULSE-B2	<ul style="list-style-type: none"> ● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load 	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec

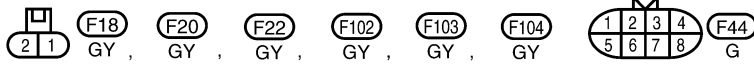
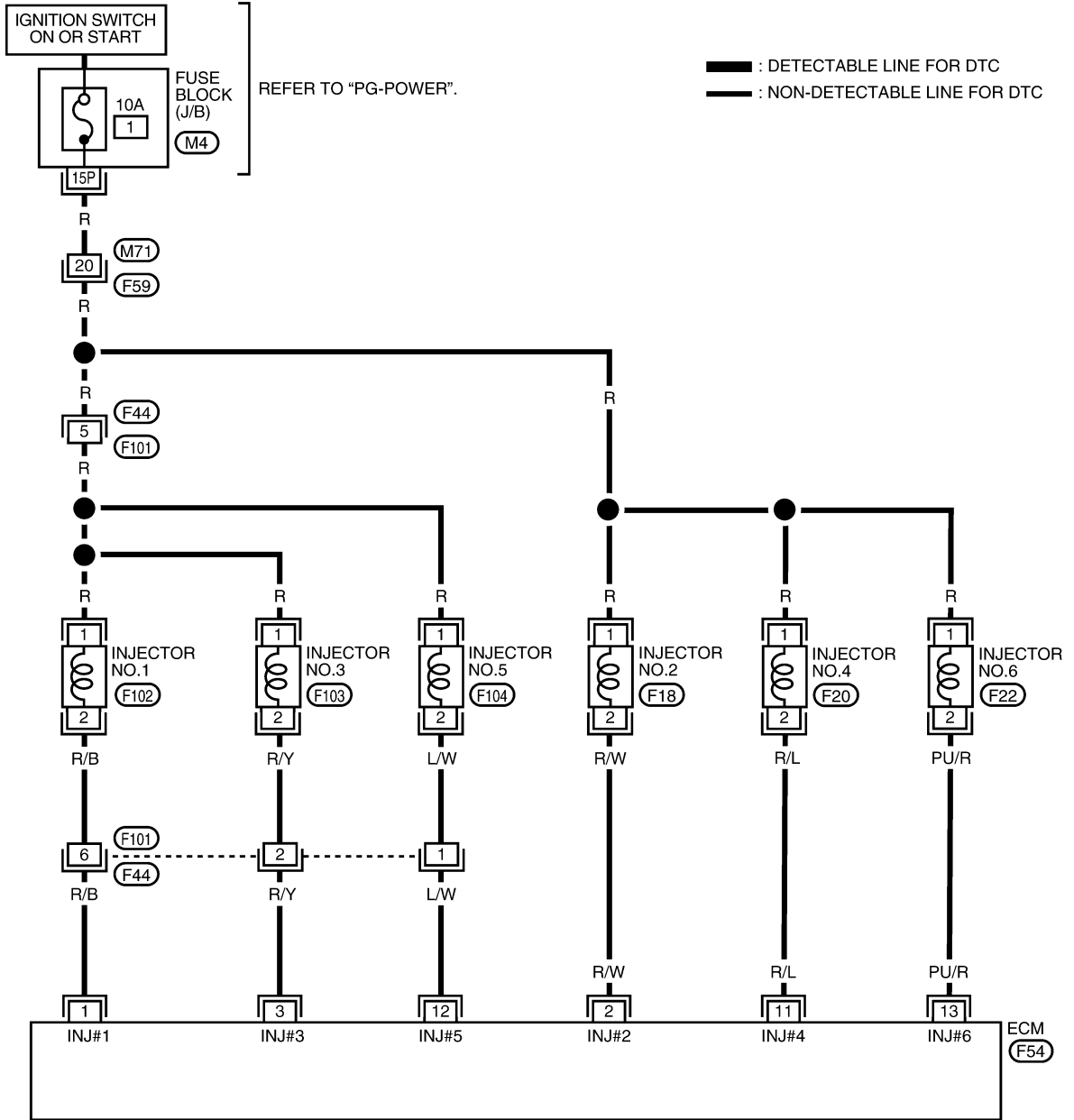
INJECTOR CIRCUIT

[VQ]

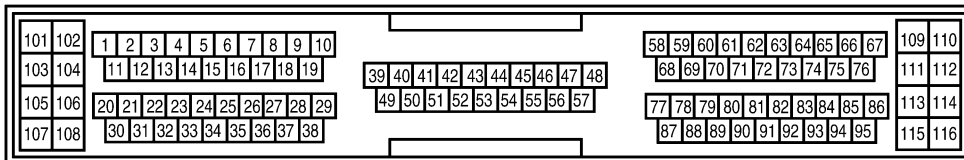
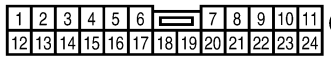
Wiring Diagram

UBS003KI

EC-INJECT-01



REFER TO THE FOLLOWING.
 M4 - FUSE BLOCK
 - JUNCTION BOX (J/B)



BBWA0089E

INJECTOR CIRCUIT

[VQ]

Specification data are reference values and are measured between each terminal and ground.

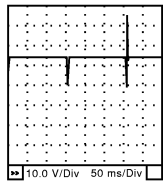
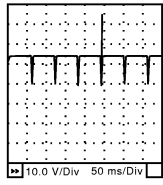
CAUTION:

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.

Specification data are reference values and are measured between each terminal and body ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	R/B	Injector No. 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>SEC984C</p>
2	R/W	Injector No. 2		
3	R/Y	Injector No. 3		
11	R/L	Injector No. 4		
12	L/W	Injector No. 5		
13	PU/R	Injector No. 6		
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm 	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>SEC985C</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

UBS003KJ

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

④ With CONSULT-II

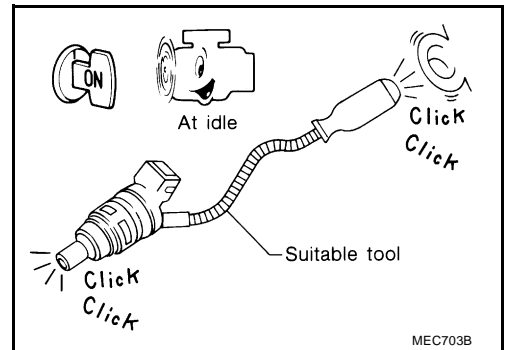
1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

⊗ Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.
Clicking noise should be heard.

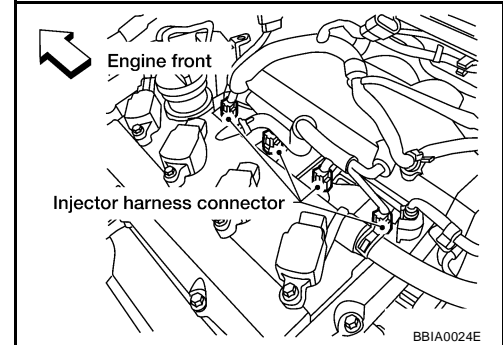


OK or NG

- OK >> **INSPECTION END**
 NG >> **GO TO 3.**

3. CHECK INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect injector harness connector.
3. Turn ignition switch "ON".

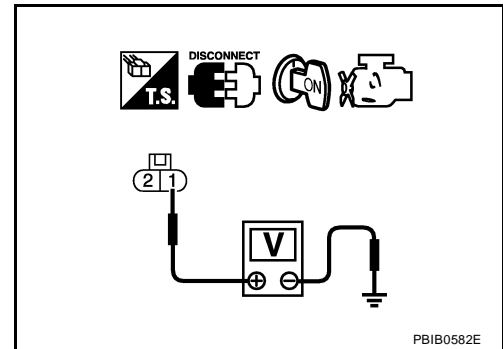


4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, F59
- Harness connectors F44, F101
- Fuse block (J/B) connector M4
- 10A fuse
- Harness for open or short between injector and fuse

>> Repair harness or connectors.

5. CHECK INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between injector terminal 2 and ECM terminals 1, 2, 3, 11, 12, 13. 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 F44, F101
- Harness for open or short between injector and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK INJECTOR

Refer to [EC-1235, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace injector.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

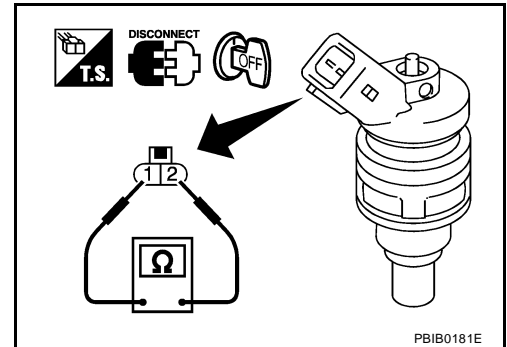
>> INSPECTION END

Component Inspection INJECTOR

UBS003KK

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 13.5 - 17.5Ω [at 20°C (68°F)]



UBS003KL

Removal and Installation INJECTOR

Refer to [EM-129, "FUEL INJECTOR AND FUEL TUBE"](#) .

START SIGNAL

[VQ]

START SIGNAL

PF:48750

CONSULT-II Reference Value in Data Monitor Mode

UBS003KM

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
START SIGNAL	● Ignition switch: ON → START → ON	OFF → ON → OFF

START SIGNAL

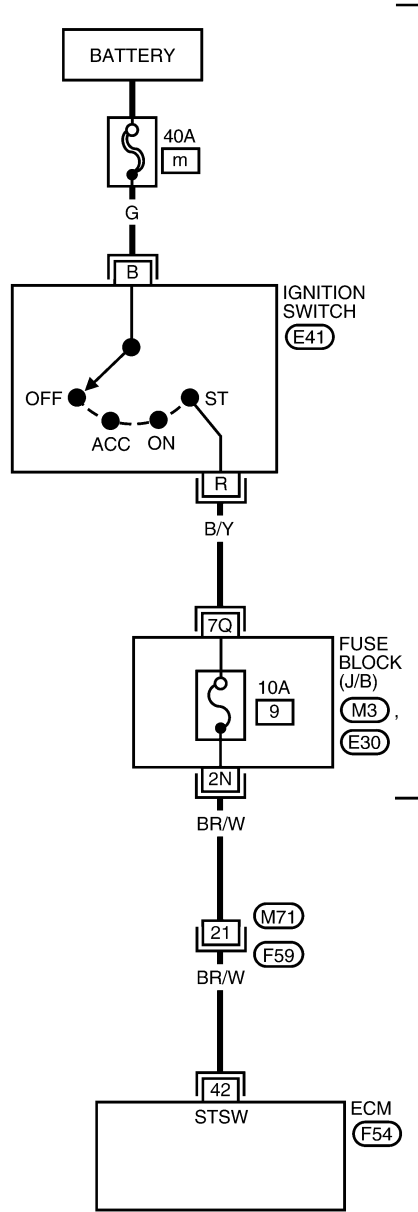
[VQ]

Wiring Diagram

UBS003KN

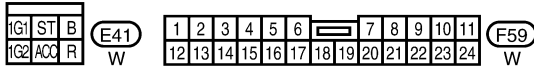
EC-S/SIG-01

A
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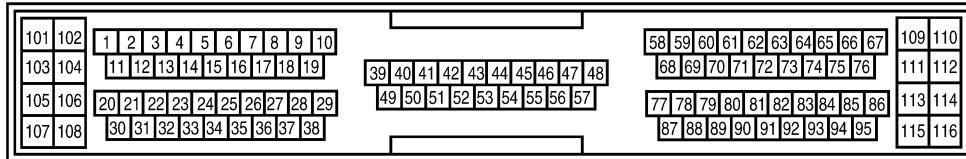


— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".



REFER TO THE FOLLOWING.
M3, E30 - FUSE BLOCK
- JUNCTION BOX (J/B)



F54
GY



BBWA0090E

Specification data are reference values and are measured between each terminal and ground.

START SIGNAL

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
42	BR/W	Start signal	[Ignition switch "ON"]	Approximately 0V
			[Ignition switch "START"]	9 - 14V

Diagnostic Procedure

UBS003KO

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

2. CHECK OVERALL FUNCTION

With CONSULT-II

- Turn ignition switch "ON".
- Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	START SIGNAL
Ignition switch "ON"	OFF
Ignition switch "START"	ON

DATA MONITOR	
MONITOR	NO DTC
START SIGNAL	OFF
CLSD THL POS	ON
AIR COND SIG	OFF
P/N POSI SW	ON

PBIB0182E

OK or NG

OK >> **INSPECTION END**

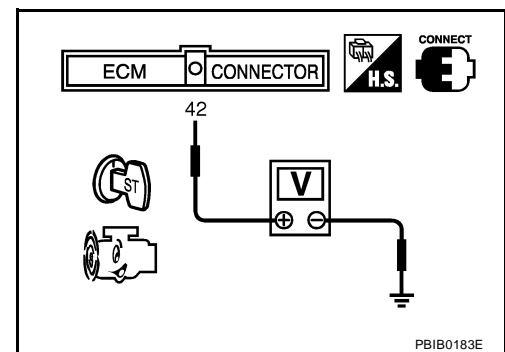
NG >> GO TO 4.

3. CHECK OVERALL FUNCTION

Without CONSULT-II

Check voltage between ECM terminal 42 and ground under the following conditions.

Condition	Voltage
Ignition switch "START"	Battery voltage
Other positions	Approximately 0V



PBIB0183E

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 4.

4. CHECK STARTING SYSTEM

Turn ignition switch "OFF", then turn it to "START".

Does starter motor operate?

Yes or No

Yes >> GO TO 5.

No >> Refer to [SC-9, "STARTING SYSTEM"](#).

5. CHECK FUSE

1. Turn ignition switch "OFF".
2. Disconnect 10A fuse.
3. Check if 10A fuse is OK.

OK or NG

- OK >> GO TO 6.
 NG >> Replace 10A fuse.

6. CHECK START SIGNAL INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Disconnect ignition switch harness connector.
3. Check harness continuity between ECM terminal 42 and ignition switch terminal R. 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 M71, F59
- Fuse block (J/B) connectors M3, E30
- Harness for open or short between ignition switch and fuse block (J/B)
- Harness for open or short between ECM and fuse block (J/B)

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

A
 EC
 C
 D
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 J
 K
 L
 M

FUEL PUMP CIRCUIT

[VQ]

FUEL PUMP CIRCUIT

PF1:17042

Description SYSTEM DESCRIPTION

UBS003KP

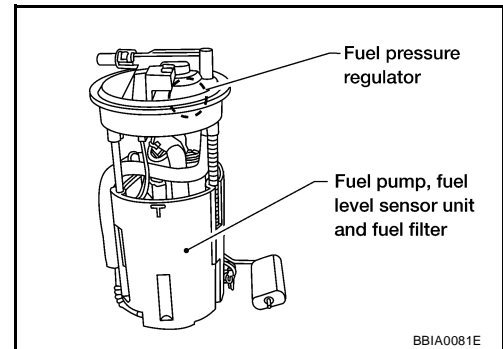
Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Fuel pump control	Fuel pump relay
Ignition switch	Start signal		

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.



BBIA0081E

CONSULT-II Reference Value in Data Monitor Mode

UBS003KQ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	<ul style="list-style-type: none"> For 1 seconds after turning ignition switch ON Engine running or cranking 	ON
	<ul style="list-style-type: none"> Except above conditions 	OFF

FUEL PUMP CIRCUIT

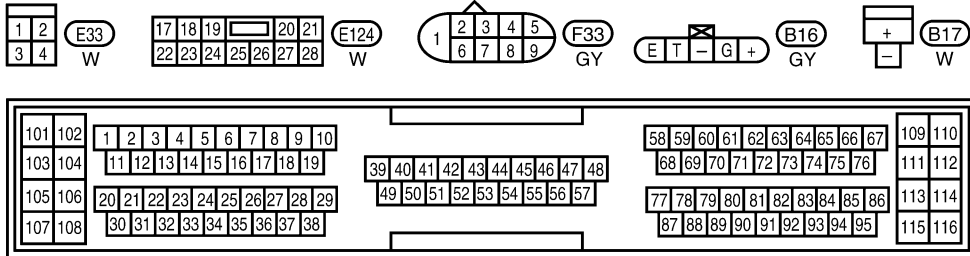
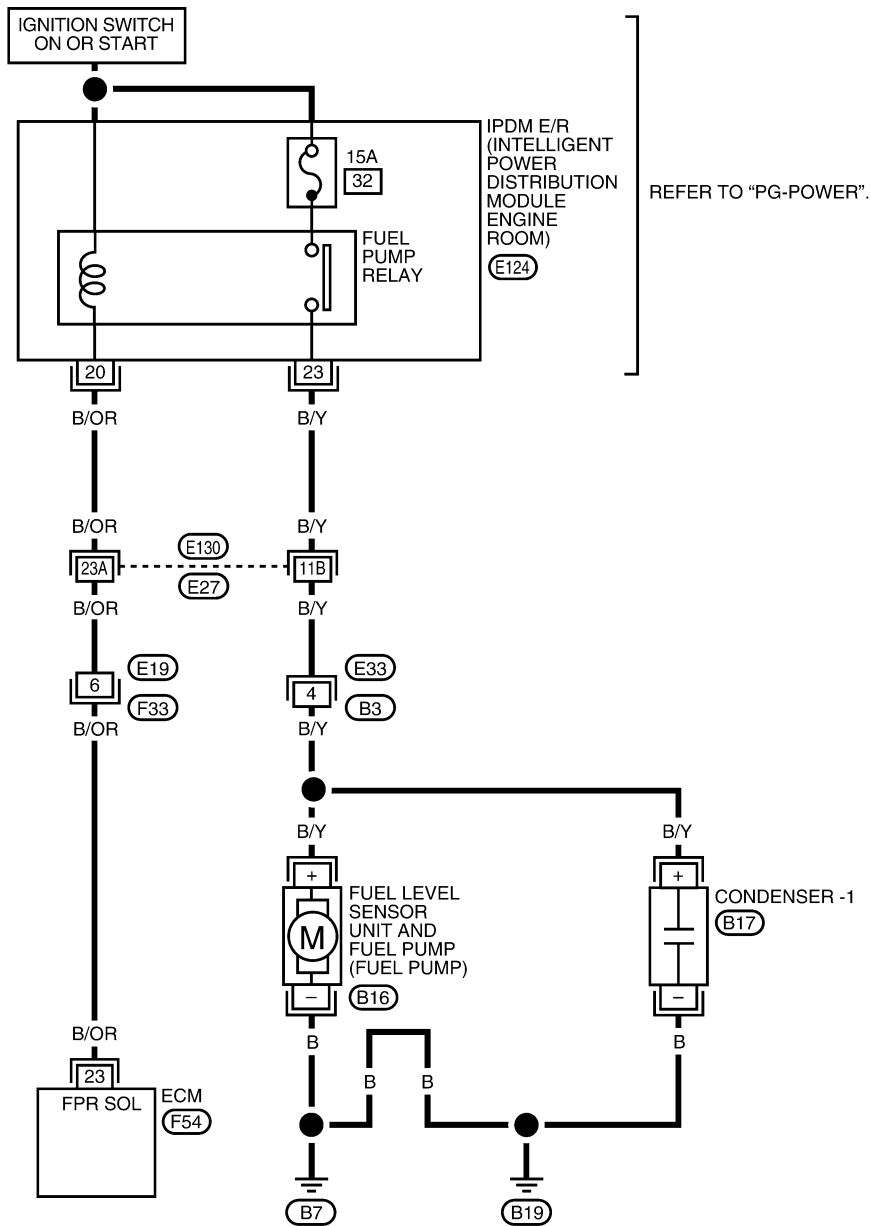
[VQ]

Wiring Diagram

UBS003KR

EC-F/PUMP-01

A
EC
C
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.
(E130) - SUPER MULTIPLE JUNCTION (SMJ)

Specification data are reference values and are measured between each terminal and ground.

FUEL PUMP CIRCUIT

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
23	B/OR	Fuel pump relay	[Ignition switch "ON"] ● For 1 seconds after turning ignition switch "ON"	0 - 1.5V
			[Engine is running] [Ignition switch "ON"] ● More than 1 seconds after turning ignition switch "ON".	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

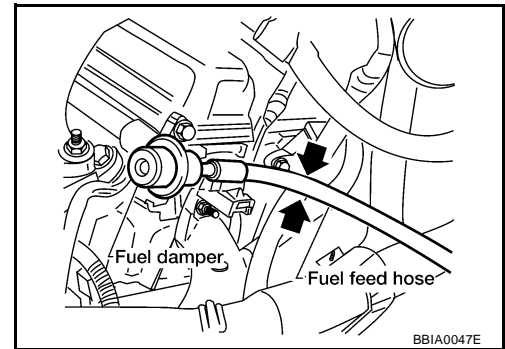
UBS003KS

1. CHECK OVERALL FUNCTION

- Turn ignition switch "ON".
- Pinch fuel feed hose with two fingers.
Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned "ON".

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 2.



BBIA0047E

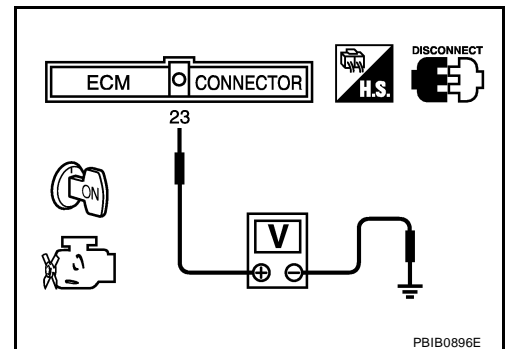
2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

- Turn ignition switch "OFF".
- Disconnect ECM harness connector.
- Turn ignition switch "ON".
- Check voltage between ECM terminal 23 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 3.



PBIB0896E

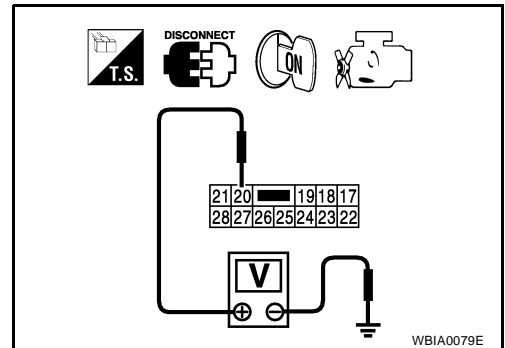
3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

1. Turn ignition switch "OFF".
2. Disconnect IPDM E/R harness connector E124.
3. Turn ignition switch "ON".
4. Check voltage between IPDM E/R terminal 20 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 13.



4. DETECT MALFUNCTIONING PART

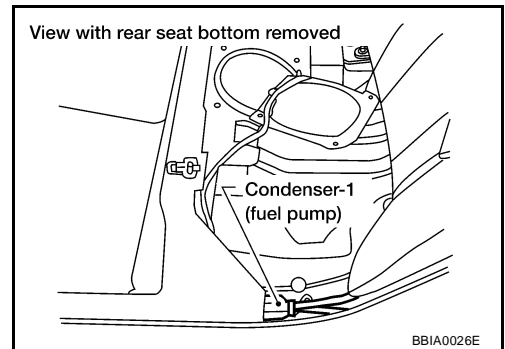
Check the following.

- Harness connectors E130, E27
- Harness connectors E19, F33
- Harness for open or short between IPDM E/R and ECM

>> Repair harness or connectors.

5. CHECK CONDENSER POWER SUPPLY CIRCUIT-I

1. Turn ignition switch "OFF".
2. Reconnect all harness connectors disconnected.
3. Disconnect condenser harness connector.
4. Turn ignition switch "ON".



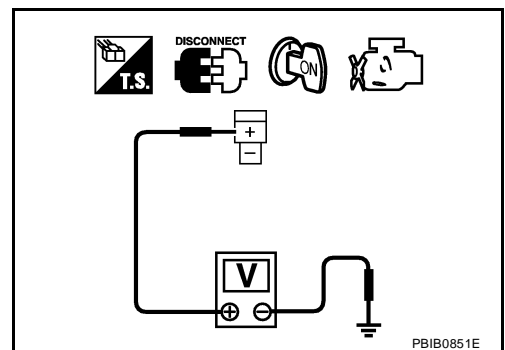
5. Check voltage between condenser terminal + and ground with CONSULT-II or tester.

Voltage: Battery voltage should exist for 1 second after ignition switch is turned "ON".

6. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 6.



6. CHECK 15A FUSE

1. Turn ignition switch "OFF".
2. Disconnect 15A fuse.
3. Check 15A fuse.

OK or NG

- OK >> GO TO 7.
NG >> Replace fuse.

7. CHECK CONDENSER POWER SUPPLY CIRCUIT-II

1. Disconnect IPDM E/R harness connector E124.
2. Check harness continuity between IPDM E/R terminal 23 and condenser terminal +.
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 13.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E33, B3
- Harness for open or short between IPDM E/R and condenser

>> Repair harness or connectors.

9. CHECK CONDENSER GROUND CIRCUIT

1. Check harness continuity between condenser terminal – and body 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 open circuit or short to power in harness or connectors.

10. CHECK CONDENSER

Refer to [EC-1245, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
NG >> Replace condenser.

11. CHECK FUEL PUMP POWER SUPPLY AND GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check harness continuity between fuel pump terminal + and harness connector B3 terminal 4, fuel pump terminal – and body ground.
Refer to Wiring Diagram.

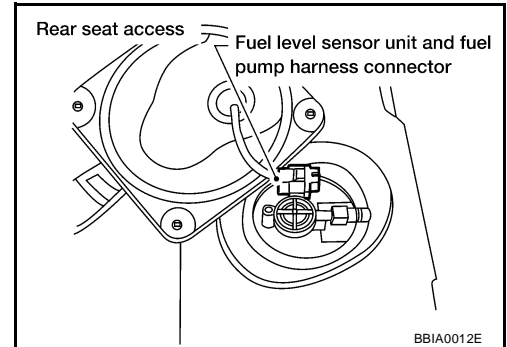
Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 12.

NG >> Repair open circuit or short to power in harness or connectors.



12. CHECK CONDENSER

Refer to [EC-1245, "Component Inspection"](#) .

OK or NG

OK >> GO TO 13.

NG >> Replace fuel pump.

13. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R.

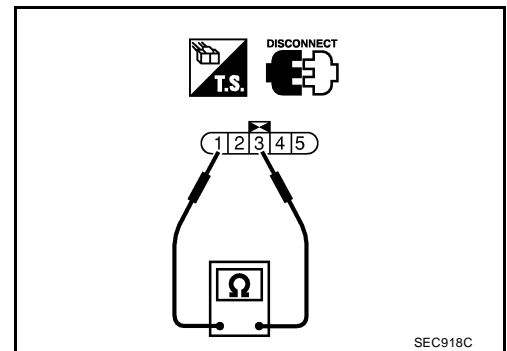
NG >> Repair or replace harness or connectors.

Component Inspection FUEL PUMP

UBS003KT

1. Disconnect fuel level sensor unit and fuel pump harness connector.
2. Check resistance between fuel level sensor unit and fuel pump terminals 3 and 5.

Resistance: Approximately 1.0Ω [at 25°C (77°F)]



CONDENSER

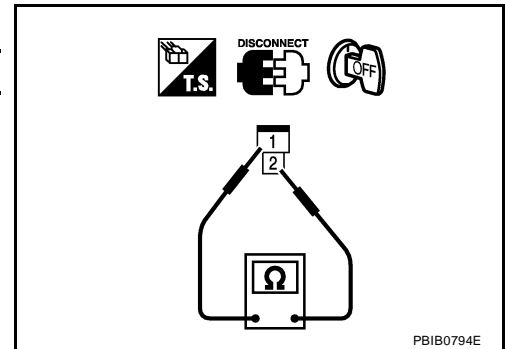
1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.

FUEL PUMP CIRCUIT

[VQ]

3. Check resistance between condenser terminals as 1 and 2.

Resistance	Above 1 MΩ at 25°C (77°F)
------------	---------------------------



Removal and Installation FUEL PUMP

Refer to [FL-5, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

UBS003KU

ELECTRONIC CONTROLLED ENGINE MOUNT

[VQ]

ELECTRONIC CONTROLLED ENGINE MOUNT

PFP:11270

System Description

UBS003KV

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Engine mount control	Electronic controlled engine mount
Vehicle speed sensor (CAN communication line)	Vehicle speed		

The ECM controls the engine mount operation corresponding to the engine speed and the vehicle speed. The control system has 2-step control [Soft/Hard]

Vehicle condition	Engine mount control
Idle (with vehicle stopped)	Soft
Driving	Hard

CONSULT-II Reference Value in Data Monitor Mode

UBS003KW

MONITOR ITEM	CONDITION	SPECIFICATION
ENGINE MOUNT	● Engine: Running	Idle
		Except above

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ELECTRONIC CONTROLLED ENGINE MOUNT

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	W	Electronic controlled engine mount-1	[Engine is running] ● Idle speed	0 - 1.0V
			[Engine is running] ● Except above condition	BATTERY VOLTAGE (11 - 14V)
14	W/R	Electronic controlled engine mount-2	[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Except above condition	0 - 1.0V

Diagnostic Procedure

UBS003KY

1. CHECK OVERALL FUNCTION

 **With CONSULT-II**

- Start engine and warm it up to normal operating temperature.
- Shift selector lever to "D" range while depressing the brake pedal and pulling the parking brake control lever.
- Perform "ENGINE MOUNTING" in "ACTIVE TEST" mode with CONSULT-II and check that the vibration changes according to switching the condition (with vehicle stopped).

ACTIVE TEST	
ENGINE MOUNTING	IDLE
MONITOR	
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEC237C

 **Without CONSULT-II**

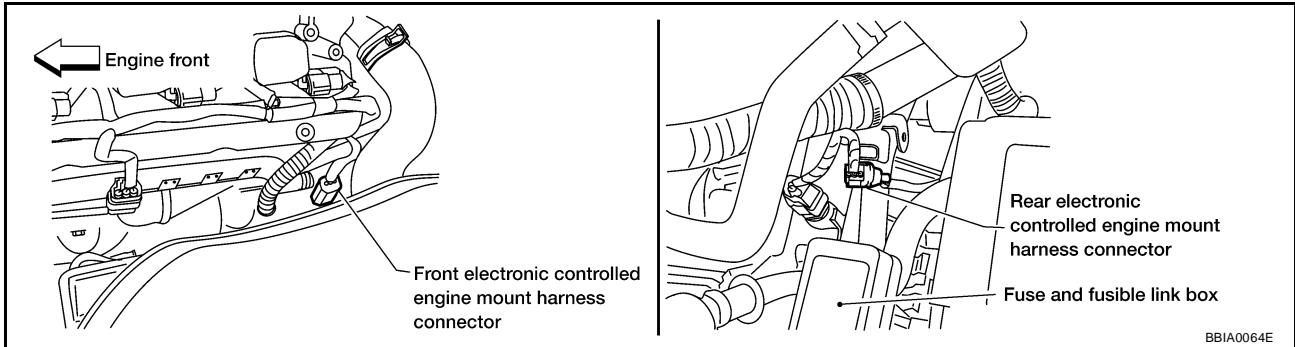
- Start engine and warm it up to normal operating temperature.
- Shift selector lever to "D" range while depressing the brake pedal and pulling the parking brake control lever.
- Disconnect front or rear electronic controlled engine mount harness connector when engine speed is more than 1,000 rpm.
- When returning engine speed to idle speed, check that body vibration increases compared with the condition of the above step 2 (with vehicle stopped).

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 2.

2. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect front or rear electronic controlled engine mount harness connector.

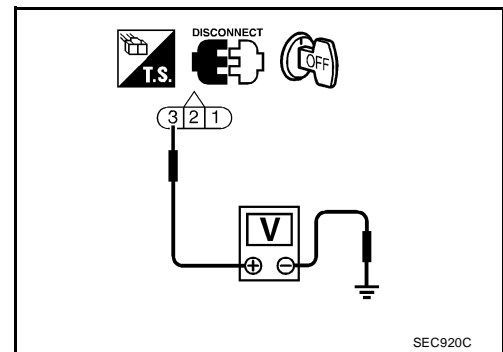


3. Check voltage between electronic controlled engine mount terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E20, F32
- 10A fuse
- Harness for open and short between electronic controlled engine mount and battery

>> Repair harness or connectors.

4. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals and electronic engine mount terminals as follows. Refer to Wiring Diagram.

ECM terminal	Front electronic controlled engine mount terminal	Rear electronic controlled engine mount terminal
4	1	2
14	1	2

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.

ELECTRONIC CONTROLLED ENGINE MOUNT

[VQ]

5. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT

Visually check front and rear electronic controlled engine mount.

OK or NG

OK >> GO TO 6.

NG >> Replace front or rear electronic controlled engine mount.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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REFRIGERANT PRESSURE SENSOR

[VQ]

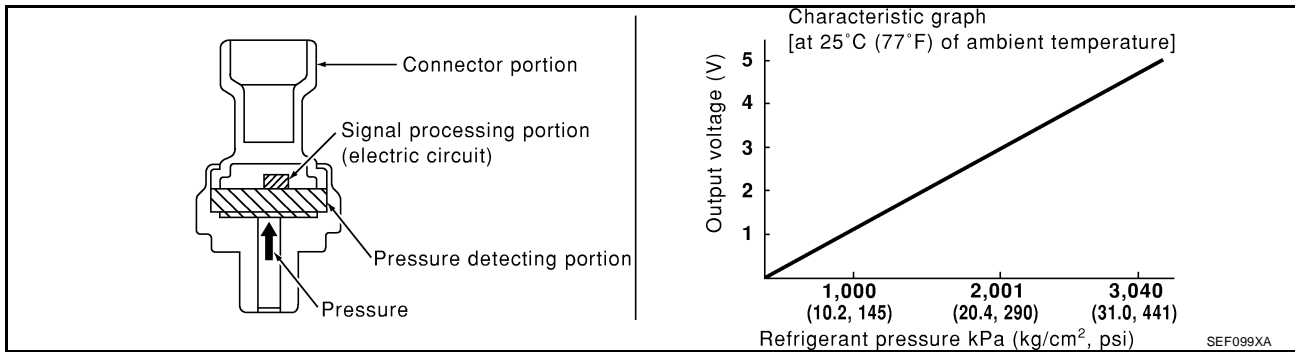
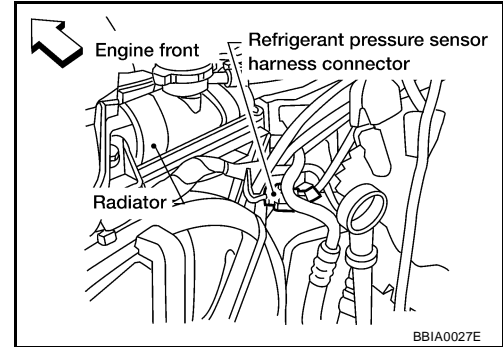
REFRIGERANT PRESSURE SENSOR

PF9:92136

Component Description

UBS003KZ

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



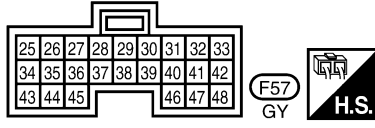
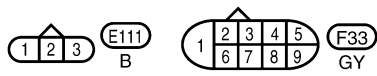
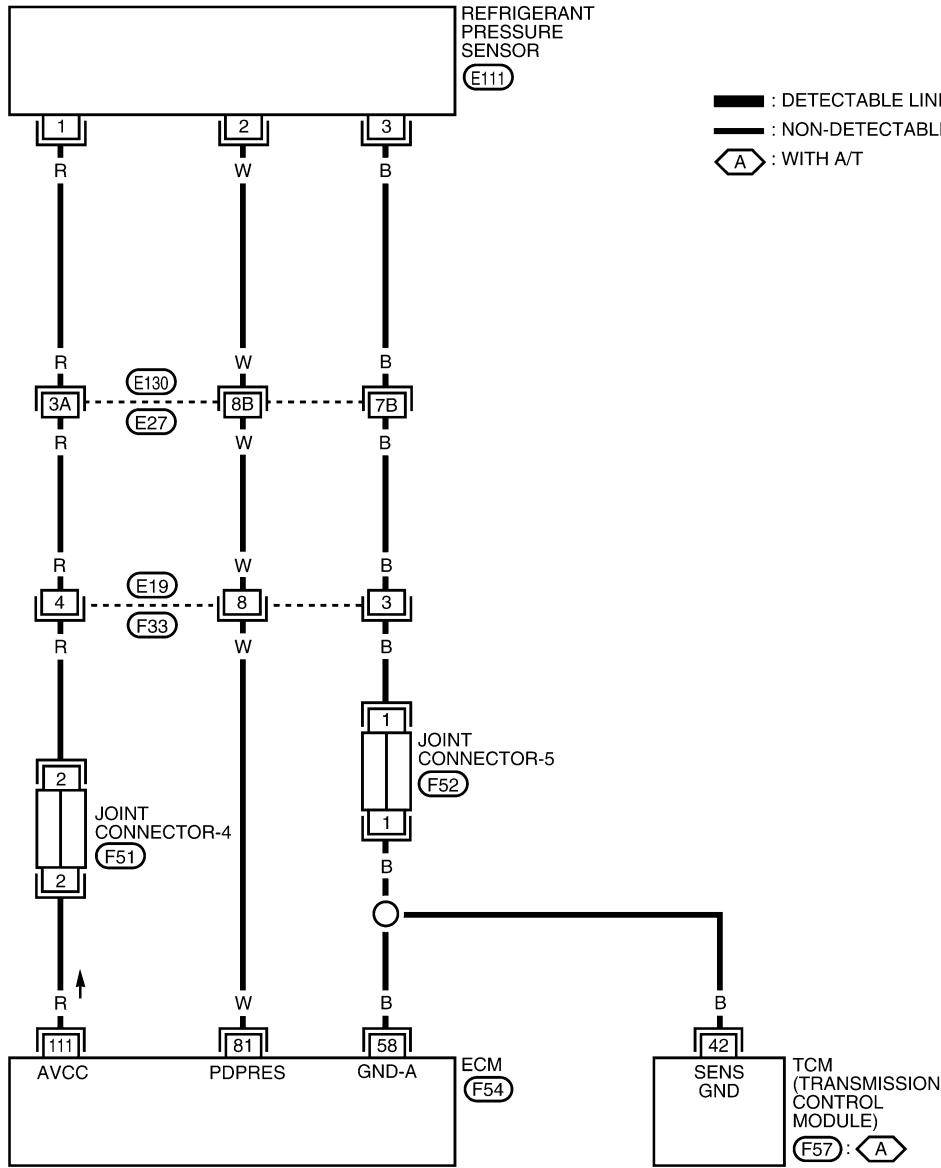
REFRIGERANT PRESSURE SENSOR

[VQ]

Wiring Diagram

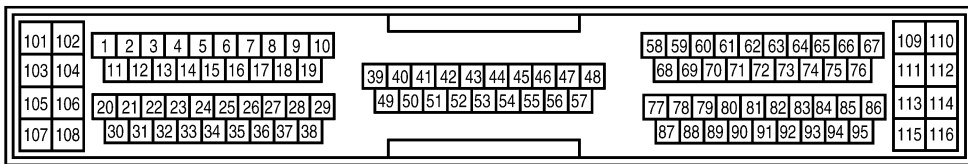
UBS003L0

EC-RP/SEN-01



REFER TO THE FOLLOWING.

- (E130) - SUPER MULTIPLE JUNCTION (SMJ)
- (F51) (F52) - JOINT CONNECTOR (J/C)



BBWA0093E

Specification data are reference values and are measured between each terminal and ground.

REFRIGERANT PRESSURE SENSOR

[VQ]

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
81	W	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch are "ON". (Compressor operates.)	1.0 - 4.0V
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

Diagnostic Procedure

UBS003L1

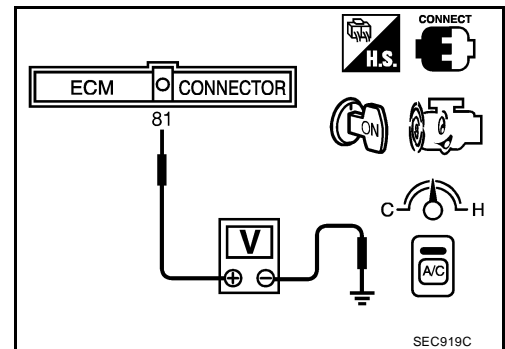
1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower switch "ON".
3. Check voltage between ECM terminal 81 and ground with CONSULT-II or tester.

Voltage: 1.0 - 4.0V

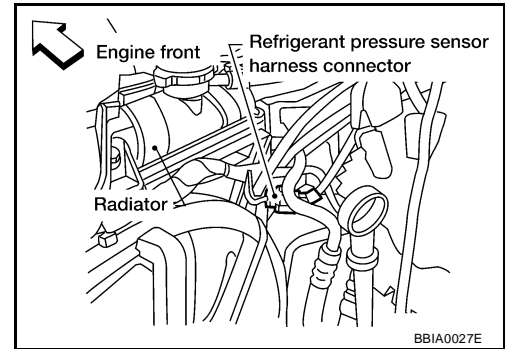
OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 2.



2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn A/C switch and blower switch "OFF".
2. Stop engine.
3. Disconnect refrigerant pressure sensor harness connector.
4. Turn ignition switch "ON".

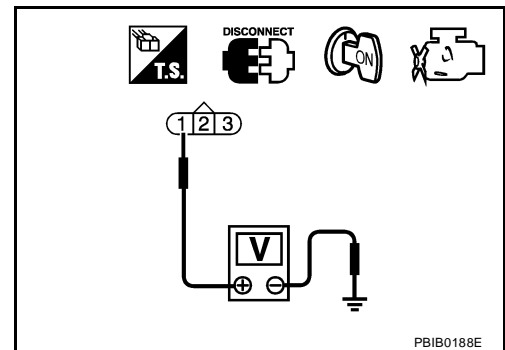


5. Check voltage between refrigerant pressure sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E19, F33
- Joint connector-4
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair harness or connectors.

4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between refrigerant pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram.

Continuity should 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 E130, E27
- Harness connectors E19, F33
- Joint connector-5
- Harness for open or short between ECM and refrigerant pressure sensor
- Harness for open or short between TCM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 81 and refrigerant pressure 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 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E130, E27
- Harness connectors E19, F33
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace refrigerant pressure sensor.
- NG >> Repair or replace.

Removal and Installation REFRIGERANT PRESSURE SENSOR

UBS003L2

Refer to [MTC-88, "Removal and Installation for Refrigerant Pressure Sensor"](#) (manual A/C) or [ATC-126, "Removal and Installation for Refrigerant Pressure Sensor"](#) (auto A/C).

ELECTRICAL LOAD SIGNAL

PFP:25350

Description

UBS003L3

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

Diagnostic Procedure

UBS003L4

1. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch "ON".
2. Connect CONSULT-II or GST and select "DATA MONITOR" mode.
3. Select "LOAD SIGNAL" and check indication under the following conditions.

Condition	Indication
Rear window defogger switch "ON"	ON
Rear window defogger switch "OFF"	OFF

OK or NG

- OK >> GO TO 2.
 NG >> GO TO 3.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

2. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

Check "LOAD SIGNAL" indication under the following conditions.

Condition	Indication
Lighting switch "ON" at 2nd position	ON
Lighting switch "OFF"	OFF

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 4.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

3. CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to [GW-41, "REAR WINDOW DEFOGGER"](#) .

>> **INSPECTION END**

4. CHECK HEADLAMP SYSTEM

Refer to [LT-5, "HEADLAMP \(FOR USA\)"](#) or [LT-28, "HEADLAMP \(FOR CANADA\) - DAYTIME LIGHT SYSTEM -"](#) .

>> **INSPECTION END**

ASCD BRAKE SWITCH

[VQ]

PFV:25320

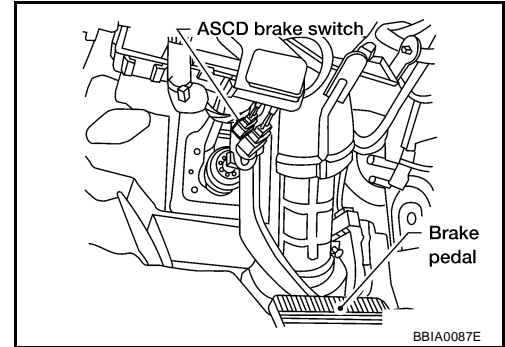
ASCD BRAKE SWITCH

UBS003L5

Component Description

When depress on the brake pedal, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal)

Refer to [EC-1286, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

UBS003L6

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal fully released	ON
		● Brake pedal depressed	OFF
BRAKE SW 2 (stop lamp switch)	● Ignition switch: ON	● Brake pedal fully released	OFF
		● Brake pedal depressed	ON

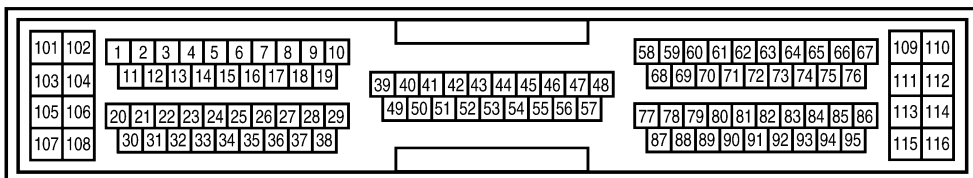
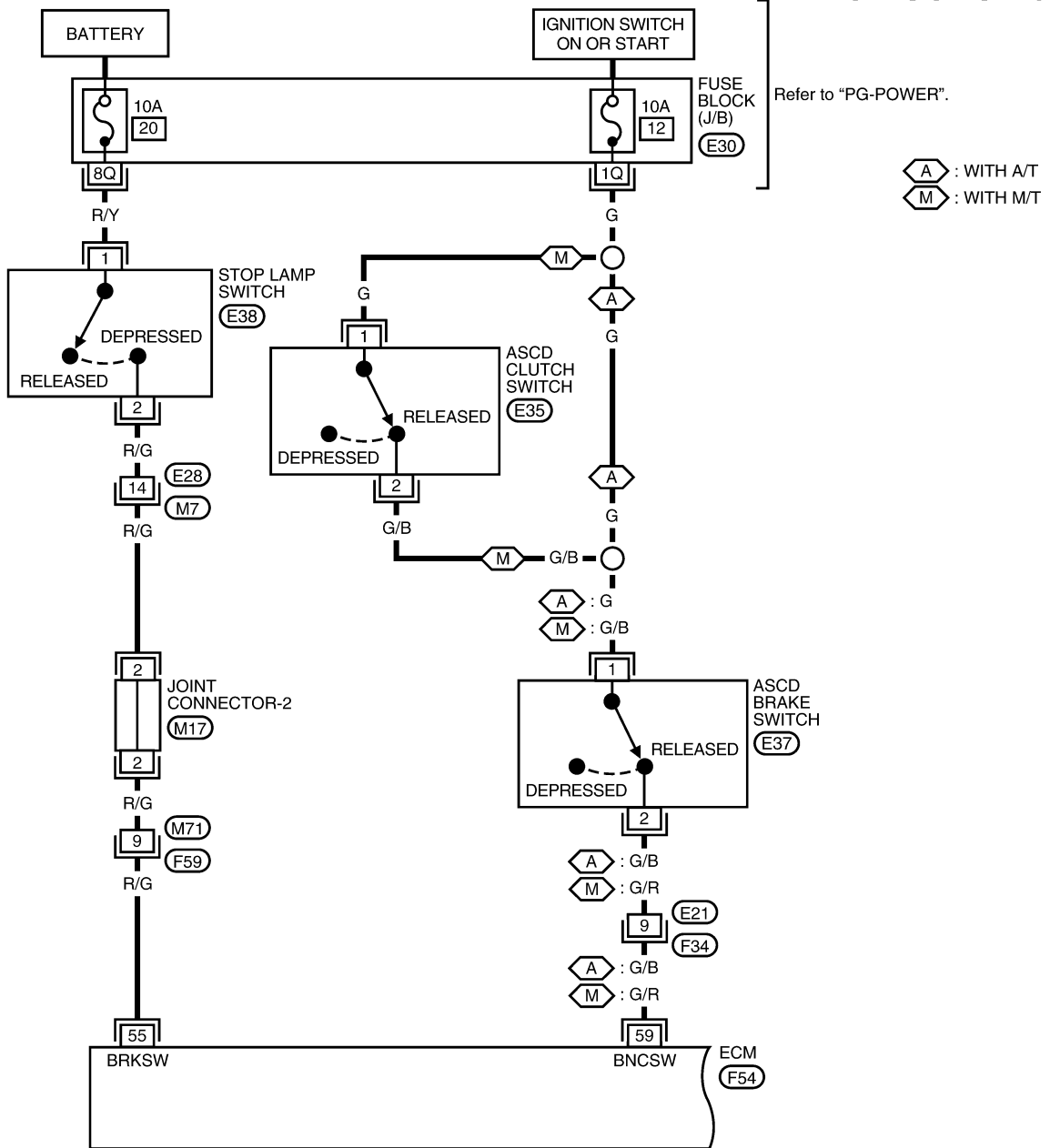
ASCD BRAKE SWITCH

[VQ]

UBS003L7

Wiring Diagram

EC-ASCBOF-01



BBWA0203E

ASCD BRAKE SWITCH

[VQ]

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	R/G	Stop lamp switch	[Ignition switch "ON"] ● Brake pedal is fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
59	G/B (A/T) G/R (M/T)	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V

ASCD BRAKE SWITCH

[VQ]

UBS003LB

Diagnostic Procedure

1. CHECK OVERALL FUNCTION-I

With CONSULT-II

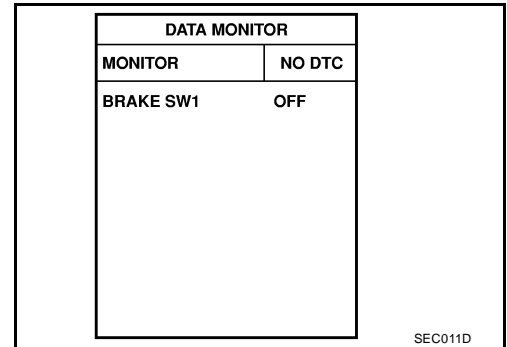
1. Turn ignition switch "ON".
2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
3. Check "BRAKE SW1" indication under the following conditions.

A/T models

CONDITION	INDICATION
When brake pedal is depress	OFF
When brake pedal is fully released	ON

M/T models

CONDITION	INDICATION
When clutch pedal or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON



Without CONSULT-II

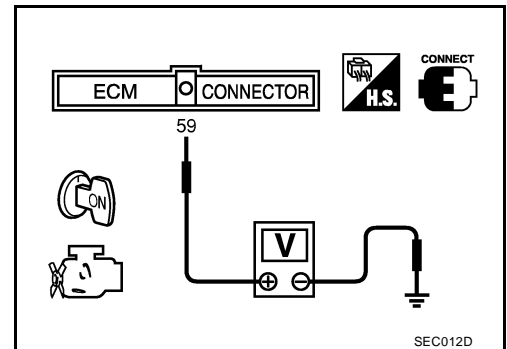
1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 59 and ground under the following conditions.

A/T models

CONDITION	VOLTAGE
When brake pedal is depress	Approximately 0V
When brake pedal is fully released	Battery voltage

M/T models

CONDITION	VOLTAGE
When clutch pedal or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
- NG (M/T models) >>GO TO 3.
- NG (A/T models) >>GO TO 8.

ASCD BRAKE SWITCH

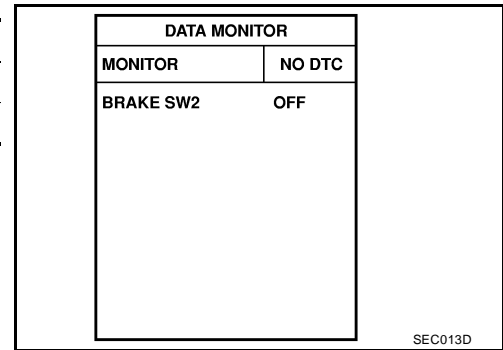
[VQ]

2. CHECK OVERALL FUNCTION-II

① With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

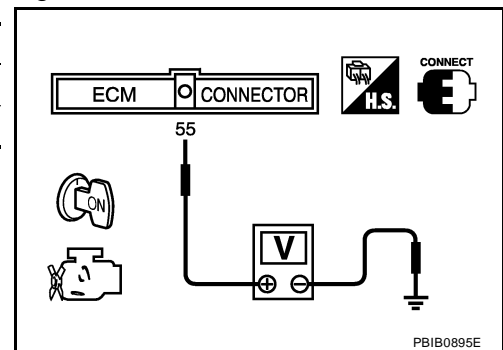
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



② Without CONSULT-II

Check voltage between ECM terminal 55 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

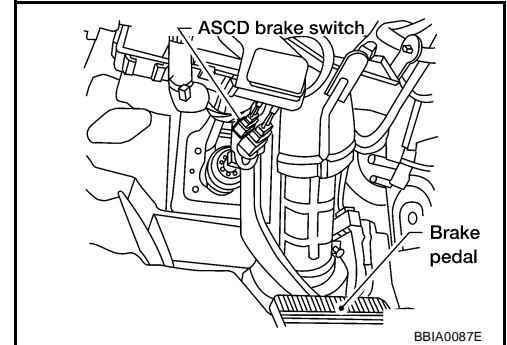


OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 13.

3. CHECK ASCD CLUTCH SWITCH CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

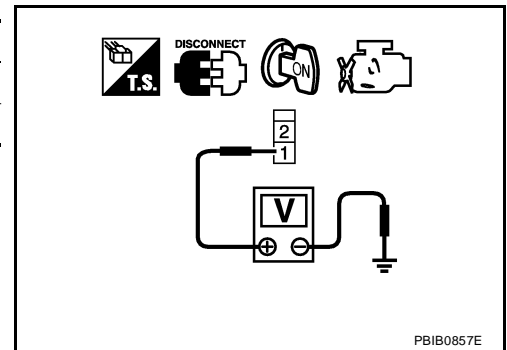


4. Check voltage between ASCD brake switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When clutch pedal is released	Battery voltage
When clutch pedal is depressed	Approx. 0V

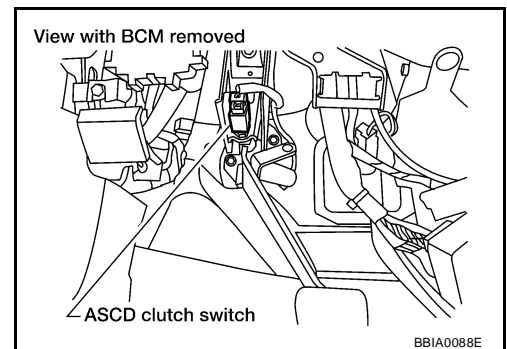
OK or NG

- OK >> GO TO 10.
 NG >> GO TO 4.



4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".

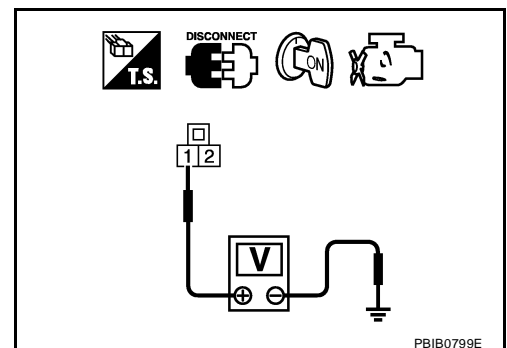


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 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. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD clutch switch terminal 2 and ASCD brake switch 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 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH

Refer to [EC-1190, "Component Inspection"](#)

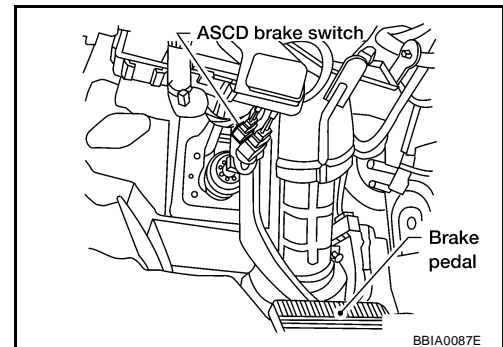
OK or NG

OK >> GO TO 18.

NG >> Replace ASCD clutch switch.

8. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".



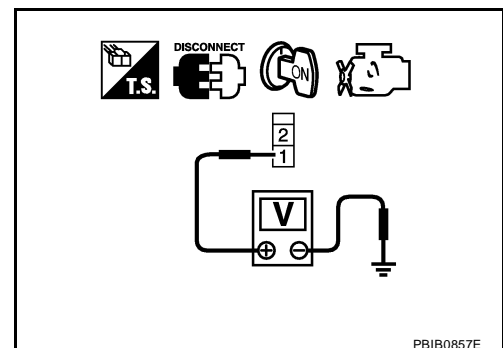
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.



9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 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.

10. 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 59 and ASCD brake switch terminal 2.
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 12.
- NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E21, F34
- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ASCD BRAKE SWITCH

Refer to [EC-1190, "Component Inspection"](#)

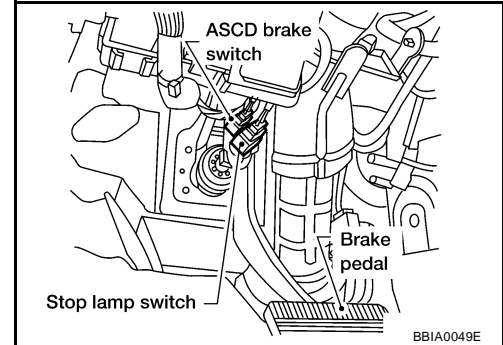
OK or NG

- OK >> GO TO 18.
- NG >> Replace ASCD brake switch.

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13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.

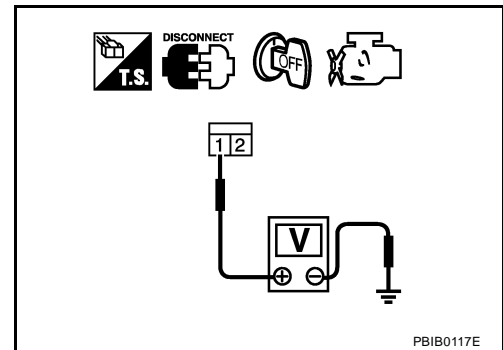


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.



14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E30
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 55 and stop lamp 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 17.
- NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E28, M7
- Harness connectors M71, F59
- Joint connector-2
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

17. CHECK STOP LAMP SWITCH

Refer to [EC-1190, "Component Inspection"](#)

OK or NG

OK >> GO TO 18.

NG >> Replace stop lamp switch.

18. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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ASC D INDICATOR

Component Description

UBS003L9

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 CRUISE 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 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-1286, "AUTOMATIC SPEED CONTROL DEVICE \(ASC D\)"](#) for the ASC D function.

CONSULT-II Reference Value in Data Monitor Mode

UBS003LA

Specification data are reference value.

MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	<ul style="list-style-type: none"> ● Ignition switch: ON 	<ul style="list-style-type: none"> ● CRUISE switch pressed 	ON
		<ul style="list-style-type: none"> ● CRUISE switch released 	OFF
SET LAMP	<ul style="list-style-type: none"> ● CRUISE switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH) 	<ul style="list-style-type: none"> ● COAST/SET switch pressed 	ON
		<ul style="list-style-type: none"> ● COAST/SET switch released 	OFF

ASC D INDICATOR

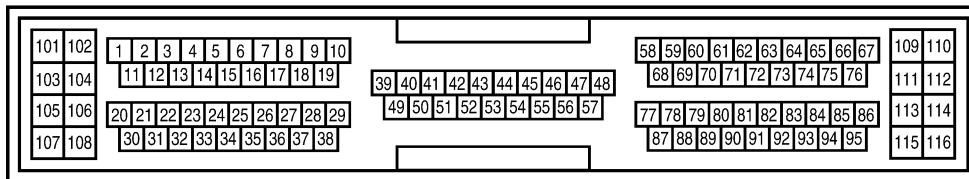
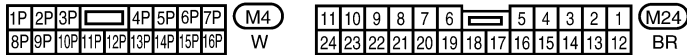
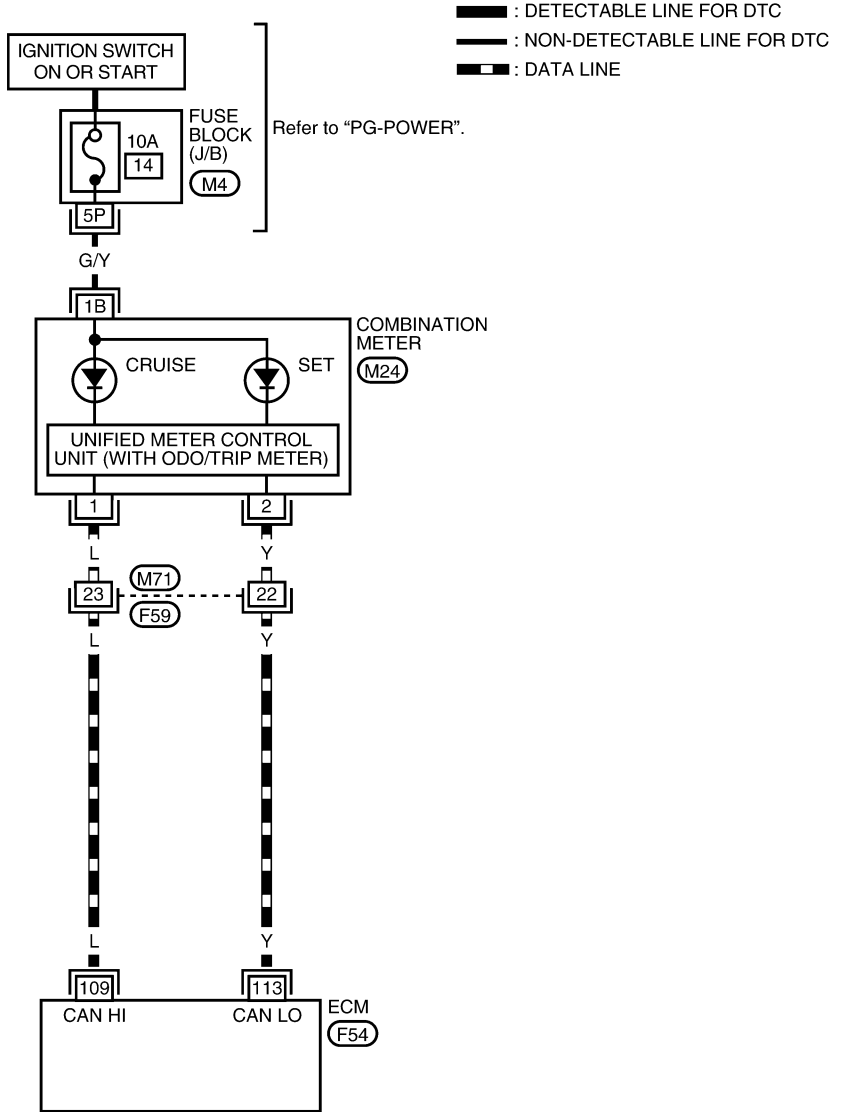
[VQ]

Wiring Diagram

UBS003LB

EC-ASCIND-01

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WBWA0006E

Diagnostic Procedure

1. CHECK OVERALL FUNCTION

Check ASC D indicator under the following conditions.

ASC D INDICATOR	CONDITION	SPECIFICATION	
CRUISE LAMP	<ul style="list-style-type: none"> ● Ignition switch: ON 	<ul style="list-style-type: none"> ● CRUISE switch pressed 	ON
		<ul style="list-style-type: none"> ● CRUISE switch released 	OFF
SET LAMP	<ul style="list-style-type: none"> ● CRUISE switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH) 	<ul style="list-style-type: none"> ● COAST/SET switch pressed 	ON
		<ul style="list-style-type: none"> ● COAST/SET switch released 	OFF

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 2.

2. CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC U1000, U1001, refer to [EC-763, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

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-4, "COMBINATION METERS"](#).

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-756, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

DATA LINK CONNECTOR

[VQ]

DATA LINK CONNECTOR

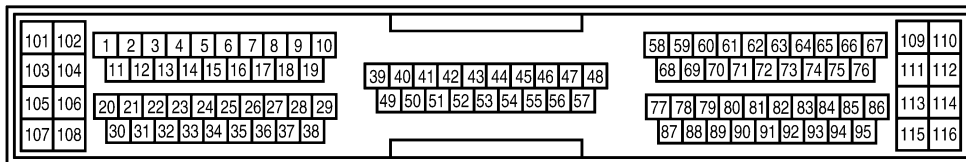
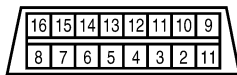
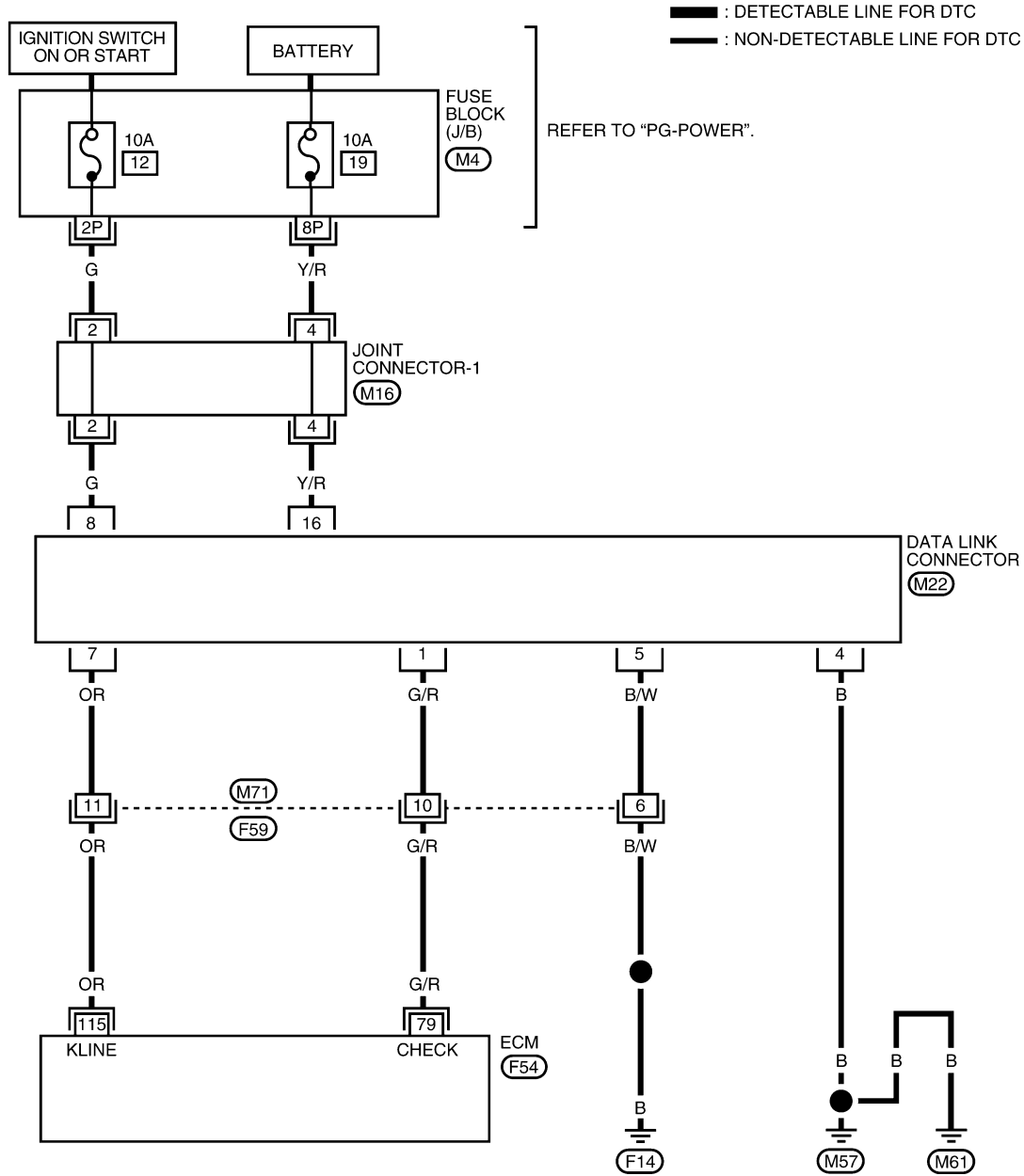
PFP:24814

Wiring Diagram

UBS003LD

EC-DLC-01

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REFER TO THE FOLLOWING.

- (M4) - FUSE BLOCK
- JUNCTION BOX (J/B)
- (M16) - JOINT CONNECTOR (J/C)

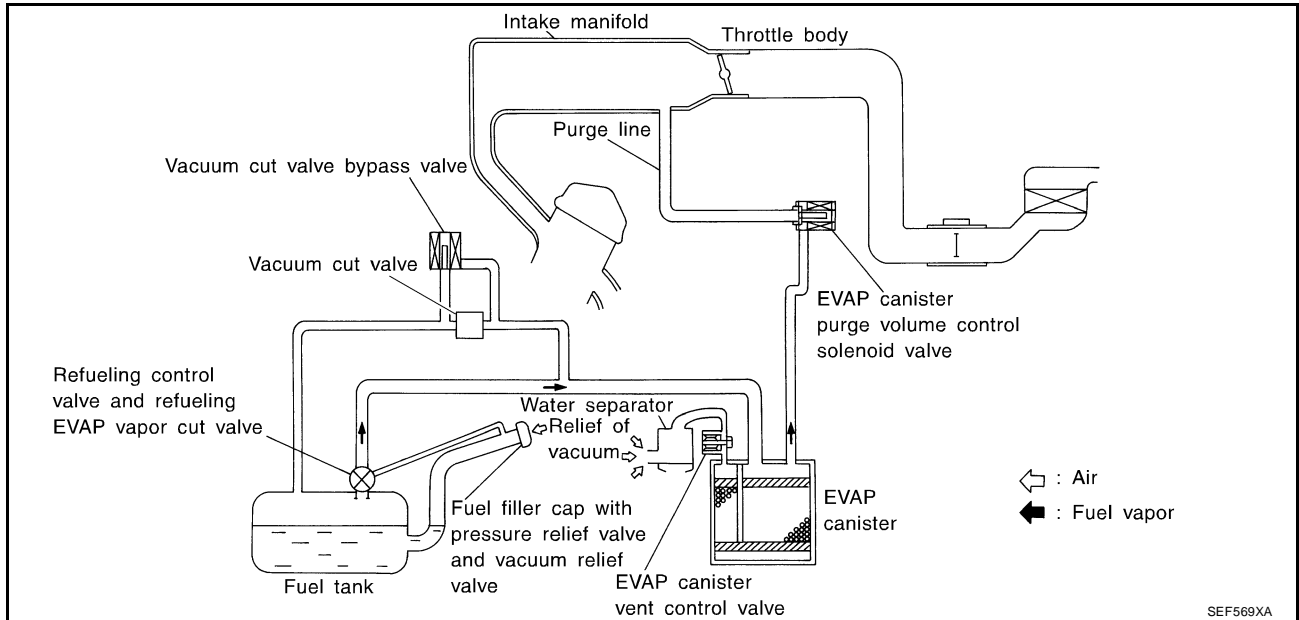


EVAPORATIVE EMISSION SYSTEM

PFP:14950

Description SYSTEM DESCRIPTION

UBS003LE



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 SYSTEM

[VQ]

EVAPORATIVE EMISSION LINE DRAWING

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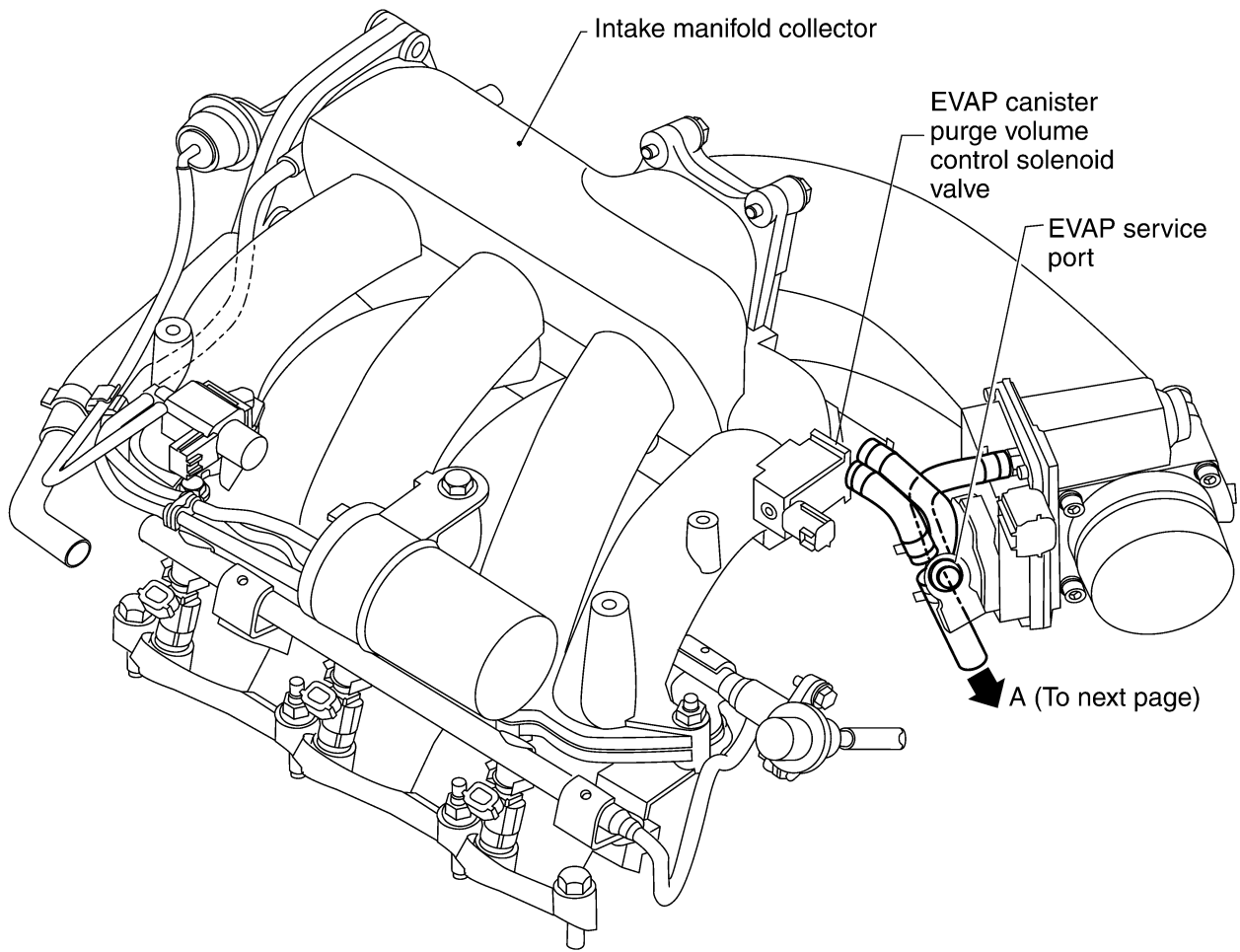
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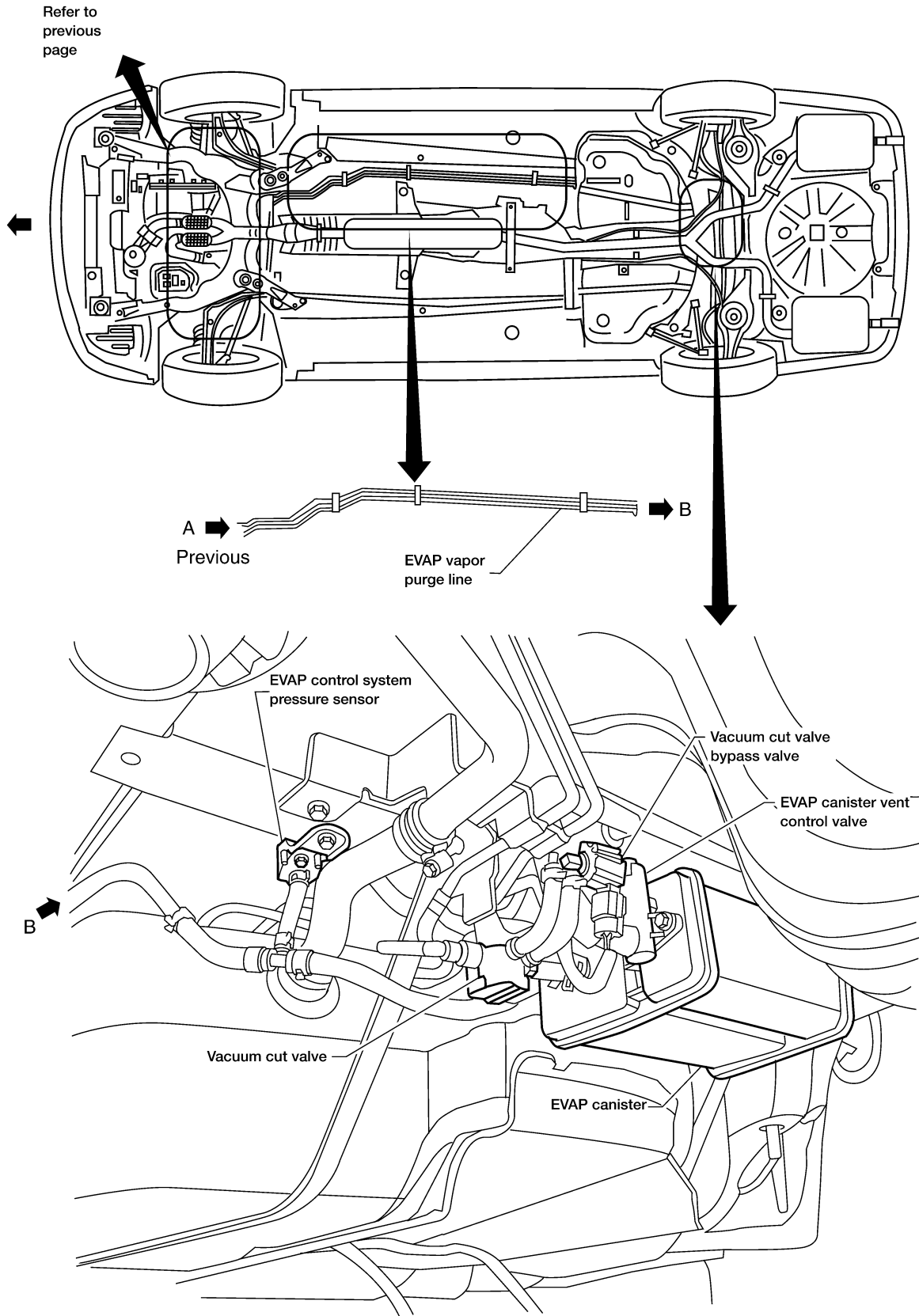
M



BBIA0056E

EVAPORATIVE EMISSION SYSTEM

[VQ]

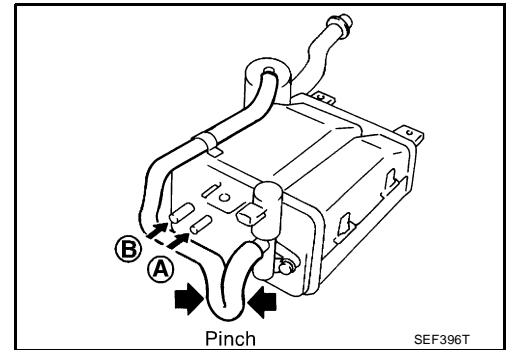


B8IA0057E

Component Inspection EVAP CANISTER

Check EVAP canister as follows:

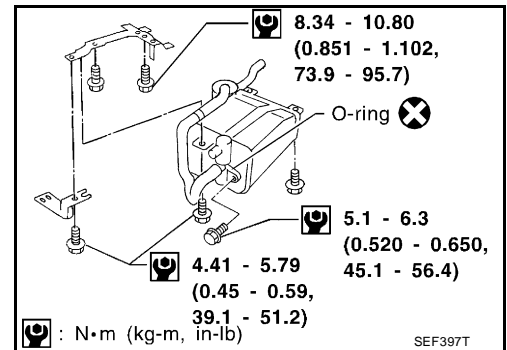
1. Pinch the fresh air hose.
2. Blow air into port **A** and check that it flows freely out of port **B**.



Tightening Torque

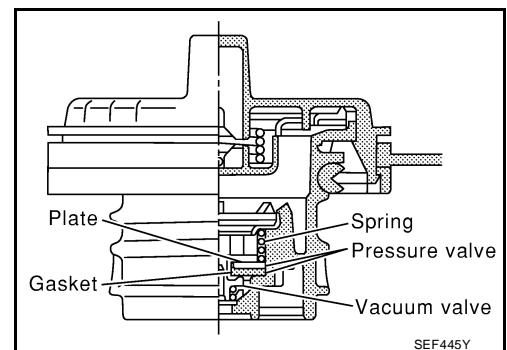
Tighten EVAP canister as shown in the figure.

Make sure new O-ring is installed properly between EVAP canister and EVAP canister vent control valve.



FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FILLER CAP)

1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

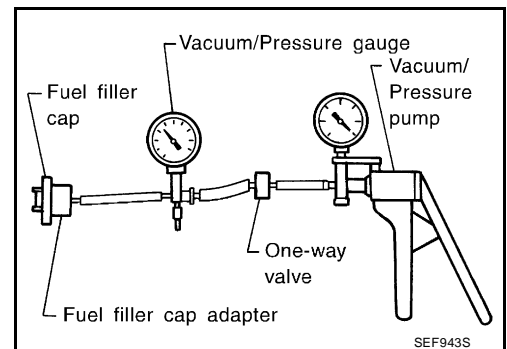
Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 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.



VACUUM CUT VALVE AND VACUUM CUT VALVE BYPASS VALVE

Refer to [EC-1165](#).

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

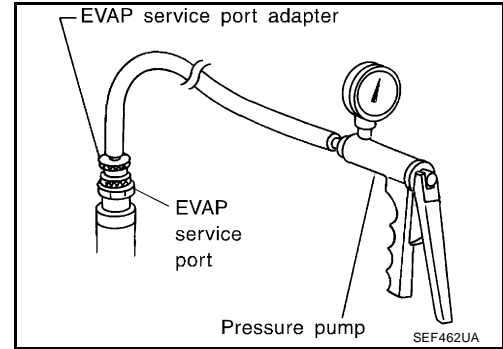
Refer to [EC-977](#).

FUEL TANK TEMPERATURE SENSOR

Refer to [EC-900](#).

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.



UBS003LG

How to Detect Fuel Vapor Leakage

CAUTION:

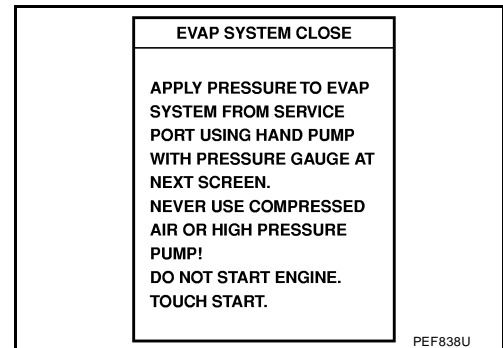
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

NOTE:

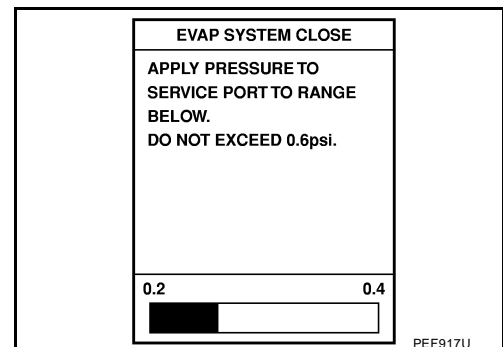
- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

Ⓜ WITH CONSULT-II

1. Attach the EVAP service port adapter securely to the EVAP service port.
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-II.
5. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.



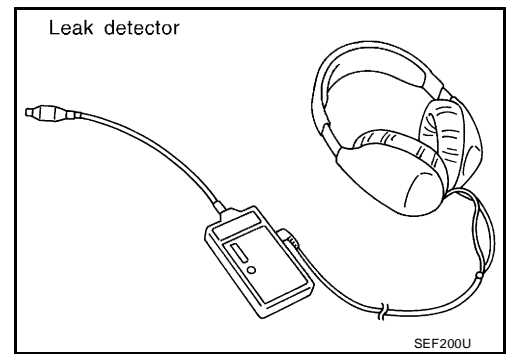
6. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7. Remove EVAP service port adapter and hose with pressure pump.



EVAPORATIVE EMISSION SYSTEM

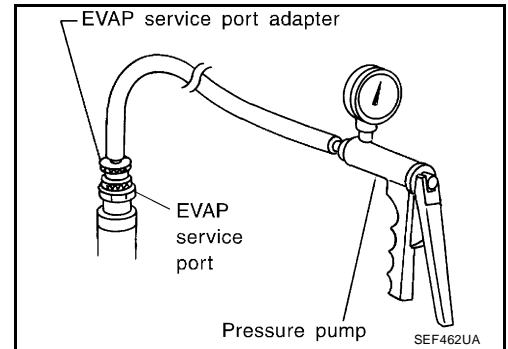
[VQ]

8. Locate the leak using a leak detector. Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

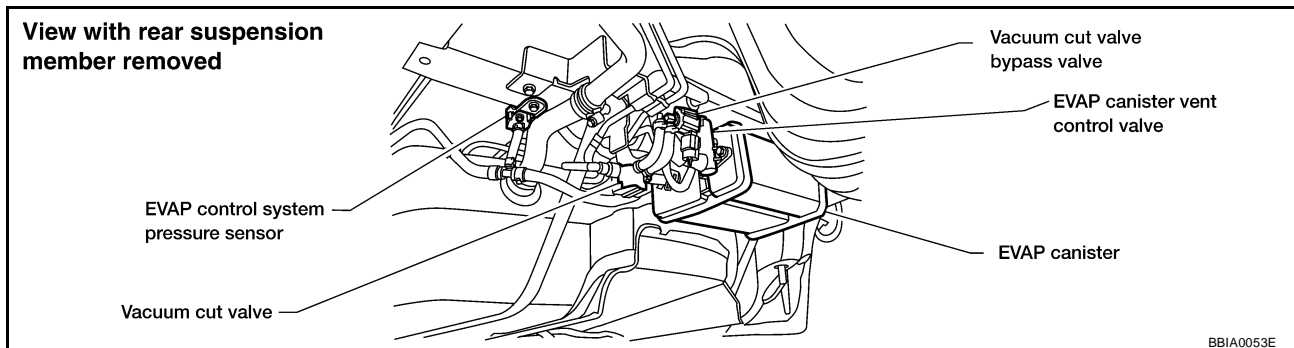


⊗ **WITHOUT CONSULT-II**

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 between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.



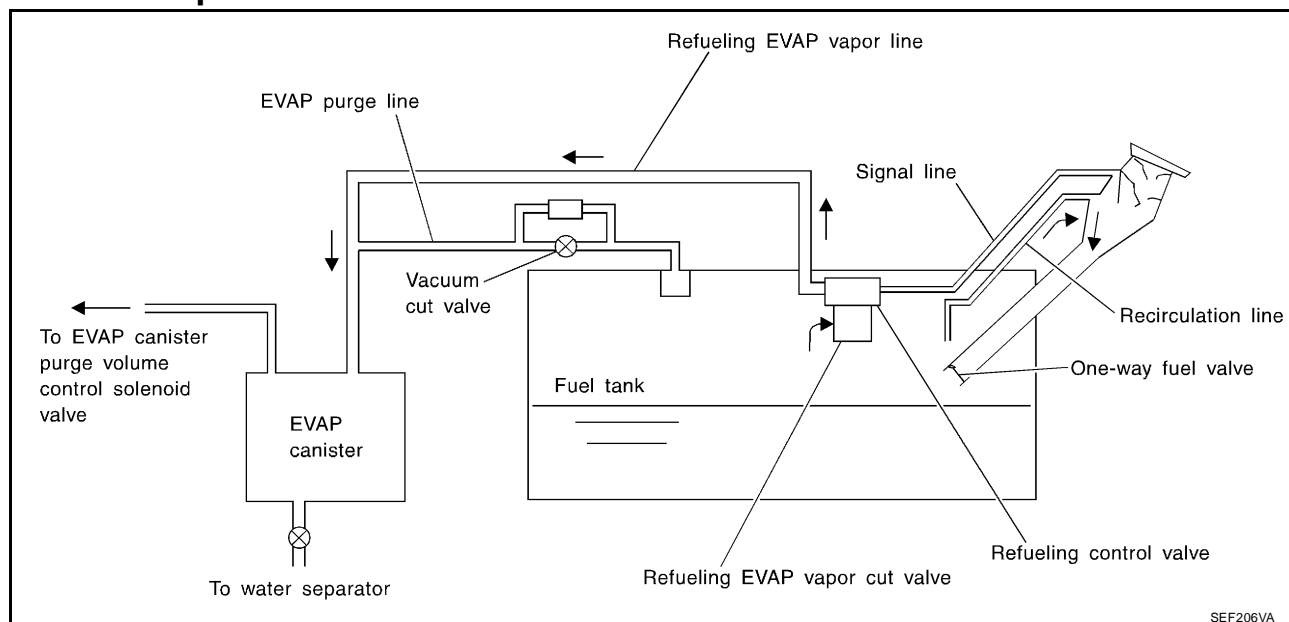
4. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm² , 0.2 to 0.4 psi).
5. Remove EVAP service port adapter and hose with pressure pump.
6. Locate the leak using a leak detector. Refer to [EC-1273, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

PFP:00032

System Description

UBS003LH



From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and refueling vapor line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

WARNING:

When conducting inspections below, be sure to observe the following:

- Put a “CAUTION: INFLAMMABLE” sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a 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 “Fuel Pressure Release”, [EC-671](#).
 - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

Diagnostic Procedure

SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

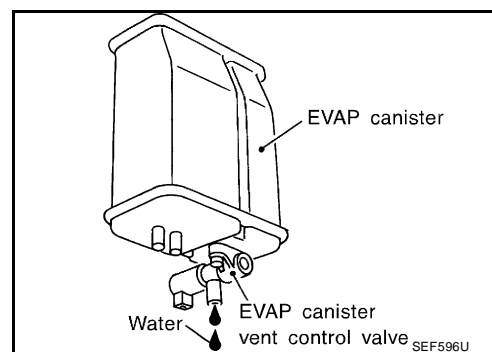
- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 WATER SEPARATOR

Refer to [EC-1281, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace water separator.

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.

>> Repair or replace EVAP hose.

6. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1281, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank.

7. CHECK REFUELING CONTROL VALVE

Refer to [EC-1281, "Component Inspection"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace refueling control 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 attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

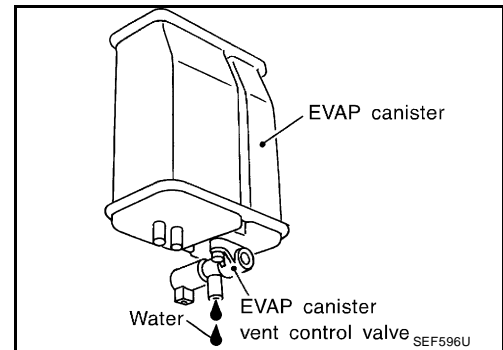
- OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 WATER SEPARATOR

Refer to [EC-1281, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace water separator.

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and water separator 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 control 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 signal line and recirculation line for clogging, dents and cracks.

OK or NG

- OK >> GO TO 8.
NG >> Replace filler neck tube.

8. CHECK REFUELING CONTROL VALVE

Refer to [EC-1281, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace refueling control valve with fuel tank.

9. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1281, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank.

10. 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 11.
- NG >> Replace fuel filler tube.

11. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

OK or NG

- OK >> GO TO 12.
- NG >> Repair or replace one-way fuel valve with fuel tank.

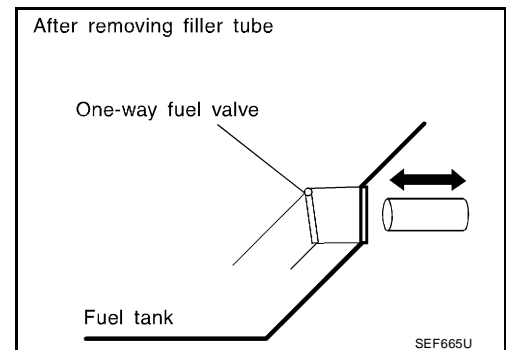
12. CHECK ONE-WAY FUEL VALVE-II

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.



UBS003LJ

Component Inspection WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.

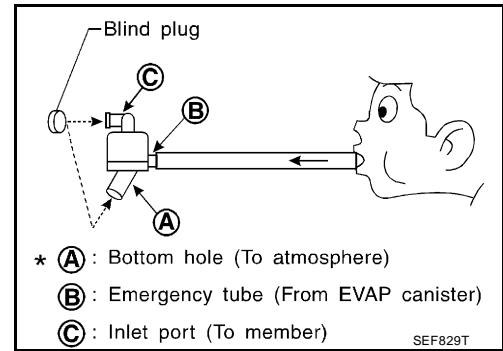
ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[VQ]

4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

NOTE:

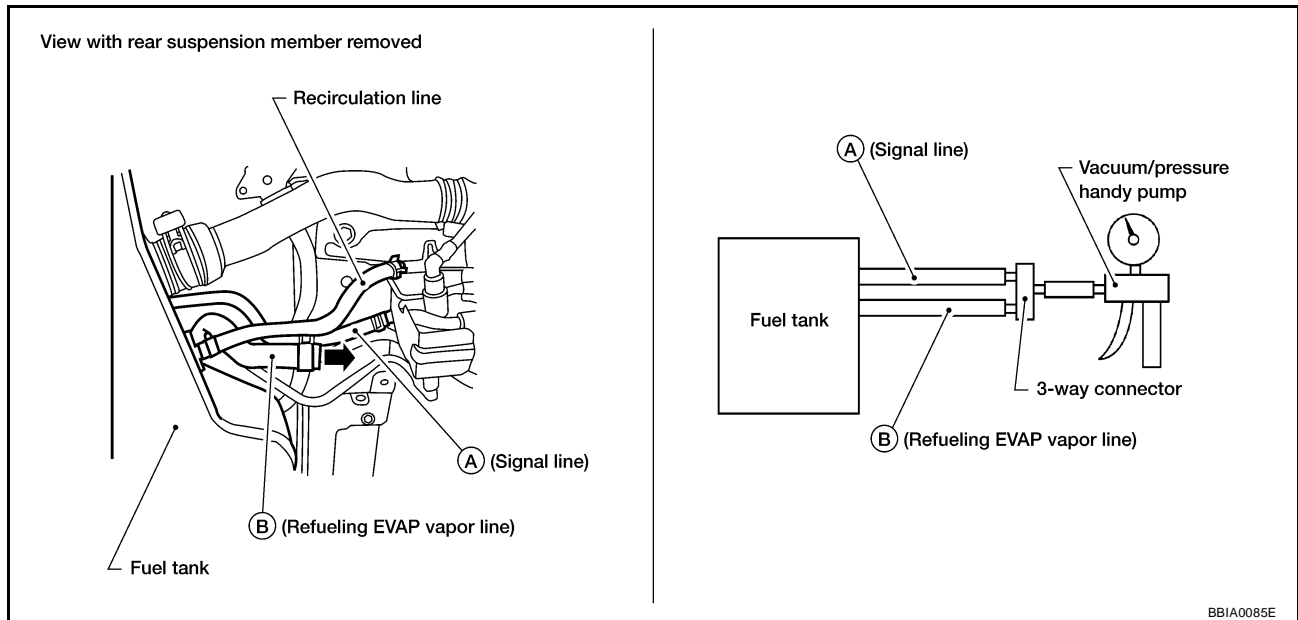
- Do not disassemble water separator.



REFUELING EVAP VAPOR CUT VALVE

With CONSULT-II

1. Remove fuel tank. Refer to [FL-8, "FUEL TANK"](#).
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-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows. Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel gauge retainer with fuel gauge unit. **Always replace O-ring with new one.**
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



With GST

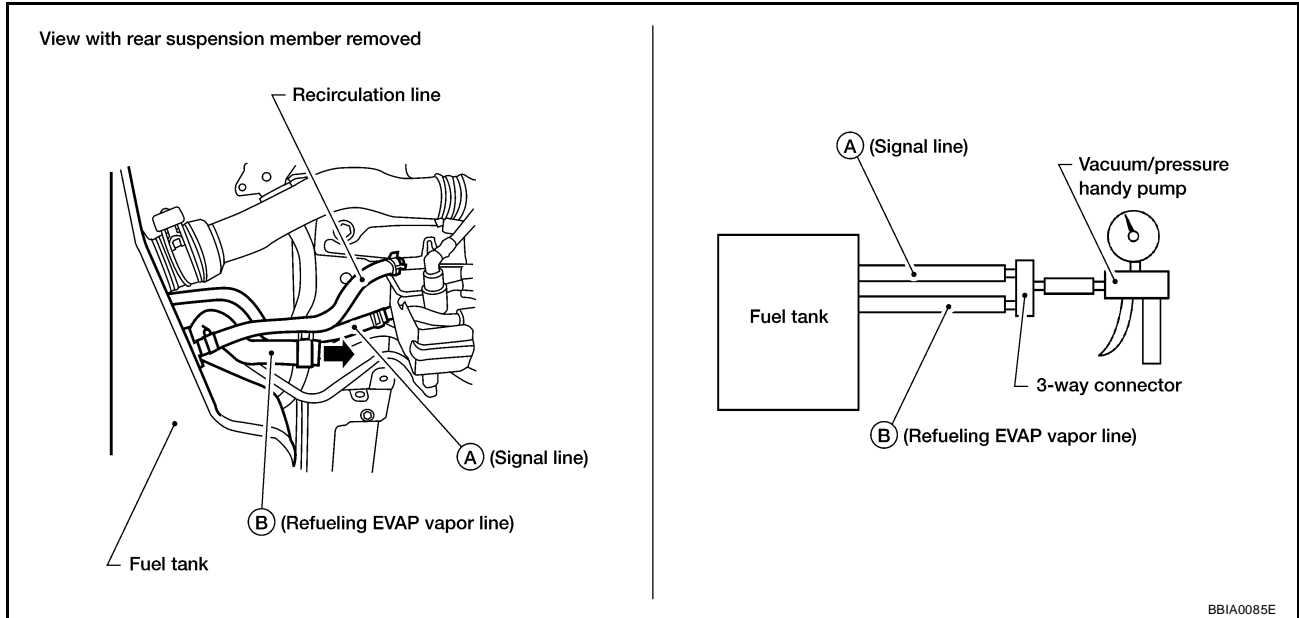
1. Remove fuel tank. Refer to [FL-8, "FUEL TANK"](#).
2. Drain fuel from the tank as follows:
 - a. Remove fuel gauge retainer.
 - b. Drain fuel from the tank using a hand pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[VQ]

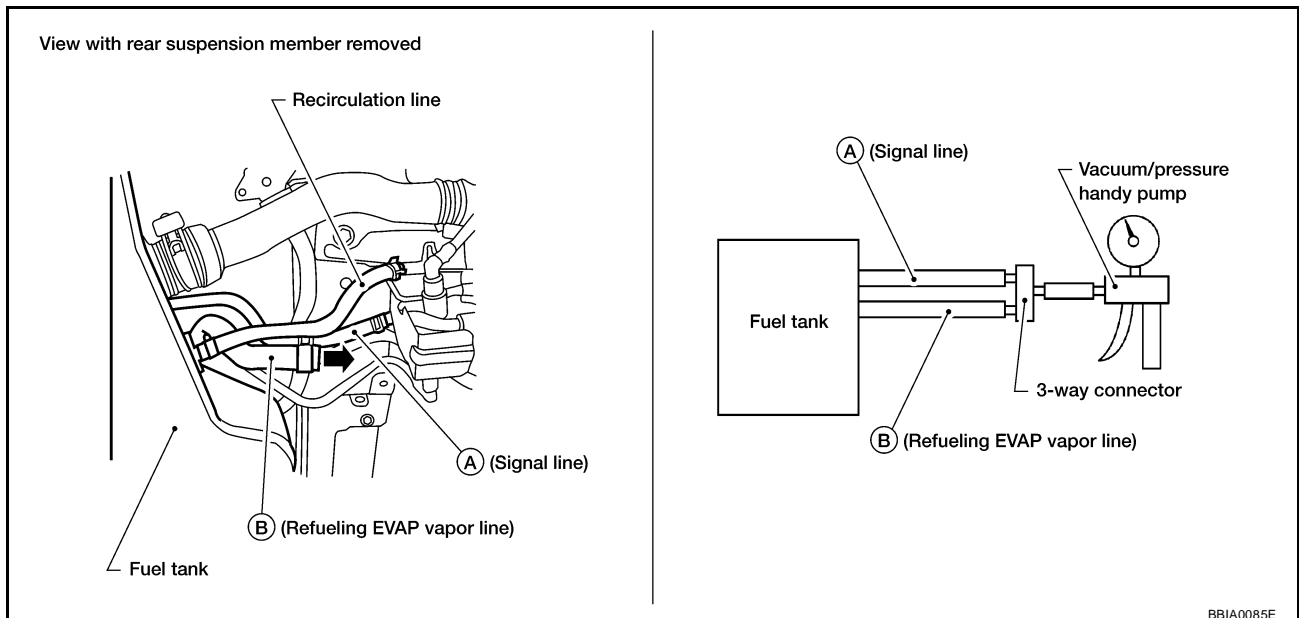
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.

4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



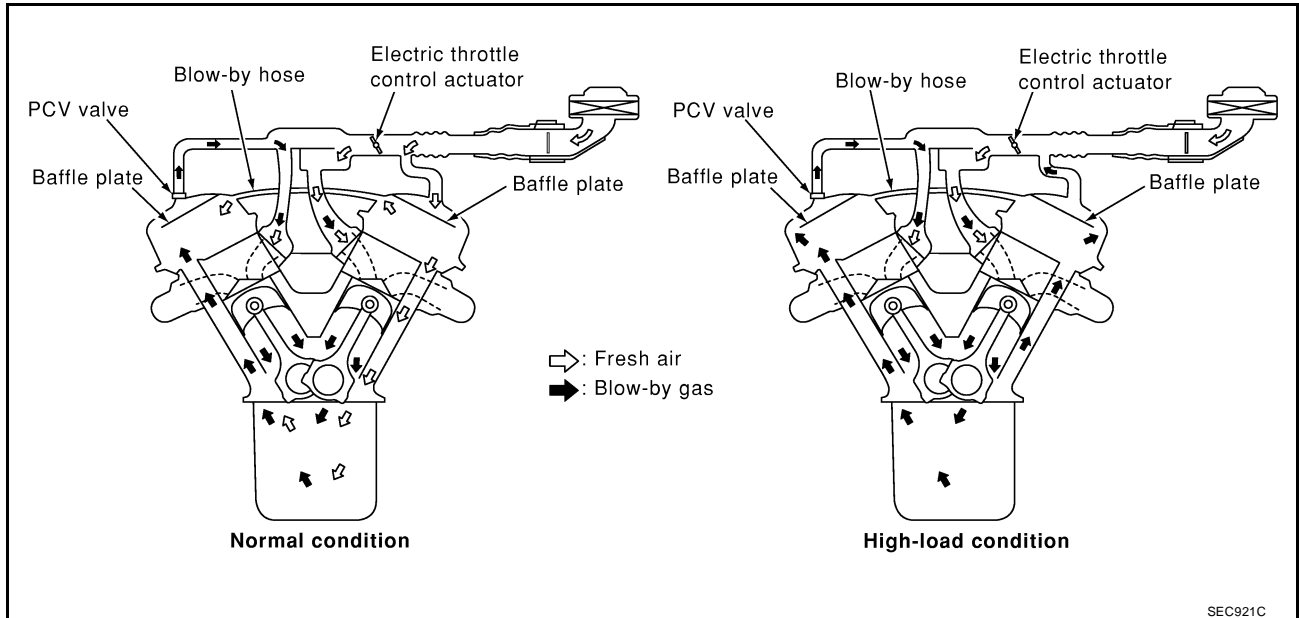
REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air continuity between hose ends A and B.
Blow air into the hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.



POSITIVE CRANKCASE VENTILATION

Description
SYSTEM DESCRIPTION

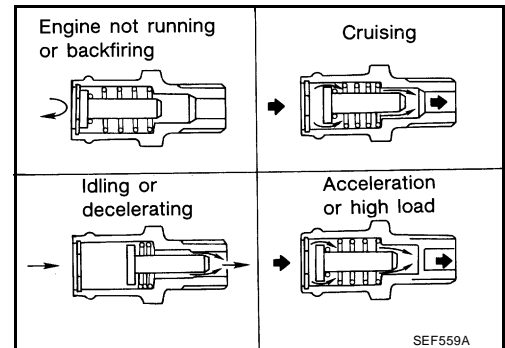


SEC921C

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.

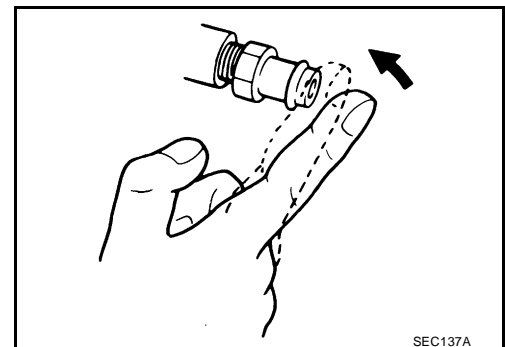
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



SEF559A

Component Inspection
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.



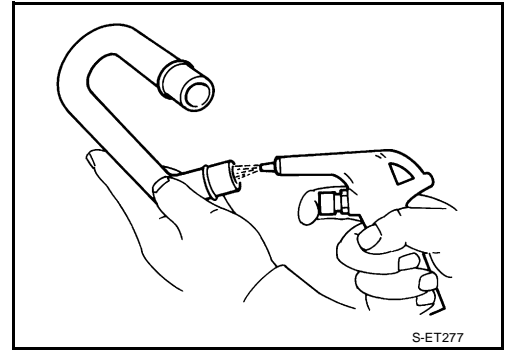
SEC137A

POSITIVE CRANKCASE VENTILATION

[VQ]

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.



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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[VQ]

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PF:18930

System Description INPUT/OUTPUT SIGNAL CHART

UBS003LM

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 (A/T models)	Gear position		
Combination meter	Vehicle speed		
TCM	Powertrain revolution		

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.

SET OPERATION

Press ASCD CRUISE switch (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 switch. (Then SET indicator in combination meter illuminates.)

ACCEL OPERATION

If the RESUME/ACCEL 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 depressed
- Brake pedal is depressed
- Clutch pedal is depressed (M/T models)

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

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.

RESUME OPERATION

When the RESUME/ACCEL 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.

- Brake pedal is released.
- Clutch pedal is released (M/T models)
- A/T selector lever is in other than P and N position (A/T models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

Component Description ASCD STEERING SWITCH

UBS003LN

Refer to [EC-1174](#) .

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[VQ]

ASCD BRAKE SWITCH

Refer to [EC-1181](#) , and [EC-1258](#) .

A

ASCD CLUTCH SWITCH

Refer to [EC-1181](#) and [EC-1258](#) .

EC

STOP LAMP SWITCH

Refer to [EC-1181](#) , [EC-1205](#) and [EC-1258](#) .

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EC-1047](#) , [EC-1049](#) , [EC-1056](#) and [EC-1061](#) .

C

ASCD INDICATOR

Refer to [EC-1268](#) .

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SERVICE DATA AND SPECIFICATIONS (SDS)

[VQ]

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Fuel Pressure

UBS003LO

Fuel pressure at idling kPa (kg/cm ² , psi)	Approximately 350 (3.7, 51)
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Idle Speed and Ignition Timing

UBS003LP

Target idle speed	No-load*1 (in "P" or N" position)	700±50 rpm
Air conditioner: ON	In "P" or N" position	825 rpm or more
Ignition timing	In "P" or N" position	15° ± 5° BTDC

*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

UBS003LO

	Calculated load value % (Using CONSULT-II or GST)
At idle	10 - 35
At 2,500 rpm	10 - 35

Mass Air Flow Sensor

UBS003LR

Supply voltage	Battery voltage (11 - 14V)
Output voltage at idle	1.1 - 1.5*V
Mass air flow (Using CONSULT-II or GST)	2.0 - 6.0 g-m/sec at idle* 7.0 - 20.0 g-m/sec at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no-load.

Intake Air Temperature Sensor

UBS003LS

Temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1
80 (176)	0.31 - 0.37

Engine Coolant Temperature Sensor

UBS003LT

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

Heated Oxygen Sensor 1 Heater

UBS003LU

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω
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Heated Oxygen sensor 2 Heater

UBS003LV

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω
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Crankshaft Position Sensor (POS)

UBS003LW

Refer to [EC-943, "Component Inspection"](#).

Camshaft Position Sensor (PHASE)

UBS003LX

Refer to [EC-951, "Component Inspection"](#).

Throttle Control Motor

UBS003LY

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω
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SERVICE DATA AND SPECIFICATIONS (SDS)

[VQ]

Injector

UBS003LZ

Resistance [at 20°C (68°F)]	13.5 - 17.5Ω
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A

Fuel Pump

UBS003M0

Resistance [at 25°C (77°F)]	Approximately 1.0Ω
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