SECTION EC
ENGINE CONTROL SYSTEM

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INDEX FOR DTC

PFP:00024

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EBS013IU

Check if the vehicle is a model with Euro-OBD (E-OBD) system or not by the “Type approval number” on the identification plate. Refer to GI-47, "IDENTIFICATION PLATE" .

NOTE:
If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to EC-83, "DTC U1000 CAN COMMUNICATION LINE" .

X: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1 *2 (CONSULT-II, GST)	Trip	MI lighting up	Reference page
APP SEN 1/CIRCUIT	P0122	1	—	EC-124
APP SEN 1/CIRCUIT	P0123	1	—	EC-124
APP SEN 2/CIRCUIT	P0222	1	—	EC-164
APP SEN 2/CIRCUIT	P0223	1	—	EC-164
APP SENSOR	P2135	1	—	EC-298
BARO SEN/CIRC	P2228	3	×	EC-315
BARO SEN/CIRC	P2229	3	×	EC-315
BATTERY VOLTAGE	P0563	1	—	EC-233
BRAKE SW/CIRCUIT	P0504	1	—	EC-224
CAN COMM CIRCUIT	U1000	1	—	EC-83
CKP SEN/CIRCUIT	P0335	3	×	EC-182
CKP SENSOR	P0336	3	×	EC-187
CMP SEN/CIRCUIT	P0340	3	×	EC-193
CMP SENSOR	P0341	3	×	EC-199
CMP/CKP RELATION	P0016	3	×	EC-86
CYL1 INJECTOR	P0201	3	×	EC-141
CYL2 INJECTOR	P0202	3	×	EC-141
CYL3 INJECTOR	P0203	3	×	EC-141
CYL4 INJECTOR	P0204	3	×	EC-141
ECM	P0605	3	×	EC-241
ECM	P0606	3	×	EC-243
ECM RELAY	P0686	1	—	EC-260
ECT SEN/CIRCUIT	P0117	3	×	EC-119
ECT SEN/CIRCUIT	P0118	3	×	EC-119
EGR VALVE	P0404	3	×	EC-209
ENG OVER TEMP	P0217	1	×	EC-147
FRP RELIEF VALVE	P1272	3	×	EC-277
FRP SEN/CIRC	P0192	3	×	EC-134
FRP SEN/CIRC	P0193	3	×	EC-134
FUEL LEAK	P0093	3	×	EC-98
FUEL PUMP	P0089	3	×	EC-95
FUEL PUMP	P1273	3	×	EC-283
FUEL PUMP	P1274	1	×	EC-288
FUEL PUMP	P1275	1	×	EC-293
FUEL PUMP/CIRC	P0628	3	×	EC-245
FUEL PUMP/CIRC	P0629	3	×	EC-245

Items (CONSULT-II screen terms)	DTC*1 *2 (CONSULT-II, GST)	Trip	MI lighting up	Reference page
FUEL TEMP SEN/CIRC	P0182	3	×	EC-130
FUEL TEMP SEN/CIRC	P0183	3	×	EC-130
GLOW RELAY	P0380	3	×	EC-205
HIGH FUEL PRESS	P0088	3	×	EC-93
IAT SEN/CIRCUIT	P0112	3	×	EC-115
IAT SEN/CIRCUIT	P0113	3	×	EC-115
INJ ADJ RES/CIRC1	P1260	3	×	EC-266
INJ ADJ RES/CIRC1	P1261	3	×	EC-266
INJ ADJ RES/CIRC2	P1262	3	×	EC-266
INJ ADJ RES/CIRC2	P1263	3	×	EC-266
INJ ADJ RES/CIRC3	P1264	3	×	EC-266
INJ ADJ RES/CIRC3	P1265	3	×	EC-266
INJ ADJ RES/CIRC4	P1266	3	×	EC-266
INJ ADJ RES/CIRC4	P1267	3	×	EC-266
INJ PWR/CIRC	P2146	3	×	EC-304
INJ PWR/CIRC	P2149	3	×	EC-304
INJECTOR	P0200	3	×	EC-139
INJECTOR/CIRC	P2147	3	×	EC-309
INJECTOR/CIRC	P2148	3	×	EC-309
INJECTOR 1	P1268	1	—	EC-271
INJECTOR 2	P1269	1	—	EC-271
INJECTOR 3	P1270	1	—	EC-271
INJECTOR 4	P1271	1	—	EC-271
MAF SEN/CIRCUIT	P0102	3	×	EC-110
MAF SEN/CIRCUIT	P0103	3	×	EC-110
MAF SENSOR	P0101	3	×	EC-102
NATS MALFUNCTION	P1610 - P1617	1	—	EC-35
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	—	—	—
SENSOR PWR/CIRC1	P0642	3	×	EC-250
SENSOR PWR/CIRC1	P0643	3	×	EC-250
SENSOR PWR/CIRC2	P0652	3	×	EC-255
SENSOR PWR/CIRC2	P0653	3	×	EC-255
STRG SW/CIRC	P0580	1	—	EC-235
STRG SW/CIRC	P0581	1	—	EC-235
TC BOOST SEN/CIRC	P0237	3	×	EC-177
TC BOOST SEN/CIRC	P0238	3	×	EC-177
TC BOOST SOL/CIRC	P0045	3	×	EC-88
TC SYSTEM	P0234	1	—	EC-170
TCS/CIRC	P1212	1	—	EC-265
TCS C/U FUNCTN	P1211	1	—	EC-264
VEHICLE SPEED	P0501	1	—	EC-218

Items (CONSULT-II screen terms)	DTC*1 *2 (CONSULT-II, GST)	Trip	MI lighting up	Reference page
VEHICLE SPEED	P0502	1	—	EC-220
VEHICLE SPEED	P0503	1	—	EC-222

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.
*2: This number is prescribed by ISO 15031-6.

DTC No. Index

EBS013IV

Check if the vehicle is a model with Euro-OBD (E-OBD) system or not by the “Type approval number” on the identification plate. Refer to GI-47, "IDENTIFICATION PLATE" .

NOTE:
If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to EC-83, "DTC U1000 CAN COMMUNICATION LINE" .

X: Applicable —: Not applicable

DTC*1 *2 (CONSULT-II, GST)	Items (CONSULT-II screen item)	Trip	MI lighting up	Reference page
U1000	CAN COMM CIRCUIT	1	—	EC-83
P0000	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	—	—	—
P0016	CMP/CKP RELATION	3	×	EC-86
P0045	TC BOOST SOL/CIRC	3	×	EC-88
P0088	HIGH FUEL PRESS	3	×	EC-93
P0089	FUEL PUMP	3	×	EC-95
P0093	FUEL LEAK	3	×	EC-98
P0101	MAF SENSOR	3	×	EC-102
P0102	MAF SEN/CIRCUIT	3	×	EC-110
P0103	MAF SEN/CIRCUIT	3	×	EC-110
P0112	IAT SEN/CIRCUIT	3	×	EC-115
P0113	IAT SEN/CIRCUIT	3	×	EC-115
P0117	ECT SEN/CIRCUIT	3	×	EC-119
P0118	ECT SEN/CIRCUIT	3	×	EC-119
P0122	APP SEN 1/CIRCUIT	1	—	EC-124
P0123	APP SEN 1/CIRCUIT	1	—	EC-124
P0182	FUEL TEMP SEN/CIRC	3	×	EC-130
P0183	FUEL TEMP SEN/CIRC	3	×	EC-130
P0192	FRP SEN/CIRC	3	×	EC-134
P0193	FRP SEN/CIRC	3	×	EC-134
P0200	INJECTOR	3	×	EC-139
P0201	CYL1 INJECTOR	3	×	EC-141
P0202	CYL2 INJECTOR	3	×	EC-141
P0203	CYL3 INJECTOR	3	×	EC-141
P0204	CYL4 INJECTOR	3	×	EC-141
P0217	ENG OVER TEMP	1	×	EC-147
P0222	APP SEN 2/CIRCUIT	1	—	EC-164
P0223	APP SEN 2/CIRCUIT	1	—	EC-164
P0234	TC SYSTEM	1	—	EC-170
P0237	TC BOOST SEN/CIRC	3	×	EC-177

DTC*1 *2 (CONSULT-II, GST)	Items (CONSULT-II screen item)	Trip	MI lighting up	Reference page
P0238	TC BOOST SEN/CIRC	3	×	EC-177
P0335	CKP SEN/CIRCUIT	3	×	EC-182
P0336	CKP SENSOR	3	×	EC-187
P0340	CMP SEN/CIRCUIT	3	×	EC-193
P0341	CMP SENSOR	3	×	EC-199
P0380	GLOW RELAY	3	×	EC-205
P0404	EGR VALVE	3	×	EC-209
P0501	VEHICLE SPEED	1	—	EC-218
P0502	VEHICLE SPEED	1	—	EC-220
P0503	VEHICLE SPEED	1	—	EC-222
P0504	BRAKE SW/CIRCUIT	1	—	EC-224
P0563	BATTERY VOLTAGE	1	—	EC-233
P0580	STRG SW/CIRC	1	—	EC-235
P0581	STRG SW/CIRC	1	—	EC-235
P0605	ECM	3	×	EC-241
P0606	ECM	3	×	EC-243
P0628	FUEL PUMP/CIRC	3	×	EC-245
P0629	FUEL PUMP/CIRC	3	×	EC-245
P0642	SENSOR PWR/CIRC1	3	×	EC-250
P0643	SENSOR PWR/CIRC1	3	×	EC-250
P0652	SENSOR PWR/CIRC2	3	×	EC-255
P0653	SENSOR PWR/CIRC2	3	×	EC-255
P0686	ECM RELAY	1	—	EC-260
P1211	TCS C/U FUNCTN	1	—	EC-264
P1212	TCS/CIRC	1	—	EC-265
P1260	INJ ADJ RES/CIRC1	3	×	EC-266
P1261	INJ ADJ RES/CIRC1	3	×	EC-266
P1262	INJ ADJ RES/CIRC2	3	×	EC-266
P1263	INJ ADJ RES/CIRC2	3	×	EC-266
P1264	INJ ADJ RES/CIRC3	3	×	EC-266
P1265	INJ ADJ RES/CIRC3	3	×	EC-266
P1266	INJ ADJ RES/CIRC4	3	×	EC-266
P1267	INJ ADJ RES/CIRC4	3	×	EC-266
P1268	INJECTOR 1	1	—	EC-271
P1269	INJECTOR 2	1	—	EC-271
P1270	INJECTOR 3	1	—	EC-271
P1271	INJECTOR 4	1	—	EC-271
P1272	FRP RELIEF VALVE	3	×	EC-277
P1273	FUEL PUMP	3	×	EC-283
P1274	FUEL PUMP	1	×	EC-288
P1275	FUEL PUMP	1	×	EC-293
P1610 - P1617	NATS MALFUNTION	1	—	EC-35
P2135	APP SENSOR	1	—	EC-298

DTC*1 *2 (CONSULT-II, GST)	Items (CONSULT-II screen item)	Trip	MI lighting up	Reference page
P2146	INJ PWR/CIRC	3	×	EC-304
P2147	INJECTOR/CIRC	3	×	EC-309
P2148	INJECTOR/CIRC	3	×	EC-309
P2149	INJ PWR/CIRC	3	×	EC-304
P2228	BARO SEN/CIRC	3	×	EC-315
P2229	BARO SEN/CIRC	3	×	EC-315

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.
*2: This number is prescribed by ISO 15031-6.

PRECAUTIONS

PFP:00001

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

EBS013IW

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 harnesses or harness connectors.**

On Board Diagnostic (OBD) System of Engine

EBS013IX

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

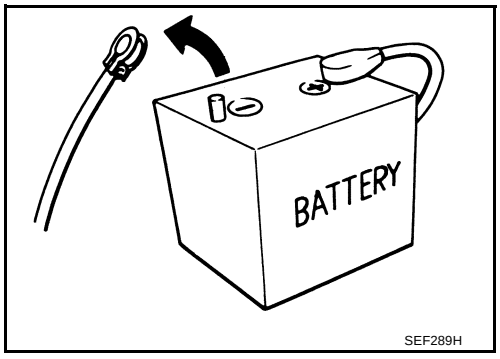
CAUTION:

- **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 MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI 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-108, "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 MI 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 MI to light up due to the malfunction of the fuel system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM before returning the vehicle to the customer.**

Precautions

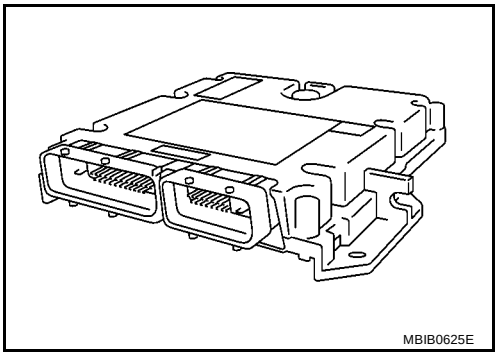
EBS013IY

- **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.**

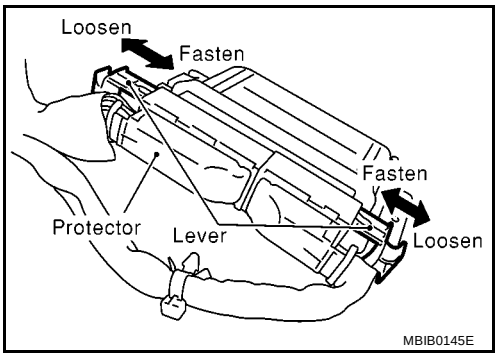


SEF289H

- **Do not disassemble ECM.**

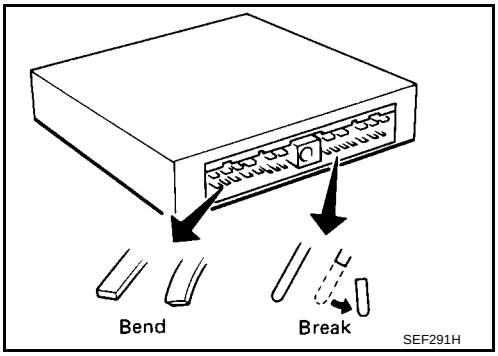

MBIB0625E

- **When connecting ECM harness connector, fasten it securely with levers as far as they will go as shown in the figure.**



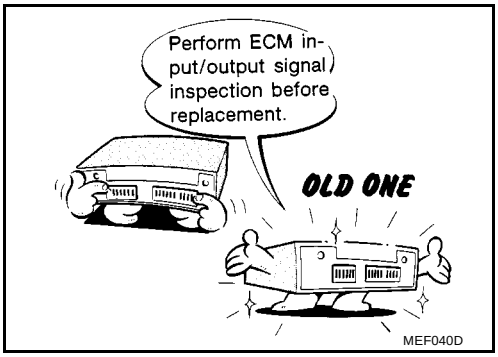
MBIB0145E

- **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 IC's.
- **Keep engine control system harness at least 10cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of IC's, etc.**
- **Keep engine control system parts and harness dry.**



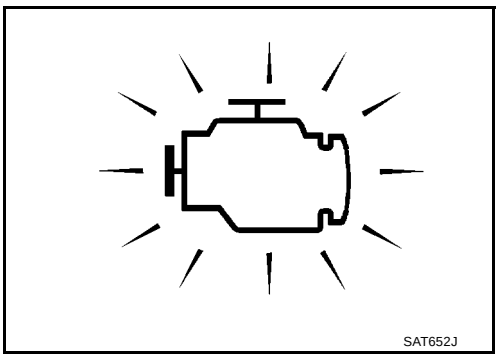
SEF291H

- **Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-57, "ECM Terminals And Reference Value".**
- **Handle mass air flow sensor carefully to avoid damage.**
- **Do not disassemble mass air flow sensor.**
- **Do not clean mass air flow sensor with any type of detergent.**
- **Even a slight leak in the air intake system can cause serious incidents.**
- **Do not shock or jar the camshaft position sensor, crankshaft position sensor.**

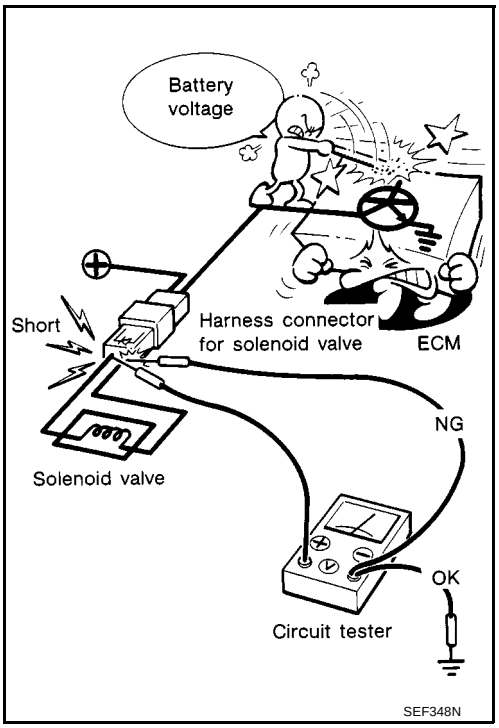


MEF040D

- **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.

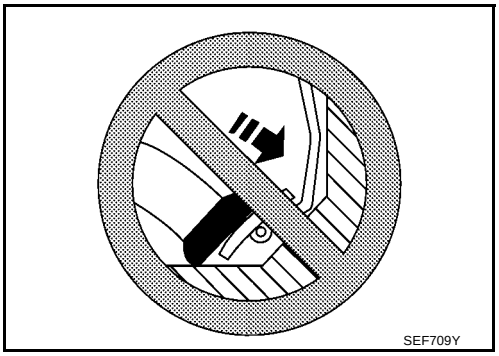

SAT652J

- **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 disassemble fuel pump.**
  If NG, take proper action.
- **Do not disassemble fuel injector.**
  If NG, replace fuel injector.

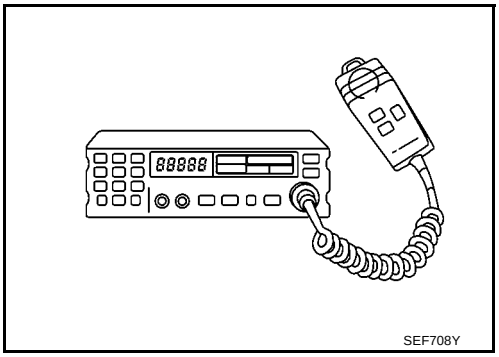


SEF348N

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


SEF709Y

- **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 standingwave radio can be kept smaller.**
  - **Be sure to ground the radio to vehicle body.**



SEF708Y

Wiring Diagrams and Trouble Diagnosis

EBS013IZ

When you read Wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams".
- PG-3, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

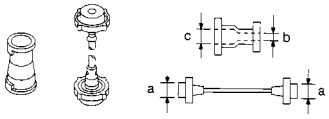
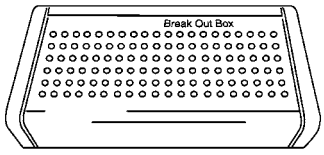
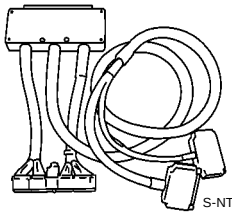
- GI-11, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES".
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident".

PREPARATION

PFP:00002

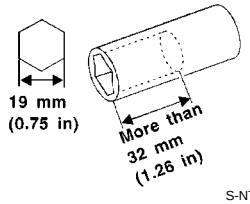
Special Service Tools

EBS013J0

Tool number Tool name	Description	
EG17650301 Radiator cap tester adapter	 S-NT564	Adapting radiator cap tester to radiator cap and radiator filler neck **a: 28 (1.10) dia.** **b: 31.4 (1.236) dia.** **c: 41.3 (1.626) dia.** Unit: mm (in)
KV109E0010 Break-out box	 S-NT825	Measuring the ECM signals with a circuit tester
KV109E0080 Y-cable adapter	 S-NT826	Measuring the ECM signals with a circuit tester

Commercial Service Tools

EBS013J1

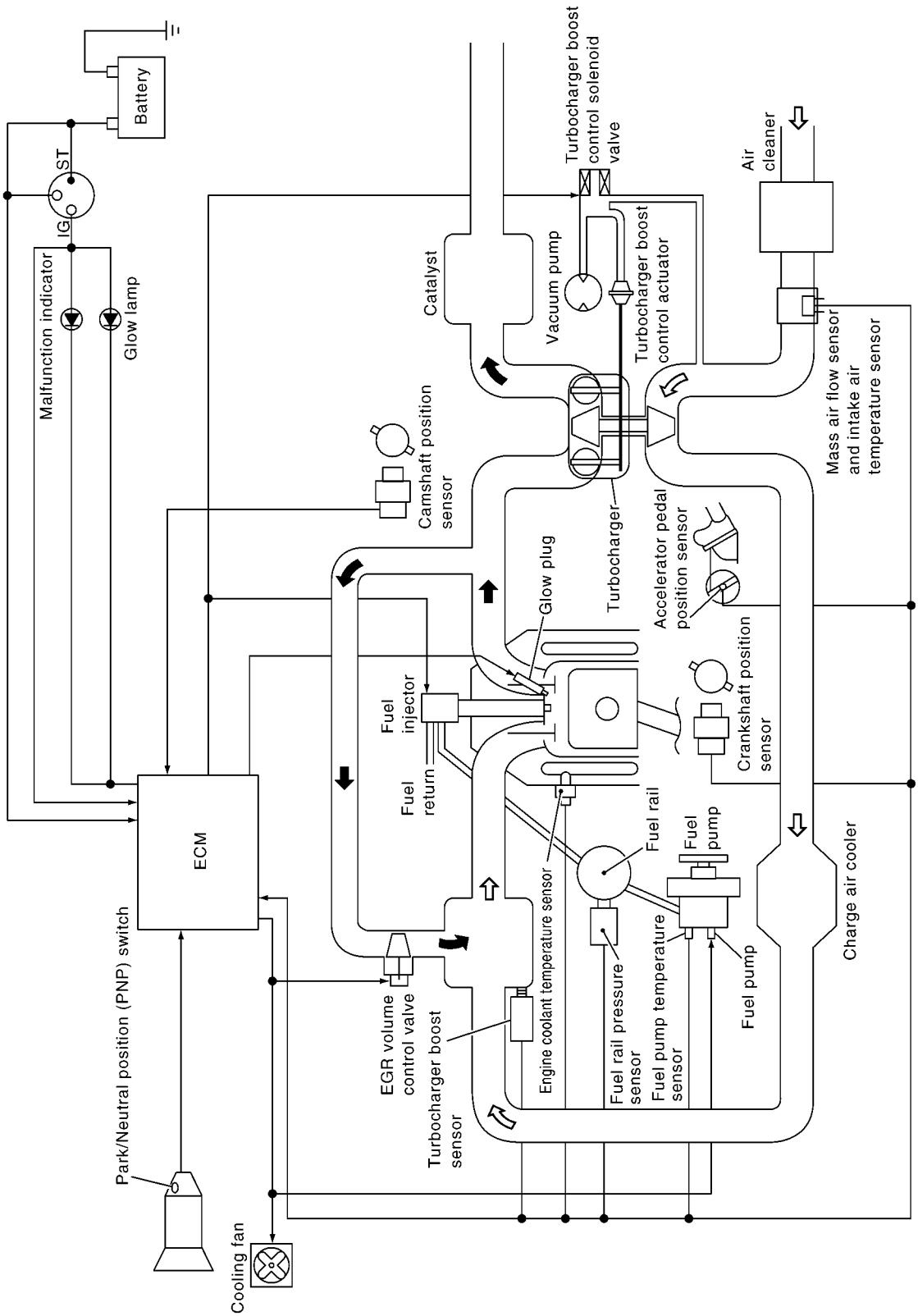
Tool name	Description	
Socket wrench	 S-NT705	Removing and installing engine coolant temperature sensor

ENGINE CONTROL SYSTEM

PFP:23710

System Diagram

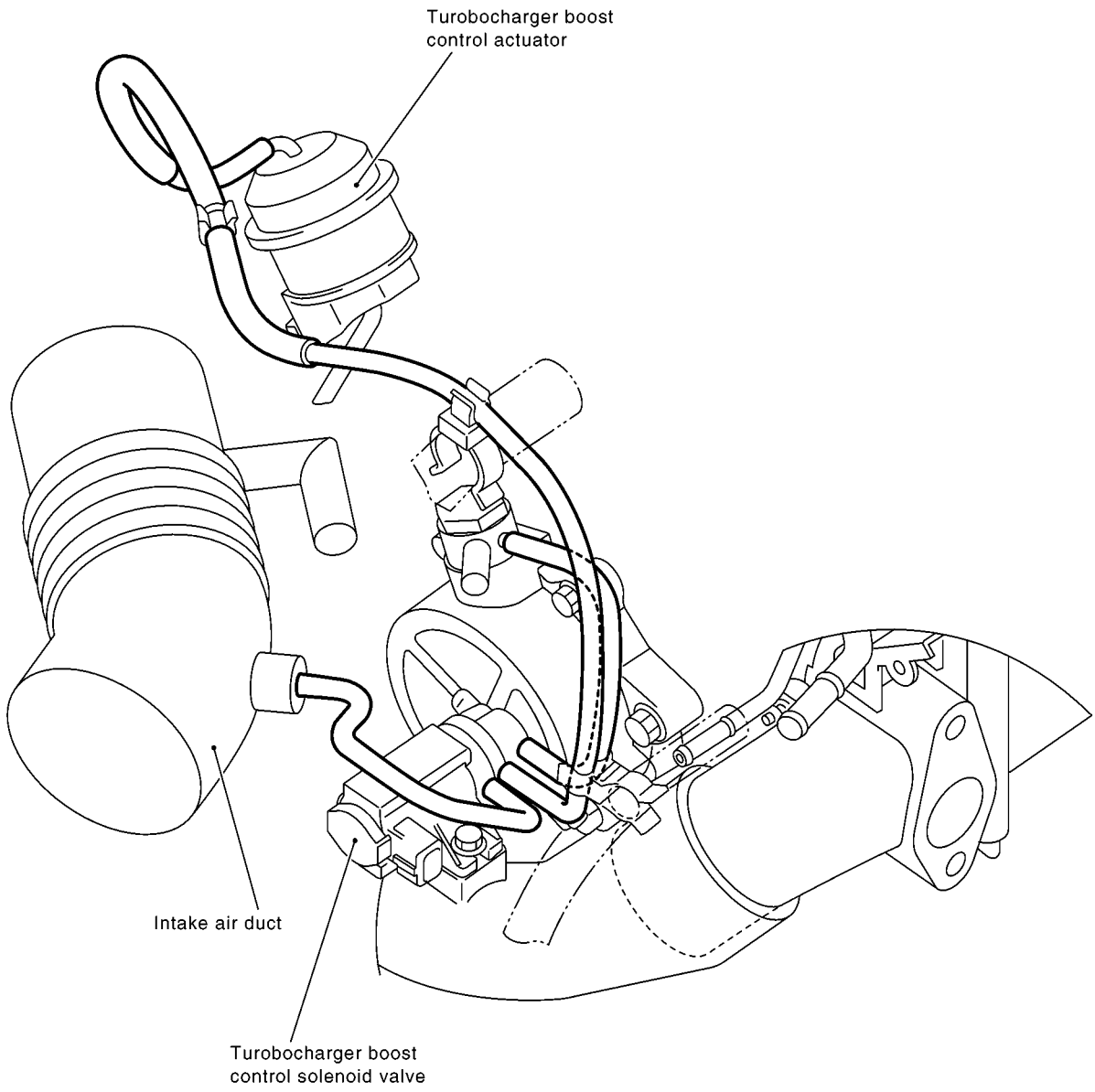
EBS013J2



MBIB0608E

Vacuum Hose Drawing

EBS013J3



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

MBIB0609E

Refer to EC-21, "System Diagram" for Vacuum Control System.

System Chart

EBS013J4

Input (Sensor)	ECM Function	Output (Actuator)
● Accelerator pedal position sensor ● Fuel rail pressure sensor ● Fuel pump temperature sensor ● Engine coolant temperature sensor ● Mass air flow sensor ● Intake air temperature sensor ● Crankshaft position sensor ● Camshaft position sensor ● Turbocharger boost sensor ● Vehicle speed sensor*1 ● ESP/TCS/ABS control unit*1 ● Ignition switch ● ASCD steering switch ● ASCD brake switch ● ASCD clutch switch ● Stop lamp switch ● Air conditioner switch*1 ● Park/neutral position switch ● Battery voltage ● Power steering pressure switch	Fuel injection control	Fuel injector and Fuel pump
	Fuel injection timing control	Fuel injector and Fuel pump
	Fuel cut control	Fuel injector and Fuel pump
	Glow control system	Glow relay and glow indicator lamp*2
	ASCD vehicle speed control	Fuel injector and Fuel pump
	On board diagnostic system	Malfunction indicator (MI)*2
	EGR volume control	EGR volume control valve
	Cooling fan control	Cooling fan relay
	Turbocharger boost control	Turbocharger boost control solenoid valve
	Air conditioning cut control	Air conditioner relay*2

*1: The input signal is sent to the ECM through CAN communication line.
*2: The output signal is sent from the ECM through CAN communication line.

Fuel Injection Control System

EBS013J5

SYSTEM DESCRIPTION

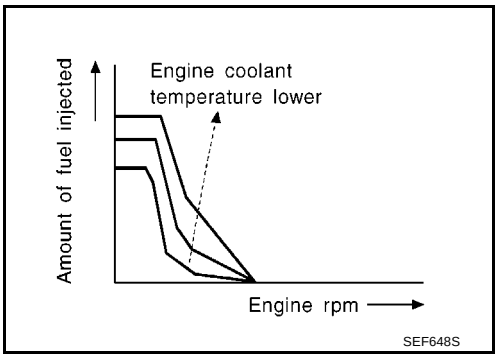
Three types of fuel injection control are provided to accommodate engine operating conditions; normal control, idle control and start control. The ECM determines the appropriate fuel injection control. Under each control, the amount of fuel injected is adjusted to improve engine performance.
Pulse signals are sent to fuel injectors according to the input signals to adjust the amount of fuel injected to preset value.

START CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Engine coolant temperature sensor	Engine coolant temperature	Fuel injection control (start control)	Fuel injector Fuel pump
Crankshaft position sensor	Engine speed		
Camshaft position sensor	Piston position		
Ignition switch	Start signal		
Fuel rail pressure sensor	Fuel rail pressure		

When the ECM receives a start signal from the ignition switch, the ECM adapts the fuel injection system for the start control. The amount of fuel injected at engine starting is a preset program value in the ECM. The program is determined by the engine speed, engine coolant temperature and fuel rail pressure.
For better startability under cool engine conditions, the lower the coolant temperature becomes, the greater the amount of fuel injected. The ECM ends the start control when the engine speed reaches the specific value, and shifts the control to the normal or idle control.



IDLE CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Engine coolant temperature sensor	Engine coolant temperature	Fuel injection control (Idle control)	Fuel injector Fuel pump
Crankshaft position sensor	Engine speed		
Battery	Battery voltage		
Accelerator pedal position sensor	Accelerator pedal position		
Fuel rail pressure sensor	Fuel rail pressure		
Vehicle speed sensor*	Vehicle speed		
Air conditioner switch*	Air conditioner signal		

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

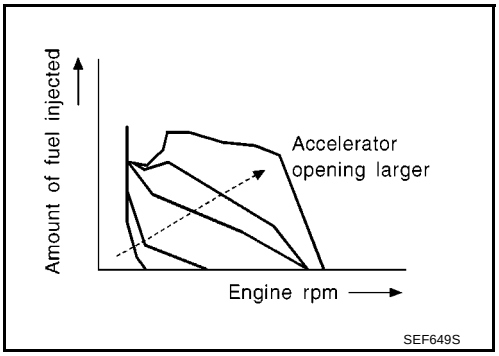
When the ECM determines that the engine speed is at idle, the fuel injection system is adapted for the idle control. The ECM regulates the amount of fuel injected corresponding to changes in load applied to the engine to keep engine speed constant. The ECM also provides the system with a fast idle control in response to the engine coolant temperature signal.

NORMAL CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor	Engine speed	Fuel injection control (Normal control)	Fuel injector Fuel pump
Accelerator pedal position sensor	Accelerator position		
Fuel rail pressure sensor	Fuel rail pressure		

The amount of fuel injected under normal driving conditions is determined according to sensor signals. The crankshaft position sensor detects engine speed, the accelerator pedal position sensor detects accelerator pedal position and fuel rail pressure sensor detects fuel rail pressure. These sensors send signals to the ECM.
The fuel injection data, predetermined by correlation between various engine speeds, accelerator pedal positions and fuel rail pressure are stored in the ECM memory, forming a map. The ECM determines the optimal amount of fuel to be injected using the sensor signals in comparison with the map.



MAXIMUM AMOUNT CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Mass air flow sensor	Amount of intake air	Fuel injection control (Maximum amount control)	Fuel Injector
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor	Engine speed		
Accelerator pedal position sensor	Accelerator pedal position		

The maximum injection amount is controlled to an optimum by the engine speed, intake air amount, engine coolant temperature, and accelerator opening in accordance with the driving conditions.
This prevents the oversupply of the injection amount caused by decreased air density at a high altitude or during a system failure.

DECELERATION CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Accelerator pedal position sensor	Accelerator pedal position	Fuel injection control (Deceleration control)	Fuel injector Fuel pump
Crankshaft position sensor	Engine speed		

The ECM sends a fuel cut signal to the fuel injectors and fuel pump during deceleration for better fuel efficiency. The ECM determines the time of deceleration according to signals from the accelerator pedal position sensor and crankshaft position sensor.

Fuel Injection Timing Control System

EBS013J6

DESCRIPTION

The target fuel injection timing in accordance with the engine speed and the fuel injection amount are recorded as a map in the ECM beforehand. The ECM determines the optimum injection timing using sensor signals accordance with the map.

Air Conditioning Cut Control

EBS013J7

INPUT / OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Air conditioner switch*1	Air conditioner ON signal	Air conditioner cut control	Air conditioner relay*2
Accelerator pedal position sensor	Accelerator pedal opening angle		
Vehicle speed sensor*1	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		

*1: The input signal is sent to the ECM through CAN communication line.
*2: The output signal is sent from the ECM through CAN communication line.

SYSTEM DESCRIPTION

This system improves acceleration when the air conditioner is used.
When the accelerator pedal is fully depressed, the air conditioner is turned off for a few seconds.
When engine coolant temperature becomes excessively high, the air conditioner is turned off. This continues until the engine coolant temperature returns to normal.

Fuel Cut Control (At No Load & High Engine Speed)

EBS013J8

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Vehicle speed sensor*	Vehicle speed	Fuel cut control	Fuel injector
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor	Engine speed		

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

If the engine speed is above 2,800 rpm under no load (for example, the shift position is neutral and engine speed is over 2,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will be operated until the engine speed reaches 1,500 rpm, then fuel cut will be cancelled.

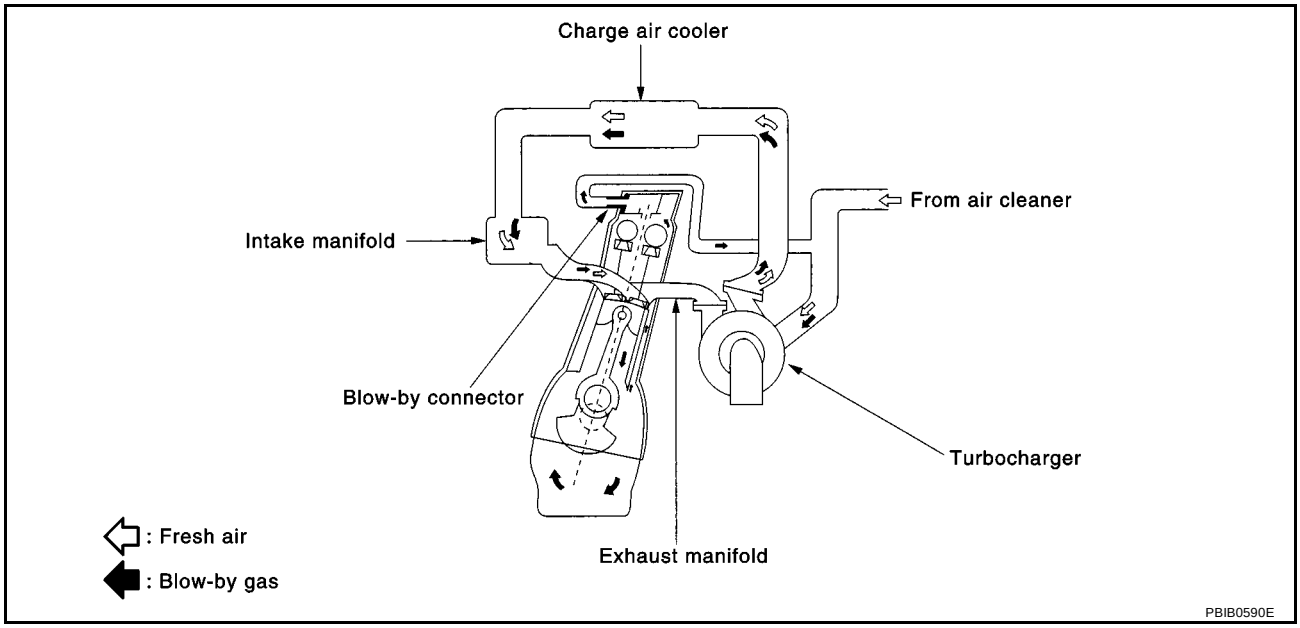
NOTE:
This function is different from deceleration control listed under EC-23, "Fuel Injection Control System".

Crankcase Ventilation System

EBS013J9

DESCRIPTION

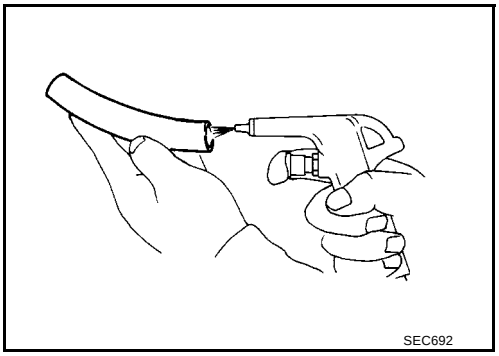
In this system, blow-by gas is sucked into the air duct after oil separation by oil separator in the rocker cover.



INSPECTION

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.



CAN Communication

EBS013JA

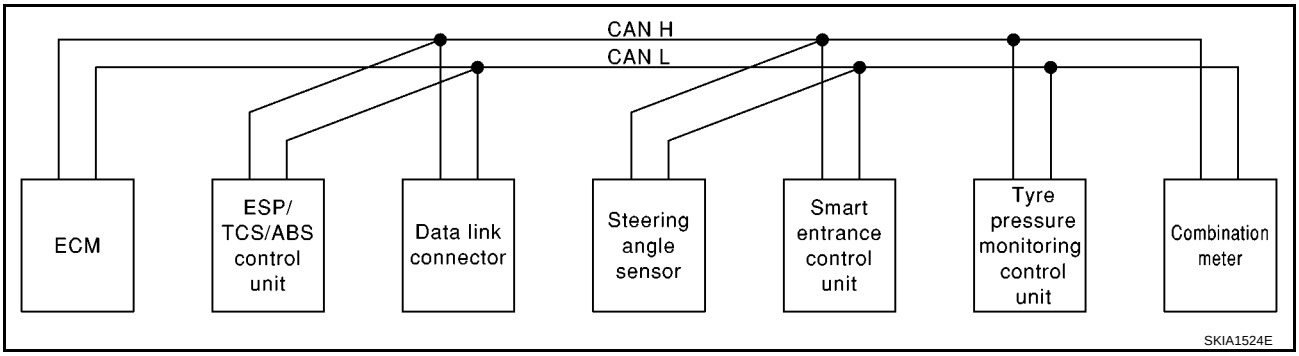
SYSTEM DESCRIPTION

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

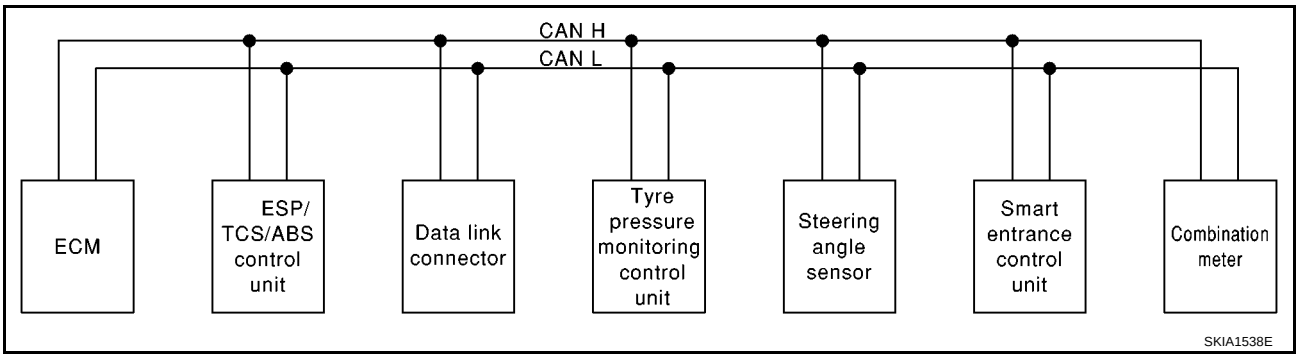
MODELS WITH ESP

System Diagram

- LHD models



- RHD models



Input/Output Signal Chart

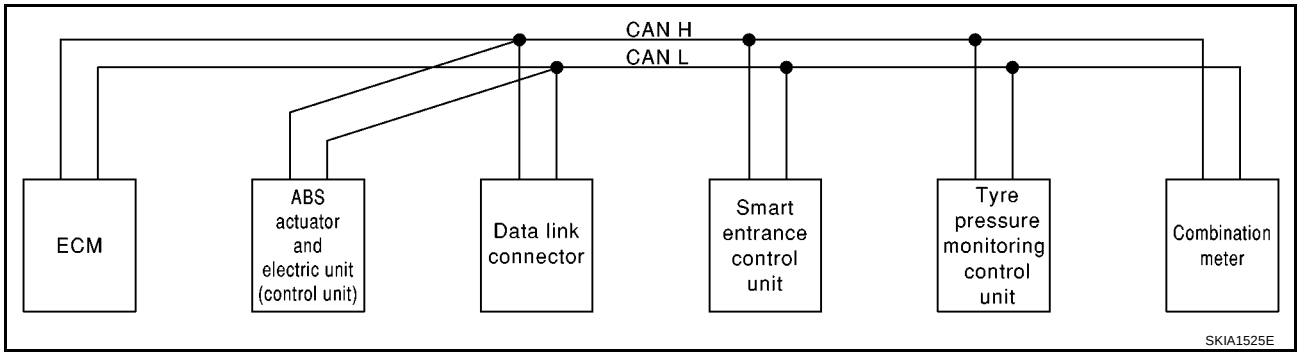
T: Transmit R: Receive

Signals	ECM	ESP/ TCS / ABS control unit	Steering angle sensor	Smart entrance control unit	Tyre pressure monitoring control unit	Combination meter
Engine speed signal	T	R				R
Accelerator pedal position signal	T	R				
Steering angle sensor signal		R	T			
Air conditioner switch signal	R					T
MI signal	T					R
Glow indicator lamp signal	T					R
Engine coolant temperature signal	T					R
Fuel consumption signal	T					R
Vehicle speed signal		T				R
	R				R	T
Seat belt reminder signal				R		T
Lighting switch position signal				T		R
Flashing indicator signal				T		R
Engine cooling fan speed signal	T			R		
Child lock indicator signal				T		R
Door switches state signal				T		R
A/C compressor signal	T			R		
Tyre pressure signal					T	R
ASCD SET lamp signal	T					R
ASCD CRUISE lamp signal	T					R

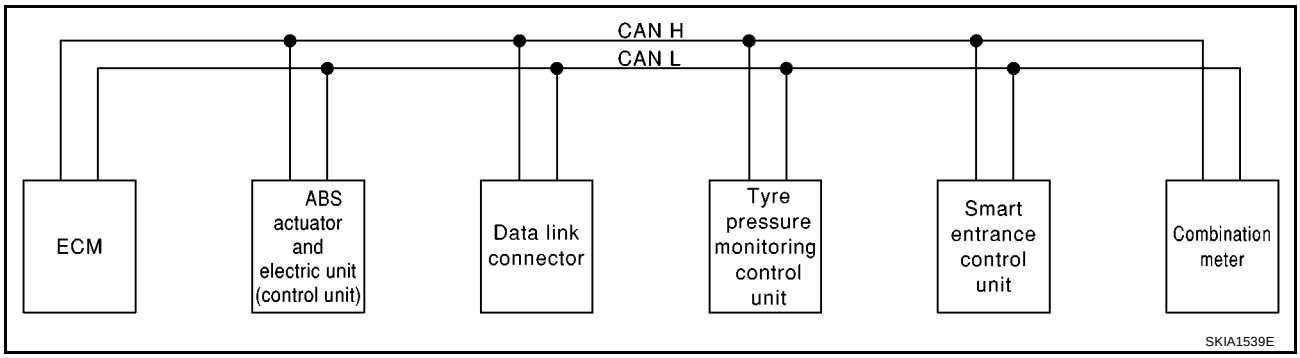
MODELS WITHOUT ESP

System Diagram

- LHD models



- RHD models



Input/Output Signal Chart

T: Transmit R: Receive

Signals	ECM	ABS actuator and electric unit (control unit)	Smart entrance control unit	Tyre pressure monitoring control unit	Combination meter
Engine speed signal	T				R
Air conditioner switch signal	R				T
MI signal	T				R
Glow indicator lamp signal	T				R
Engine coolant temperature signal	T				R
Fuel consumption signal	T				R
Vehicle speed signal		T			R
	R			R	T
Seat belt reminder signal			R		T
Lighting switch position signal			T		R
Flashing indicator signal			T		R
Engine cooling fan speed signal	T		R		
Child lock indicator signal			T		R
Door switches state signal			T		R
A/C compressor signal	T		R		
Tyre pressure signal				T	R
ASCD SET lamp signal	T				R
ASCD CRUISE lamp signal	T				R

BASIC SERVICE PROCEDURE

PFP:00018

Fuel Filter

EBS013JB

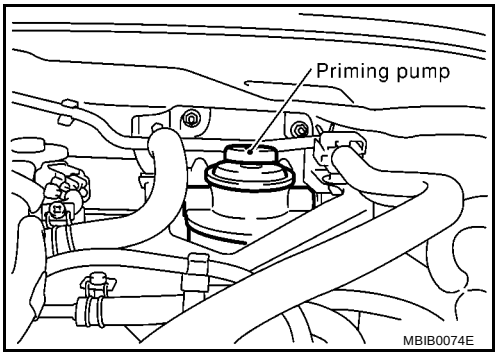
DESCRIPTION

A water draining cock is on the lower side and a priming pump for bleeding air is on the upper side.

AIR BLEEDING

Pump the priming pump to bleed air.

- When air is bled completely, the pumping of the priming pump suddenly becomes heavy. Stop the operation at that time.
- If it is difficult to bleed air by the pumping of the priming pump (the pumping of the priming pump does not become heavy), disconnect the fuel supply hose between the fuel filter and the fuel gallery. Then, perform the operation described above, and make sure that fuel comes out. (Use a pan, etc. so as not to spill fuel. Do not let fuel get on engine and other parts.) After that, connect the hose, then bleed air again.
- Start engine and let it idle for at least 1 minute after performing air bleeding.



WATER DRAINING

1. Remove the fuel filter, filter bracket, protector assembly from the dash panel as follows.

a. Remove the air cleaner case (upper), air duct assembly, and vacuum hose for brake booster (between the vacuum pump and vacuum pipe).

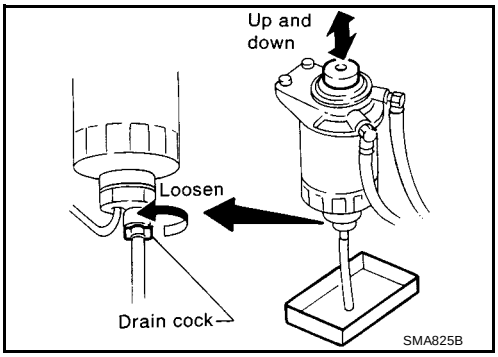
CAUTION:
After the duct is removed, cover the opening with gum tape, etc. to prevent foreign object from getting into the engine during the operation.

b. Remove the mounting nuts on the dash panel, then remove the fuel filter, filter bracket, and protector assembly from the dash panel.

- It is not necessary to disconnect the fuel hose.

2. Using a tool such as a pliers, loosen the water draining cock at the bottom of the fuel filter.
Loosening drain cock four to five turns causes water to start draining.
Do not remove drain cock by loosening it excessively.
If water dose not drain properly, move the priming up and down.

CAUTION:
When the water is drained, the fuel is also drained. Use a pan, etc. to avoid fuel adherence to the rubber parts such as the engine mount insulator.
Do not over-tighten the water draining cock. This will damage the cock thread, resulting in water or fuel leak.



3. Bleed air of the fuel filter. Refer to EC-29, "AIR BLEEDING" .
4. Start the engine.

Fuel Pump Learning Value Clearing

EBS013JC

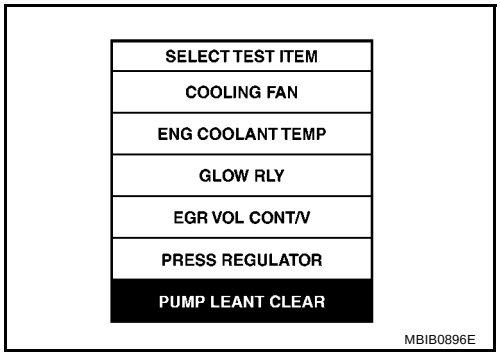
DESCRIPTION

In order to always keep optimum fuel pressure in fuel rail, the ECM controls fuel pump in high precision with monitoring the signal of fuel rail pressure sensor.
Accordingly, the ECM always learns characteristic value of fuel pump. Fuel Pump Learning Value Clearing is an operating to clear the value of the fuel pump learning.
It must be performed after the fuel pump is changed. When the ECM is replaced with brand new one, the Fuel Pump Learning Value Clearing is not necessary to be performed. If the ECM to be replaced has the possibility of learning the characteristic value of fuel pump, the Fuel Pump Learning Value Clearing is necessary to be performed after the ECM has been replaced.

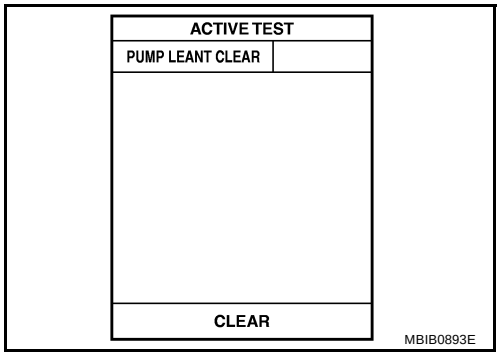
OPERATION PROCEDURE

NOTE:
Remove fuel pump without starting engine after performing Fuel Pump Learning Value Clearing.

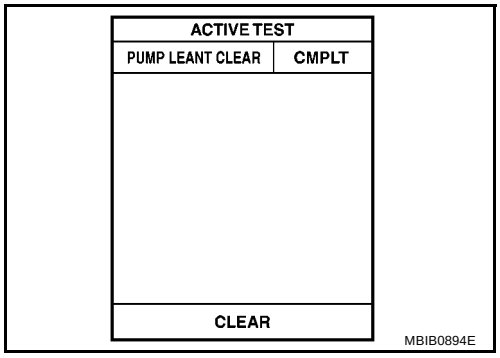
1. Turn ignition switch ON.
2. Select “PUMP LEARNT CLEAR” in “ACTIVE TEST” mode with CONSULT-II.



3. Touch “CLEAR” and wait a few seconds.



4. Make sure that “CMPLT” is displayed on CONSULT-II screen.



ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

Introduction

EBS013JD

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	ISO Standard
Diagnostic Trouble Code (DTC)	Mode 3 of ISO 15031-5
Freeze Frame data	Mode 2 of ISO 15031-5
1st/2nd Trip Diagnostic Trouble Code (1st/2nd Trip DTC)	Mode 7 of ISO 15031-5
Calibration ID	Mode 9 of ISO 15031-5

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

×: Applicable —: Not applicable

	DTC	1st trip DTC	2nd trip DTC	Freeze Frame data
CONSULT-II	×	×	×	×
GST	×	×	×	×

The malfunction indicator (MI) on the instrument panel lights up when the same malfunction is detected in three consecutive trips (Three trip detection logic).

Three Trip Detection Logic and One Trip Detection Logic

EBS013JE

On board diagnosis (OBD) system of this vehicle has “Three Trip Detection Logic” and “One Trip Detection Logic”. For which logic each self-diagnosis corresponds with, refer to EC-11, "INDEX FOR DTC" .
“Trip” of “Three Trip Detection Logic” means a driving mode in which the self-diagnosis is performed while driving.

THREE TRIP DETECTION LOGIC

When a malfunction is detected for the first time, 1st trip DTC is stored in the ECM memory. MI does not illuminate at this stage. <1st trip>
When the same malfunction is detected again during the next driving, 2nd trip DTC is stored in the ECM memory and 1st trip DTC is cleared from the ECM memory. MI does not illuminate at this stage. <2nd trip>
When the same malfunction is detected again at the third driving, DTC and Freeze Frame Data are stored in the ECM memory and 2nd trip DTC is cleared from the ECM memory. MI illuminates at the same time when DTC is stored. <3rd trip>
In other words, DTC and Freeze Frame Data are stored and MI illuminates when the same malfunction occurs in 3 consecutive trips.
This is called “Three Trip Detection Logic”.

ONE TRIP DETECTION LOGIC

When a malfunction is detected for the first time, DTC and Freeze Frame Data are stored in the ECM memory and MI lights up. This is called “One Trip Detection Logic”. Some self-diagnoses will not illuminate MI when DTC is stored. (Refer to EC-31, "Emission-related Diagnostic Information" .) 1st/2nd trip DTC is not stored for one trip detection logic.

Emission-related Diagnostic Information

EBS013JF

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

X: Applicable —: Not applicable

Items (CONSULT-II screen item)	DTC*1 *2 (CONSULT-II, GST)	1st/2nd trip DTC	MI lighting up	Reference page
CAN COMM CIRCUIT	U1000	—	—	EC-83
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	—	—	—
CMP/CKP RELATION	P0016	×	×	EC-86
TC BOOST SOL/CIRC	P0045	×	×	EC-88
HIGH FUEL PRESS	P0088	×	×	EC-93

Items (CONSULT-II screen item)	DTC*1 *2 (CONSULT-II, GST)	1st/2nd trip DTC	MI lighting up	Reference page
FUEL PUMP	P0089	×	×	EC-95
FUEL LEAK	P0093	×	×	EC-98
MAF SENSOR	P0101	×	×	EC-102
MAF SEN/CIRCUIT	P0102	×	×	EC-110
MAF SEN/CIRCUIT	P0103	×	×	EC-110
IAT SEN/CIRCUIT	P0112	×	×	EC-115
IAT SEN/CIRCUIT	P0113	×	×	EC-115
ECT SEN/CIRCUIT	P0117	×	×	EC-119
ECT SEN/CIRCUIT	P0118	×	×	EC-119
APP SEN 1/CIRCUIT	P0122	—	—	EC-124
APP SEN 1/CIRCUIT	P0123	—	—	EC-124
FUEL TEMP SEN/CIRC	P0182	×	×	EC-130
FUEL TEMP SEN/CIRC	P0183	×	×	EC-130
FRP SEN/CIRC	P0192	×	×	EC-134
FRP SEN/CIRC	P0193	×	×	EC-134
INJECTOR	P0200	×	×	EC-139
CYL1 INJECTOR	P0201	×	×	EC-141
CYL2 INJECTOR	P0202	×	×	EC-141
CYL3 INJECTOR	P0203	×	×	EC-141
CYL4 INJECTOR	P0204	×	×	EC-141
ENG OVER TEMP	P0217	—	×	EC-147
APP SEN 2/CIRCUIT	P0222	—	—	EC-164
APP SEN 2/CIRCUIT	P0223	—	—	EC-164
TC SYSTEM	P0234	—	—	EC-170
TC BOOST SEN/CIRC	P0237	×	×	EC-177
TC BOOST SEN/CIRC	P0238	×	×	EC-177
CKP SEN/CIRCUIT	P0335	×	×	EC-182
CKP SENSOR	P0336	×	×	EC-187
CMP SEN/CIRCUIT	P0340	×	×	EC-193
CMP SENSOR	P0341	×	×	EC-199
GLOW RELAY	P0380	×	×	EC-205
EGR VALVE	P0404	×	×	EC-209
VEHICLE SPEED	P0501	—	—	EC-218
VEHICLE SPEED	P0502	—	—	EC-220
VEHICLE SPEED	P0503	—	—	EC-222
BRAKE SW/CIRCUIT	P0504	—	—	EC-224
BATTERY VOLTAGE	P0563	—	—	EC-233
STRG SW/CIRC	P0580	—	—	EC-235
STRG SW/CIRC	P0581	—	—	EC-235
ECM	P0605	×	×	EC-241
ECM	P0606	×	×	EC-243
FUEL PUMP/CIRC	P0628	×	×	EC-245
FUEL PUMP/CIRC	P0629	×	×	EC-245

Items (CONSULT-II screen item)	DTC*1 *2 (CONSULT-II, GST)	1st/2nd trip DTC	MI lighting up	Reference page
SENSOR PWR/CIRC1	P0642	×	×	EC-250
SENSOR PWR/CIRC1	P0643	×	×	EC-250
SENSOR PWR/CIRC2	P0652	×	×	EC-255
SENSOR PWR/CIRC2	P0653	×	×	EC-255
ECM RELAY	P0686	—	—	EC-260
TCS C/U FUNCTN	P1211	—	—	EC-264
TCS/CIRC	P1212	—	—	EC-265
INJ ADJ RES/CIRC1	P1260	×	×	EC-266
INJ ADJ RES/CIRC1	P1261	×	×	EC-266
INJ ADJ RES/CIRC2	P1262	×	×	EC-266
INJ ADJ RES/CIRC2	P1263	×	×	EC-266
INJ ADJ RES/CIRC3	P1264	×	×	EC-266
INJ ADJ RES/CIRC3	P1265	×	×	EC-266
INJ ADJ RES/CIRC4	P1266	×	×	EC-266
INJ ADJ RES/CIRC4	P1267	×	×	EC-266
INJECTOR 1	P1268	—	—	EC-271
INJECTOR 2	P1269	—	—	EC-271
INJECTOR 3	P1270	—	—	EC-271
INJECTOR 4	P1271	—	—	EC-271
FRP RELIEF VALVE	P1272	×	×	EC-277
FUEL PUMP	P1273	×	×	EC-283
FUEL PUMP	P1274	—	×	EC-288
FUEL PUMP	P1275	—	×	EC-293
NATS MALFUNTION	P1610 - P1617	—	—	EC-35
APP SENSOR	P2135	—	—	EC-298
INJ PWR/CIRC	P2146	×	×	EC-304
INJECTOR/CIRC	P2147	×	×	EC-309
INJECTOR/CIRC	P2148	×	×	EC-309
INJ PWR/CIRC	P2149	×	×	EC-304
BARO SEN/CIRC	P2228	×	×	EC-315
BARO SEN/CIRC	P2229	×	×	EC-315

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.
*2: This number is prescribed by ISO 15031-6.

DTC AND 1ST/2ND TRIP DTC

The number of 1st/2nd trip DTC is the same as the number of DTC.
When a malfunction is detected during 1st trip, 1st trip DTC is stored in the ECM memory. MI does not illuminate at this time. When the same malfunction is detected in the next trip (2nd trip), 2nd trip DTC is stored in the ECM memory and 1st trip DTC is cleared from the ECM memory. MI does not illuminate at this time. In addition, DTC is stored in the ECM memory and Mi lights up when the same malfunction is detected during the following consecutive trip (3rd trip).
The procedure for erasing DTC, 1st trip DTC, and 2nd trip DTC from the ECM memory is described in EC-34, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
For malfunctions in which 1st/2nd trip DTC are displayed, Refer to EC-31, "Emission-related Diagnostic Information" .
1st/2nd trip DTC is specified in Mode 7 of ISO15031-5. 1st/2nd trip DTC detection occurs without lighting up MI and therefore does not warn the driver of a malfunction.

When 1st/2nd trip DTC is detected, check, print out or write down, and erase 1st/2nd trip DTC as specified with step II of Work Flow, refer to EC-41, "WORK FLOW" . Then perform DTC Confirmation Procedure or Overall Function Check to try to duplicate the malfunction. If the malfunction is duplicated, it is necessary to investigate the cause again.

How to Read DTC and 1st/2nd Trip DTC

DTC and 1st/2nd trip DTC can be read by the following procedures.

With CONSULT-II

With GST

ONSULT-II or GST (Generic Scan Tool): Examples: P0117, P0335, P1260, etc.
These numbers are prescribed by ISO 15031-6.
(CONSULT-II also displays the malfunctioning parts and systems.)

A sample of CONSULT-II display for DTC and 1st/2nd trip DTC is shown in the figure. DTC and 1st/2nd trip DTC are displayed in the “SELF-DIAG RESULTS” mode of CONSULT-II.
“TIME” data shows how many times the vehicle was driven after the last detection of DTC or 1st/2nd trip DTC. When DTC or 1st/2nd trip DTC has been detected currently, “TIME” becomes “0”.

SELF DIAG RESULTS	
DTC RESULTS	TIME
CKP SEN/CIRCUIT [P0335]	0

PBIB2022E

- CONSULT-II displays for DTC and 1st/2nd trip DTC become the same.
- The output of a DTC indicates a malfunction. However, GST does not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify the malfunction status. Therefore the use of CONSULT-II (If available) is recommended.

FREEZE FRAME DATA

ECM records driving conditions such as calculated load value, engine coolant temperature, engine speed, vehicle speed, and intake manifold pressure at the moment a malfunction is detected.
The data stored together with DTC is called Freeze Frame Data, and is displayed on CONSULT-II or GST.
When 1st/2nd trip DTC is detected, Freeze Frame Data is not recorded.
Only a set of Freeze Frame Data can be stored in the ECM memory. When ECM records Freeze Frame Data, and another Freeze Frame Data is generated after that, the first (original) Freeze Frame Data is not updated in ECM and it remains.
When the DTC is erased from ECM memory, Freeze Frame Data is erased with DTC. The procedure for erasing DTC is described in EC-34, "How to Erase DTC" .

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC

With CONSULT-II

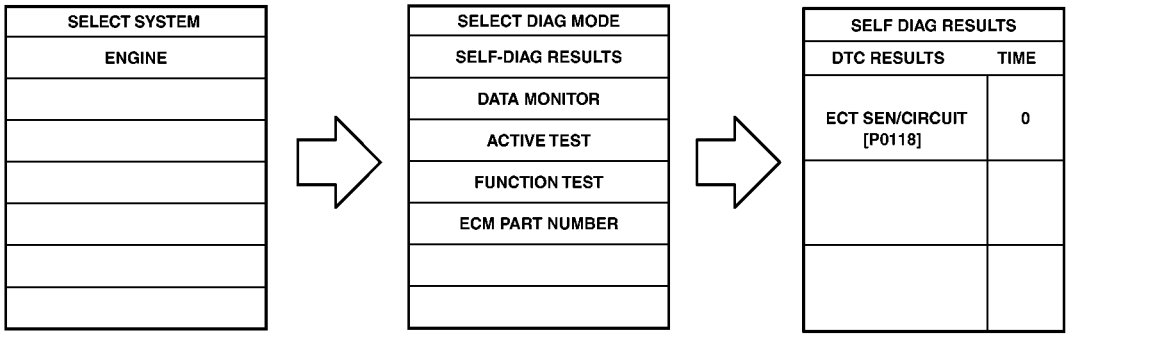
The emission related diagnostic information in the ECM can be erased by selecting “ERASE” in the “SELF-DIAG RESULTS” mode with CONSULT-II.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 5 seconds and then turn it ON (engine stopped) again.
2. Touch “ENGINE”.
3. Touch “SELF-DIAG RESULTS”.

4. 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 5 seconds and then turn it “ON” again.



2. Turn CONSULT-II “ON” and touch “ENGINE”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. (The DTC in the ECM will be erased.)

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With GST

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

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 5 seconds and then turn it ON (engine stopped) again.
2. Select MODE 4 with GST (Generic Scan Tool).

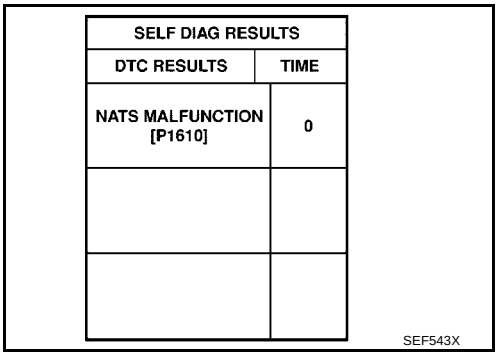
- **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**
- **The following data are cleared when the ECM memory is erased.**
  - Diagnostic trouble codes
  - 1st trip diagnostic trouble codes
  - 2nd trip diagnostic trouble codes
  - Freeze frame data

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.

NATS (Nissan Anti-theft System)

EBS013JG

- **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 NATS (Nissan Anti-Theft System) in BL section.**
- **Confirm no self-diagnostic results of NATS is displayed before touching "ERASE" in "SELF-DAIG RESULTS" mode with CONSULT-II.**
- **When replacing ECM, initialization of NATS system and registration of all NATS ignition key IDs must be carried out with CONSULT-II using NATS program card.**
  Therefore, be sure to receive all keys from vehicle owner.
  Regarding the procedure of NATS initialization and NATS ignition key ID registration, refer to CONSULT-II operation manual, NATS.



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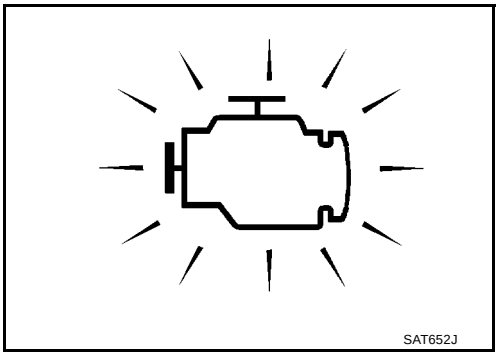
Malfunction Indicator (MI)

EBS013JH

DESCRIPTION

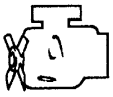
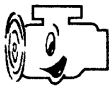
The MI is located on the instrument panel.

1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   - If the MI does not light up, refer to DI-84, "WARNING LAMPS" or see EC-347 .
2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.


SAT652J

On Board Diagnostic System Function

The on board diagnostic system has the following two functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position  Engine stopped 	BULB CHECK	This function checks the MI bulb for damage (blown, open circuit, etc.). If the MI does not come on, check MI circuit. (See EC-347, "MI & DATA LINK CONNECTORS" .)
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When ECM detects a malfunction, the MI will light up to inform the driver that a malfunction has been detected.

Diagnostic Test Mode I - Bulb Check

In this mode, the MI on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to DI-84, "WARNING LAMPS" or see EC-347 .

Diagnostic Test Mode I - Malfunction Warning

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

OBD System Operation Chart

EBS013JI

RELATIONSHIP BETWEEN MI, 1ST/2ND TRIP DTC, DTC, AND DETECTABLE ITEMS

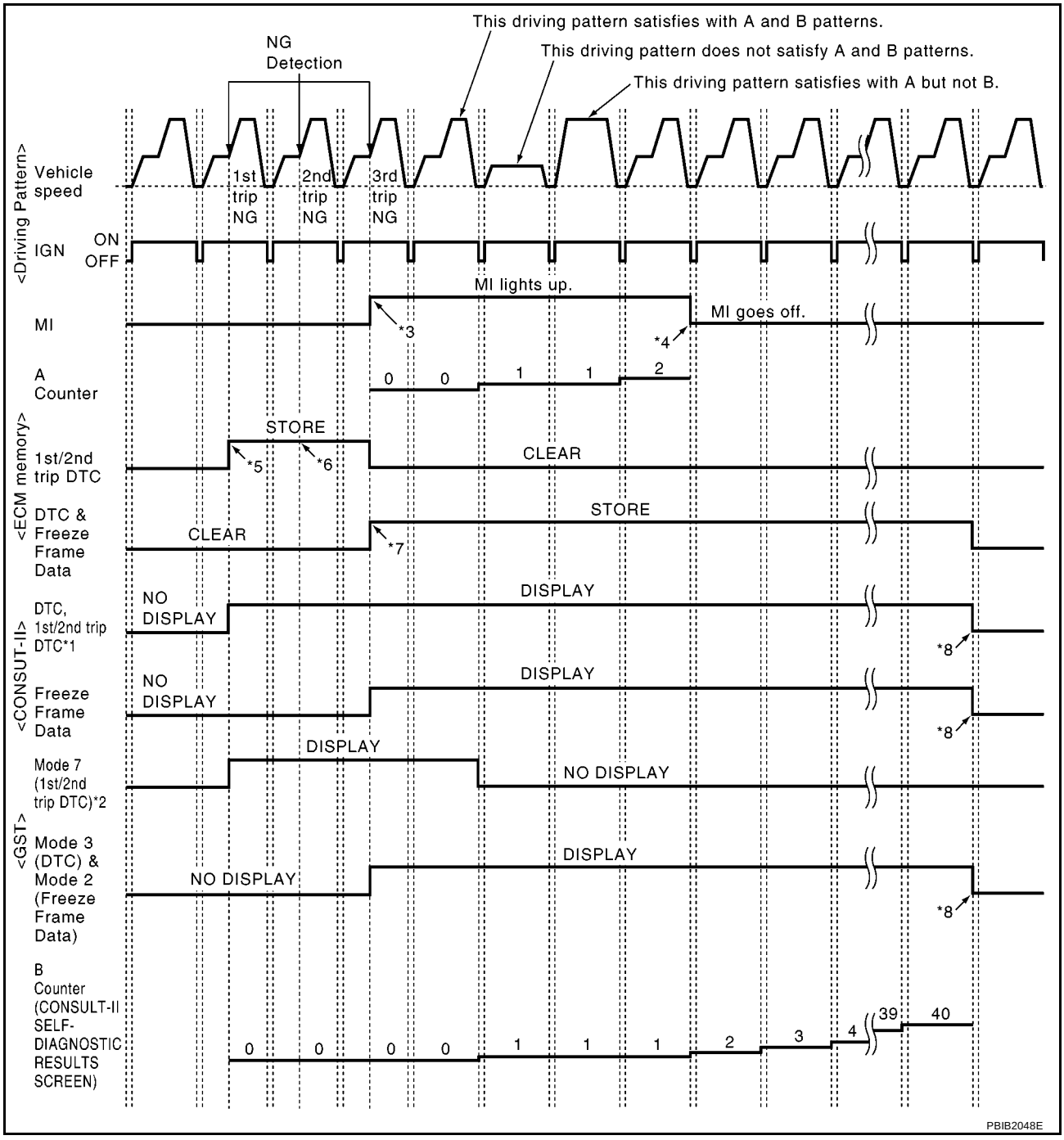
- When the malfunction is detected for the first time, 1st trip DTC is stored in the ECM memory.
- When the same malfunction is detected during 2nd consecutive trip, 2nd trip DTC is stored and 1st trip DTC is cleared.
- When the same malfunction is detected during 3rd consecutive trip, DTC and Freeze Frame Data are stored and MI illuminates. Refer to EC-31, "Three Trip Detection Logic and One Trip Detection Logic" for details.1st/2nd trip DTC are cleared from the ECM memory.
- MI will go off after the vehicle is driven 3 consecutive times with no malfunction (driving pattern A).
- 1st/2nd trip DTC, DTC, and Freeze Frame Data will be stored until the vehicle is driven 41 times (driving pattern B) without the same malfunction recurring. “TIME” data displayed in the “SELF-DIAG RESULTS” mode of CONSULT-II shows the number of times the vehicle is driven without the same malfunction recurring.

SUMMARY CHART

Items	Trip	Counter	Driving Pattern
MI (goes off)	3	2	A
DTC, Freeze Frame Data (clear)	41	40	B
1st/2nd Trip DTC (clear)	41	40	B

Refer to EC-39 for details of pattern A and B.

RELATIONSHIP BETWEEN MI, DTC, 1ST/ 2NDTRIP DTC AND DRIVING PATTERNS



*1: CONSULT-II displays for DTC and 1st/2nd trip DTC become the same.

*2: 1st/2nd trip DTC becomes the same display in mode7 of GST.

*3: When the same malfunction is detected in three consecutive trips, MI will light up.

*4: MI will go off after vehicle is driven 3 times (pattern A) without any malfunctions.

*5: When the malfunction is detected for the first time, 1st trip DTC is stored in the ECM memory.

*6: When the same malfunction is detected during 2nd consecutive trip, 2nd trip DTC is stored and 1st trip DTC is cleared.

*7: When the same malfunction is detected during 3rd consecutive trip, DTC and Freeze Frame Data are stored.

*8: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 41 times (pattern B) without the same malfunction.

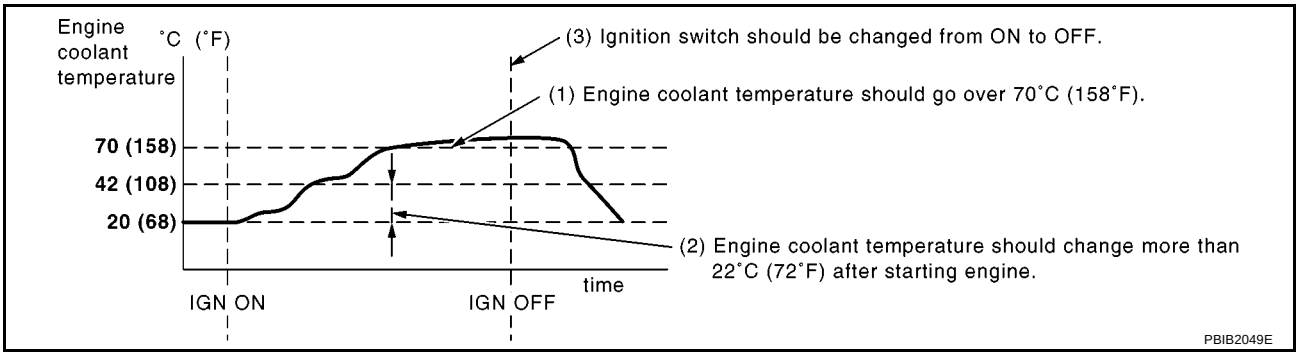
<Driving Pattern A>

Driving pattern A means the vehicle operation as follows:
Engine speed should go over 500 rpm at least 5 seconds and the DTC Confirmation Procedure is performed.

- The A counter will be cleared when the same malfunction is detected.
- The A counter will be counted up when the same malfunction is not detected.
- The MI will go off when the A counter reaches 3.

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:
Driving pattern A and (1)-(3) are satisfied.



- The B counter will be cleared when the same malfunction is detected.
- The B counter will be counted up when the same malfunction is not detected.
- The DTC will not be displayed after the B counter reaches 40.

TROUBLE DIAGNOSIS

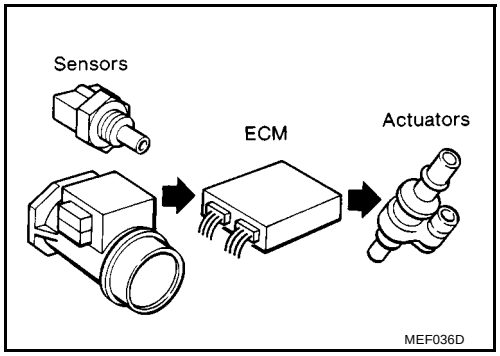
PFP:00004

Trouble Diagnosis Introduction

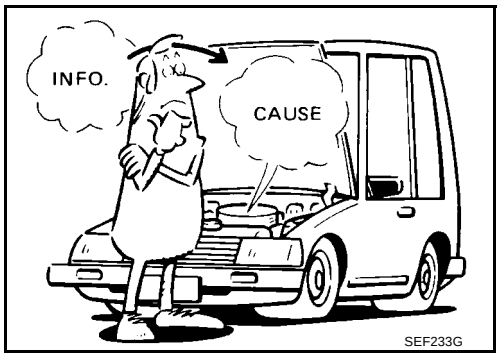
EBS013JJ

INTRODUCTION

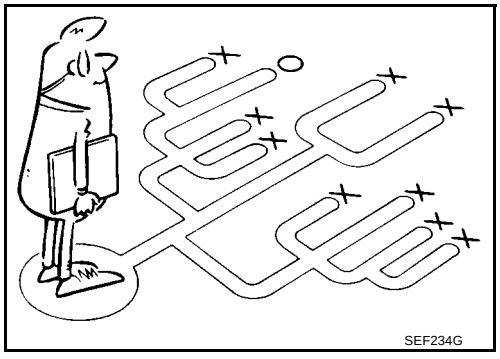
The engine has an ECM to control major systems such as fuel injection control, fuel injection timing control, glow control system, etc. The ECM accepts input signals from sensors and instantly actuators. It is essential that both input and output signals are proper and stable. At the same time, it is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



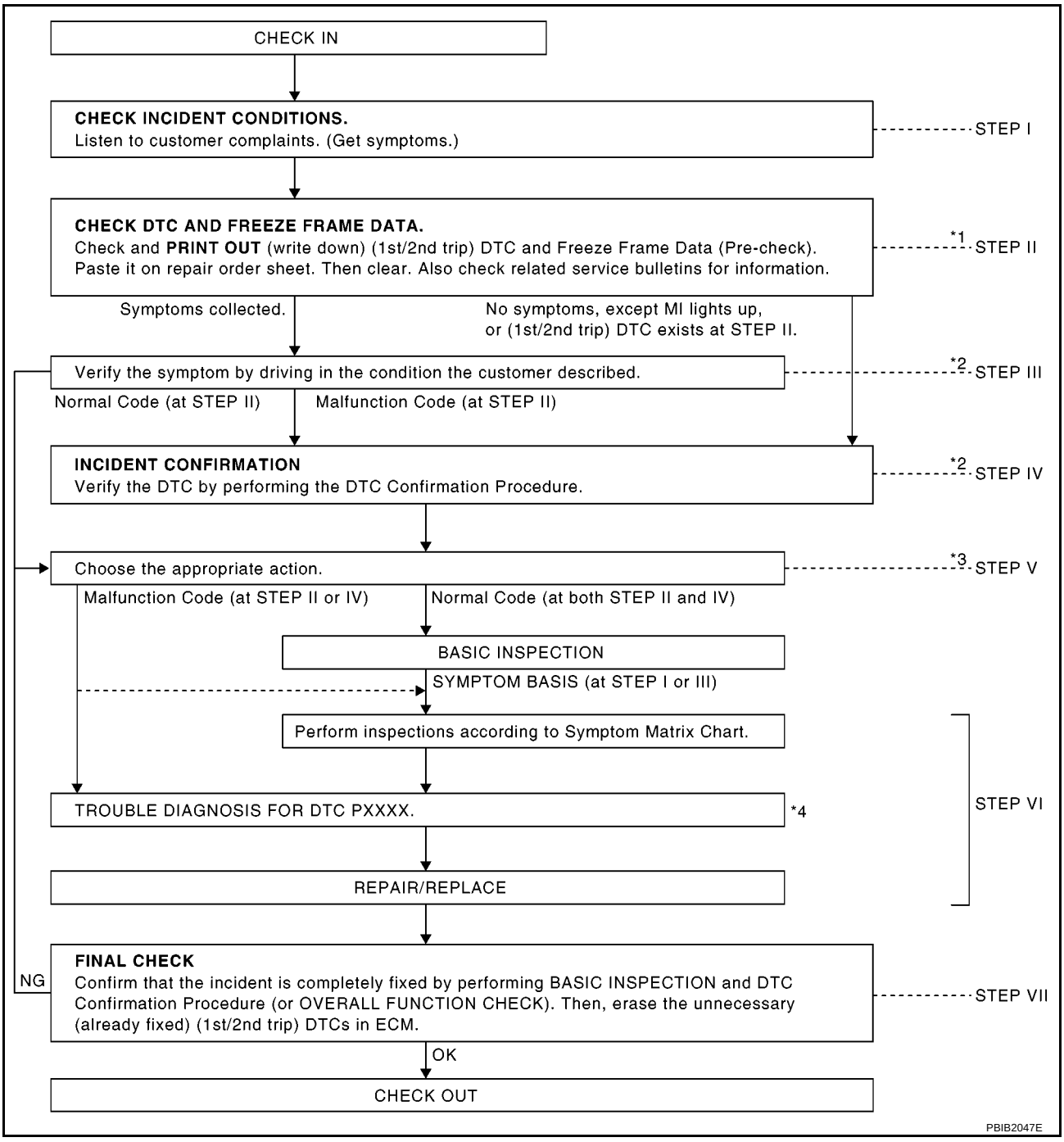
It is much more difficult to diagnose a malfunction that occurs intermittently rather than continuously. Most intermittent malfunctions are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



A visual check only may not find the cause of the incidents. A road test with CONSULT-II or a circuit tester connected should be performed. Follow the EC-41, "WORK FLOW" .
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 incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A Diagnostic Worksheet like the example on next page should be used.
Start your diagnosis by looking for conventional incidents first. This will help troubleshoot driveability incidents on an electronically controlled engine vehicle.



WORK FLOW



*1 If time data of “SELF-DIAG RESULTS” is other than “0”, perform EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*2 If the incident cannot be verified, perform EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*3 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to EC-76, "MAIN POWER SUPPLY AND GROUND CIRCUIT" .

*4 If malfunctioning part cannot be detected, perform EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

Description for Work Flow

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the EC-42, "DIAGNOSTIC WORK SHEET" .
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or GST) the (1st/2nd trip) DTC and the freeze frame data (When 1st/2nd trip DTC is detected, Freeze Frame Data is not recorded.), then erase the DTC and the data. (Refer to EC-34 .) The (1st/2nd trip) DTC and the freeze frame data can be used when duplicating the incident at STEP III & IV. If the incident cannot be verified, perform EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . Study the relationship between the cause, specified by (1st/2nd trip) DTC, and the symptom described by the customer. (The Symptom Matrix Chart will be useful. See EC-48 .) 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-75, "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/2nd trip) DTC by driving in (or performing) the DTC Confirmation Procedure. Check and read the (1st/2nd trip) DTC and freeze frame data by using CONSULT-II or GST. During the (1st/2nd 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-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . In case the DTC Confirmation Procedure is not available, perform the Overall Function Check instead. The (1st/2nd 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/2nd 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-44 .)Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-48 .)
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-57 , EC-72 . 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-24, "How to Perform Efficient Diagnosis for an Electrical Incident" . Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform EC-75, "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/2nd trip) DTC in ECM. (Refer to EC-34, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .)

DIAGNOSTIC WORK SHEET

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about an incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one shown below in order to organize all the information for troubleshooting.

KEY POINTS

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

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Worksheet Sample

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

MTBL0533

DTC Inspection Priority Chart

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

NOTE:

If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to **EC-83, "DTC U1000 CAN COMMUNICATION LINE"** .

Priority	Detected items (DTC)
1	● U1000 CAN communication line ● P0016 Crankshaft position - camshaft position correlation ● P0101 P0102 P0103 Mass air flow sensor ● P0112 P0113 Intake air temperature sensor ● P0117 P0118 Engine coolant temperature sensor ● P0122 P0123 P0222 P0223 P2135 Accelerator pedal position sensor ● P0182 P0183 Fuel pump temperature sensor ● P0192 P0193 Fuel rail pressure sensor ● P0237 P0238 Turbocharger boost sensor ● P0335 P0336 Crankshaft position sensor ● P0340 P0341 Camshaft position sensor ● P0563 Battery voltage ● P0605 P0606 ECM ● P0642 P0643 P0652 P0653 Sensor power supply ● P1260 - P1267 Fuel injector adjustment resistor ● P1610 - P1617 NATS ● P2228 P2229 Barometric pressure sensor
2	● P0045 Turbocharger boost control solenoid valve ● P0089 P0628 P0629 P1272 - P1275 Fuel pump ● P0200 - P0204 P1268 - P1271 P2146 - P2149 Fuel injector ● P0380 Glow relay ● P0404 EGR volume control valve ● P0686 ECM relay ● P1212 TCS communication line
3	● P0088 P0093 Fuel system ● P0217 Engine over temperature (OVERHEAT) ● P0234 Turbocharger system ● P0501 P0502 P0503 ASCD vehicle speed sensor ● P0504 ASCD brake switch ● P0580 P0581 ASCD steering switch ● P1211 TCS control unit

Basic Inspection

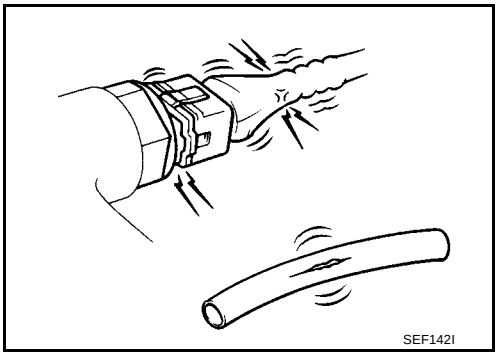
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Precaution:
Perform Basic Inspection without electrical or mechanical loads applied;

- **Headlamp switch is OFF.**
- **On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.**
- **Air conditioner switch is OFF.**
- **Rear defogger switch is OFF.**
- **Steering wheel is in the straight-ahead position, etc.**

1. INSPECTION START

1. Check service records for any recent repairs that may indicate a related incident.
2. Check the current need for scheduled maintenance, especially for fuel filter and air cleaner filter. Refer to MA-7, "PERIODIC MAINTENANCE" .
3. Open engine hood and check the following:
- Harness connectors for improper connections
- Vacuum hoses for splits, kinks, or improper connections
- Wiring for improper connections, pinches, or cuts
4. Start engine and warm it up to the normal operating temperature.


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>> GO TO 2.

2. PREPARATION FOR CHECKING IDLE SPEED

With CONSULT-II

Connect CONSULT-II to the data link connector.

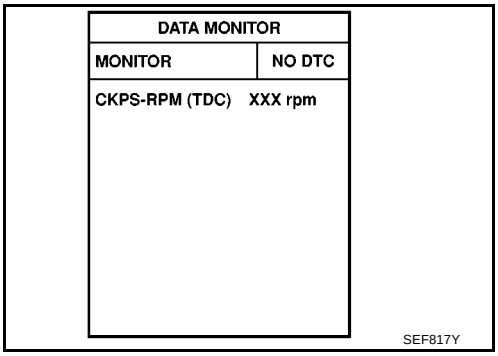
>> GO TO 3.

3. CHECK IDLE SPEED

With CONSULT-II

1. Select “CKPS·RPM (TDC)” in “DATA MONITOR” mode with CONSULT-II.
2. Read idle speed.

725±25 rpm



SEF817Y

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

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. BLEED AIR FROM FUEL SYSTEM

1. Stop engine.
2. Use priming pump to bleed air from fuel system. Refer to EC-29, "AIR BLEEDING" .

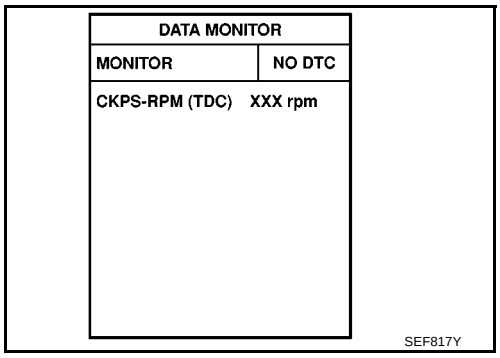
>> GO TO 6.

6. CHECK IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and let it idle.
2. Select “CKPS·RPM (TDC)” in “DATA MONITOR” mode with CONSULT-II.
3. Read idle speed.

725±25 rpm



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. DRAIN WATER FROM FUEL FILTER

Drain water from fuel filter. Refer to EC-29, "WATER DRAINING" .

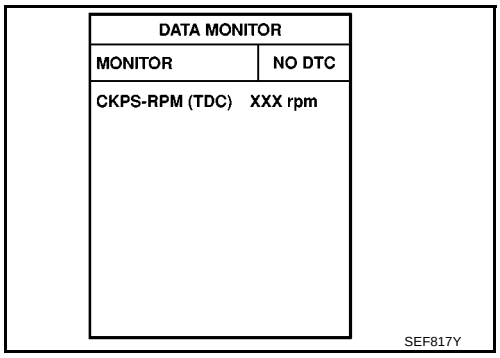
>> GO TO 8.

8. CHECK IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and let it idle.
2. Select “CKPS·RPM (TDC)” in “DATA MONITOR” mode with CONSULT-II.
3. Read idle speed.

725±25 rpm



OK or NG

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

9. CHECK AIR CLEANER FILTER

Check air cleaner filter for clogging or breaks.

OK or NG

OK >> GO TO 10.
NG >> Replace air cleaner filter.

10. CHECK BATTERY VOLTAGE

Check battery voltage.

Voltage: More than 12.13V

OK or NG

OK >> GO TO 12.
NG >> GO TO 11.

11. CHECK BATTERY

Refer to SC-3, "BATTERY" .

OK or NG

OK >> Check charging system. Refer to SC-12 .
NG >> Repair or replace.

12. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-78, "CHECKING COMPRESSION PRESSURE" .

OK or NG

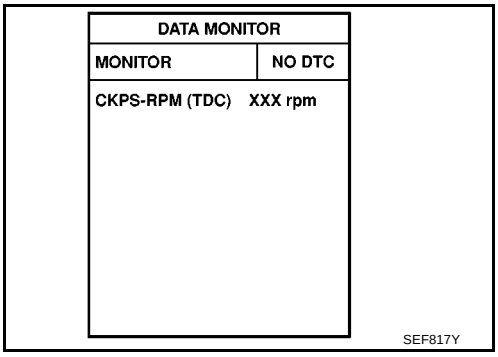
OK >> GO TO 11.
NG >> Follow the instruction of “CHECKING COMPRESSION PRESSURE”.

13. CHECK IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and let it idle.
2. Select “CKPS·RPM (TDC)” in “DATA MONITOR” mode with CONSULT-II.
3. Read idle speed.

725±25 rpm



OK or NG

OK >> **INSPECTION END**
NG >> 1. Replace fuel injector.
2. GO TO 3.

Symptom Matrix Chart

EBS013JM

SYSTEM — Basic engine control system		SYMPTOM: HARD/NO START/RESTART (EXCP. HA)				SYMPTOM: ENGINE STALL									Reference page
		NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD	HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING	HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE	LOW IDLE	
Warranty symptom code		AA				AB			AC	AD	AE		AF		
Fuel pump		5	5	5	5	5	5	5	5		5	5		5	—
Fuel injector		3	3	3	3	3	3	3	3	3	4	4	3	3	EC-141
Glow control system		1	1	1	1					1					EC-317
Engine body		3	3	3	3	3	3	3		3	4	4		3	EM-89
EGR system											3	3			EC-209
Air cleaner and duct											3	3			EM-15
Fuel rail pressure relief valve															EC-98
ENGINE CONTROL	Fuel pump circuit	4	4	4	4	4	4	4	4		4	4		4	EC-245
	Fuel injector circuit	1	1	1	1	1	1	1	1	1	1	1	1	1	EC-141
	Mass air flow sensor circuit								1		1	1			EC-110
	Engine coolant temperature circuit			1		1		1						1	EC-119
	Vehicle speed signal circuit											1			LAN-5
	Accelerator pedal position sensor circuit								1		1	1			EC-124, EC-164, EC-298
	Fuel rail pressure sensor circuit														EC-134

SYSTEM — Basic engine control system		SYMPTOM: HARD/NO START/RESTART (EXCP. HA)				SYMPTOM: ENGINE STALL			SYMPTOM	SYMPTOM	SYMPTOM	SYMPTOM	SYMPTOM	SYMPTOM	Reference page
		NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD	HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING	HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE	LOW IDLE	
Warranty symptom code		AA				AB			AC	AD	AE		AF		
ENGINE CONTROL	Crankshaft position sensor circuit		1	1	1	1	1	1	1	1	1	1			EC-182
	Camshaft position sensor circuit			3	3										EC-193
	Turbocharger boost sensor circuit								1		1	1			EC-177
	Turbocharger boost control solenoid valve circuit								1		1	1			EC-88
	Start signal circuit	1	1	1	1	1		1	1		1	1			EC-340
	Ignition switch circuit		1			1	1	1							EC-76
	Power supply for ECM circuit		1			1	1	1							EC-76
	Cooling fan relay circuit														EC-147
	EGR volume control valve circuit								1		1	1			EC-209
	Glow relay circuit	1	1	1	1										EC-205
	ECM relay (Self-shutoff) circuit		1				1	1	1						EC-260
	ECM, connector circuit	2	2	2	2	2	2	2	2	2	2	2	2	2	EC-241, EC-243
NATS (Nissan Anti-theft System)			1												EC-35

1 - 5: The numbers refer to the order of inspection.

(continued on next page)

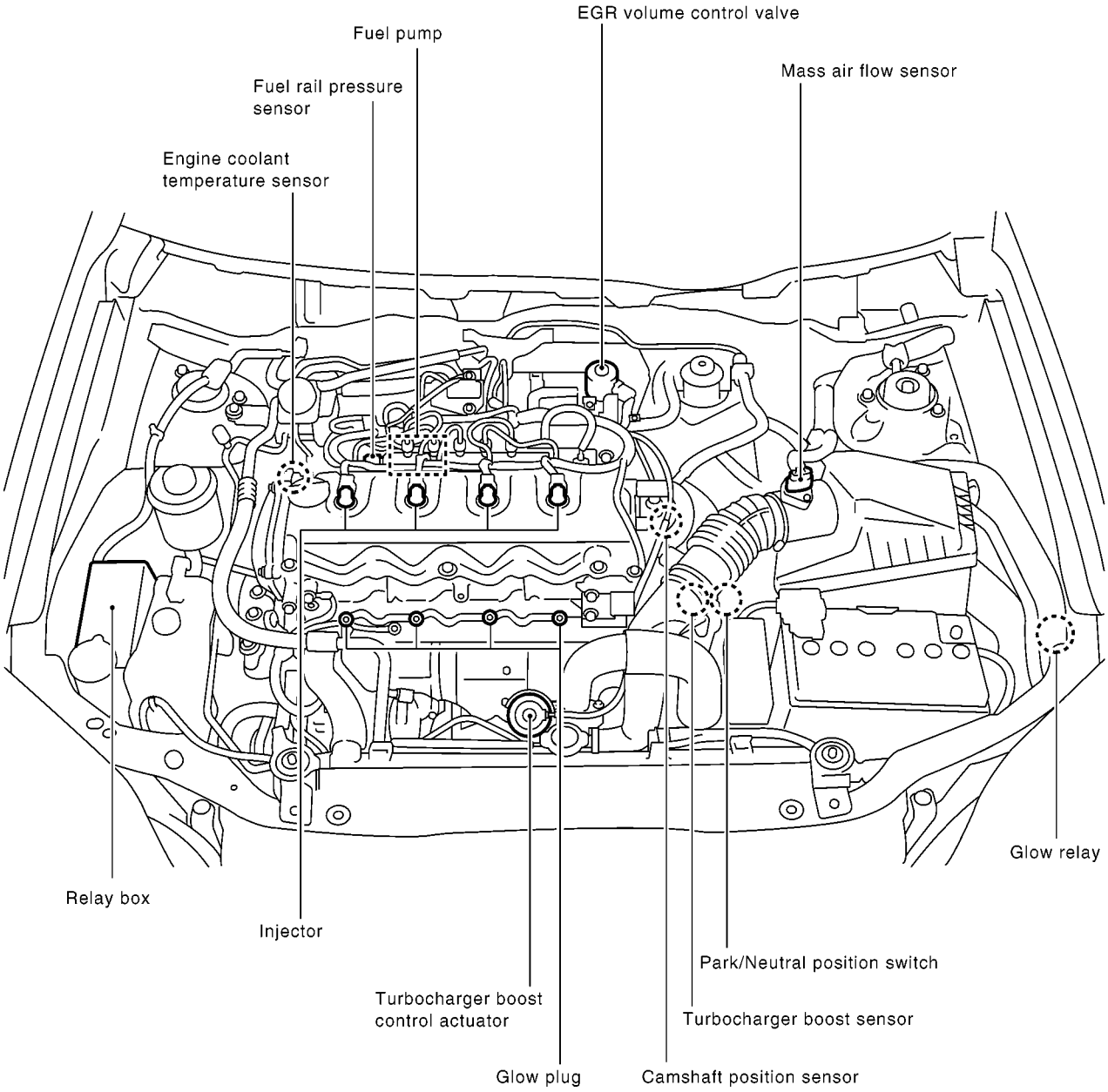
SYSTEM — Basic engine control system		SYMPTOM											Reference page
		ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEAT/HIGH ENGINE COOLANT TEMPERATURE	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	ABNORMAL SMOKE COLOR		DEAD BATTERY (UNDER CHARGE)	Malfunction indicator illuminates.	Can be detected by CONSULT-II?	
								BLACK SMOKE	WHITE SMOKE				
Warranty symptom code		AG	AH	AJ	AK	AL	AM	AP		HA			
Fuel pump		5	5	5		5					1	1	—
Fuel injector		3	3	3		4		4	4		1	1	EC-141
Glow control system									1				EC-317
Engine body			3	3	3	3	1		3				EM-89
EGR system								3					EC-209
Air cleaner and duct								3					EM-15
Fuel rail pressure relief valve													EC-98
ENGINE CONTROL	Fuel pump circuit	4	4	4		4					1	1	EC-283
	Fuel injector circuit	1	1	1		1		1	1		1	1	EC-141
	Mass air flow sensor circuit							1			1	1	EC-110
	Engine coolant temperature circuit	1	1		1						1	1	EC-119
	Vehicle speed signal circuit										1	1	LAN-5
	Accelerator pedal position sensor circuit			1							1	1	EC-124, EC-164, EC-298
	Fuel rail pressure sensor circuit										1	1	EC-134

SYSTEM — Basic engine control system		SYMPTOM											Reference page
		ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEAT/HIGH ENGINE COOLANT TEMPERATURE	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	ABNORMAL SMOKE COLOR		DEAD BATTERY (UNDER CHARGE)	Malfunction indicator illuminates.	Can be detected by CONSULT-II?	
								BLACK SMOKE	WHITE SMOKE				
Warranty symptom code		AG	AH	AJ	AK	AL	AM	AP		HA			
ENGINE CONTROL	Crankshaft position sensor circuit	1	1								1	1	EC-182
	Camshaft position sensor circuit										1	1	EC-193
	Turbocharger boost sensor circuit										1	1	EC-177
	Turbocharger boost control solenoid valve circuit							1	1				EC-88
	Start signal circuit												EC-340
	Ignition switch circuit												EC-76
	Power supply for ECM circuit										1	1	EC-76
	Cooling fan relay circuit				2								EC-147
	EGR volume control valve circuit							1					EC-209
	Glow relay circuit								1				EC-205
	ECM relay (Self-shutoff) circuit											1	EC-260
	ECM, connector circuit	2	2	2	2	2	2	2	2	2	2	2	EC-241, EC-243
NATS (Nissan Anti-theft System)												1	EC-35

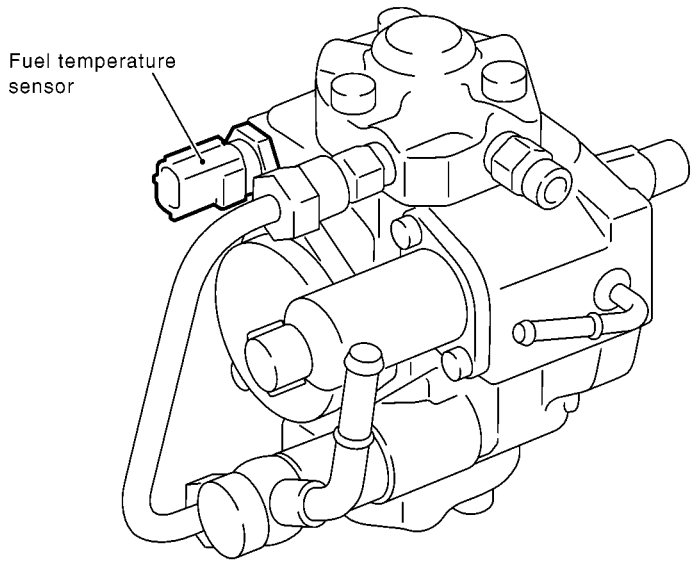
1 - 5: The numbers refer to the order of inspection.

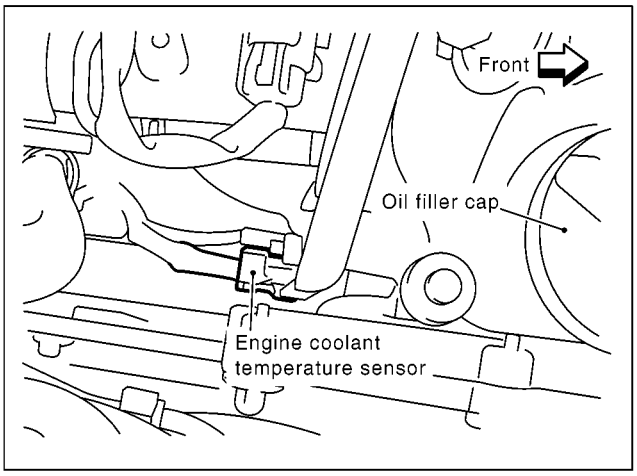
Engine Control Component Parts Location

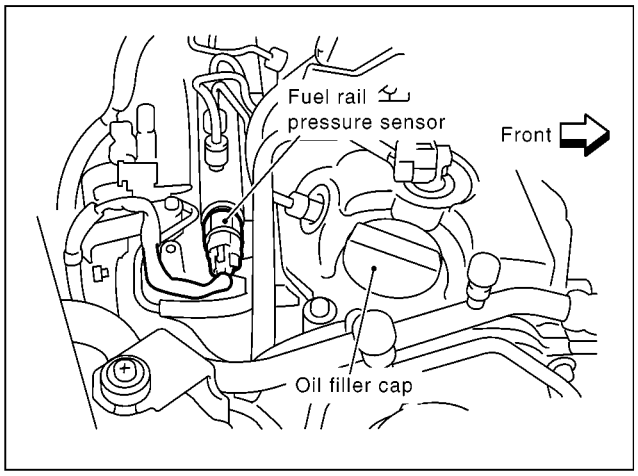
EBS013JN

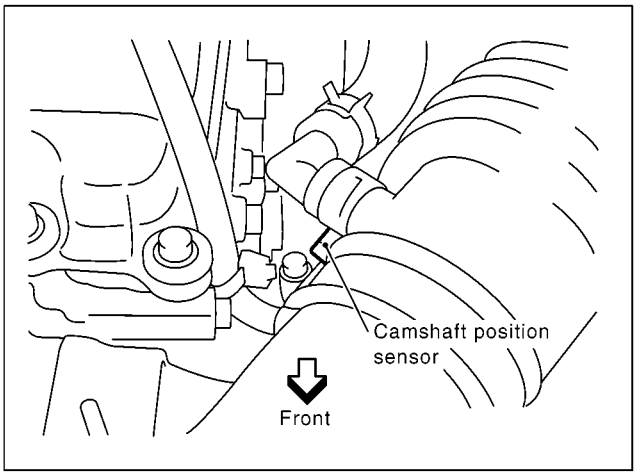


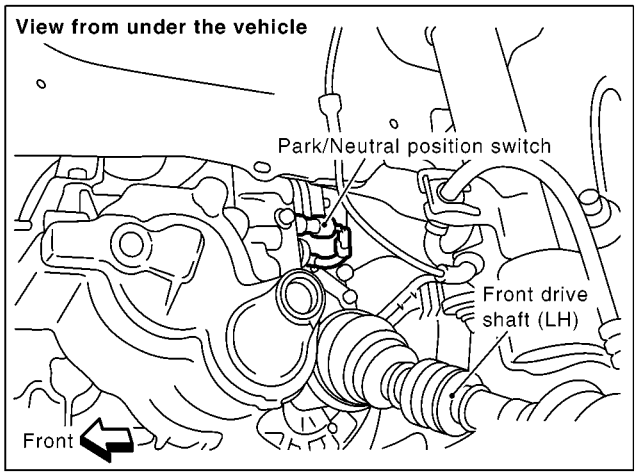
MBIB1089E


Fuel temperature sensor

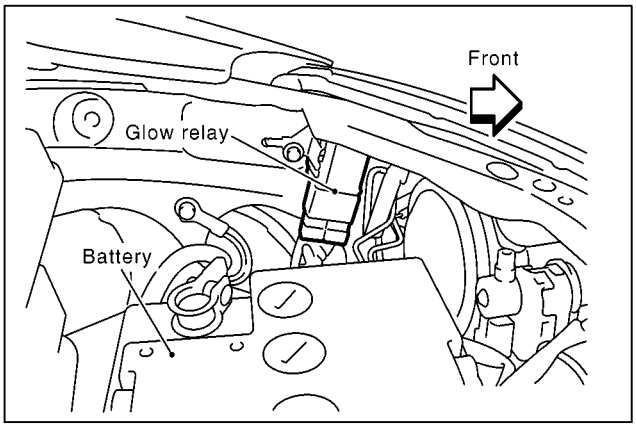

Front
Oil filler cap
Engine coolant temperature sensor

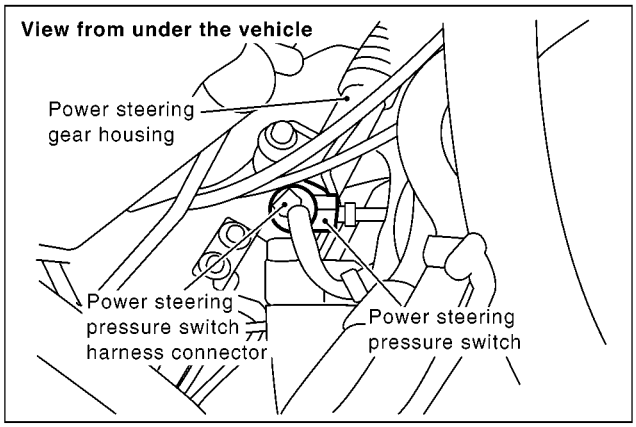

Fuel rail pressure sensor
Front
Oil filler cap

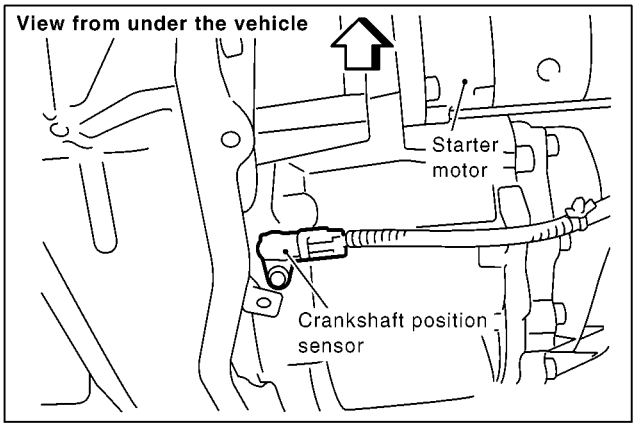

Camshaft position sensor
Front

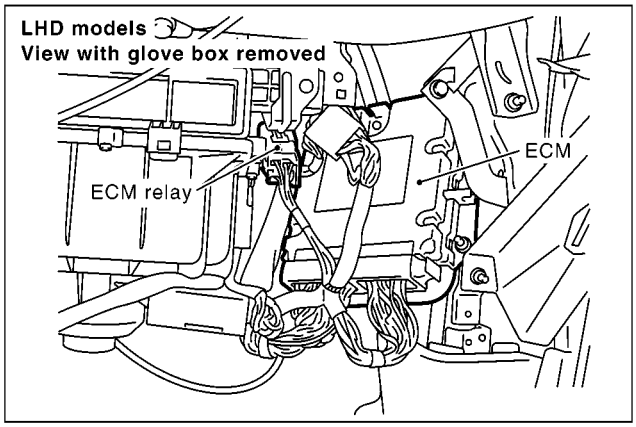

View from under the vehicle
Park/Neutral position switch
Front drive shaft (LH)
Front

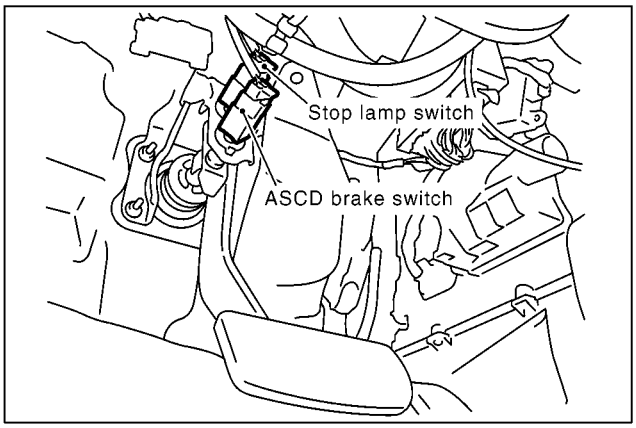
MBIB1090E

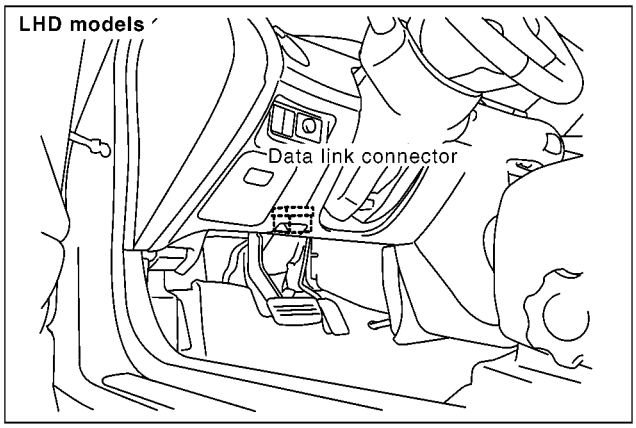

Front
Glow relay
Battery

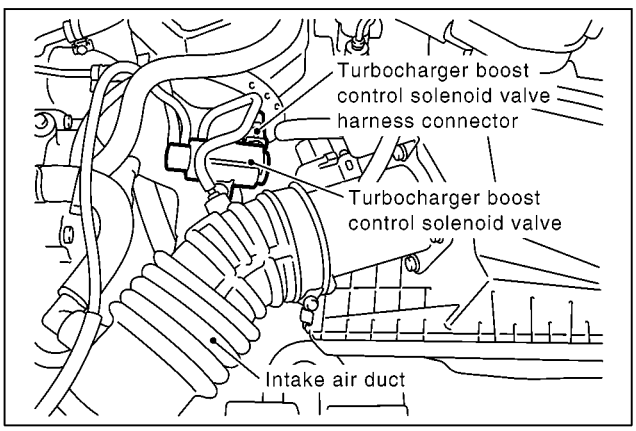

View from under the vehicle
Power steering gear housing
Power steering pressure switch harness connector
Power steering pressure switch

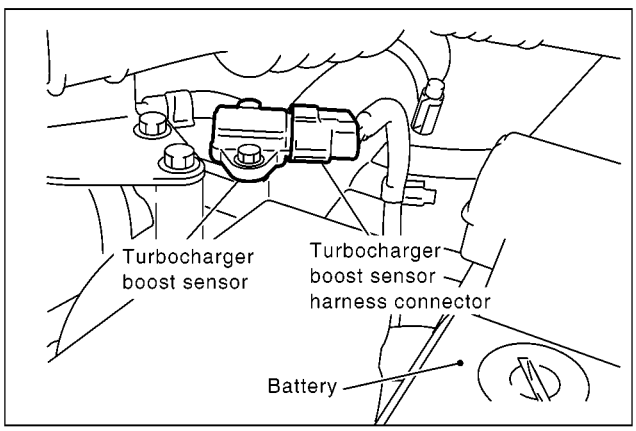

View from under the vehicle
Starter motor
Crankshaft position sensor


LHD models
View with glove box removed
ECM relay
ECM


Stop lamp switch
ASCD brake switch


LHD models
Data link connector

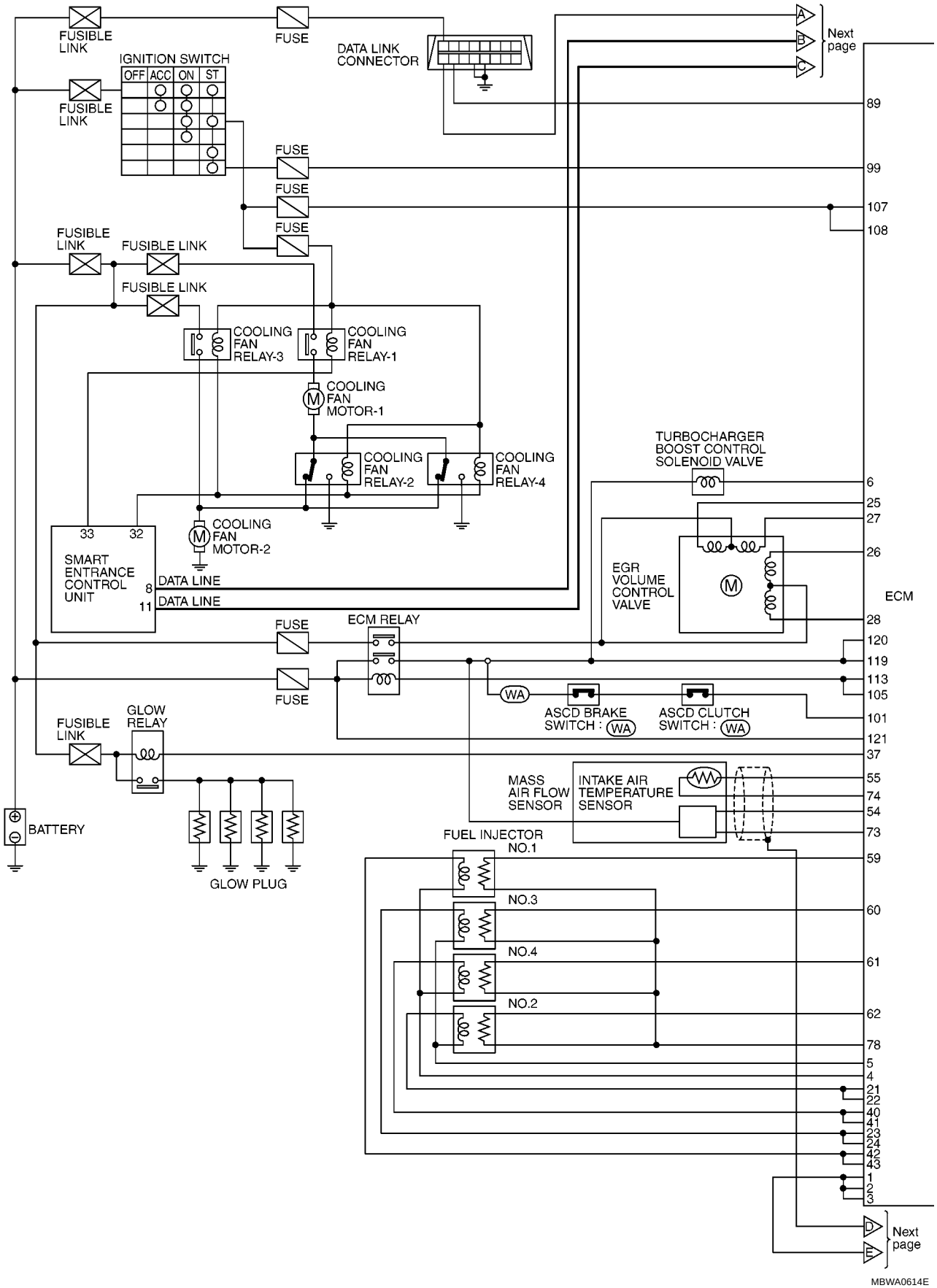

Turbocharger boost control solenoid valve harness connector
Turbocharger boost control solenoid valve
Intake air duct

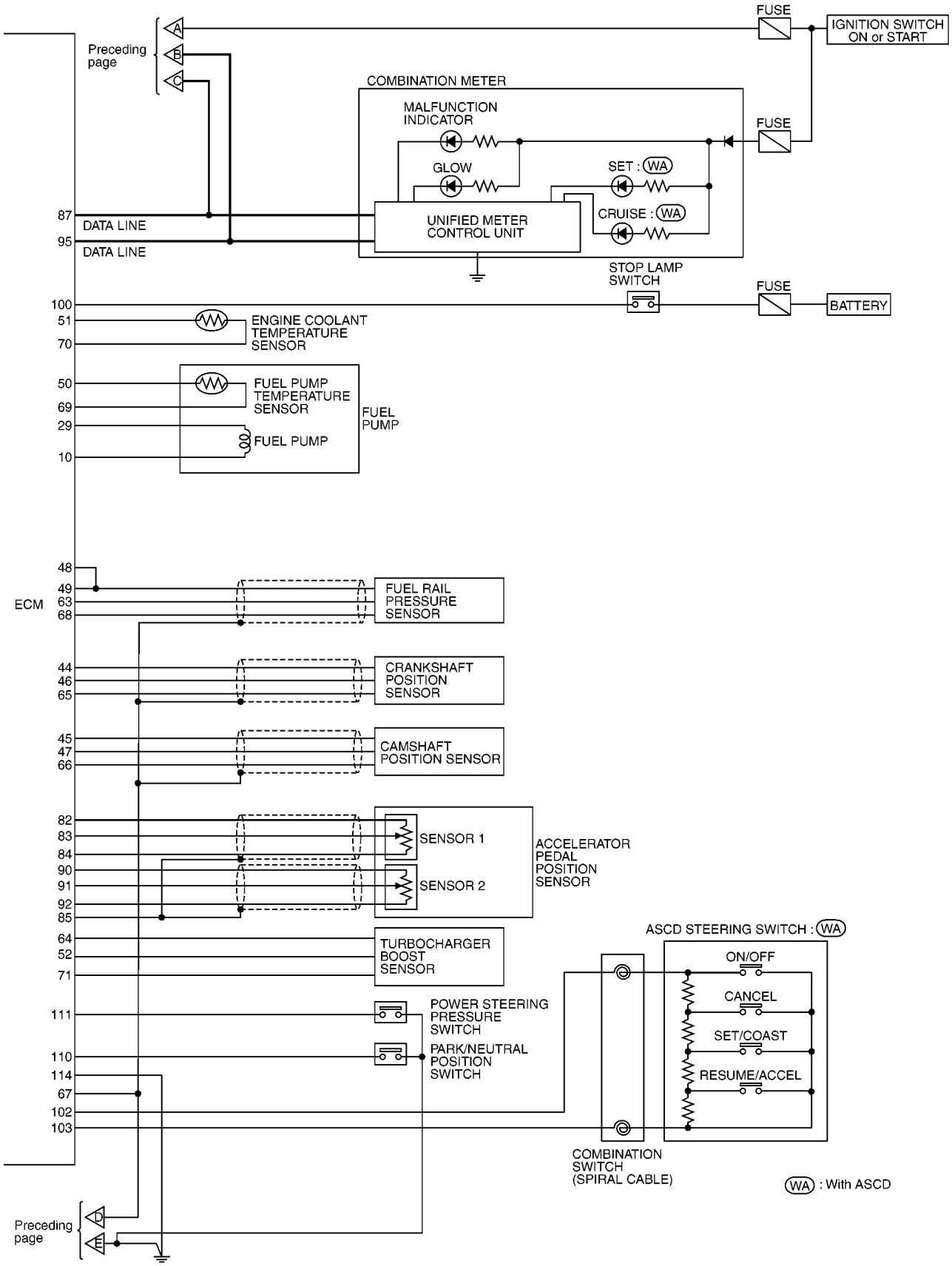

Turbocharger boost sensor
Turbocharger boost sensor harness connector
Battery

MBIB1091E

Circuit Diagram

EBS013JO

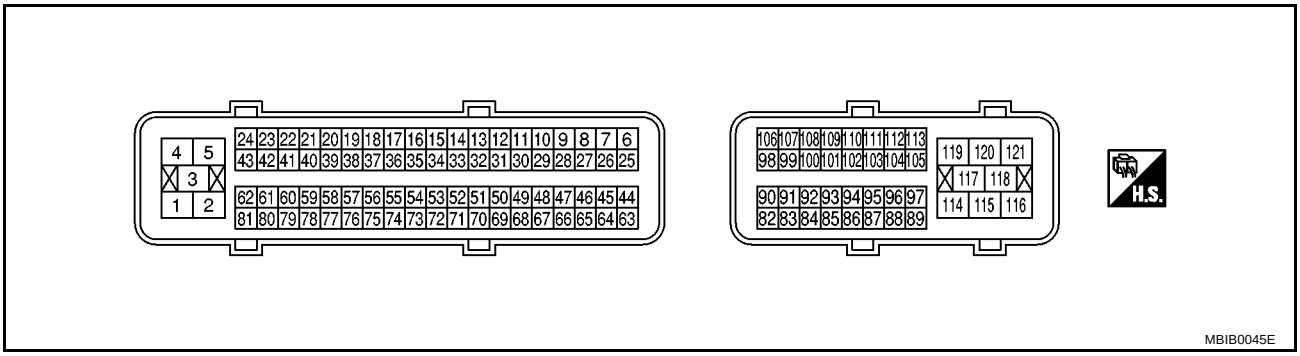



Preceding page
A
B
C
FUSE
IGNITION SWITCH ON or START
COMBINATION METER
MALFUNCTION INDICATOR
GLOW
SET : WA
CRUISE : WA
UNIFIED METER CONTROL UNIT
87
DATA LINE
95
DATA LINE
FUSE
STOP LAMP SWITCH
FUSE
BATTERY
100
51
70
ENGINE COOLANT TEMPERATURE SENSOR
50
69
29
10
FUEL PUMP TEMPERATURE SENSOR
FUEL PUMP
FUEL PUMP
48
49
63
68
ECM
FUEL RAIL PRESSURE SENSOR
44
46
65
CRANKSHAFT POSITION SENSOR
45
47
66
CAMSHAFT POSITION SENSOR
82
83
84
90
91
92
85
SENSOR 1
SENSOR 2
ACCELERATOR PEDAL POSITION SENSOR
64
52
71
TURBOCHARGER BOOST SENSOR
111
POWER STEERING PRESSURE SWITCH
110
PARK/NEUTRAL POSITION SWITCH
114
67
102
103
ASCD STEERING SWITCH : WA
ON/OFF
CANCEL
SET/COAST
RESUME/ACCEL
COMBINATION SWITCH (SPIRAL CABLE)
WA : With ASCD
Preceding page
D
E

MBWA0613E

ECM Harness Connector Terminal Layout

EBS013JP

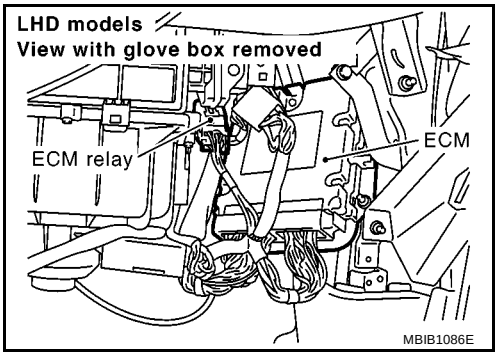


ECM Terminals And Reference Value

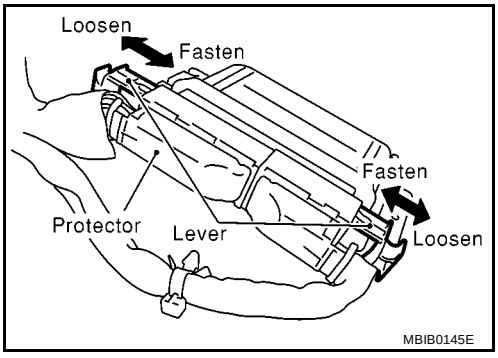
EBS013JQ

PREPARATION

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



3. When disconnecting ECM harness connector, loosen it with levers as far as they will go as shown in the figure.
4. Connect a break-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.
   - Use extreme care not to touch 2 pins at one time.
   - Data is for comparison and may not be exact.



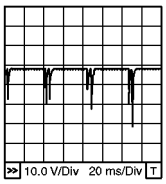
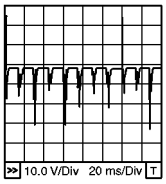
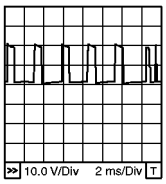
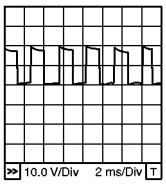
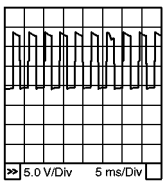
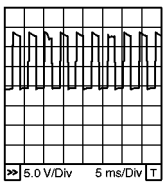
ECM INSPECTION TABLE

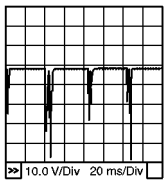
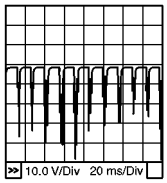
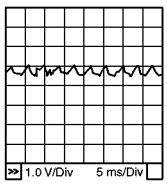
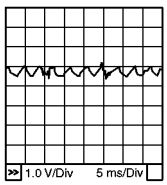
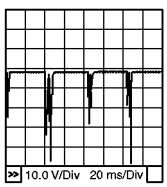
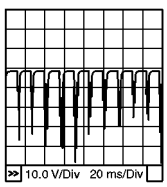
Remarks: Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

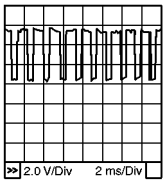
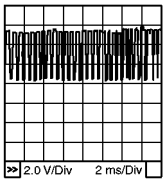
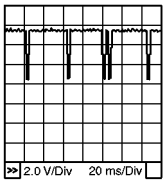
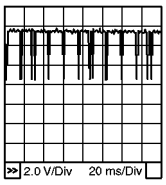
CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
1 2 3	B B B	ECM ground	**[Engine is running]** ● Idle speed	Approximately 0V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
4	O/B	Fuel injector power supply (For cylinder No. 1 and 4)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
5	B	Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E
6	L	Turbocharger boost control solenoid valve	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0889E
			[Ignition switch ON] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0890E
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
25 26 27 28	GY W/L OR/B GY/B	EGR volume control valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.1 - 14V (Voltage signals of each ECM terminals differ according to the control position of EGR volume control valve.)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E
37	R/G	Glow relay	Refer to EC-317, "GLOW CONTROL SYSTEM" .	
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
44	L	Crankshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
45	R	Camshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
46	L/W	Crankshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0879E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0880E
47	B	Camshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0877E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0878E
48 49	R R	Fuel rail pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.7 - 2.0V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.0 - 2.3V
50	PU	Fuel pump temperature sensor	**[Engine is running]** ● **Warm-up condition**	Approximately 0.3 - 5.3V Output voltage varies with fuel pump temperature
51	L/OR	Engine coolant temperature sensor	**[Engine is running]** ● **Warm-up condition**	Approximately 0.3 - 5.3V Output voltage varies with engine coolant temperature

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
52	Y	Turbocharger boost sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	2.3 - 2.6V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.5 - 2.8V
54	W	Mass air flow sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.8 - 2.3V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.5 - 3.0V
55	G	Intake air temperature sensor	**[Engine is running]** ● **Warm-up condition**	Approximately 0.3 - 5.2V Output voltage varies with intake air temperature
59	L/G	Fuel injector adjustment resistor No. 1	**[Ignition switch ON]**	0.5 - 5.1V (There are individual differences between fuel injector adjustment resistors.)
60	L/R	Fuel injector adjustment resistor No. 3		
61	R/Y	Fuel injector adjustment resistor No. 4		
62	LG/W	Fuel injector adjustment resistor No. 2		
63	W	Fuel rail pressure sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
64	W	Turbocharger boost sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
65	L/R	Crankshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
66	W	Camshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
68	B	Fuel rail pressure sensor ground	**[Ignition switch ON]**	Approximately 0.3V
69	B	Fuel pump temperature sensor ground	**[Ignition switch ON]**	Approximately 0.3V
70	B	Engine coolant temperature sensor ground	**[Ignition switch ON]**	Approximately 0.3V
71	B	Turbocharger boost sensor ground	**[Ignition switch ON]**	Approximately 0.3V
73	B	Mass air flow sensor ground	**[Ignition switch ON]**	Approximately 0.3V
74	R	Intake air temperature sensor ground	**[Ignition switch ON]**	Approximately 0.3V
78	R	Fuel injector adjustment resistor ground	**[Ignition switch ON]**	Approximately 0.3V
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
87	R	CAN communication line	**[Ignition switch ON]**	Approximately 2.0 - 2.6V Output voltage varies with the communication status.
89	LG/W	Data link connector	**[Ignition switch ON]** ● CONSULT-II or GST is disconnected.	Approximately 0V - Battery voltage (11 - 14V)
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V
95	L	CAN communication line	**[Ignition switch ON]**	Approximately 2.6 - 3.2V Output voltage varies with the communication status.
99	B/Y	Start signal	**[Ignition switch ON]**	Approximately 0.3V
			[Ignition switch START]	BATTERY VOLTAGE (11 - 14V)
100	R/G	Stop lamp switch	**[Ignition switch ON]** ● Brake pedal fully released	Approximately 0V
			[Ignition switch ON] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
101	L/Y	ASCD brake switch	**[Ignition switch ON]** ● Brake pedal and clutch pedal fully released	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON] ● Brake pedal and/or clutch pedal depressed	Approximately 0V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
102	PU	ASCD steering switch	**[Ignition switch ON]** ● ASCD steering switch is OFF	Approximately 4.3V
			[Ignition switch ON] ● ON/OFF switch is ON.	Approximately 0.3V
			[Ignition switch ON] ● CANCEL switch is ON.	Approximately 1.3V
			[Ignition switch ON] ● SET/COAST switch is ON.	Approximately 2.3V
			[Ignition switch ON] ● RESUME/ACCEL switch is ON.	Approximately 3.3V
103	B	ASCD steering switch ground	**[Ignition switch ON]**	Approximately 0.3V
105	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
107 108	W/R W/R	Ignition switch	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
110	G/OR	Park/Neutral position switch	**[Ignition switch ON]** ● Gear position is Neutral	Approximately 0V
			[Ignition switch ON] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)
111	R/B	Power steering 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)
113	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
114	B	ECM ground	**[Engine is running]** ● Idle speed	Approximately 0V
119 120	R R	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
121	W/L	Power supply for ECM (Back-up)	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)

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

CONSULT-II Function

EBS013JR

FUNCTION

Diagnostic test mode	Function
Self-diagnostic results	Self-diagnostic results such as 1st/2nd trip DTC, DTC and freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT-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.
ECM part number	ECM part number can be read.

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

- Diagnostic trouble codes
- 1st/2nd trip diagnostic trouble codes
- Freeze frame data

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

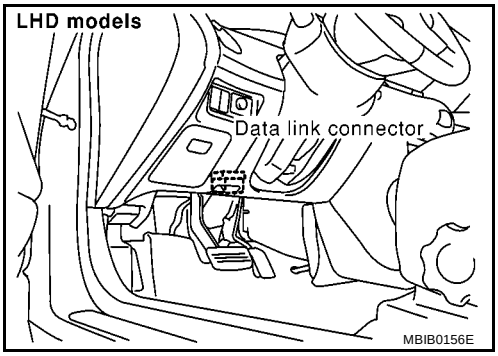
Item			DIAGNOSTIC TEST MODE			
			SELF-DIAG RESULTS		DATA MONITOR	ACTIVE TEST
			DTC*	FREEZE FRAME DATA		
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor	×	×	×	
		Camshaft position sensor	×			
		Engine coolant temperature sensor	×	×	×	×
		Vehicle speed sensor	×	×	×	
		Fuel pump temperature sensor	×		×	
		Accelerator pedal position sensor 1	×		×	
		Accelerator pedal position sensor 2	×		×	
		Fuel rail pressure sensor	×		×	
		Mass air flow sensor	×		×	
		Intake air temperature sensor	×			
		Turbocharger boost sensor	×	×	×	
		Battery voltage	×		×	
		Park/neutral position (PNP) switch			×	
		Power steering pressure switch			×	
		Stop lamp switch	×		×	
		Barometric pressure sensor (built-into ECM)	×		×	
		Fuel injector adjustment resistor	×			
		ASCD steering switch	×		×	
		ASCD brake switch	×		×	
		ASCD clutch switch	×		×	
	OUTPUT	Fuel pump	×		×	×
		Fuel injector	×		×	×
		Glow relay	×		×	×
		Cooling fan relay	×		×	×
		Turbocharger boost control solenoid valve	×			
		EGR volume control valve	×		×	×

X: Applicable

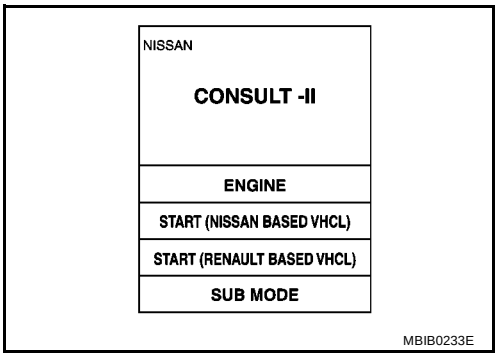
*: This item includes 1st/2nd trip DTCs.

INSPECTION PROCEDURE

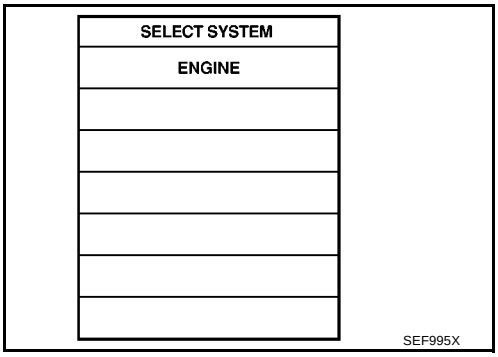
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located under the driver side dash panel.
3. Turn ignition switch ON.



4. Touch “START (NISSAN BASED VHCL)”.

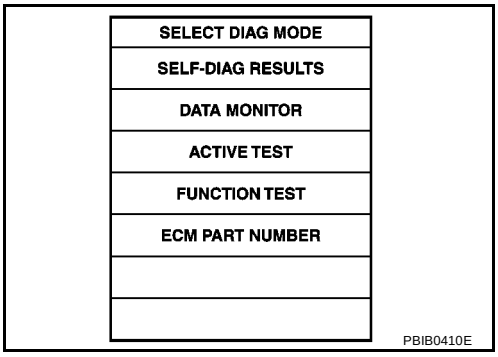


5. Touch “ENGINE”.
   If “ENGINE” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit/For YD Engine Models" .



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

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



SELF-DIAGNOSTIC MODE

Self Diagnostic Item

Regarding items of DTC and 1st/2nd trip DTC, refer to — EC-11, "INDEX FOR DTC" .

Freeze Frame Data

Freeze frame data item	Description
DIAG TROUBLE CODE [PXXXX]	● The engine control component part/control system has a trouble code, it is displayed as “PXXXX”. (Refer to EC-11, "INDEX FOR DTC" .)
CAL/LD VALUE [%]	● The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	● The engine coolant temperature at the moment a malfunction is detected is displayed.
ENGINE SPEED [rpm]	● The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	● The vehicle speed at the moment a malfunction is detected is displayed.
INT MANI PRES [kPa]	● The intake manifold pressure at the moment a malfunction is detected is displayed.

DATA MONITOR MODE

MONITOR ITEM	ECM INPUT SIG-NAL	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	CONDITION	SPECIFICATION
CKPS·RPM (TDC) [rpm]	×	×		● The engine speed computed from the crankshaft position sensor signal is displayed.	
COOLAN TEMP/S [°C] or [°F]	×	×		● The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	When the engine coolant temperature circuit is open or short, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
VHCL SPEED SE [km/h] or [mph]	×	×		● The vehicle speed computed form the vehicle speed sensor signal is displayed.	
FUEL TEMP SEN [°C] or [°F]	×	×		● The fuel temperature (determined by the signal voltage of the fuel pump temperature sensor) is displayed.	
ACCEL POS SEN [V]	×	×		● The accelerator pedal position sensor 1 signal voltage is displayed.	
ACCEL SEN 2 [V]	×	×		● The accelerator pedal position sensor 2 signal voltage is displayed.	
ACT CR PRESS [MPa]	×	×		● The Fuel rail pressure (determined by the signal voltage of the fuel rail pressure sensor) is displayed.	
BATTERY VOLT [V]	×	×		● The power supply voltage of ECM is displayed.	
P/N POSI SW [ON/OFF]	×	×		● Indicates [ON/OFF] condition from the park/neutral position switch signal.	
START SIGNAL [ON/OFF]	×	×		● indicates [ON/OFF] condition from the starter signal.	
PW/ST SIGNAL [ON/OFF]	×			● indicates [ON/OFF] condition from the power steering pressure switch signal.	[OFF] is always displayed for models without power steering pressure switch.
BRAKE SW [ON/OFF]	×	×		● indicates [ON/OFF] condition from the stop lamp switch signal.	

MONITOR ITEM	ECM INPUT SIG-NAL	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	CONDITION	SPECIFICATION
BRAKE SW2 [ON/OFF]	×	×		● indicates [ON/OFF] condition from the ASCD brake switch and ASCD clutch switch signal.	
IGN SW [ON/OFF]	×	×		● Indicates [ON/OFF] condition from ignition switch signal.	
MAS AIR/FL SE [V]	×	×		● The signal voltage of the mass air flow sensor is displayed.	
MAIN INJ WID [msec]		×		● Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	
PUMP CURRENT [mA]		×		● Indicates the fuel pump power supply current from the ECM.	
GLOW RLY [ON/OFF]		×		● The glow relay control condition (determined by ECM according to the input signal) is displayed.	
COOLING FAN [LOW/HI/OFF]		×		● Indicates the control condition of the cooling fans (determined by ECM according to the input signal). LOW ... Operates at low speed. HI ... Operates at high speed. OFF ... Stopped	
EGR VOL CON/V [step]		×		● Indicates the EGR volume control value computed by the ECM according to the input signals. ● The opening becomes larger as the value increases.	
INT/A VOLUME [mg/]				● The intake air volume computed from the mass air flow sensor signal is displayed.	
BARO SEN [kPa]	×	×		● The barometric pressure (determined by the signal voltage from the absolute pressure sensor built into the ECM) is displayed.	
INT/M PRES SE [kPa]				● Turbocharger boost (determined by the signal voltage from the turbocharger boost sensor) is displayed.	
CYL COUNT [1/2/3/4]				● The cylinder being injected is displayed. 1 ... Cylinder No.1 is injected. 2 ... Cylinder No.2 is injected. 3 ... Cylinder No.3 is injected. 4 ... Cylinder No.4 is injected.	
SET SW [ON/OFF]	×			● Indicates [ON/OFF] condition from SET/COAST switch signal.	
RESUME/ACC SW [ON/OFF]	×			● Indicates [ON/OFF] condition from RESUME/ACCEL switch signal.	
CANCEL SW [ON/OFF]	×			● Indicates [ON/OFF] condition from CANCEL switch signal.	

MONITOR ITEM	ECM INPUT SIG-NAL	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	CONDITION	SPECIFICATION
MAIN SW [ON/OFF]	×			● Indicates [ON/OFF] condition from ON/OFF switch signal.	
Voltage [V]				Voltage, frequency, duty cycle or pulse width measured by the probe.	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. [Hz] or [%]
Frequency [msec], [Hz] or [%]					
DUTY-HI					
DUTY-LOW					
PLS WIDTH-HI					
PLS WIDTH-LOW					
CAN COMM [OK/NG]			×	● Indicates the communication condition of CAN communication line.	● 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.

ACTIVE TEST MODE

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
POWER BAL-ANCE	● 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.	● Harness and connectors ● Compression ● Fuel injector
COOLING FAN *	● Ignition switch: ON ● Operate the cooling fan at LOW, HI speed and turn OFF using CONSULT-II.	Cooling fan moves at LOW, HI speed and stops.	● Harness and connector ● Cooling fan motor ● Cooling fan relay
ENG COOLANT TEMP	● Engine: Return to the original trouble condition ● Change the engine coolant temperature using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Engine coolant temperature sensor ● Fuel injector
GLOW RLY	● Ignition switch: ON (Engine stopped) ● Turn the glow relay ON and OFF using CONSULT-II and listen to operating sound.	Glow relay makes the operating sound.	● Harness and connector ● Glow relay

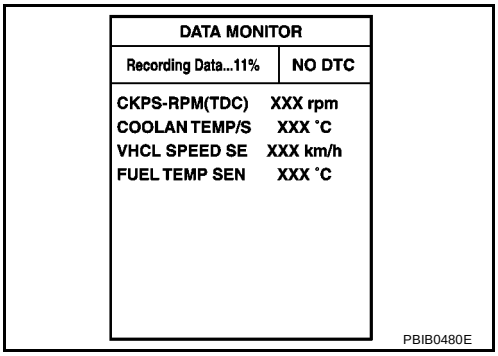
TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
EGR VOL CONT/V	● Ignition switch: ON ● Change EGR volume control valve opening step using CONSULT-II.	EGR volume control valve makes an operating sound.	● Harness and connector ● EGR volume control valve
PRES REGULATOR	● Ignition switch: ON ● Change fuel rail pressure using CONSULT-II	Fuel leaks.	● Fuel line ● Fuel pressure relief valve
PUMP LEANT CLEAR	● This mode is used for performing Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .		

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

REAL TIME DIAGNOSIS IN DATA MONITOR MODE

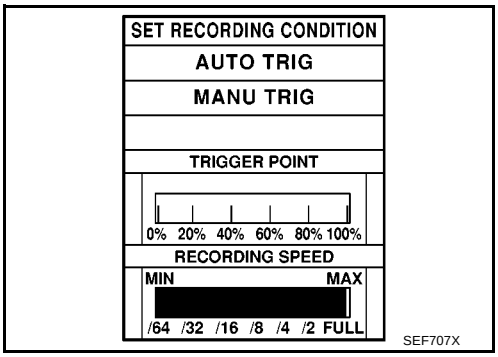
CONSULT-II has two kinds of triggers and they can be selected by touching “SETTING” in “DATA MONITOR” mode.

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/2nd trip DTC 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 in the figure, 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/2nd trip DTC 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.

Use these triggers as follows:

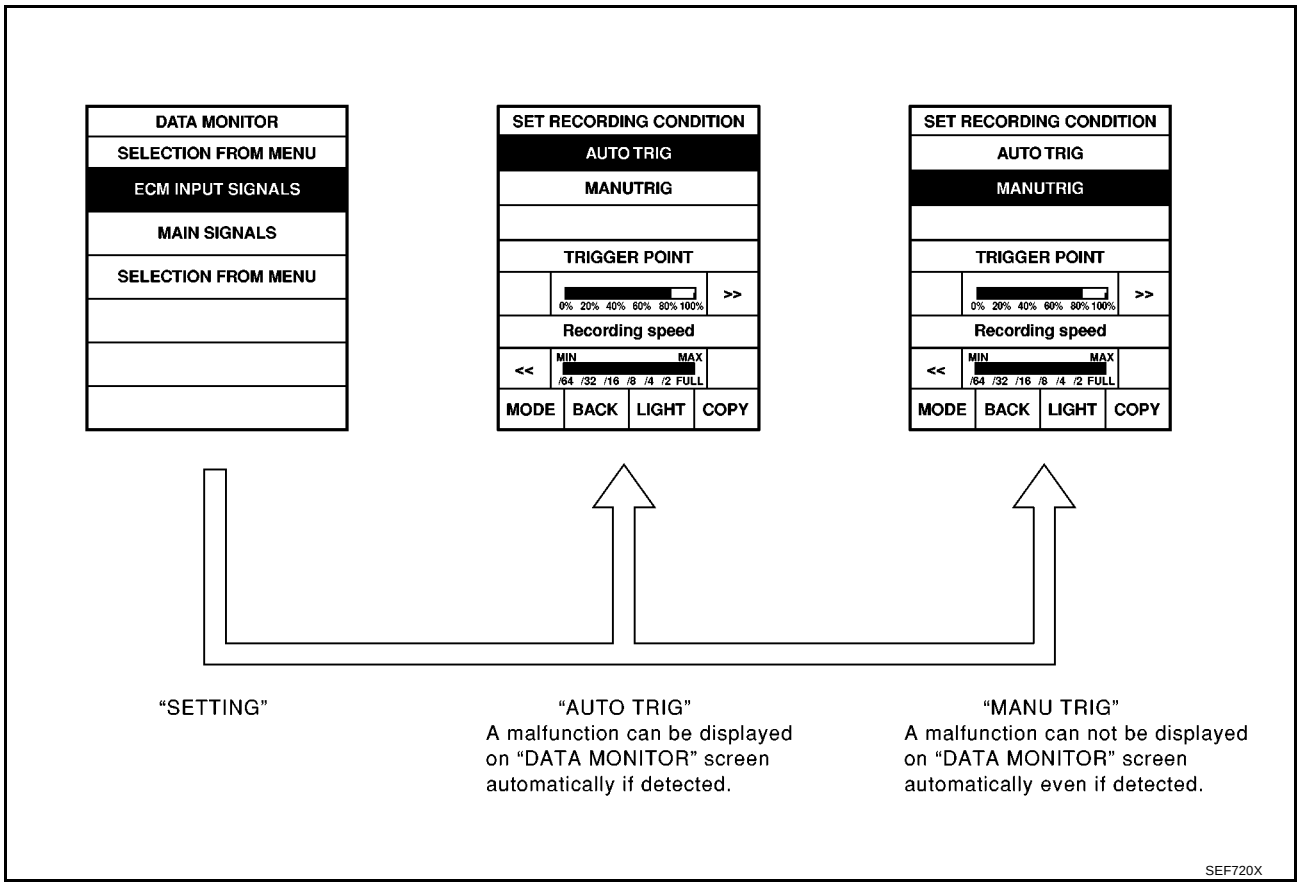
1. “AUTO TRIG”

– While trying to detect the DTC/1st trip DTC/2nd 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/2nd trip DTC will be displayed. Refer to GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" , “INCIDENT SIMULATION TESTS”.

2. “MANU TRIG”

– If the malfunction is displayed as soon as “DATA MONITOR” is selected, reset CONSULT-II to “MANU TRIG”. By selecting “MANU TRIG” you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



FUNCTION TEST

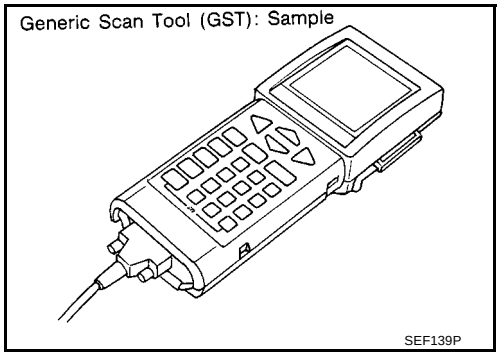
This mode is used to inform customers of their vehicle condition of periodic maintenance.

Generic Scan Tool (GST) Function

EBS013JS

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with ISO 15031-4 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.



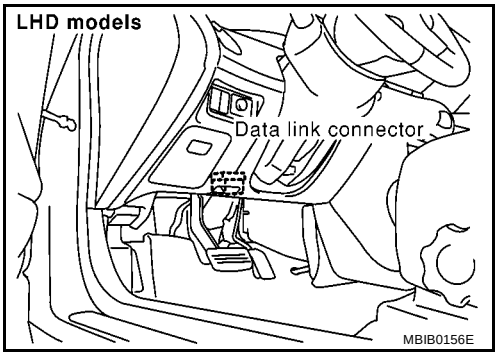
FUNCTION

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-34, "FREEZE FRAME DATA" .
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.

Diagnostic test mode		Function
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: ● 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 7)
MODE 6	(ON BOARD TESTS)	This mode is not applicable on this vehicle.
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 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.

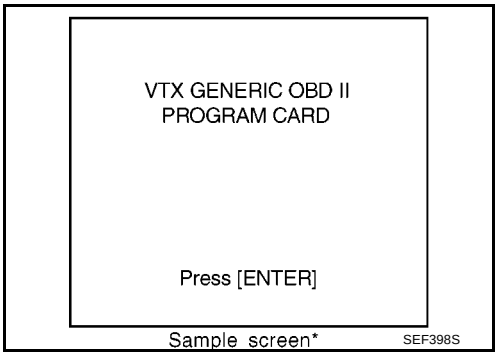
INSPECTION PROCEDURE

1. Turn ignition switch OFF.
2. Connect “GST” to data link connector, which is located under drivers side dash panel near the fuse box cover.
3. Turn ignition switch ON.



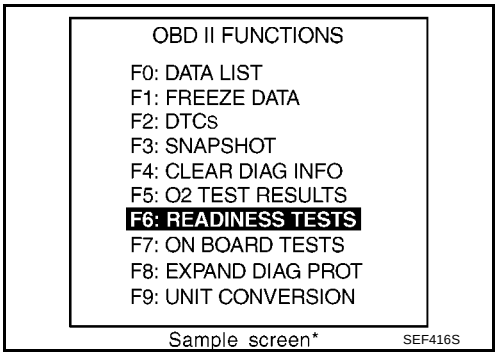
4. Enter the program according to instruction on the screen or in the operation manual.

(*: 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 Mode

EBS013JT

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.

MONITOR ITEM	CONDITION		SPECIFICATION
CKPS-RPM (TDC)	● Run engine and compare CONSULT-II value with the tachometer indication.		Almost the same speed as the tachometer indication
COOLAN TEMP/S	● Engine: After warming up		More than 70°C (158°F)
VHCL SPEED SE	● Turn drive wheels and compare CONSULT-II value with the speedometer indication		Almost the same speed as the speedometer indication
FUEL TEMP SEN	● Engine: After warming up		More than 40°C (104°F)
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V
MAS AIR/FL SE*	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1.5 - 2.0V
		2,000 rpm	2.2 - 2.7V
BATTERY VOLT	● Ignition switch: ON (Engine stopped)		11 - 14V
P/N POSI SW	● Ignition switch: ON	Shift lever: Neutral position	ON
		Except above	OFF
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → 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
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
BRAKE SW2	● Ignition switch: ON	Brake pedal and clutch pedal: Fully released	OFF
		Brake pedal and/or clutch pedal: Slightly depressed	ON
IGN SW	● Ignition switch: ON → OFF		ON → OFF
ACT CR PRESS	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	20 - 30 MPa
		2,000 rpm	45 - 55 MPa
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec
GLOW RLY	Refer to EC-317, "GLOW CONTROL SYSTEM" .		
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA
COOLING FAN	● When cooling fan is stopped.		OFF
	● When cooling fans operate at low speed.		LOW
	● When cooling fans operate at high speed.		HI

MONITOR ITEM	CONDITION		SPECIFICATION
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	After 1 minute at idle	More than 10 steps
		Revving engine from idle to 3,600 rpm	0 step
INT/A VOLUME	● Engine: After warming up, idle the engine		150 - 450 mg/st
INT/M PRES SE [kPa]	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	Approx. 100 kPa
		2,800 rpm	Approx. 126 kPa
		4,000 rpm	Approx. 106 kPa
BARO SEN	● Ignition switch: ON		Altitude Approx. 0m: Approx. 100.62 kPa (1.0062 bar, 1.026 kg/cm^2 , 14.59 psi) Approx. 1,000 m: Approx. 88.95 kPa (0.8895 bar, 0.907 kg/cm^2 , 12.90 psi) Approx. 1,500 m: Approx. 83.16 kPa (0.8316 bar, 0.848 kg/cm^2 , 12.06 psi) Approx. 2,000 m: Approx. 78.36 kPa (0.7836 bar, 0.799 kg/cm^2 , 11.36 psi)
CYL COUNT	● Engine is running		1 → 3 → 4 → 2
SET SW	● Ignition switch: ON	SET/COAST switch: Released	OFF
		SET/COAST switch: Pressed	ON
RESUME/ACC SW	● Ignition switch: ON	RESUME/ACCEL switch: Released	OFF
		RESUME/ACCEL switch: Pressed	ON
CANCEL SW	● Ignition switch: ON	CANCEL switch: Released	OFF
		CANCEL switch: Pressed	ON
MAIN SW	● Ignition switch: ON	ON/OFF switch: Released	OFF
		ON/OFF switch: Pressed	ON

NOTE:
Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.
*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

Major Sensor Reference Graph in Data Monitor Mode

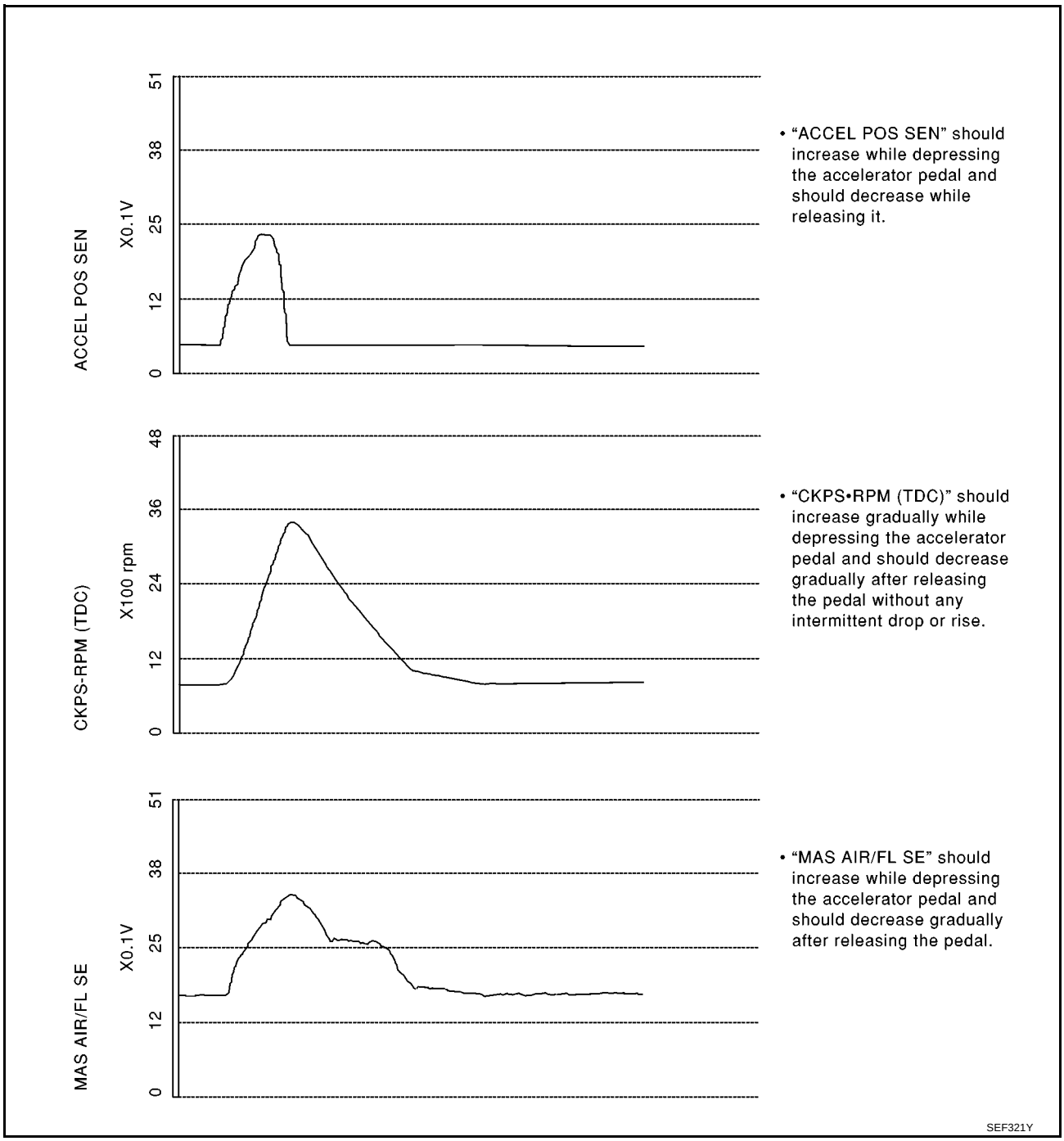
EBS013JU

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

ACCEL POS SEN, “CKPS·RPM (TDC)”, “MAS AIR/FL SE”

Below is the data for “ACCEL POS SEN”, “CKPS·RPM (TDC)” and “MAS AIR/FL SE” when revving engine quickly up to 3,000 rpm under no load after warming up engine to the normal operating temperature.

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



TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

Description

EBS013JV

Intermittent incidents (I/I) may occur. In many cases, the incident 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/2nd 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 malfunctioning 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”.
III	The symptom described by the customer does not recur.
IV	(1st/2nd trip) DTC does not appear during the DTC Confirmation Procedure.
VI	The Diagnostic Procedure for XXXX does not indicate the malfunctioning area.

Diagnostic Procedure

EBS013JW

1. INSPECTION START

Erase (1st/2nd trip) DTCs. Refer to EC-34, "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-24, "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-24, "How to Perform Efficient Diagnosis for an Electrical Incident" , “INCIDENT SIMULATION TESTS”.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace.

MAIN POWER SUPPLY AND GROUND CIRCUIT

PFP:24110

ECM Terminals and Reference Value

EBS013JX

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

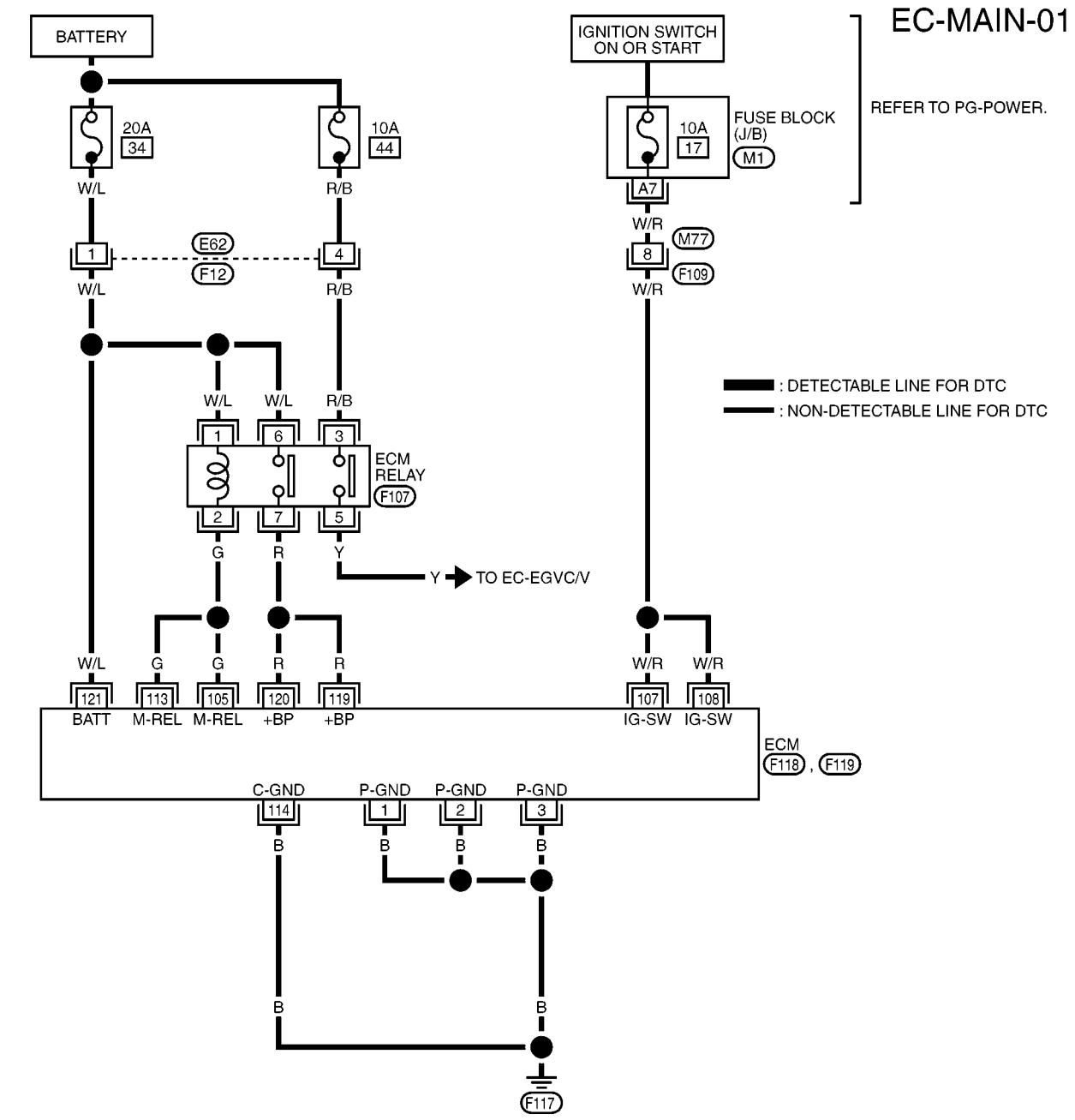
CAUTION:

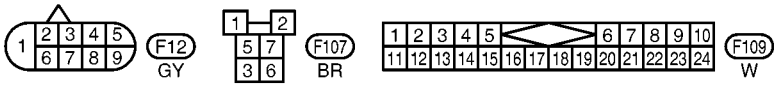
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
1 2 3	B B B	ECM ground	**[Engine is running]** ● Idle speed	Approximately 0V
105	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
107 108	W/R W/R	Ignition switch	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
113	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
114	B	ECM ground	**[Engine is running]** ● Idle speed	Approximately 0V
119 120	R R	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
121	W/L	Power supply for ECM (Back-up)	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)

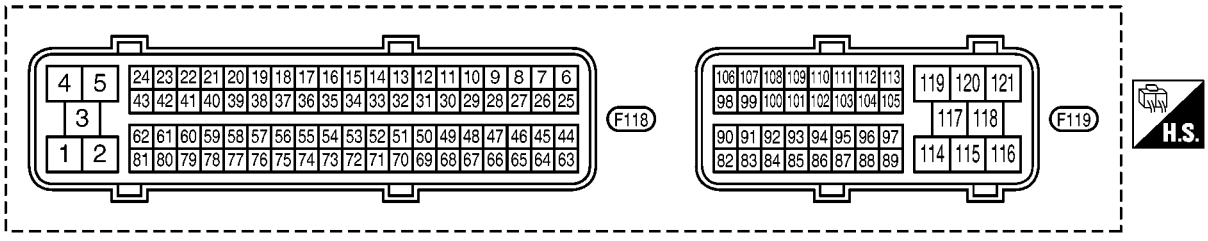
Wiring Diagram

EBS013JY





REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-JUNCTION BOX (J/B)



MBWA0642E

Diagnostic Procedure

EBS013JZ

1. INSPECTION START

Start engine.
Is engine running?

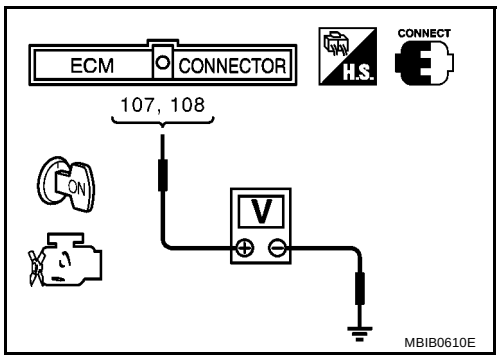
Yes or No

Yes >> GO TO 6.
No >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between ECM terminals 107, 108 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.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness connectors M77, F109
- Harness for open or short between ECM and fuse

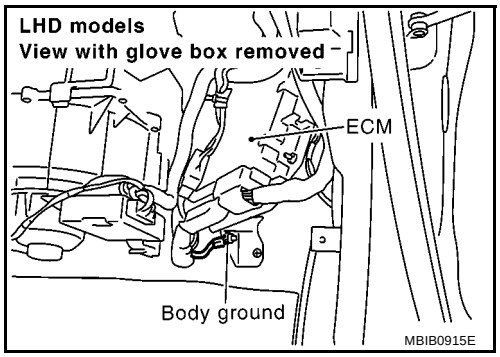
>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body. Refer to EC-82, "Ground Inspection" .

OK or NG

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



5. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 2, 3, 114 and body ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

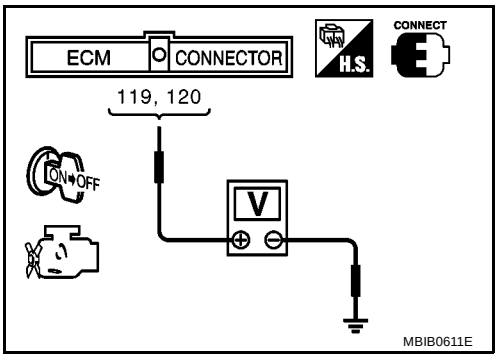
OK or NG

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

6. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connector.
2. Turn ignition switch ON and then OFF.
3. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

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

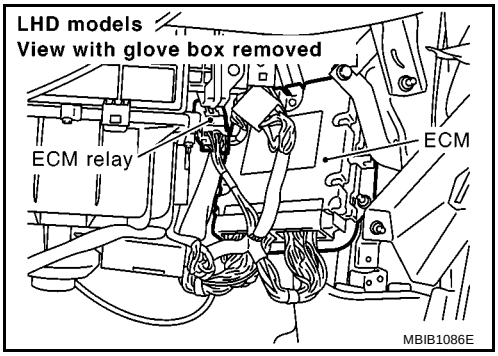


OK or NG

OK >> GO TO 12.
NG (Battery voltage does not exist)>>GO TO 7.
NG (Battery voltage exists for more then a few seconds)>>GO TO 9.

7. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Disconnect ECM relay.

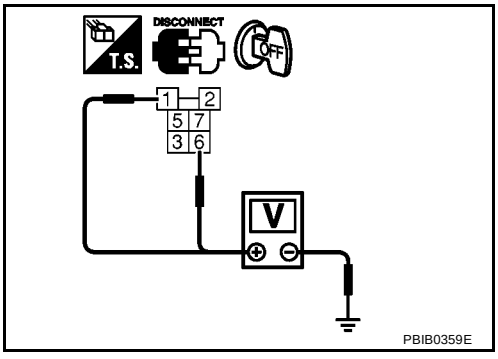


2. Check voltage between relay terminals 1, 6 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 9.
NG >> GO TO 8.



8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E62, F12
- 20A fuse
- Harness for open or short between ECM relay and battery

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

9. CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 105, 113 and ECM relay terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Check harness continuity between ECM terminals 119, 120 and ECM relay terminal 7. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 11.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK ECM RELAY

Refer to EC-81, "Component Inspection" .

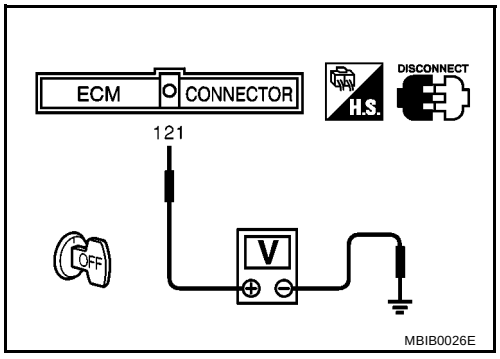
OK or NG

OK >> GO TO 12.
NG >> Replace ECM relay.

12. CHECK ECM POWER SUPPLY CIRCUIT-V

Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 14.
NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.

- 20A fuse
- Harness connectors E62, F12
- Harness for open or short between ECM and fuse

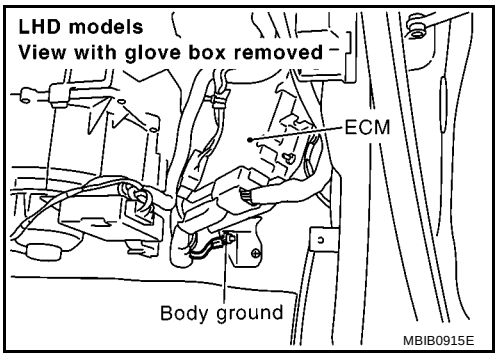
>> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body. Refer to EC-82, "Ground Inspection" .

OK or NG

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



15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminals 1, 2, 3, 114 and body ground. Refer to Wiring Diagram.

Continuity should exist.

2. 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-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

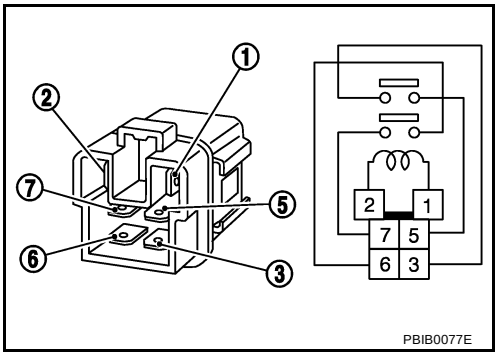
EBS013K0

ECM RELAY

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

3. If NG, replace ECM relay.



Ground Inspection

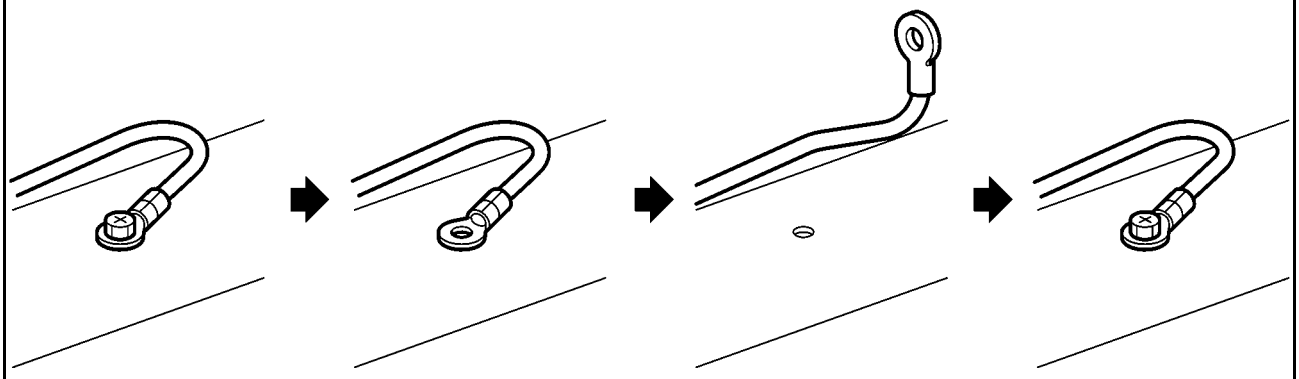
EBS013K1

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.
Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.
When inspecting a ground connection follow these rules:

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

For detailed ground distribution information, refer to “Ground Distribution” in PG section.

Ground Inspection



DTC U1000 CAN COMMUNICATION LINE

PFP:23710

Description

EBS013K2

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

EBS013K3

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

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

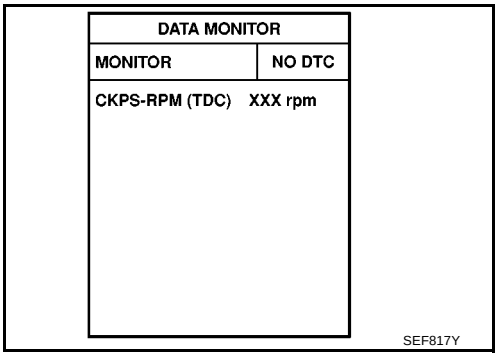
DTC Confirmation Procedure

EBS013K4

NOTE:
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 3 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If DTC is detected, go to EC-85, "Diagnostic Procedure" .

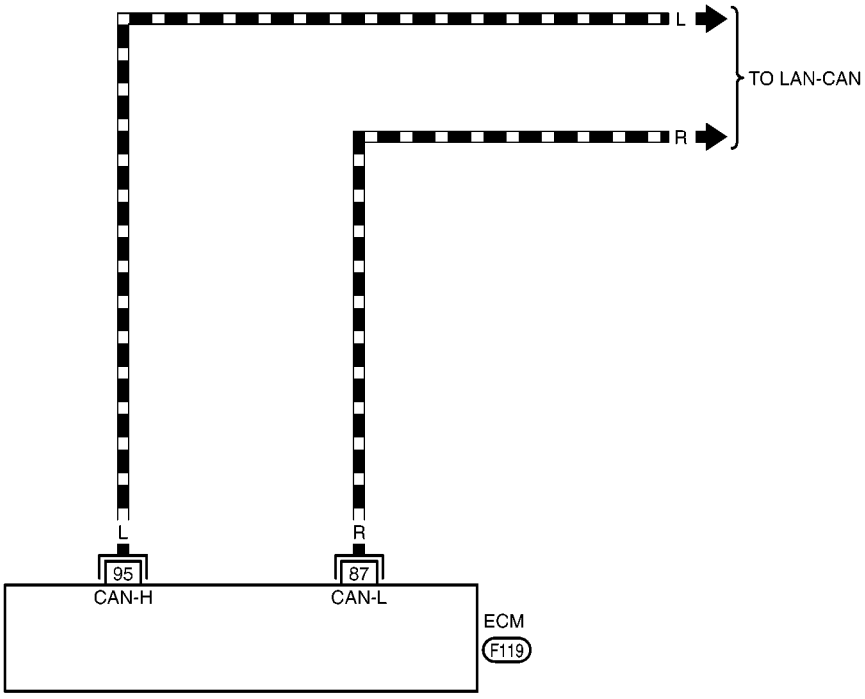


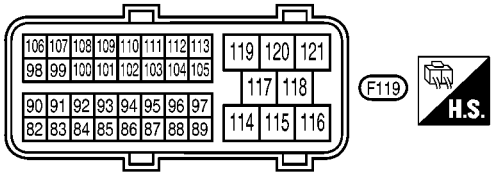
Wiring Diagram

EBS013K5

EC-CAN-01

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





MBWA0370E

Diagnostic Procedure

EBS013K6

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 ESP

OK data

DATA MONITOR	
MONITOR	
CAN COMM	OK
CAN CIRC 1	OK
CAN CIRC 2	UNKWN
CAN CIRC 3	OK
CAN CIRC 4	OK
CAN CIRC 5	UNKWN
CAN CIRC 6	UNKWN
CAN CIRC 7	UNKWN

NG data

DATA MONITOR	
MONITOR	
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

MBIB0868E

Models without ESP

OK data

DATA MONITOR	
MONITOR	
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	UNKWN
CAN CIRC 7	UNKWN

NG data

DATA MONITOR	
MONITOR	
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

MBIB0009E

>> Go to LAN-5, "CAN COMMUNICATION" .

DTC P0016 CKP - CMP CORRELATION

PFP:10328

On Board Diagnosis Logic

EBS013K7

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0016	Crankshaft position - camshaft position correlation	The correlation between crankshaft position sensor signal and camshaft position sensor signal is out of the normal range.	● Camshaft position sensor ● Crankshaft position sensor ● Timing chain ● Signal plate

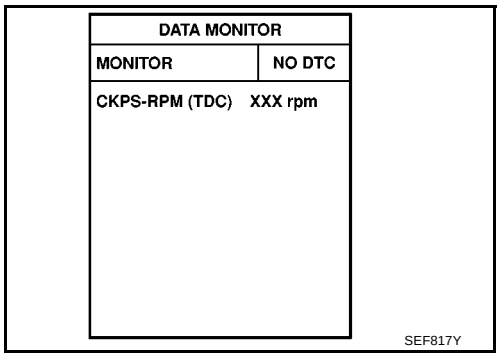
DTC Confirmation Procedure

EBS013K8

NOTE:
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-86, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013K9

1. CHECK CAMSHAFT POSITION SENSOR

Refer to EC-197, "Component Inspection" .

OK or NG

OK >> GO TO 2.
NG >> Replace camshaft position sensor.

2. CHECK SPROCKET

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 3.
NG >> Remove debris and clean the signal plate or replace sprocket.

3. CHECK CRANKSHAFT POSITION SENSOR

Refer to EC-186, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace crankshaft position sensor.

4. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 5.
NG >> Replace the signal plate.

5. CHECK TIMING CHAIN

Refer to EM-63, "SECONDARY TIMING CHAIN" , EM-68, "PRIMARY TIMING CHAIN" and EM-35, "VACUUM PUMP" .

OK or NG

OK >> GO TO 6.
NG >> Replace timing chain.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

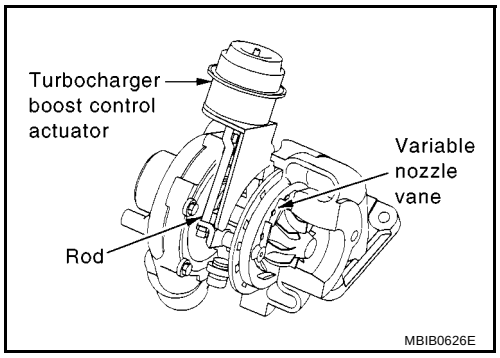
DTC P0045 TC BOOST CONTROL SOLENOID VALVE

PFP:14956

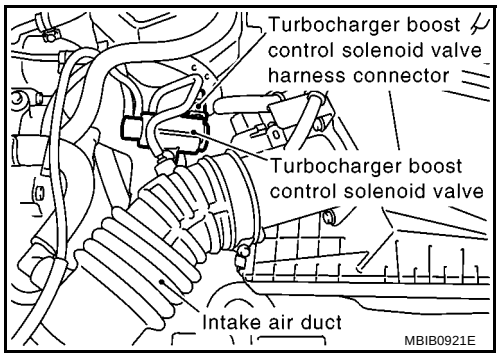
Description

EBS013KA

The turbocharger boost control solenoid valve controls vacuum signal to the turbocharger boost control actuator. By changing the variable nozzle vane opening through the rods, the intake air volume is adjusted.



The turbocharger boost control solenoid valve is moved by ON/OFF pulse from the ECM. The longer the ON pulse, the charge air pressure rises.



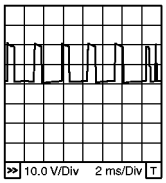
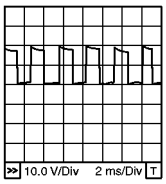
ECM Terminals and Reference Value

EBS013KB

Specification data are reference valves, and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
6	L	Turbocharger boost control solenoid valve	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0889E
			[Ignition switch ON] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0890E

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

On Board Diagnosis Logic

EBS013KC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0045	Turbocharger boost control solenoid valve circuit / open	An improper voltage is sent to ECM through turbocharger boost control solenoid valve.	● Harness or connectors (The solenoid valve circuit is open or shorted.) ● Turbocharger boost control solenoid valve

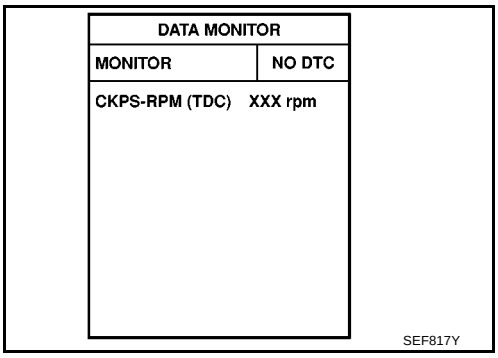
DTC Confirmation Procedure

EBS013KD

NOTE:
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-91, "Diagnostic Procedure" .

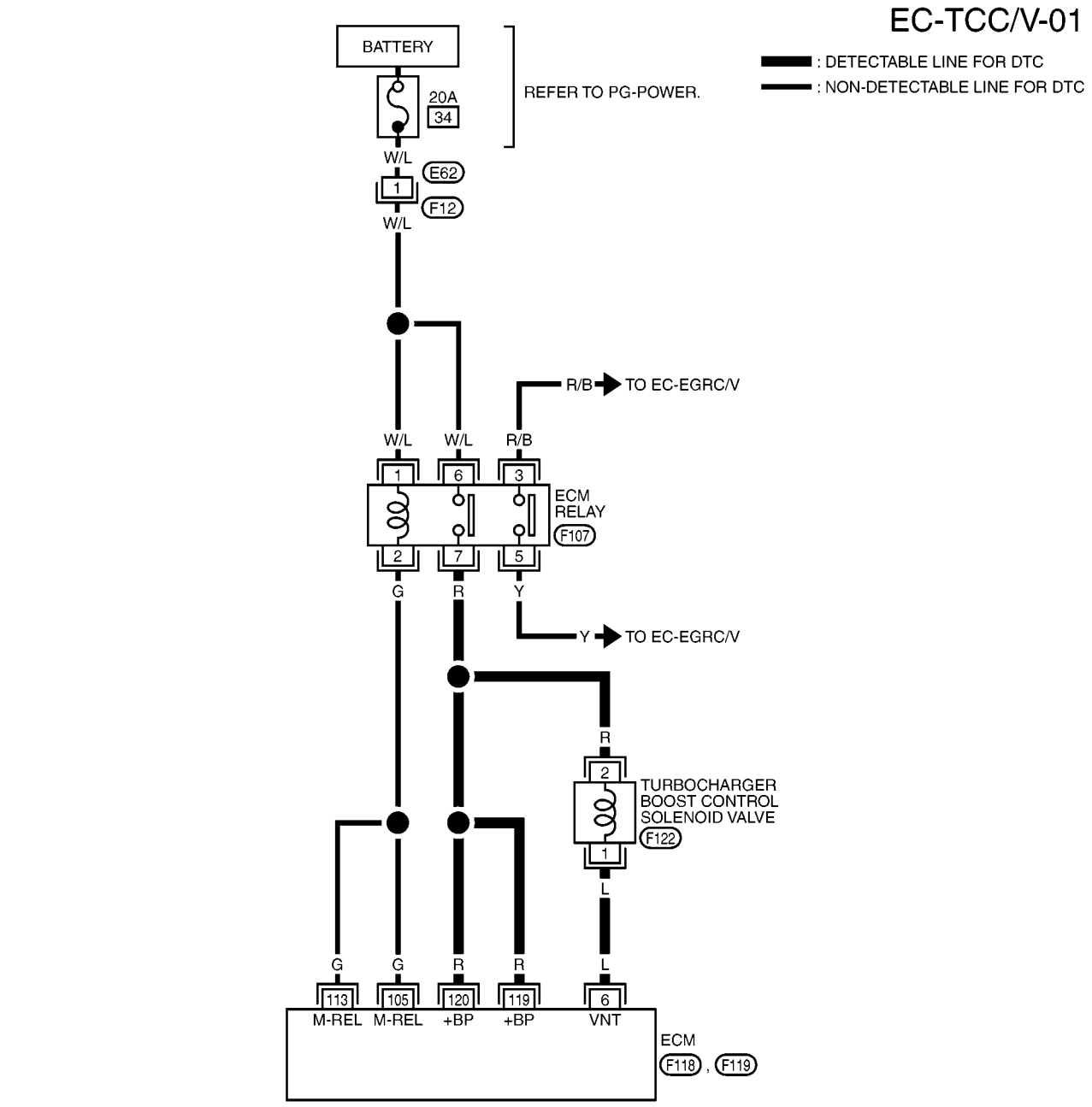


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013KE



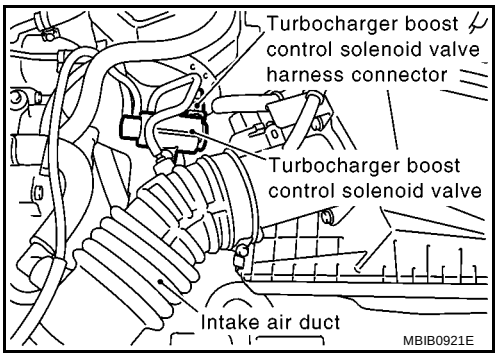
MBWA0617E

Diagnostic Procedure

EBS013KF

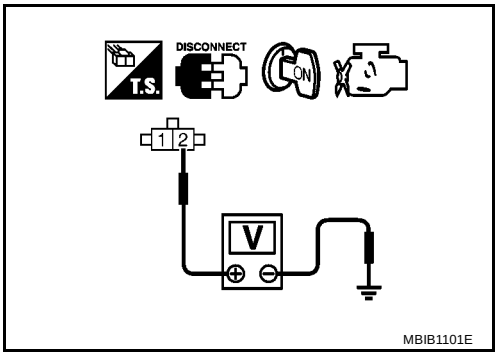
1. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect turbocharger boost control solenoid valve harness connector.
2. Turn ignition switch ON.



3. Check voltage between turbocharger boost control solenoid valve terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage



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 TURBOCHARGER BOOST 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 6 and turbocharger boost 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 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE

Refer to EC-92, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace turbocharger boost control solenoid valve.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

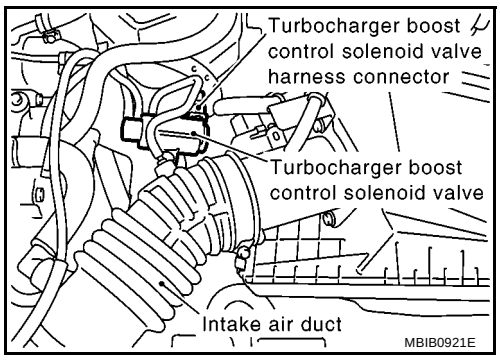
>> **INSPECTION END**

Component Inspection

EBS013KG

TURBOCHARGER BOOST CONTROL SOLENOID VALVE

1. Disconnect turbocharger boost control solenoid valve harness connector.
2. Apply 12V direct current between turbocharger boost control solenoid valve terminals.

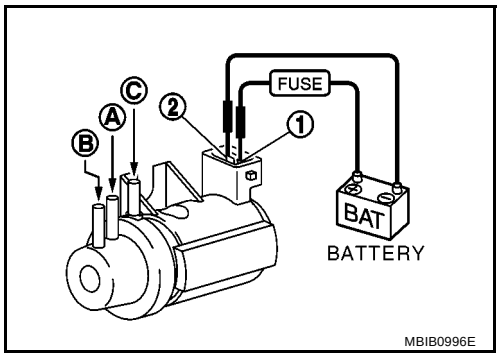


3. Check air passage continuity of turbocharger boost control solenoid valve under the following conditions.

CONDITIONS	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.

If NG, replace turbocharger boost control solenoid valve.



DTC P0088 FUEL SYSTEM

PFP:17520

On Board Diagnosis Logic

EBS013KH

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0088	Fuel rail pressure too high	Fuel pressure is too much higher than the specified value.	● Fuel pump ● Fuel injector ● Fuel rail pressure sensor

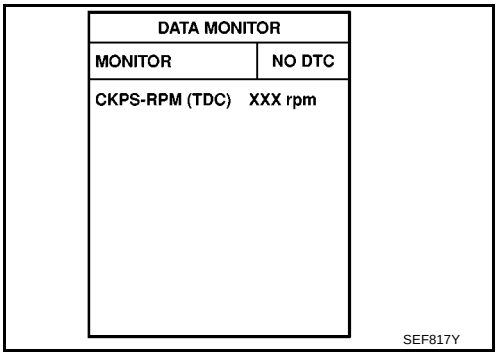
DTC Confirmation Procedure

EBS013KI

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Keep engine speed more than 2,000 rpm for at least 20 seconds.
4. If 1st trip DTC is detected, go to EC-93, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013KJ

1. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-138, "Component Inspection" .

OK or NG

OK >> GO TO 2.
NG >> Replace fuel rail.

2. CHECK FUEL INJECTOR

Refer to EC-146, "Component Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Replace fuel injector.

3. CHECK FUEL PUMP

Refer to EC-249, "Component Inspection" .

OK or NG

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

4. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Removal and Installation

EBS013KK

FUEL INJECTOR

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P0089 FUEL PUMP

PFP:16700

On Board Diagnosis Logic

EBS013KL

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0089	Fuel pump performance	Fuel pressure is too much higher than the target value.	● Fuel pump ● Air mixed with fuel ● Lack of fuel ● Fuel rail pressure sensor

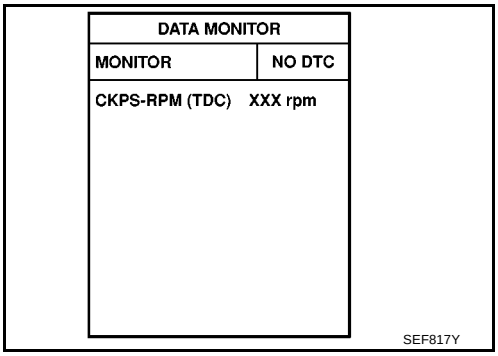
DTC Confirmation Procedure

EBS013KM

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Let engine idle for at least 30 seconds.
4. If 1st trip DTC is detected, go to EC-96, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013KN

1. PERFORM FUEL PUMP LEARNING VALUE CLEARING

NOTE:
If the DTC is detected because of air mixed with fuel (i.e.: caused by lack of fuel), it may become normal by performing following procedure.

With CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select “SELF-DIAG RESULT” mode with CONSULT-II.
5. Touch “ERASE”.
6. Perform EC-95, "DTC Confirmation Procedure" , again.
7. Is 1st trip DTC detected again?

With GST

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select MODE 4 with GST.
5. Touch “ERASE”.
6. Perform EC-95, "DTC Confirmation Procedure" , again.
7. Is 1st trip DTC detected again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-138, "Component Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Replace fuel rail.

3. CHECK FUEL PUMP

Perform EC-246, "DTC Confirmation Procedure" .

OK or NG

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

4. REPLACE FUEL PUMP

1. Replace Fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Removal and Installation

EBS013KO

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P0093 FUEL SYSTEM

PFP:17520

On Board Diagnosis Logic

EBS013KP

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0093	Fuel system leak	ECM detects a fuel system leak. (The relation between the output voltage to the fuel pump and input voltage from the fuel rail pressure sensor is out of the normal range.)	● Fuel pump ● Fuel rail ● Fuel pipe ● Fuel rail pressure relief valve ● Air mixed with fuel ● Lack of fuel

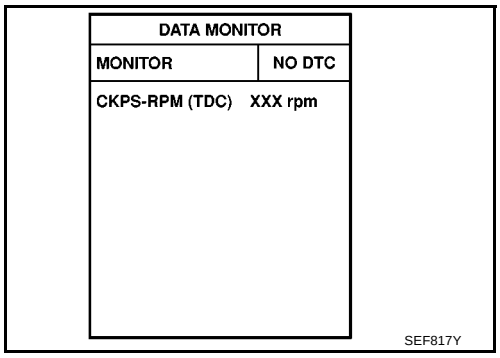
DTC Confirmation Procedure

EBS013KQ

NOTE:
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 keep engine speed more than 4,000 rpm for at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-99, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013KR

1. PERFORM FUEL PUMP LEARNING VALUE CLEARING

NOTE:
If the DTC is detected because of air mixed with fuel (i.e.: caused by lack of fuel), it may become normal by performing following procedure.

With CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select “SELF-DIAG RESULT” mode with CONSULT-II.
5. Touch “ERASE”.
6. Perform EC-98, "DTC Confirmation Procedure" , again.
7. Is 1st trip DTC detected again?

With GST

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select MODE 4 with GST.
5. Touch “ERASE”.
6. Perform EC-98, "DTC Confirmation Procedure" , again.
7. Is 1st trip DTC detected again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. CHECK FUEL LINE FOR LEAK

1. Start engine.
2. Visually check the following for fuel leak.

- Fuel tube from fuel pump to fuel rail
- Fuel rail
- Fuel tube from fuel rail to fuel injector

3. Also check for improper connection or pinches.

OK or NG

OK >> GO TO 3.
NG >> Repair malfunctioning part.

3. CHECK FUEL RAIL PRESSURE RELIEF VALVE

Refer to EC-100, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel rail.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

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

5. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

Component Inspection

EBS013KS

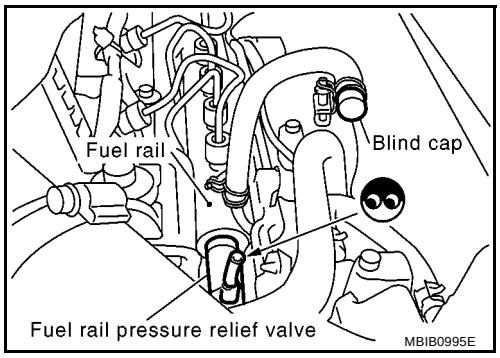
FUEL RAIL PRESSURE RELIEF VALVE

With CONSULT-II

WARNING:

- **Confirm that the engine is cooled down and there are no fire hazards near the vehicle.**
- **Prepare pans or saucers under the disconnected fuel line because the fuel may spill out.**

1. Turn ignition switch OFF.
2. Remove fuel hose from fuel rail pressure relief valve.
3. Attach a blind cap or plug to removed hose.
4. Turn ignition switch ON.



5. Select “PRES REGULATOR” in “ACTIVE TEST MODE” with CONSULT-II.
6. Start engine and keep engine speed 2,000 rpm.
7. Raise fuel pressure to 160 MPa with touching “UP” or “Qu” on the CONSULT-II screen.
8. Confirm that the fuel does not come out from the fuel rail pressure relief valve.

WARNING:

- **Be careful not to allow leaked fuel to contaminate engine compartment. Especially, ensure to keep engine mount insulator clear of fuel.**
- **If the fuel comes out, stop the engine immediately.**

ACTIVE TEST	
PRES REGULATOR	XXX MPa
MONITOR	
CKPS-RPM (TDC)	XXX rpm
ACT CR PRESS	XXX MPa

PBIB0587E

Without CONSULT-II

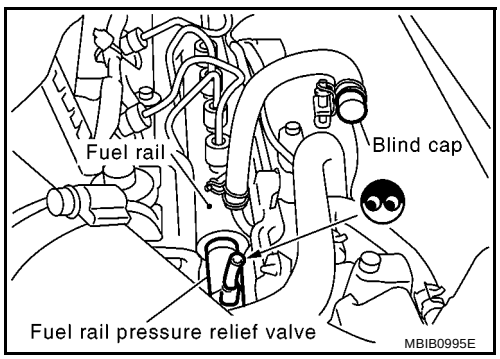
WARNING:

- **Confirm that the engine is cooled down and there are no fire hazards near the vehicle.**
- **Prepare pans or saucers under the disconnected fuel line because the fuel may spill out.**

1. Turn ignition switch OFF.
2. Remove fuel hose from fuel rail pressure relief valve.
3. Attach a blind cap or plug to removed hose.
4. Start engine and keep engine speed more than 4,000 rpm for at least 5 seconds.
5. Confirm that the fuel does not come out from the fuel rail pressure relief valve.

WARNING:

- **Be careful not to allow leaked fuel to contaminate engine compartment. Especially, ensure to keep engine mount insulator clear of fuel.**
- **If the fuel comes out, stop the engine immediately.**



Removal and Installation

EBS013KT

FUEL RAIL

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

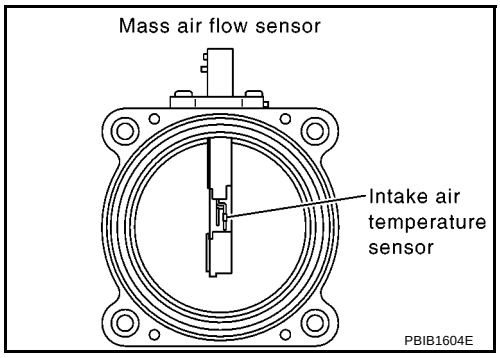
DTC P0101 MAF SENSOR

PFP:22680

Component Description

EBS013KU

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. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

EBS013KV

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS AIR/FL SE*	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1.5 - 2.0V
		2,000 rpm	2.2 - 2.7V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS013KW

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)
54	W	Mass air flow sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.8 - 2.3V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.5 - 3.0V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
73	B	Mass air flow sensor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013KX

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0101	Mass air flow sensor circuit range/performance problem	Improper voltage from the sensor is sent to ECM compared with the driving condition.	● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor ● Intake air leaks ● Air cleaner ● Intake air temperature sensor ● Turbocharger boost sensor ● EGR volume control valve

DTC Confirmation Procedure

EBS013KY

CAUTION:
Always drive vehicle at a safe speed.

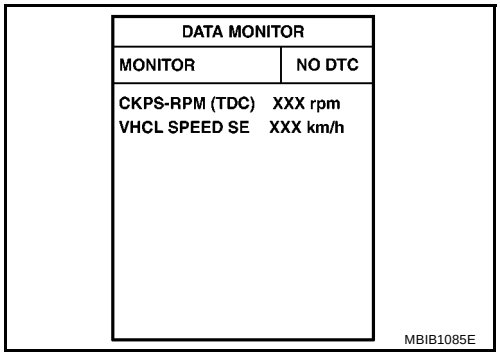
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 40 seconds.
4. Drive vehicle under the following condition.

CKPS·RPM	Approx. 2800 rpm
VHCL SPEED SE	70 - 100 km/h
Shift lever	4th position

5. Release accelerator pedal for at least 10 seconds.
   Do not depress brake pedal during this procedure.
6. If 1st trip DTC is detected, go to EC-106, "Diagnostic Procedure"
   .



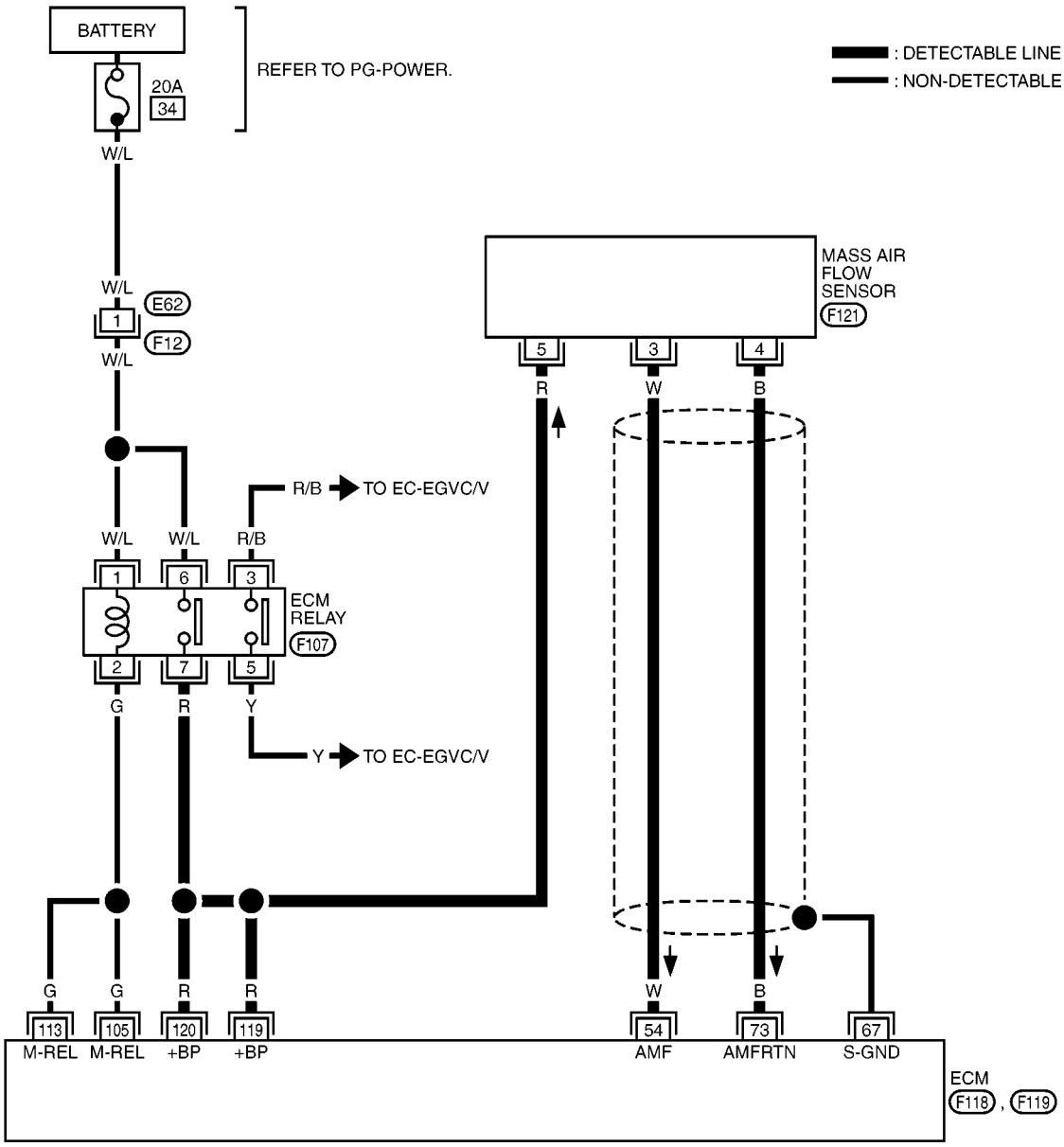
WITH GST

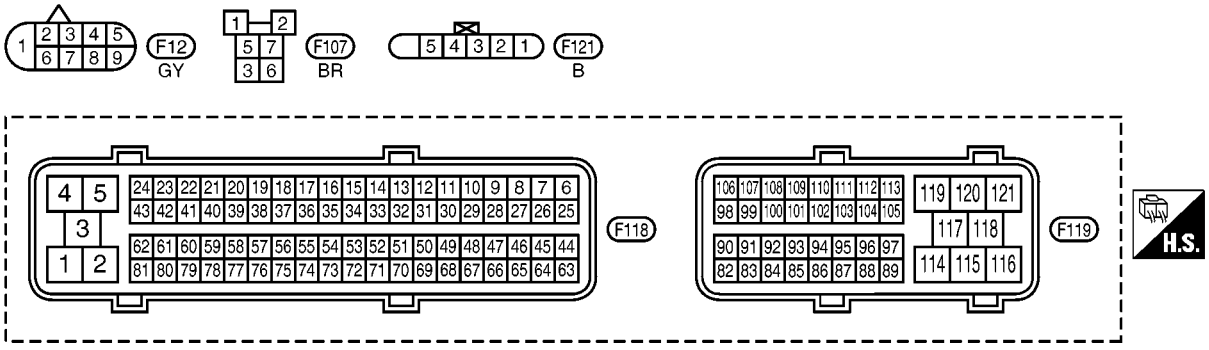
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013KZ

EC-MAFS-01





MBWA0644E

Diagnostic Procedure

EBS013L0

1. CHECK INTAKE SYSTEM

1. Check air cleaner for clogging.
2. Check the following for connection and cracks.

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

OK or NG

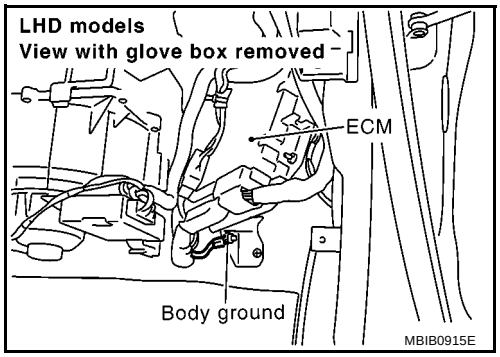
OK >> GO TO 2.
NG >> Reconnect or repair the parts.

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

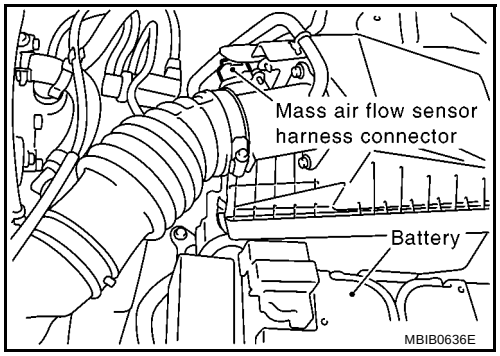
OK or NG

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



3. CHECK MAFS POWER SUPPLY CIRCUIT

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

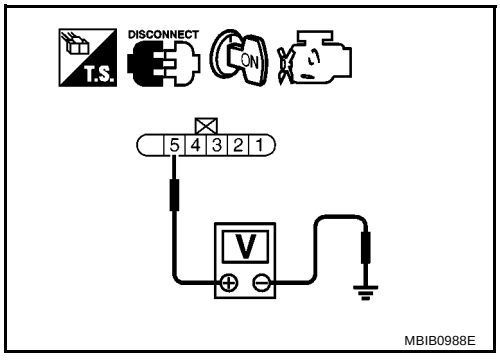


3. Check voltage between mass air flow sensor terminal 5 and ground with CONSULT-II or tester.

Voltage: Battery voltage

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 MAFS GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between mass air flow sensor terminal 4 and ECM terminal 73. 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 MAFS INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between mass air flow sensor terminal 3 and ECM terminal 54. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

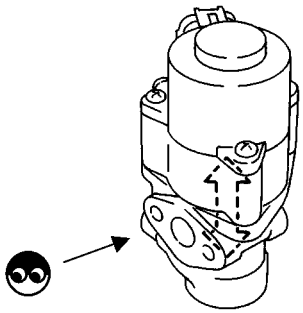
OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK EGR VOLUME CONTROL VALVE FUNCTION

With CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Remove EGR volume control valve from cylinder head.
3. Turn ignition switch ON.
4. Perform “EGR VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening.

ACTIVE TEST	
EGR VOL CONT/V	20 step
MONITOR	
CKPS-RPM (TDC)	XXX rpm

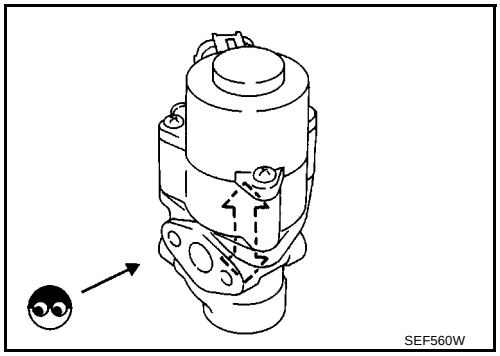


NOTE:
When installing the EGR volume control valve, make sure that the shaft is in the same position before checking.

Without CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Remove EGR volume control valve from cylinder head.
3. Turn ignition switch ON and OFF.
4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position.

   NOTE:
   When installing the EGR volume control valve, make sure that the shaft is in the same position before checking.



OK or NG

OK >> GO TO 7.
NG >> Check EGR volume control valve and its circuit. Refer to EC-213, "Diagnostic Procedure" .

7. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-118, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace mass sir flow sensor (with intake air temperature sensor).

8. CHECK TURBOCHARGER BOOST SENSOR

Refer to EC-181, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace turbocharger boost sensor.

9. CHECK MASS AIR FLOW SENSOR

Refer to EC-109, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Replace mass air flow sensor.

10. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

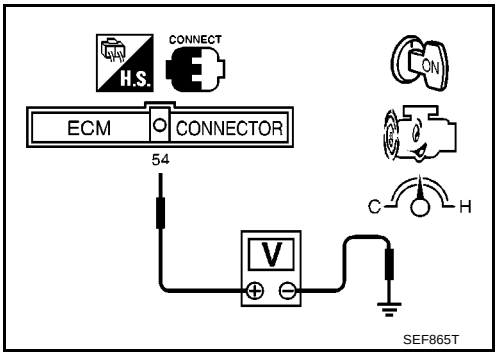
Component Inspection

EBS013L1

MASS AIR FLOW SENSOR

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 54 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch ON (Engine stopped.)	Approx. 0.7
Idle (Engine is warmed up to normal operating temperature.)	1.8 - 2.3
2,000 rpm (Engine is warmed up to normal operating temperature.)	2.5 - 3.0



4. If the voltage is out of specification, disconnect MAF sensor harness connector and connect it again.
   Then repeat above check.

Removal and Installation

EBS013L2

MASS AIR FLOW SENSOR

Refer to EM-15, "AIR CLEANER AND AIR DUCT" .

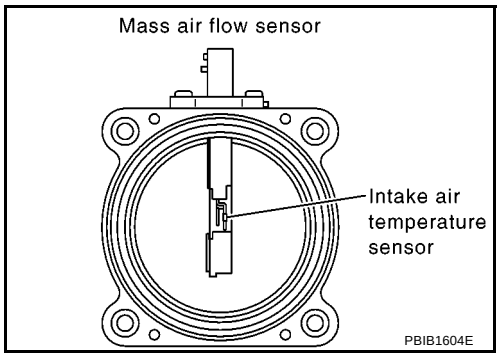
DTC P0102, P0103 MAF SENSOR

PFP:22680

Component Description

EBS013L3

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. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

EBS013L4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS AIR/FL SE*	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1.5 - 2.0V
		2,000 rpm	2.2 - 2.7V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS013L5

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)
54	W	Mass air flow sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.8 - 2.3V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.5 - 3.0V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
73	B	Mass air flow sensor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013L6

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

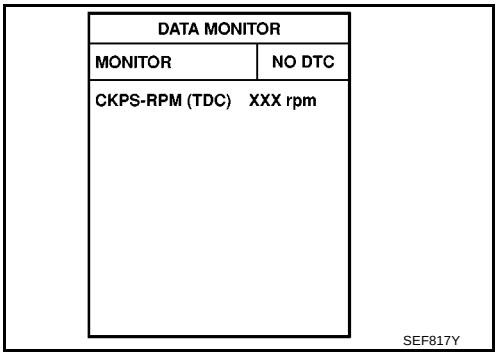
DTC Confirmation Procedure

EBS013L7

NOTE:
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-113, "Diagnostic Procedure"
.



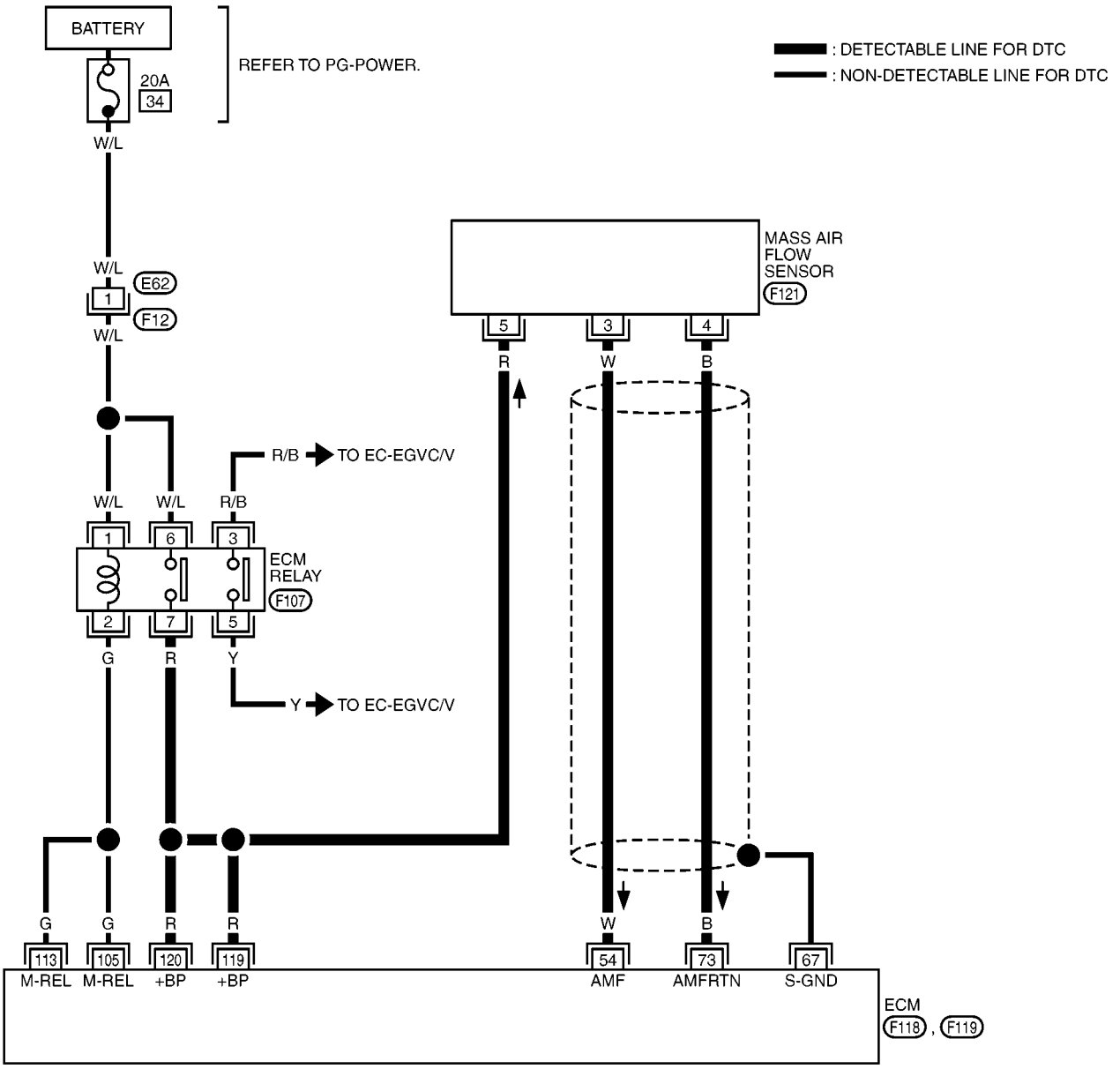
WITH GST

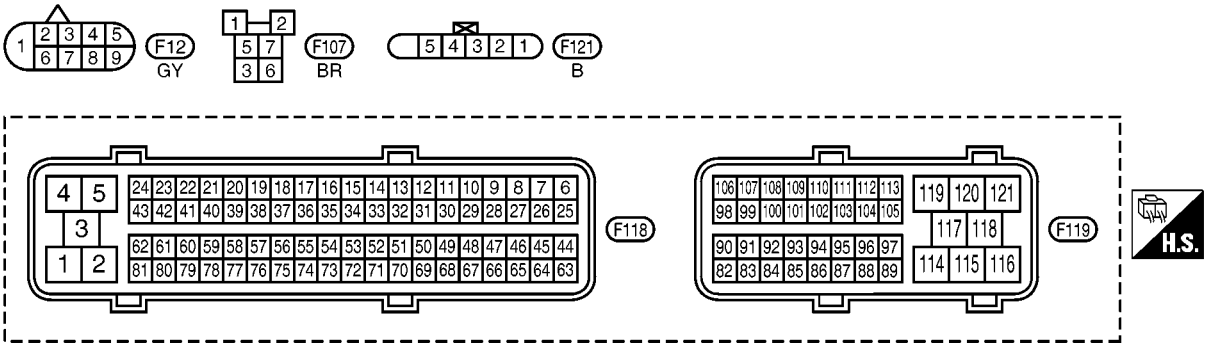
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013L8

EC-MAFS-01





MBWA0644E

Diagnostic Procedure

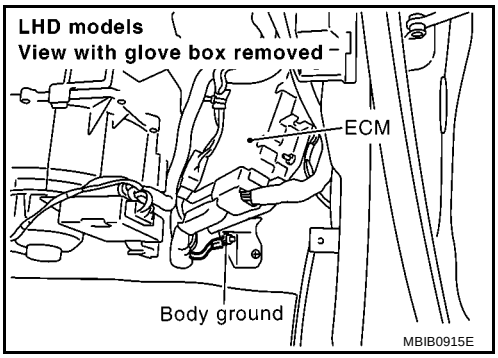
EBS013L9

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

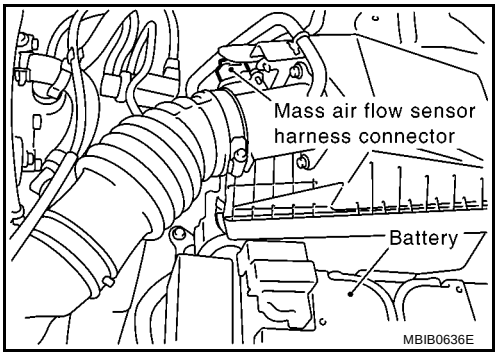
OK or NG

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



2. CHECK MAFS POWER SUPPLY CIRCUIT

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

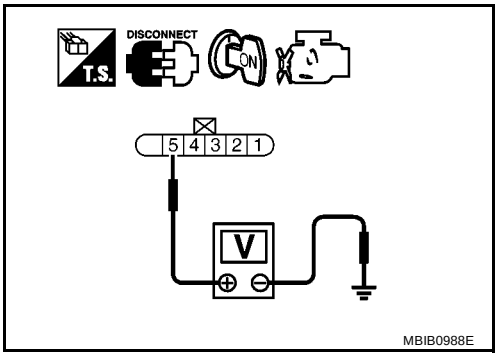


3. Check voltage between mass air flow sensor terminal 5 and ground with CONSULT-II or tester.

Voltage: Battery voltage

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 MAFS GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between mass air flow sensor terminal 4 and ECM terminal 73. 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 MAFS INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between mass air flow sensor terminal 3 and ECM terminal 54. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. CHECK MASS AIR FLOW SENSOR

Refer to EC-114, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace mass air flow sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

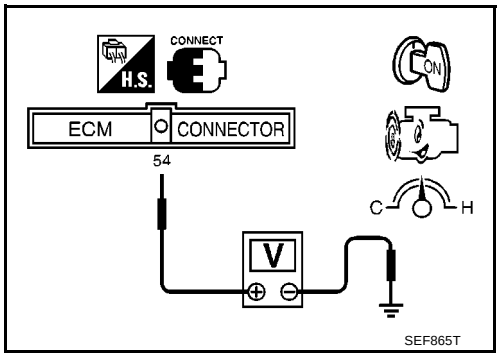
Component Inspection

EBS013LA

MASS AIR FLOW SENSOR

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 54 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch ON (Engine stopped.)	Approx. 0.7
Idle (Engine is warmed up to normal operating temperature.)	1.8 - 2.3
2,000 rpm (Engine is warmed up to normal operating temperature.)	2.5 - 3.0



4. If the voltage is out of specification, disconnect MAF sensor harness connector and connect it again.
Then repeat above check.

Removal and Installation

EBS013LB

MASS AIR FLOW SENSOR

Refer to EM-15, "AIR CLEANER AND AIR DUCT" .

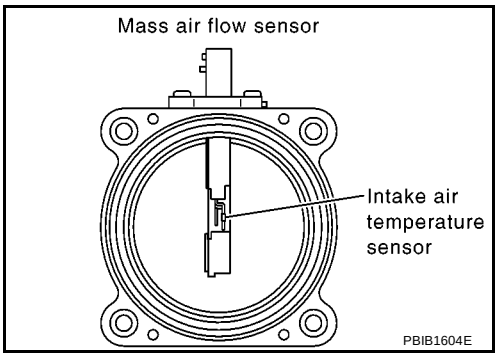
DTC P0112, P0113 IAT SENSOR

PFP:22630

Component Description

EBS013LC

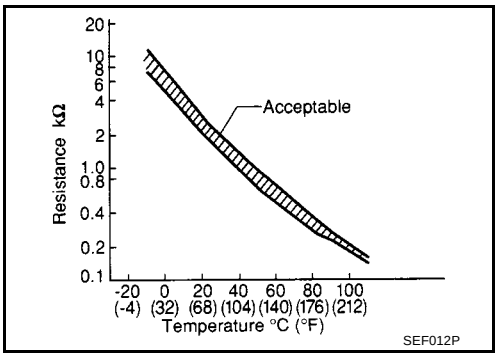
The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.73	7.9 - 9.3
25 (77)	3.62	1.9 - 2.1
80 (176)	1.53	0.31 - 0.37

*: This data is reference values and is measured between ECM terminal 55 (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

EBS013LD

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air temperature sensor
P0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

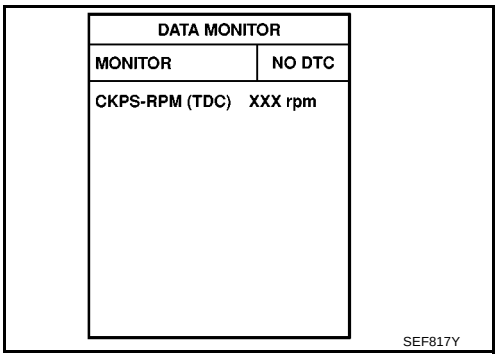
DTC Confirmation Procedure

EBS013LE

NOTE:
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-117, "Diagnostic Procedure" .



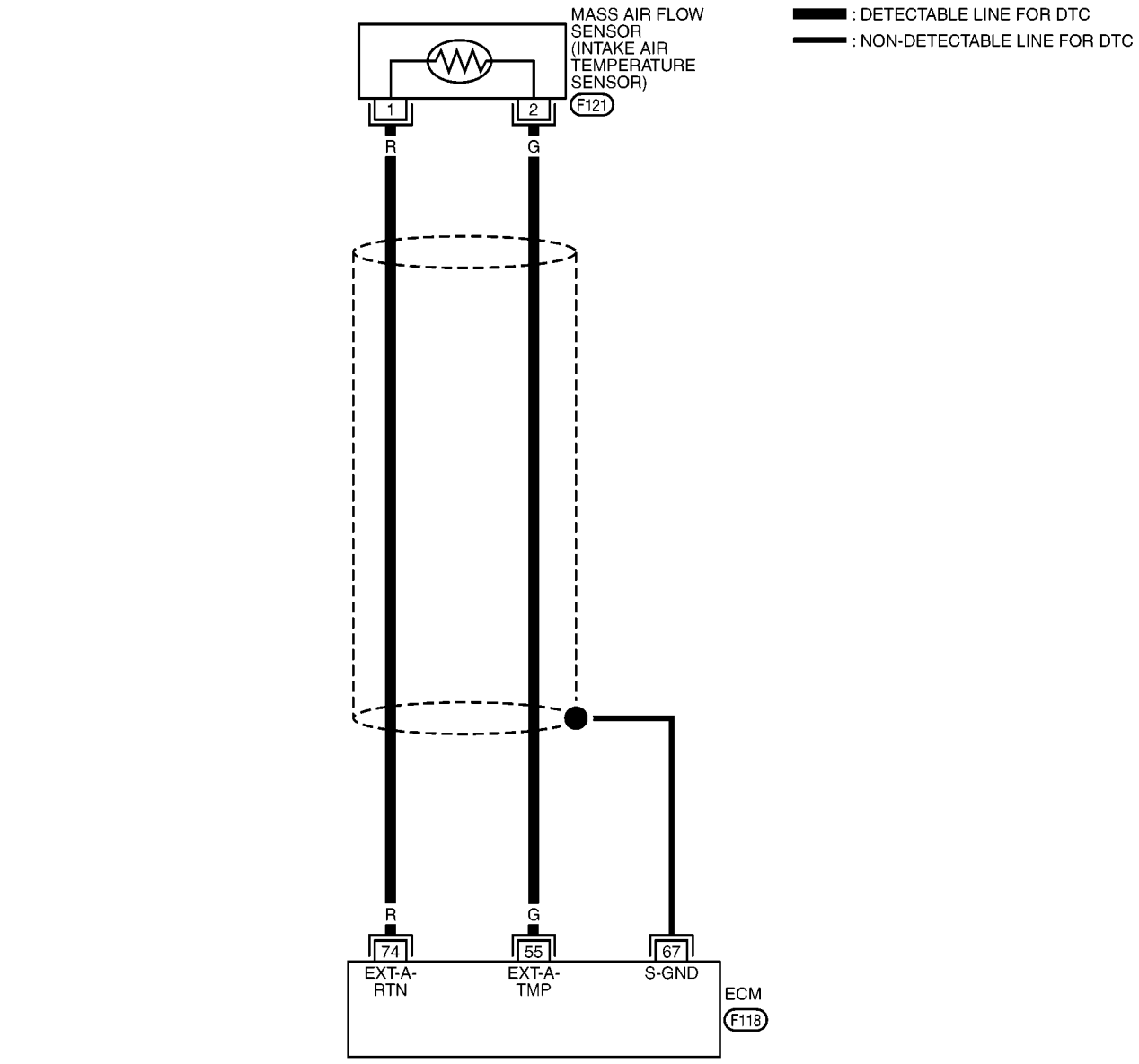
WITH GST

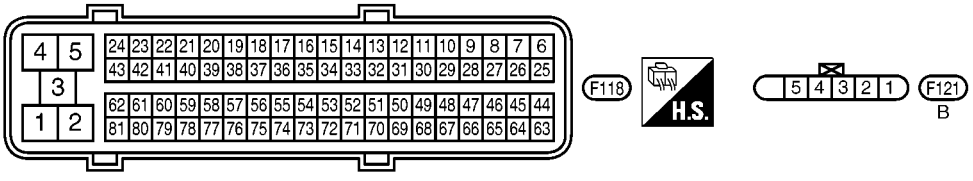
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013LF

EC-IATS-01





MBWA0372E

Diagnostic Procedure

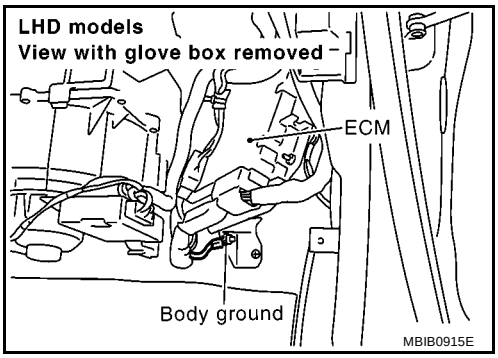
EBS013LG

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

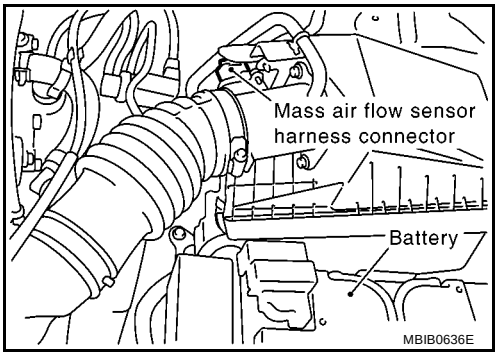
OK or NG

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



2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

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

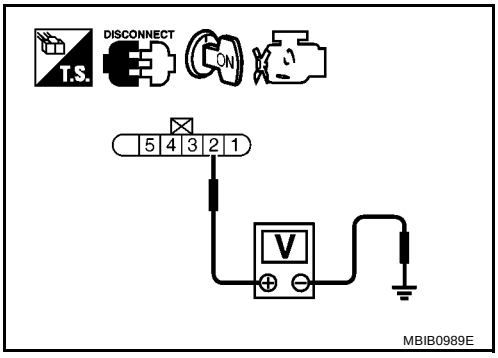


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connectors.



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

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 1 and ECM terminal 74. 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 AIR TEMPERATURE SENSOR

Refer to EC-118, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace mass air flow sensor (with intake air temperature sensor).

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

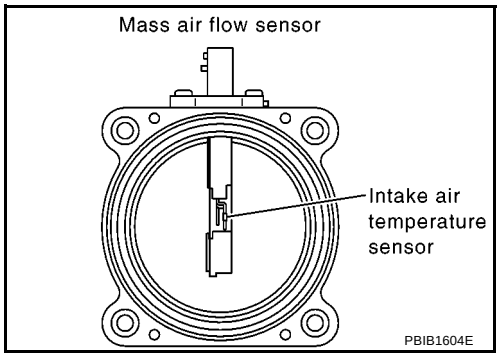
EBS013LH

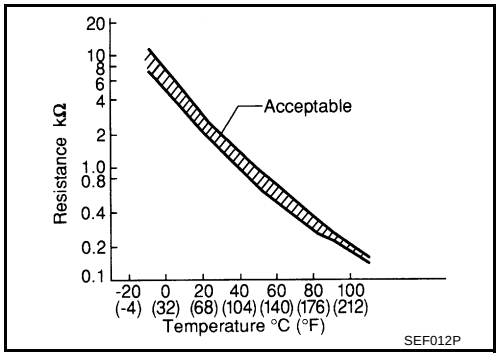
INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor terminals 1 and 2 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

EBS013LI

MASS AIR FLOW SENSOR

Refer to EM-15, "AIR CLEANER AND AIR DUCT" .

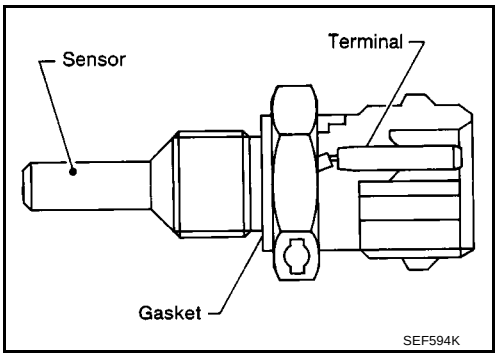
DTC P0117, P0118 ECT SENSOR

PFP:22630

Description

EBS013LJ

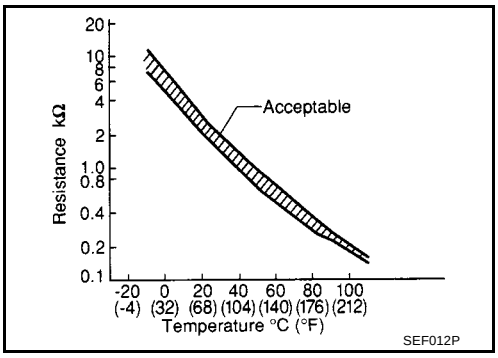
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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



<Reference data>

Engine coolant temperature °C (°F)	Voltage* (V)	Resistance (kΩ)
–10 (14)	4.7	7.0 - 11.4
20 (68)	3.8	2.1 - 2.9
50 (122)	2.6	0.68 - 1.00
90 (194)	1.3	0.236 - 0.260

*: This data is reference values and is measured between ECM terminal 51 (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

EBS013LK

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor
P0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

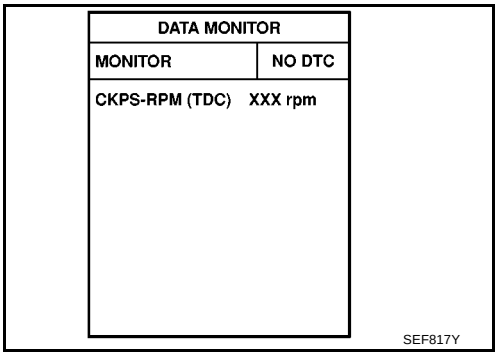
EBS013LL

NOTE:

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-122, "Diagnostic Procedure" .



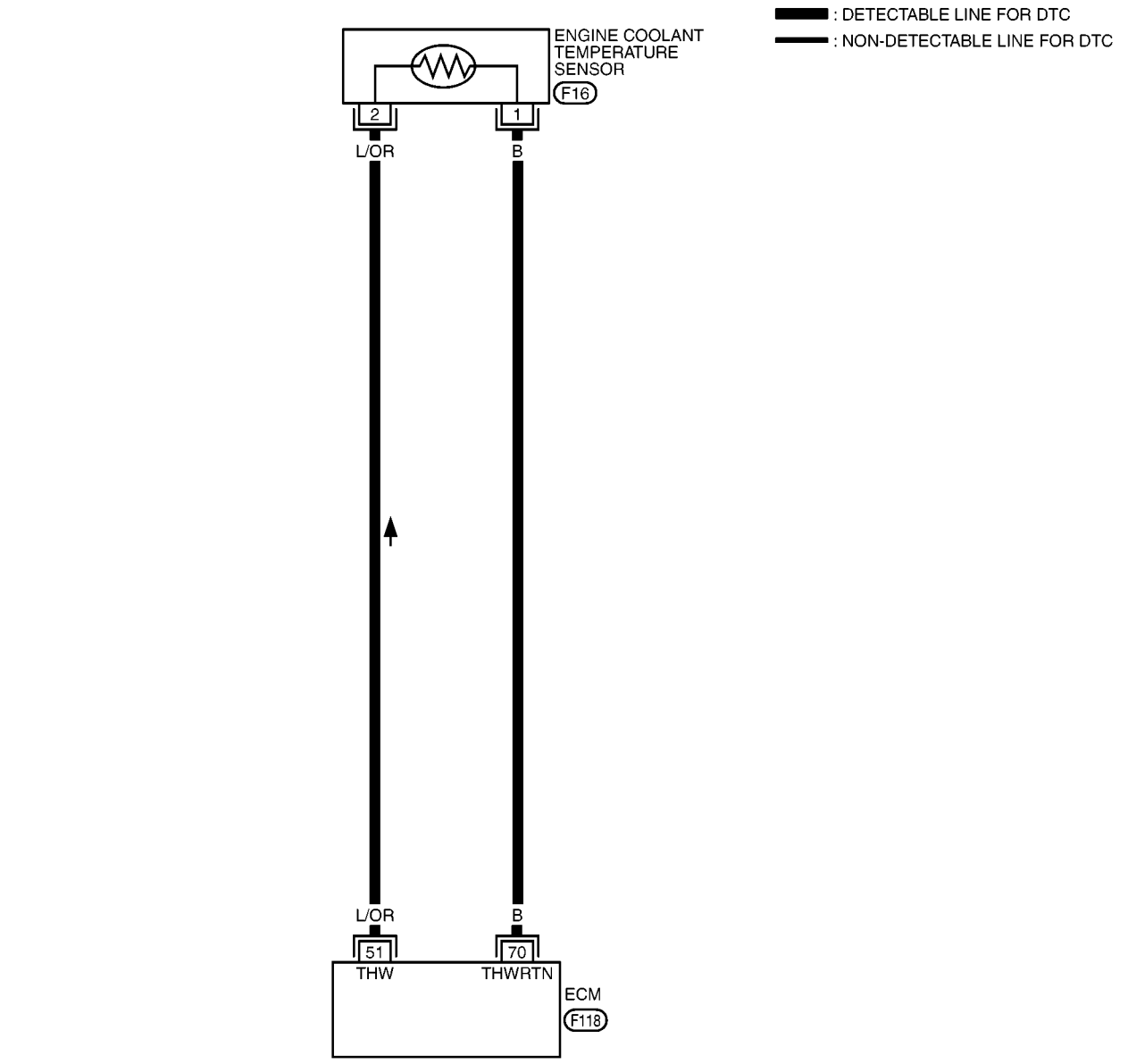
WITH GST

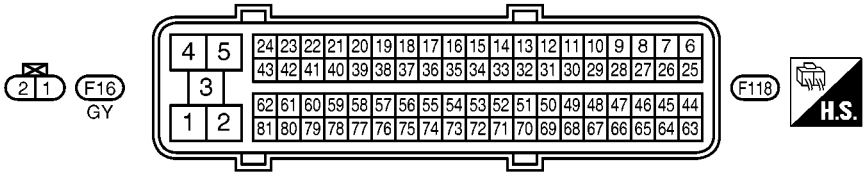
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013LM

EC-ECTS-01





MBWA0373E

Diagnostic Procedure

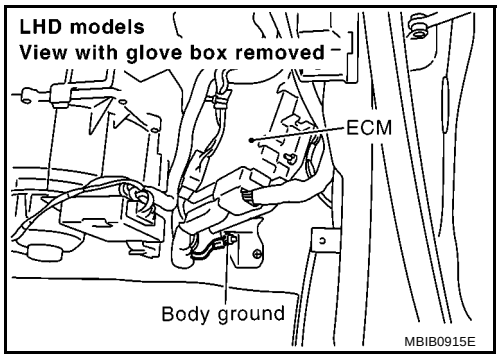
EBS013LN

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

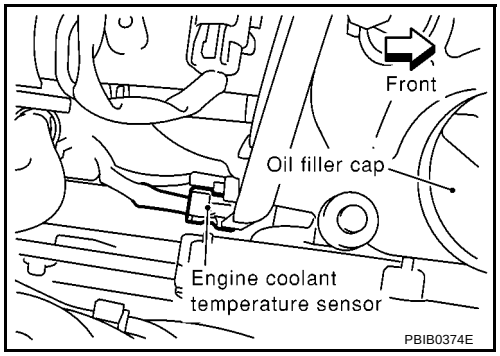
OK or NG

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



2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature sensor harness connector.
2. Turn ignition switch ON.

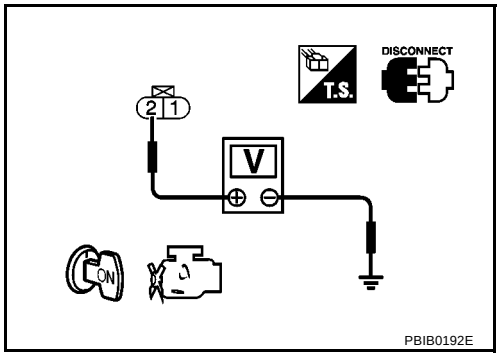


3. Check voltage between ECT sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connectors.



3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECT sensor terminal 1 and ECM terminal 70. 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 ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-123, "Component Inspection" .

OK or NG

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

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

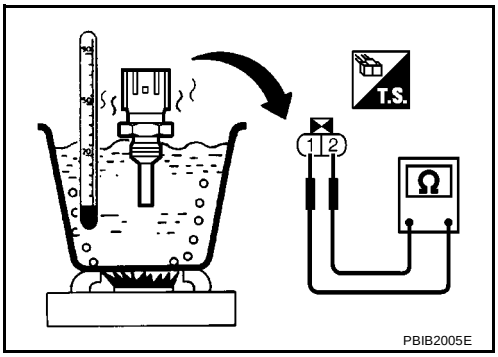
>> **INSPECTION END**

Component Inspection

EBS013LO

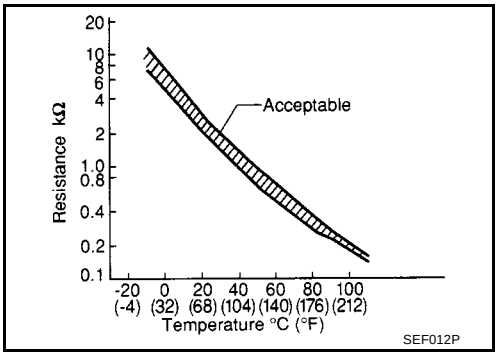
ENGINE COOLANT TEMPERATURE SENSOR

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



<Reference data>

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



2. If NG, replace engine coolant temperature sensor.

Removal and Installation

EBS013LP

ENGINE COOLANT TEMPERATURE SENSOR

Refer to EM-78, "CYLINDER HEAD" .

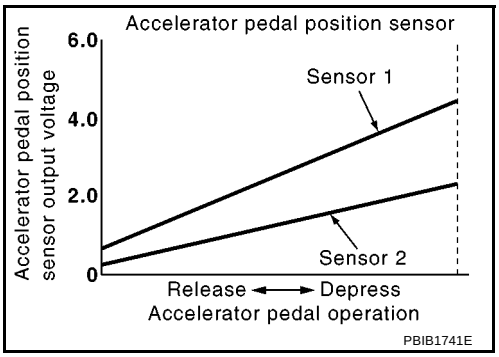
DTC P0122, P0123 APP SENSOR

PFP:18002

Description

EBS013LQ

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS013LR

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS013LS

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013LT

These self-diagnoses have the one trip detection logic.
The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122	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)
P0123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

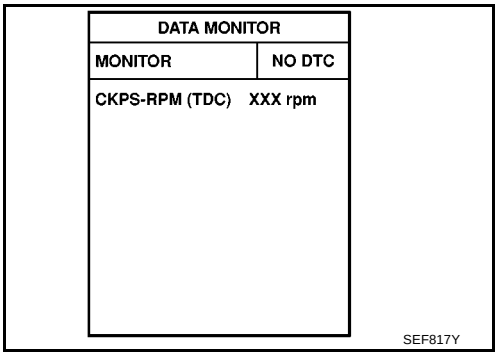
DTC Confirmation Procedure

EBS013LU

NOTE:
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-127, "Diagnostic Procedure" .

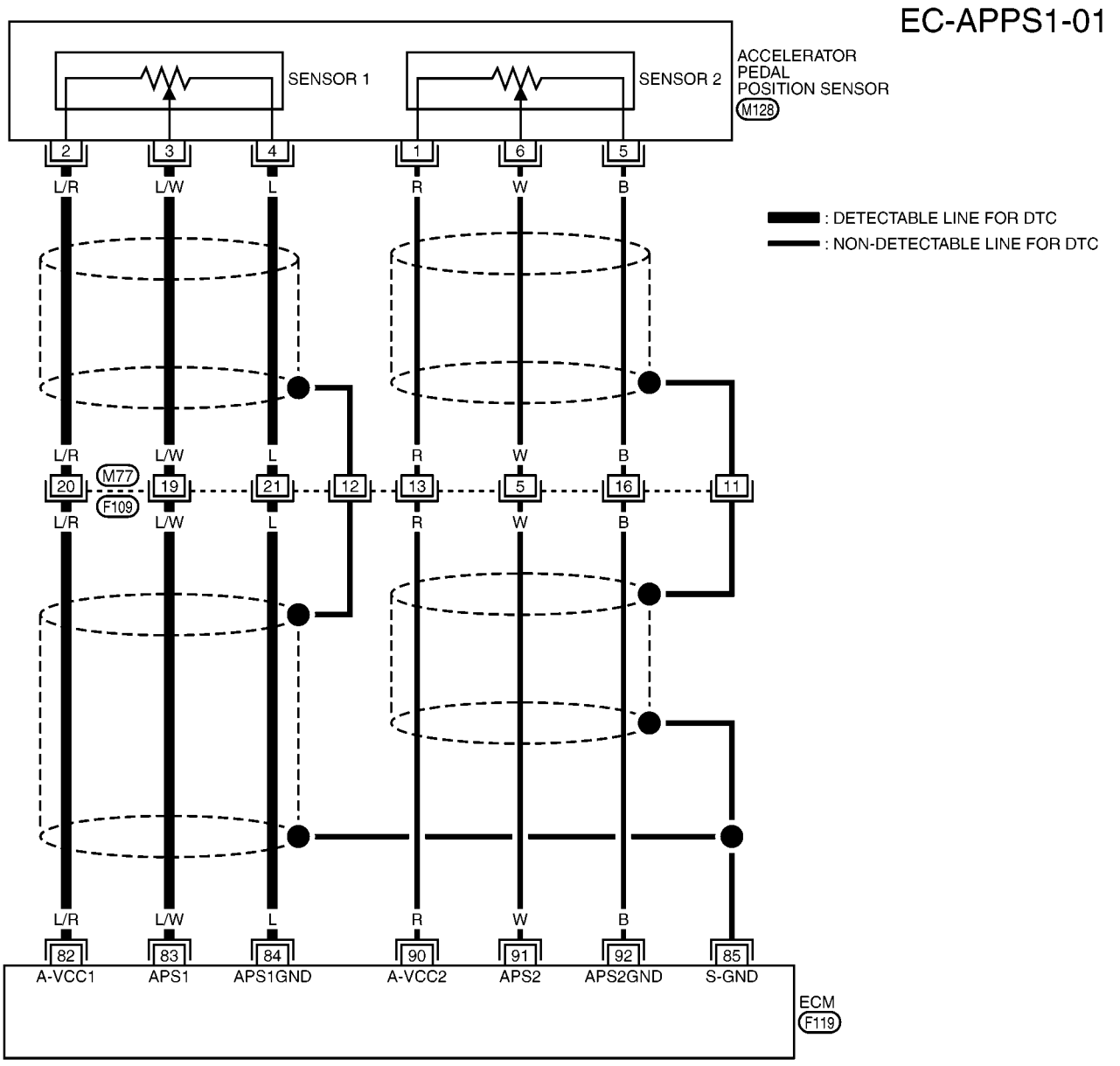


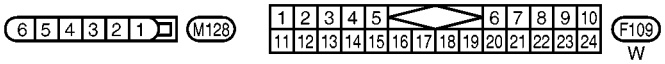
WITH GST

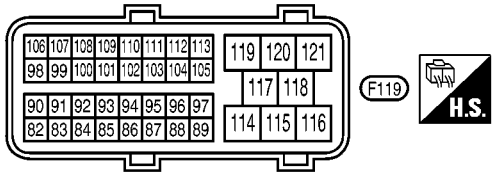
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013LV







MBWA0374E

Diagnostic Procedure

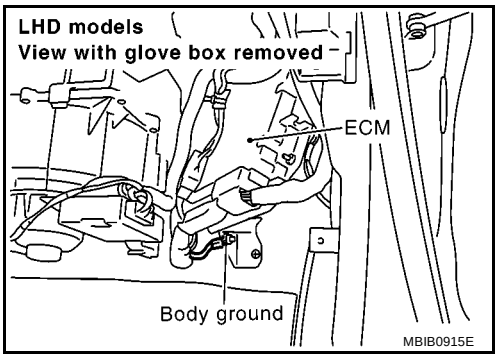
EBS013LW

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

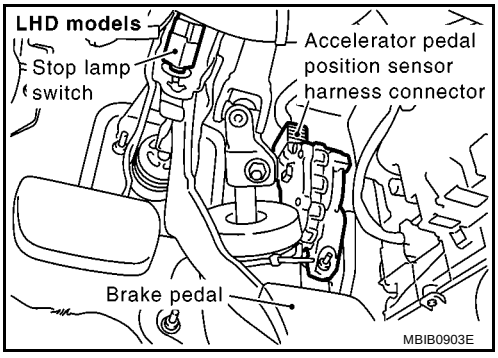
OK or NG

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



2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

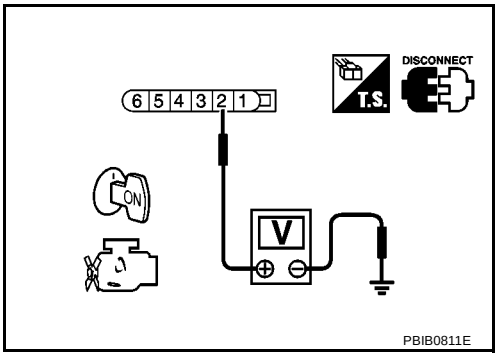


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F109, M77
- Harness for open or short between ECM and APP 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. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 4 and ECM terminal 84.
   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 F109, M77
- Harness for open or short between ECM and APP 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. Check harness continuity between ECM terminal 83 and APP sensor terminal 3.
   Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F109, M77
- Harness for open or short between ECM and APP sensor

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

8. CHECK APP SENSOR

Refer to EC-128, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

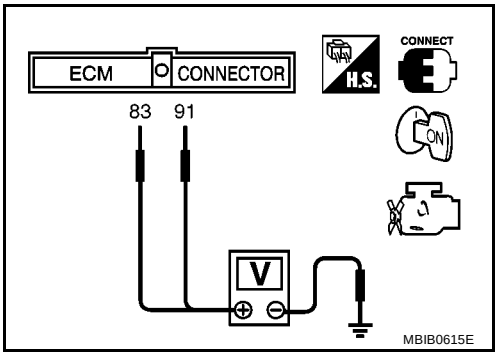
Component Inspection

EBS013LX

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and body ground under the following conditions.



Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.2V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V

4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS013LY

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

PFP:16700

Description

EBS013LZ

Fuel pump temperature sensor is built in the fuel pump. The sensor detects the fuel temperature in the fuel pump and calibrates the fuel injection amount change by fuel temperature.

CONSULT-II Reference Value in Data Monitor Mode

EBS013M0

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL TEMP SEN	● Engine: After warming up	More than 40°C (104°F)

ECM Terminals and Reference Value

EBS013M1

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)
50	PU	Fuel pump temperature sensor	**[Engine is running]** ● **Warm-up condition**	Approximately 0.3 - 5.3V Output voltage varies with fuel pump temperature
69	B	Fuel pump temperature sensor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013M2

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182	Fuel pump temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Fuel pump temperature sensor
P0183	Fuel pump temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

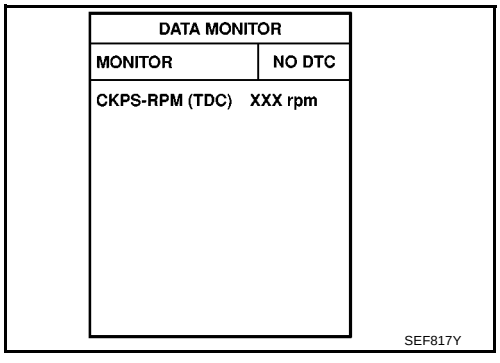
EBS013M3

NOTE:

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-132, "Diagnostic Procedure"
.



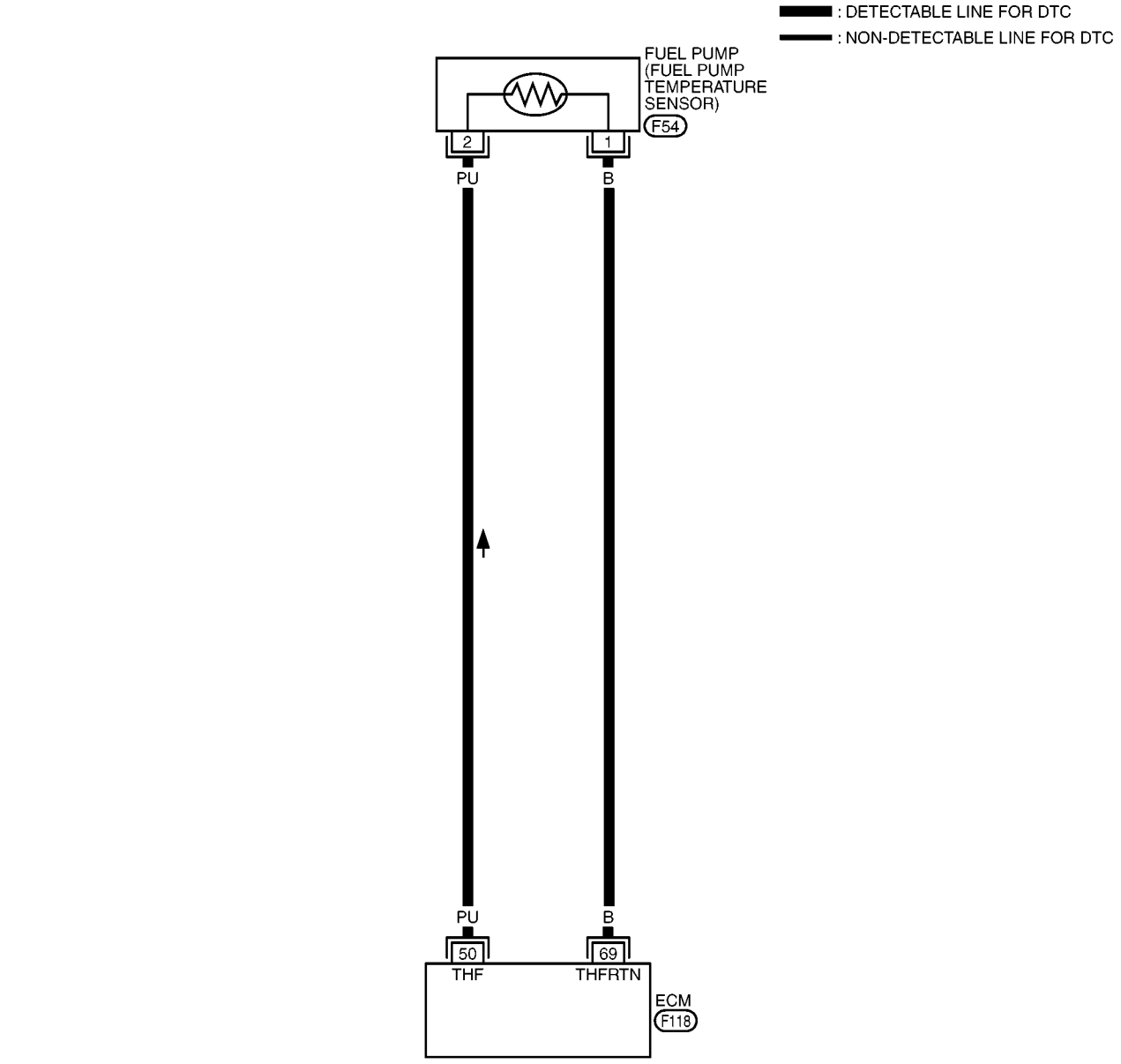
WITH GST

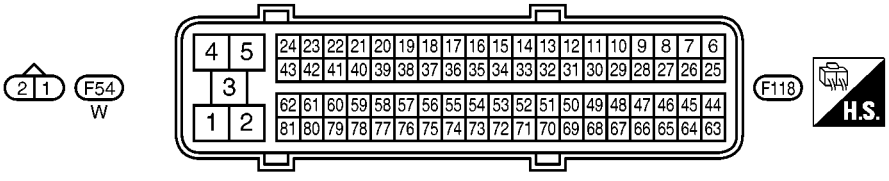
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013M4

EC-FTS-01





MBWA0381E

Diagnostic Procedure

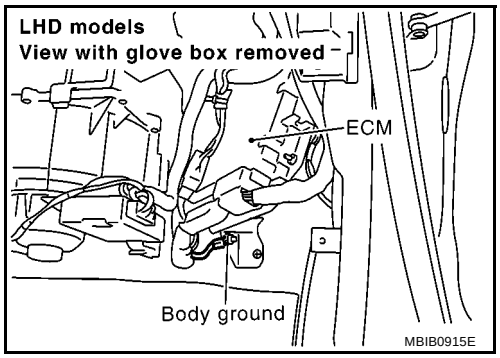
EBS013M5

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

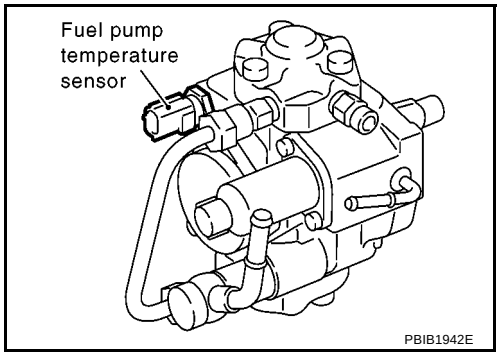
OK or NG

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



2. CHECK FUEL PUMP TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect fuel pump temperature sensor harness connector.
2. Turn ignition switch ON.

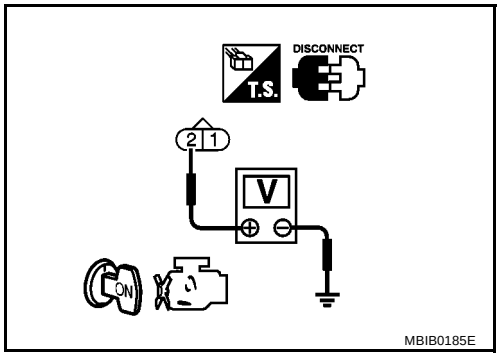


3. Check voltage between fuel pump temperature sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connectors.



3. CHECK FUEL PUMP TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel pump temperature sensor terminal 1 and ECM terminal 69. 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 INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

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

5. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

Removal and Installation

EBS013M6

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P0192, P0193 FRP SENSOR

PFP:16638

Description

EBS013M7

The fuel rail pressure (FRP) sensor is placed to the fuel rail. It measures the fuel pressure in the fuel rail. The sensor sends voltage signal to the ECM. As the pressure increases, the voltage rises.
The ECM controls the fuel pressure in the fuel rail by the inlet throttling device. The ECM uses the signal from fuel rail pressure sensor as a feedback signal.

CONSULT-II Reference Value in Data Monitor Mode

EBS013M8

Specification data are reference values.

MONITOR	CONDITION		SPECIFICATOIN
ACT CR PRESS	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	20 - 30 MPa
		2,000 rpm	45 - 55 MPa

ECM Terminals and Reference Value

EBS013M9

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)
48 49	R R	Fuel rail pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.7 - 2.0V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.0 - 2.3V
63	W	Fuel rail pressure sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
68	B	Fuel rail pressure sensor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013MA

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0192	Fuel rail pressure sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Fuel rail temperature sensor
P0193	Fuel rail temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

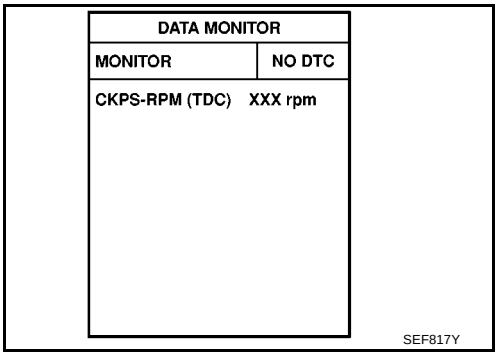
DTC Confirmation Procedure

EBS013MB

NOTE:
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-137, "Diagnostic Procedure"
.



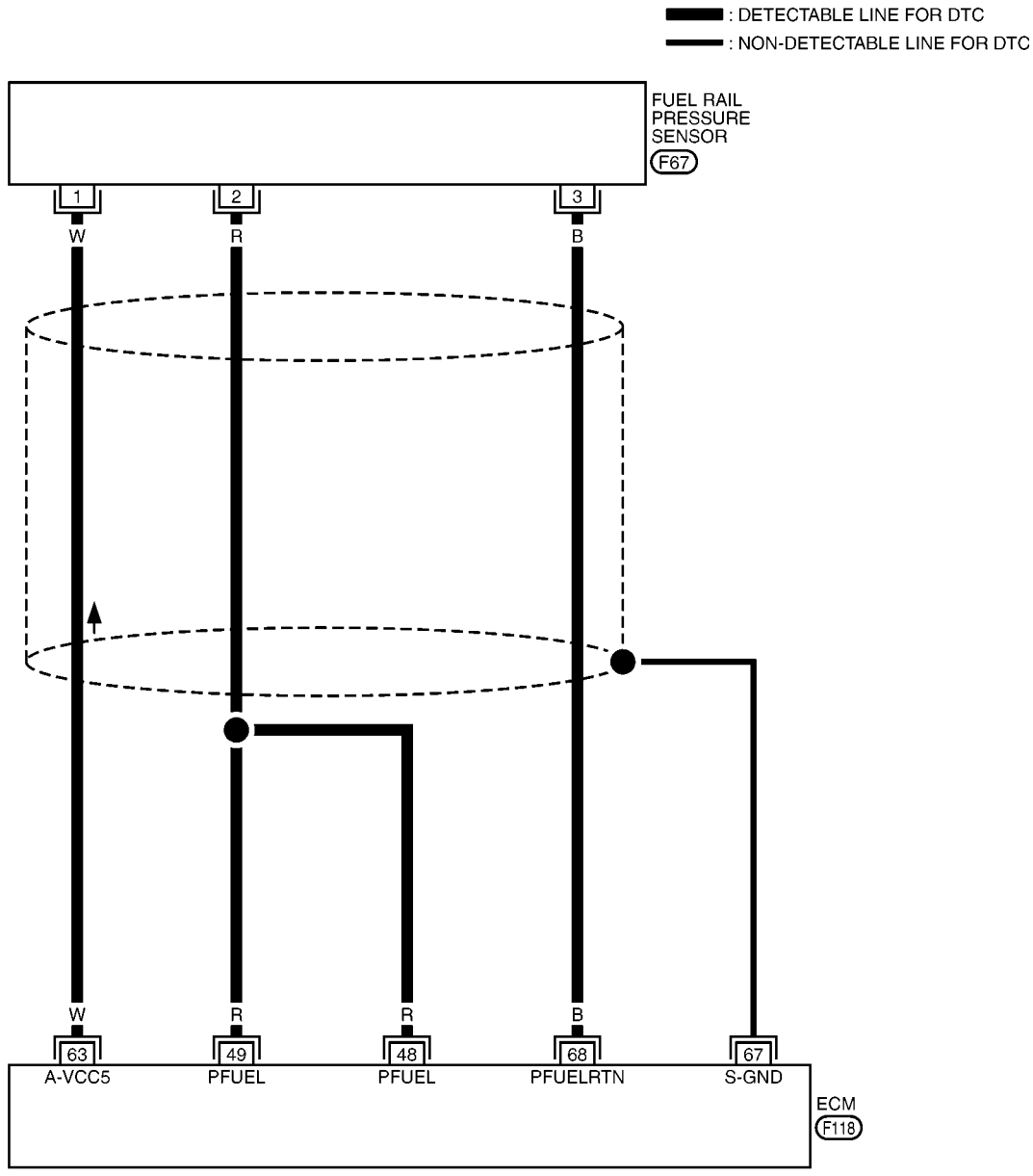
WITH GST

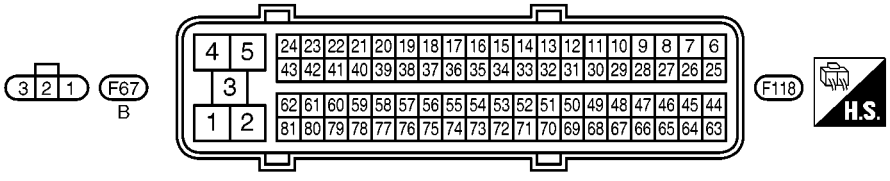
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013MC

EC-FRPS-01





MBWA0375E

Diagnostic Procedure

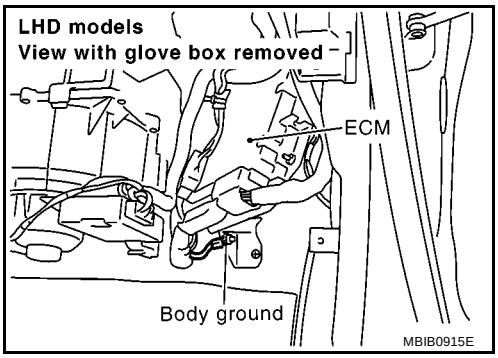
EBS013MD

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

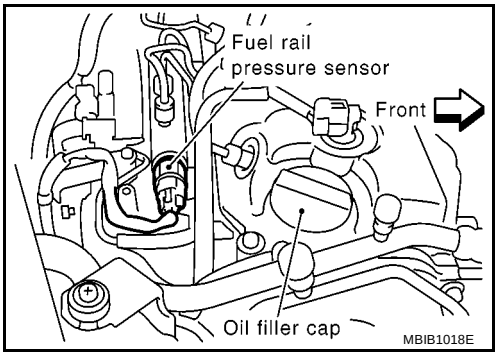
OK or NG

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



2. CHECK FUEL RAIL PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect fuel rail pressure sensor harness connector.
2. Turn ignition switch ON.

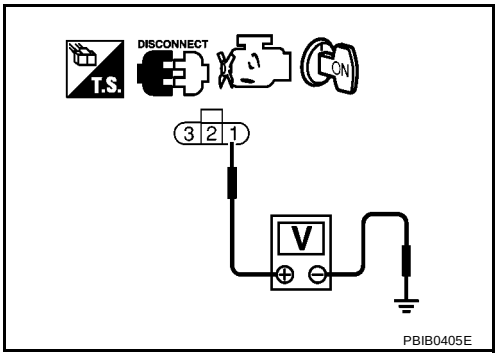


3. Check voltage between fuel rail pressure sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 FUEL RAIL PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel rail pressure sensor terminal 3 and ECM terminal 68. 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 FUEL RAIL PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminals 48, 49 and fuel rail pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-138, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace fuel rail.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

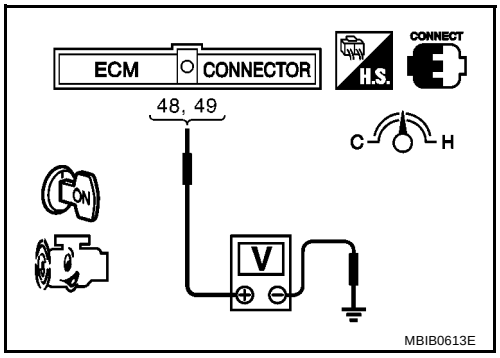
Component Inspection

EBS013ME

FUEL RAIL PRESSURE SENSOR

1. Reconnect harness connector disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminals 48, 49 (Fuel rail pressure sensor signal) and ground under the following conditions.

Condition	Voltage V
Idle	1.7 - 2.0
2,000 rpm	2.0 - 2.3



4. If the voltage is out of specification, disconnect fuel rail pressure sensor harness connector and connect it again. Then repeat above check.
5. If NG, replace fuel rail.

Removal and Installation

EBS013MF

FUEL RAIL

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

DTC P0200 FUEL INJECTOR

PFP:16600

On Board Diagnosis Logic

EBS013MG

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0200	Fuel injector power supply circuit	ECM detects a voltage of power source for the fuel injector is excessively high or low.	● ECM

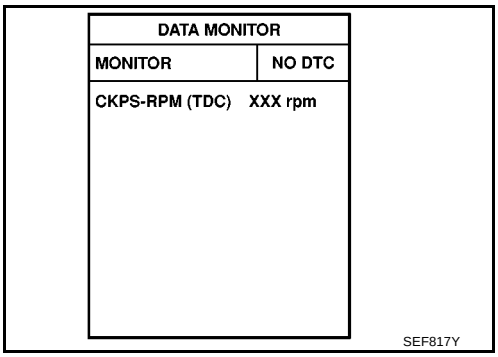
DTC Confirmation Procedure

EBS013MH

NOTE:
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-139, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013MI

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 EC-139, "DTC Confirmation Procedure" , again.
5. Is 1st trip DTC P0200 displayed again?

With GST

1. Turn ignition switch ON.
2. Select MODE 4 with GST.
3. Touch “ERASE”.
4. Perform EC-139, "DTC Confirmation Procedure" , again.
5. Is 1st trip DTC P0200 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-35, "NATS (Nissan Anti-theft System)" .
3. Perform Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

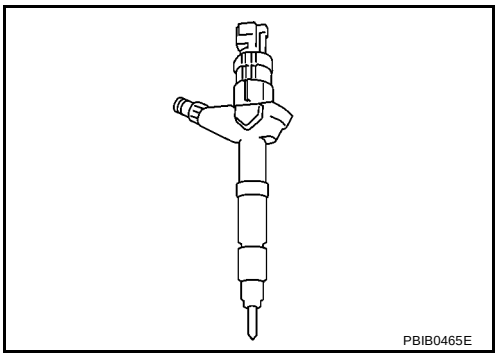
DTC P0201 - P0204 FUEL INJECTOR

PFP:16600

Component Description

EBS013MJ

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


PBIB0465E

CONSULT-II Reference Value in Data Monitor Mode

EBS013MK

Specification data are reference values.

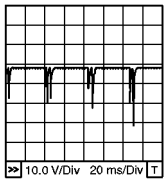
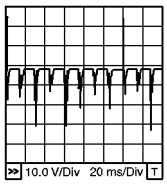
MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec

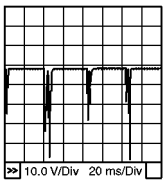
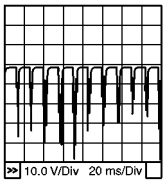
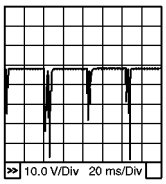
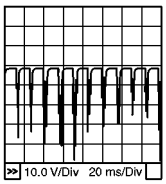
ECM Terminals and Reference Value

EBS013ML

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

CAUTION:
Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
4	O/B	Fuel injector power supply (For cylinder No. 1 and 4)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
5	B	Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

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

On Board Diagnosis Logic

EBS013MM

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0201	No. 1 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 1 cylinder fuel injector.	● Harness or connectors (The fuel injector circuit is open.) ● Fuel injector
P0202	No. 2 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 2 cylinder fuel injector.	
P0203	No. 3 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 3 cylinder fuel injector.	
P0204	No. 4 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 4 cylinder fuel injector.	

DTC Confirmation Procedure

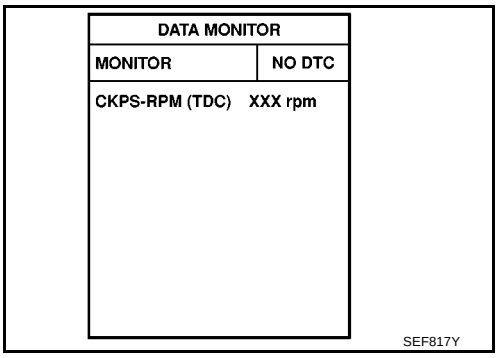
EBS013MN

NOTE:
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 the ambient temperature is more than -20°C (-4°F).

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-145, "Diagnostic Procedure"
.



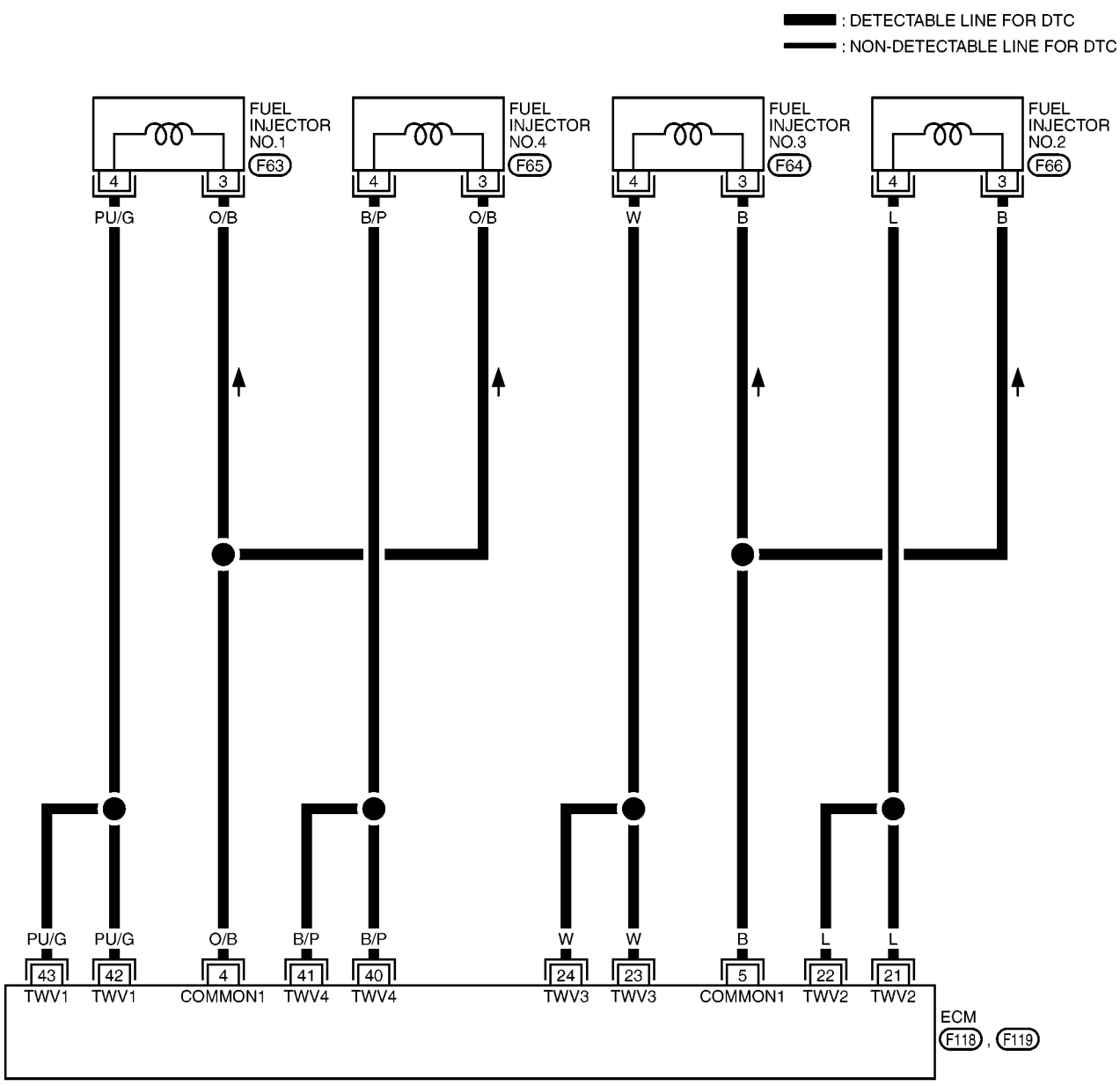
WITH GST

Follow the procedure “WITH CONSULT-II” above.

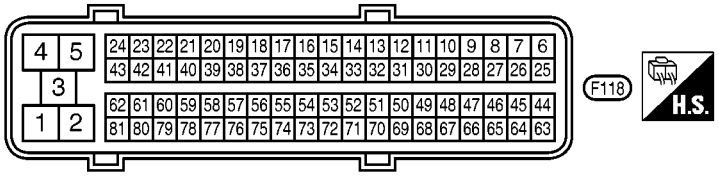
Wiring Diagram

EBS013MO

EC-INJECT-01







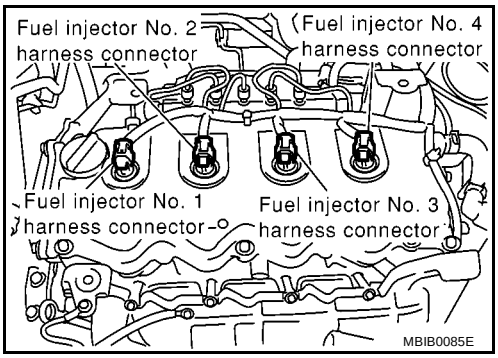
MBWA0634E

Diagnostic Procedure

EBS013MP

1. CHECK FUEL INJECTOR POWER SUPPLY FOR OPEN AND SHORT CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector harness connector.
4. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.



DTC	Terminal		Cylinder
	ECM	Fuel injector	
P0201	4	3	No.1
P0202	5	3	No.2
P0203	5	3	No.3
P0204	4	3	No.4

Continuity should exist.

5. 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 FUEL INJECOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.

DTC	Terminal		Cylinder
	ECM	Fuel injector	
P0201	42, 43	4	No.1
P0202	21, 22	4	No.2
P0203	23, 24	4	No.3
P0204	40, 41	4	No.4

Continuity should exist.

2. 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 FUEL INJECTOR-I

Refer to EC-146, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel injector.

4. CHECK FUEL INJECTOR-II

With CONSULT-II

1. Remove two fuel injectors of malfunctioning cylinder and another cylinder.
2. Install fuel injectors to different cylinder.
3. Reconnect ECM harness connector and fuel injector harness connector.
4. Turn ignition switch ON.
5. Select “SELF DIAG RESULTS” mode with CONSULT-II.
6. Touch “ERASE”.
7. Perform EC-143, "DTC Confirmation Procedure" .
8. Is another DTC displayed?

With GST

1. Remove two fuel injectors of malfunctioning cylinder and another cylinder.
2. Install fuel injectors to different cylinder.
3. Reconnect ECM harness connector and fuel injector harness connector.
4. Turn ignition switch ON.
5. Select MODE4 with GST.
6. Touch “ERASE”.
7. Perform EC-143, "DTC Confirmation Procedure" .
8. Is another DTC displayed?

Yes or No

Yes >> Replace fuel injector of malfunctioning cylinder.
No >> GO TO 5.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

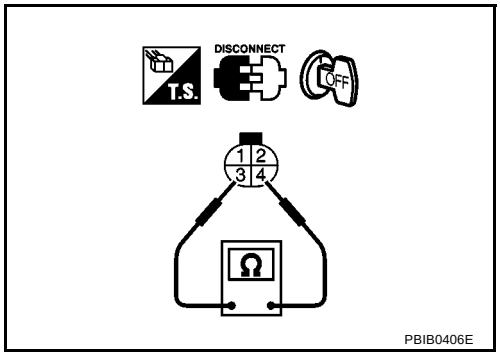
EBS013MQ

FUEL INJECTOR

1. Disconnect fuel injector.
2. Check continuity between terminals as shown in the figure.

Continuity should exist.

3. If NG, replace fuel injector.



Removal and Installation

EBS013MR

FUEL INJECTOR

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

DTC P0217 ENGINE OVER TEMPERATURE

PFP:21481

System Description

EBS013MS

NOTE:
If DTC P0217 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to EC-83, "DTC U1000 CAN COMMUNICATION LINE" .

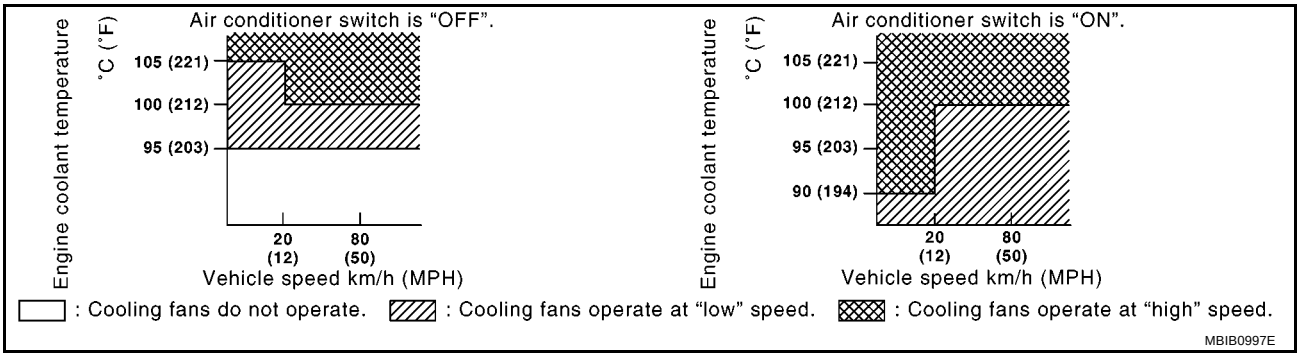
COOLING FAN CONTROL

Sensor	Input signal to ECM	ECM function	Actuator
Vehicle speed sensor*1	Vehicle speed	Cooling fan control	Cooling fan relay *2
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch*1	Air conditioner ON signal		

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

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

OPERATION



CONSULT-II Reference Value in Data Monitor Mode

EBS013MT

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
COOLING FAN	● When cooling fan is stopped.	OFF
	● When cooling fans operate at low speed.	LOW
	● When cooling fans operate at high speed.	HI

On Board Diagnosis Logic

EBS013MV

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0217	Engine over temperature (Overheat)	● Cooling fan does not operate properly (Overheat). ● Cooling fan system does not operate properly (Overheat). ● Engine coolant was not added to the system using the proper filling method. ● Engine coolant is not within the specified range.	● Harness or connectors (The cooling fan circuit is open or shorted.) ● Cooling fan ● Radiator hose ● Radiator ● Radiator cap ● Water pump ● Thermostat For more information, refer to EC-162, "Main 12 Causes of Overheating" .

Overall Function Check

EBS013MW

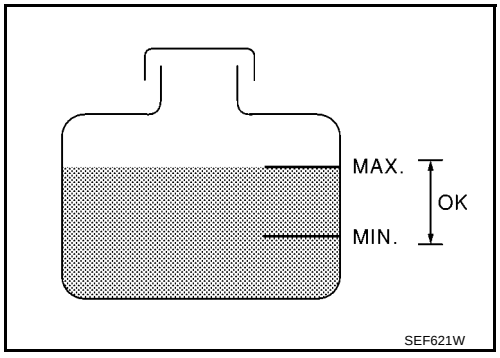
Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

WARNING:

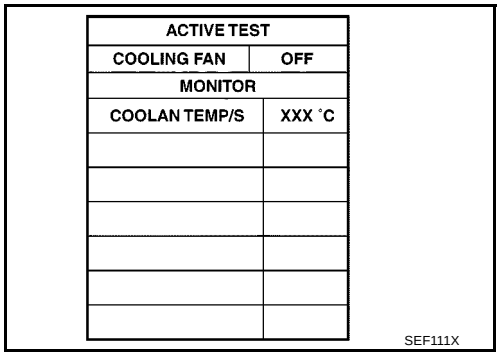
- **Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.**
- **Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.**

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-152, "Diagnostic Procedure" .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-152, "Diagnostic Procedure" .
3. Turn ignition switch ON.

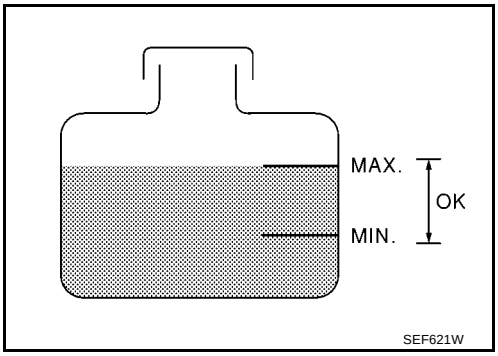


4. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II.
5. If the results are NG, go to EC-152, "Diagnostic Procedure" .

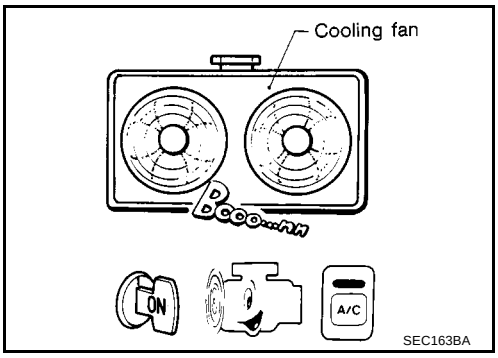


WITHOUT CONSULT-II

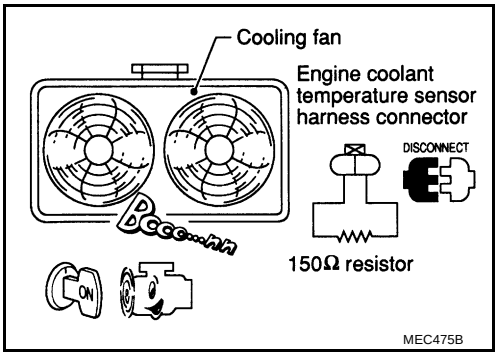
1. Check the coolant level in the reservoir tank and radiator.
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-152, "Diagnostic Procedure" .



2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-152, "Diagnostic Procedure" .
3. Start engine.
   Be careful not to overheat engine.
4. Set temperature control lever to full cold position.
5. Turn air conditioner switch ON.
6. Turn blower fan switch ON.
7. Run engine at idle for a few minutes with air conditioner operating.
   Be careful not to overheat engine.
8. Make sure that cooling fans operates at low speed.
   If NG, go to EC-152, "Diagnostic Procedure" .
   If OK, go to the following step.



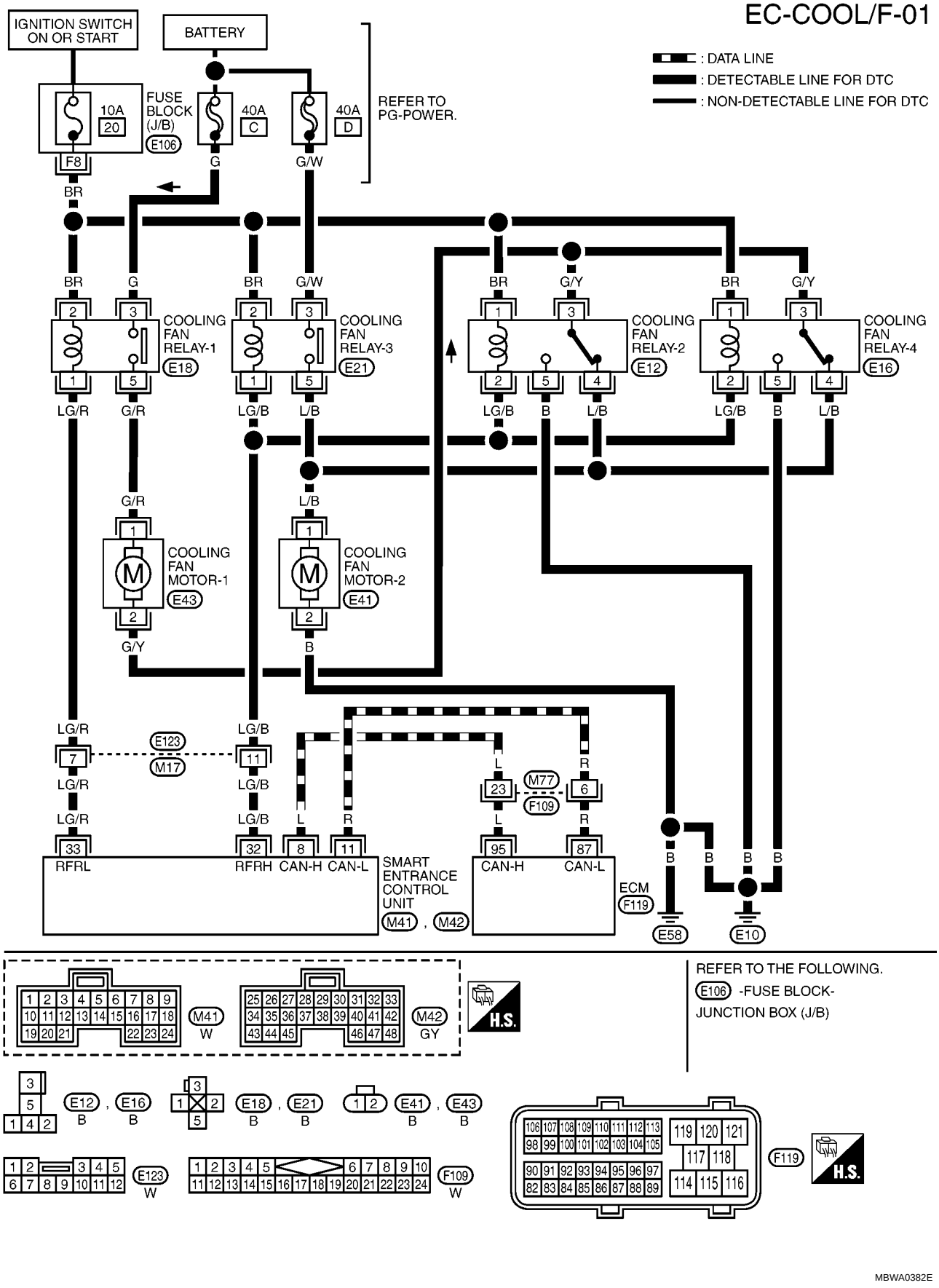
9. Turn ignition switch OFF.
10. Turn air conditioner switch and blower fan switch OFF.
11. Disconnect engine coolant temperature sensor harness connector.
12. Connect 150Ω resistor to engine coolant temperature sensor harness connector.



13. Restart engine and make sure that cooling fan operates at higher speed than low speed.
    Be careful not to overheat engine.
14. If NG, go to EC-152, "Diagnostic Procedure" .

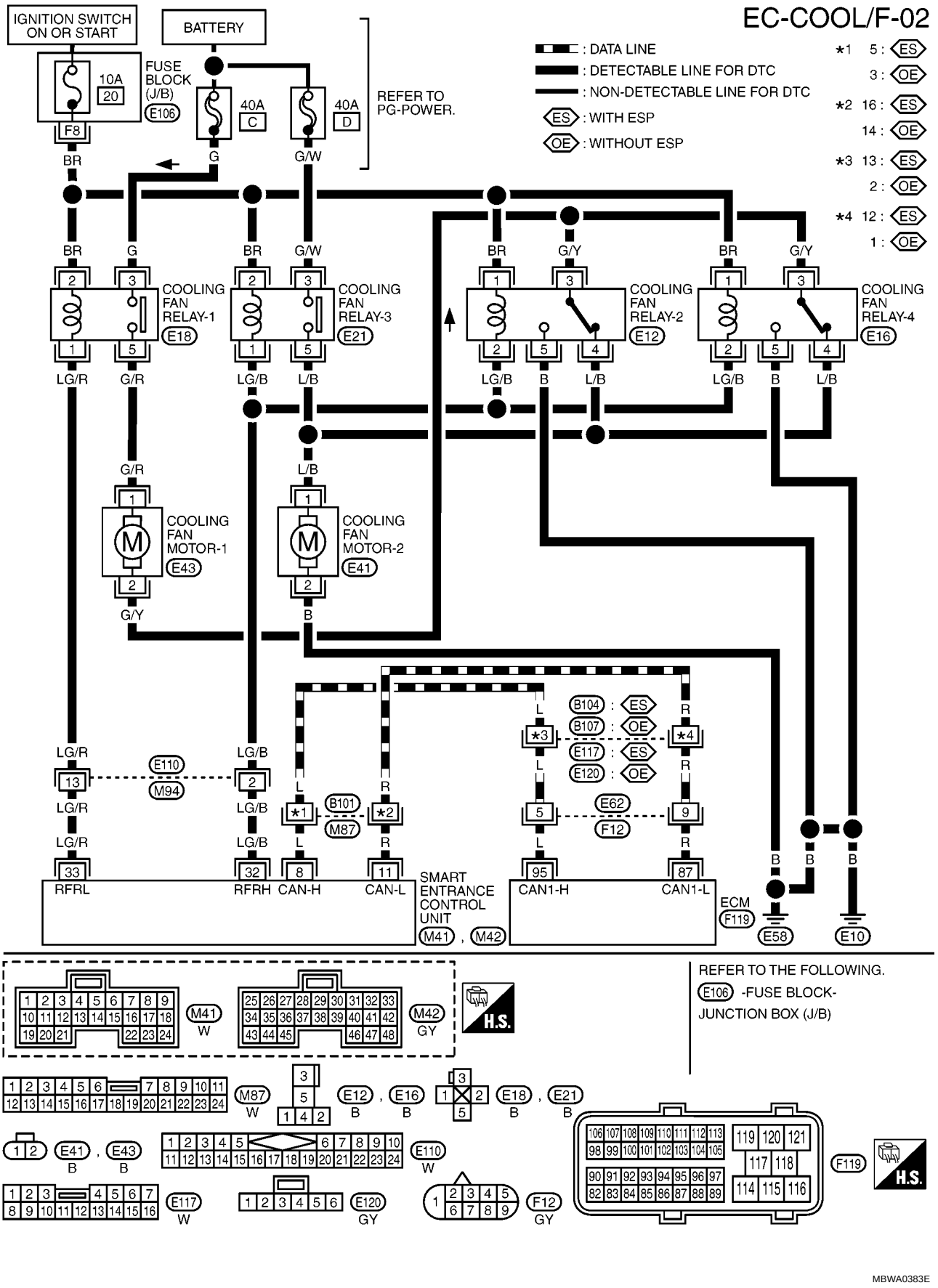
Wiring Diagram
LHD MODELS

EBS013MX



MBWA0382E

RHD MODELS



MBWA0383E

Diagnostic Procedure

EBS0152H

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.
No >> GO TO 5.

2. CHECK COOLING FAN LOW SPEED OPERATION

With CONSULT-II

1. Turn ignition switch ON.
2. Perform “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-156, "PROCEDURE A" .)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

3. CHECK COOLING FAN HIGH SPEED OPERATION-I

With CONSULT-II

1. Touch “HIGH”on the CONSULT-II screen.
2. Make sure that cooling fan-1 operates at higher speed than low speed.

OK or NG

OK >> GO TO 4.
NG >> Check cooling fan high speed control circuit-1. (Go to EC-158, "PROCEDURE B" .)

ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

4. CHECK COOLING FAN HIGH SPEED OPERATION-II

With CONSULT-II

Make sure that cooling fan-2 operates at higher speed than low speed.

OK or NG

OK >> GO TO 8.
NG >> Check cooling fan high speed control circuit-2. (Go to EC-160, "PROCEDURE C" .)

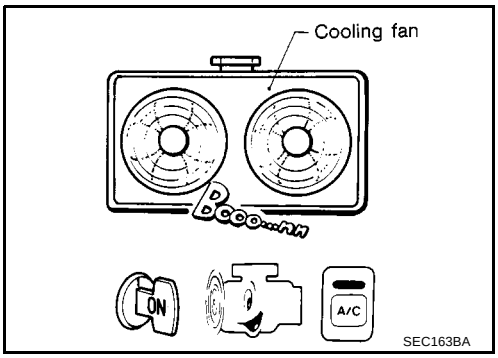
5. CHECK COOLING FAN LOW SPEED OPERATION

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 6.
NG >> Check cooling fan low speed control circuit. (Go to EC-156, "PROCEDURE A" .)



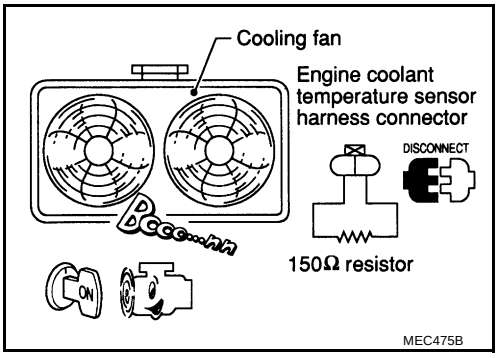
6. CHECK COOLING FAN HIGH SPEED OPERATION-I

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 fan-1 operates at higher speed than low speed.

OK or NG

OK >> GO TO 7.
NG >> Check cooling fan high speed control circuit-1. (Go to EC-158, "PROCEDURE B" .)



7. CHECK COOLING FAN HIGH SPEED OPERATION-II

Without CONSULT-II

Make sure that cooling fan-2 operates higher speed than lower speed.

OK or NG

OK >> GO TO 8.
NG >> Check cooling fan high speed control circuit-2. (Go to EC-160, "PROCEDURE C" .)

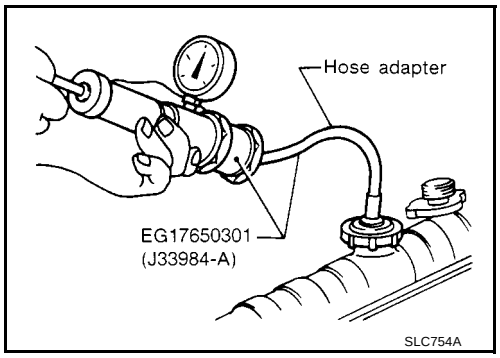
8. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

Testing pressure: 157 kPa (1.57 bar, 1.6 kg/cm^2 , 23psi)

CAUTION:
Higher than the specified pressure may cause radiator damage.

Pressure should not drop.



OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following for leak.

- Hose
- Radiator
- Water pump (Refer to CO-17, "WATER PUMP" .)

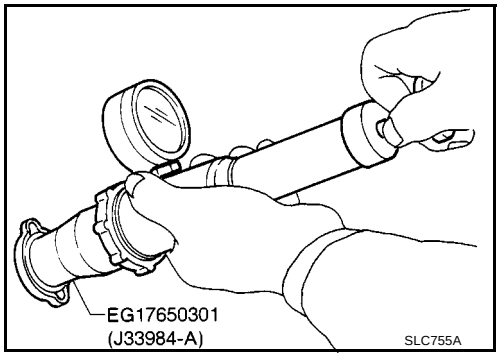
>> Repair or replace.

10. CHECK RADIATOR CAP

Apply pressure to cap with a tester and check radiator cap relief pressure.

Radiator cap relief pressure:

59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi)



OK or NG

OK >> GO TO 11.
NG >> Replace radiator cap.

11. CHECK THERMOSTAT

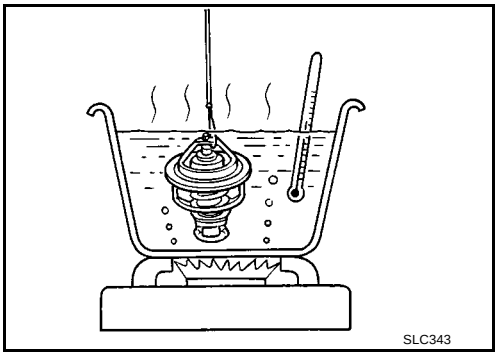
1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.
   It should seat tightly.
3. Check valve opening temperature and valve lift.

   Valve opening temperature:

   80.5 - 83.5 °C (177 - 182 °F)

   Valve lift:

   More than 8 mm/95 °C (0.31 in/203 °F)



4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to CO-19, "THERMOSTAT AND WATER PIPING" .

OK or NG

OK >> GO TO 12.
NG >> Replace thermostat.

12. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-123, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Replace engine coolant temperature sensor.

13. CHECK MAIN 12 CAUSES

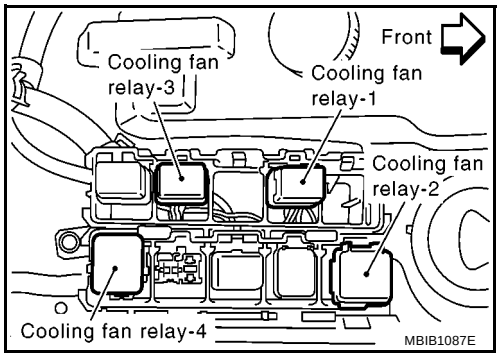
If the cause cannot be isolated, go to EC-162, "Main 12 Causes of Overheating" .

>> **INSPECTION END**

PROCEDURE A

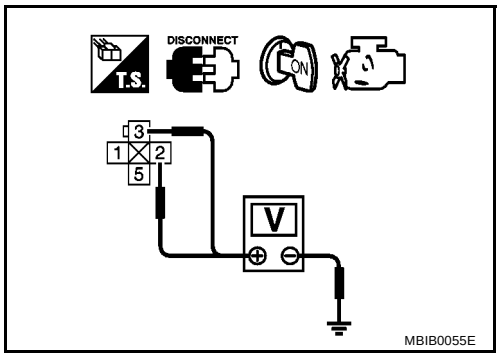
1. CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relay-1.
3. Turn ignition switch ON.



4. Check voltage between cooling fan relay-1 terminals 2, 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

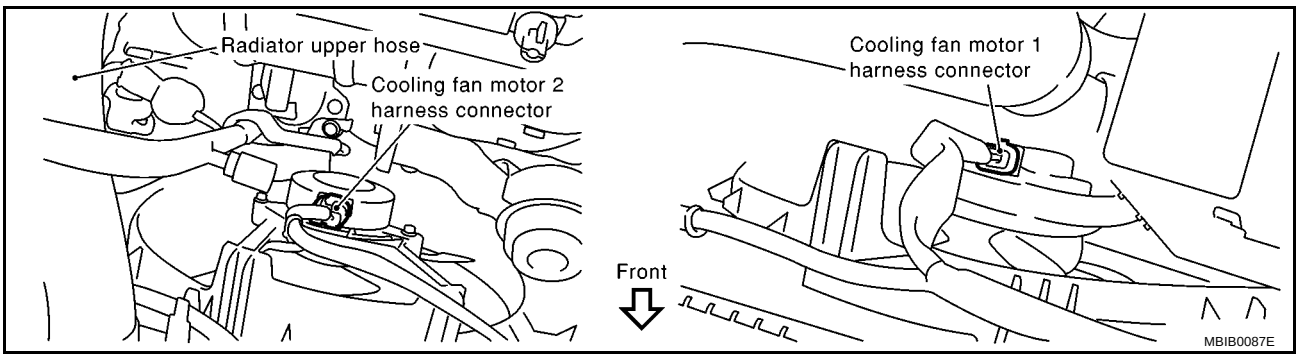
Check the following.

- Fuse block (J/B) connector E106
- 10A fuse
- 40A fusible link
- Harness for open or short between cooling fan relay-1 and fuse
- Harness for open or short between cooling fan relay-1 and battery

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

3. CHECK COOLING FAN MOTORS CONTROL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.



3. Disconnect cooling fan relay-2 and cooling fan relay-4.
4. Check harness continuity between the following.

- Cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1
- Cooling fan motor-1 terminal 2 and cooling fan relay-2 terminal 3
- Cooling fan motor-1 terminal 2 and cooling fan relay-4 terminal 3
- Cooling fan relay-2 terminal 4 and cooling fan motor-2 terminal 1
- Cooling fan relay-4 terminal 4 and cooling fan motor-2 terminal 1
- Cooling fan motor-2 terminal 2 and 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 MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

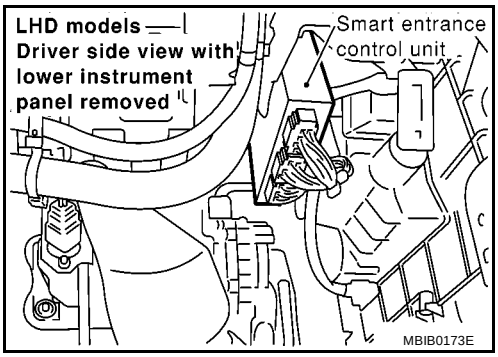
1. Disconnect smart entrance control unit harness connector.
2. Check harness continuity between cooling fan relay-1 terminal 1 and smart entrance control unit terminal 33.
   Refer to Wiring Diagram.

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 E123, M17 (LHD models)
- Harness connectors E110, M94 (RHD models)
- Harness for open or short between cooling fan relay-1 and smart entrance control unit

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

6. CHECK COOLING FAN RELAYS-1, -2 AND 4

Refer to EC-163, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace cooling fan relay.

7. CHECK COOLING FAN MOTORS-1 AND -2

Refer to EC-163, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace cooling fan motors.

8. CHECK SMART ENTRANCE CONTROL UNIT

Refer to BCS-21, "Trouble Diagnoses" .

OK or NG

OK >> GO TO 9.
NG >> Replace smart entrance control unit.

9. CHECK INTERMITTENT INCIDENT

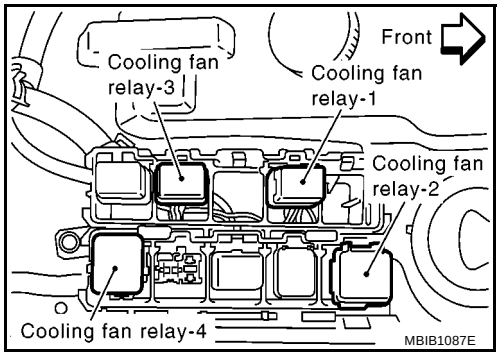
Perform EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

PROCEDURE B

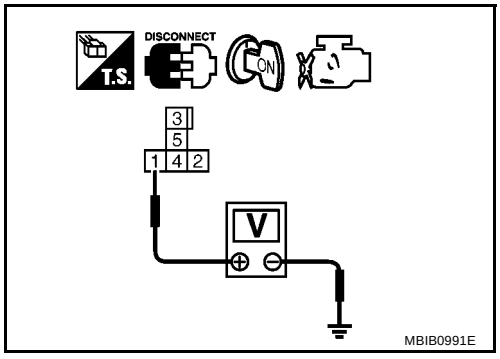
1. CHECK COOLING FAN RELAYS-2 AND -4 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relays-2 and -4.
3. Turn ignition switch ON.



4. Check voltage between cooling fan relays-2, -4 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.

- Fuse block (J/B) connector E106
- Harness for open or short between cooling fan relays-2, -4 and fuse

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

3. CHECK COOLING FAN RELAY GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between cooling fan relay-2 terminal 5 and ground, cooling fan relay-4 terminal 5 and ground.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to power.

OK or NG

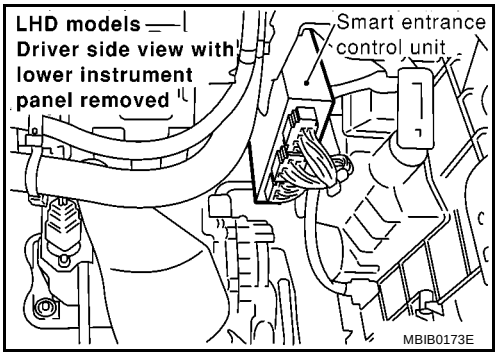
OK >> GO TO 4.
NG >> Repair open circuit or short to power in harness or connectors.

4. CHECK COOLING FAN MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect smart entrance control unit harness connector.
2. Check harness continuity between cooling fan relay-2 terminal 2 and smart entrance control unit terminal 32, cooling fan relay-4 terminal 2 and smart entrance control unit terminal 32.
   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 E123, M17 (LHD models)
- Harness connectors E110, M94 (RHD models)
- Harness for open or short between cooling fan relay-2 and smart entrance control unit
- Harness for open or short between cooling fan relay-4 and smart entrance control unit

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

6. CHECK COOLING FAN RELAYS-2 AND -4

Refer to EC-163, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace cooling fan relays.

7. CHECK SMART ENTRANCE CONTROL UNIT

Refer to BCS-21, "Trouble Diagnoses" .

OK or NG

OK >> GO TO 8.
NG >> Replace smart entrance control unit.

8. CHECK INTERMITTENT INCIDENT

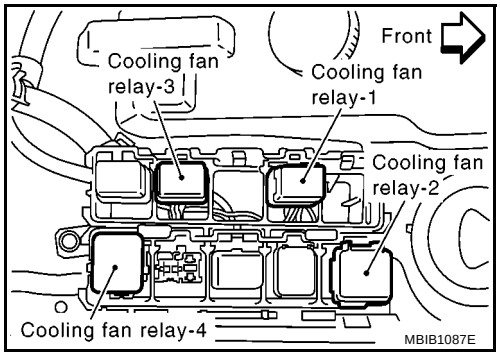
Perform EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

PROCEDURE C

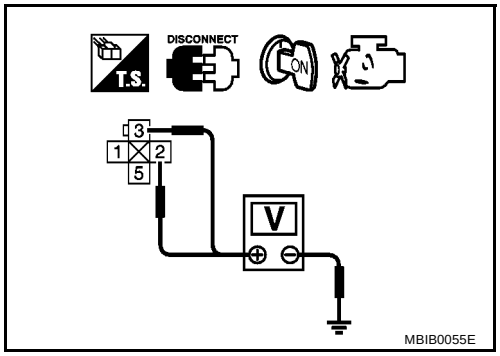
1. CHECK COOLING FAN MOTOR-2 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relay-3.
3. Turn ignition switch ON.



4. Check voltage between cooling fan relay-3 terminals 2, 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

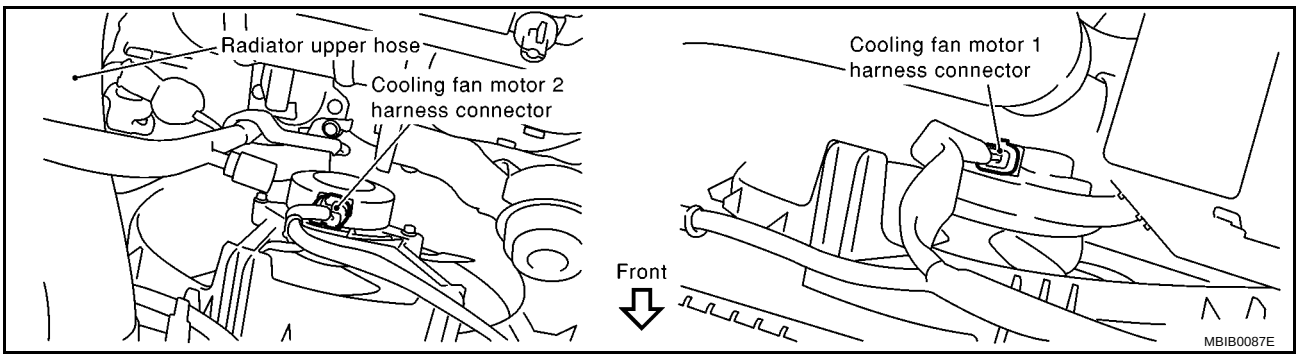
Check the following.

- Fuse block (J/B) connector E106
- 40A fusible link
- Harness for open or short between cooling fan relay-3 and fuse
- Harness for open or short between cooling fan relay-3 and battery

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

3. CHECK COOLING FAN MOTOR CONTROL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-2 harness connector.



3. Check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground short to power in harness or connectors.

4. CHECK COOLING FAN MOTOR CONTROL CIRCUIT FOR SHORT TO GROUND

Check harness continuity between cooling fan relay-3 terminal 5 or cooling fan motor-2 terminal 1 and ground. Refer to Wiring Diagram.

Continuity should not exist.

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Cooling fan relays-2 and -4 (Refer to EC-163, "Component Inspection")
- Harness for short to ground between cooling fan relay-2 and cooling fan motor-2
- Harness for short to ground between cooling fan relay-3 and cooling fan motor-2
- Harness for short to ground between cooling fan relay-4 and cooling fan motor-2

>> Repair or replace.

6. CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

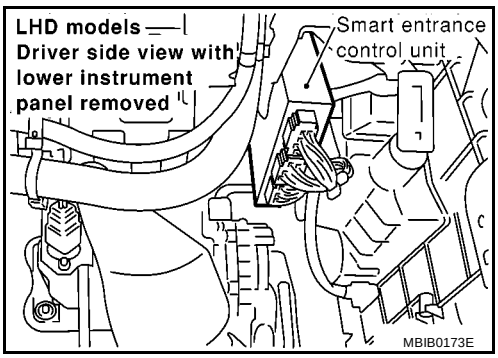
1. Disconnect smart entrance control unit harness connector.
2. Check harness continuity between cooling fan relay-3 terminal 1 and smart entrance control unit terminal 32. Refer to Wiring Diagram.

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 E123, M17 (LHD models)
- Harness connectors E110, M94 (RHD models)
- Harness for open or short between cooling fan relay-3 and smart entrance control unit

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

8. CHECK COOLING FAN RELAY-3

Refer toEC-163, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace cooling fan relay.

9. CHECK SMART ENTRANCE CONTROL UNIT

Refer to BCS-21, "Trouble Diagnoses" .

OK or NG

OK >> GO TO 10.
NG >> Replace smart entrance control unit.

10. CHECK INTERMITTENT INCIDENT

Perform EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Main 12 Causes of Overheating

EBS0152I

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper	● Visual	No blocking	—
	2	● Coolant mixture	● Coolant tester	50 - 50% coolant mixture	See MA-16, "Engine Coolant Mixture Ratio" .
	3	● Coolant level	● Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See CO-8, "LEVEL CHECK" .
	4	● Radiator cap	● Pressure tester	59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi) (Limit)	See MA-19, "CHECKING RADIATOR CAP" .
ON*2	5	● Coolant leaks	● Visual	No leaks	See CO-8, "LEAK CHECK" .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See CO-19, "THERMOSTAT AND WATER PIPING" , and CO-13, "RADIATOR (ALUMINUM TYPE)" .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P0217 (EC-147).
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See MA-17, "Changing Engine Coolant" .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See CO-8, "LEVEL CHECK" .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	SeeEM-78, "CYLINDER HEAD" .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See EM-93, "CYLINDER BLOCK" .

*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-5, "OVERHEATING CAUSE ANALYSIS" .

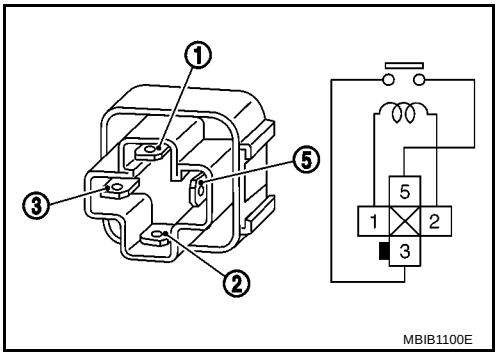
Component Inspection

EBS0152J

COOLING FAN RELAYS-1 AND -3

Check continuity between terminals 3 and 5 under the following conditions.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

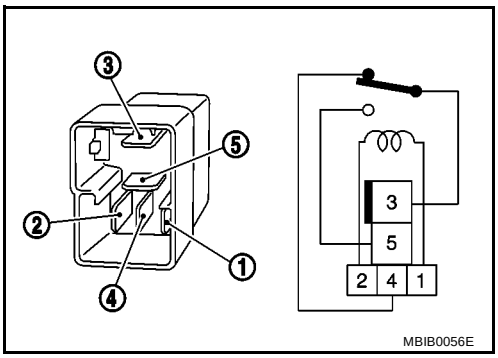


MBIB1100E

COOLING FAN RELAYS-2 AND -4

Check continuity between terminals 3 and 4, 3 and 5 under the following conditions.

Conditions	Terminals	Continuity
12V direct current supply between terminals 1 and 2	3 and 4	No
	3 and 5	Yes
No current supply	3 and 4	Yes
	3 and 5	No

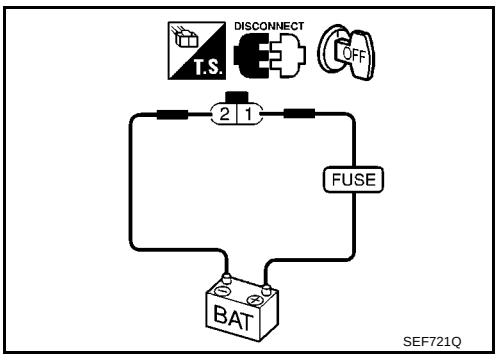


MBIB0056E

COOLING FAN MOTORS-1 AND -2

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Terminals	
	(+)	(-)
Cooling fan motor	1	2



SEF721Q

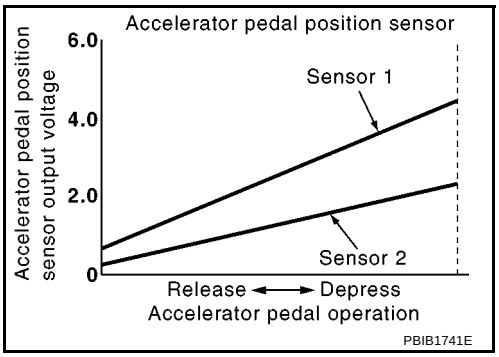
DTC P0222, P0223 APP SENSOR

PFP:18002

Description

EBS013N1

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS013N2

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS013N3

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013N4

These self-diagnoses have the one trip detection logic.
The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222	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)
P0223	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

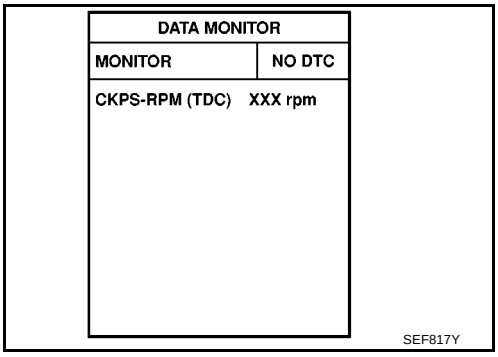
DTC Confirmation Procedure

EBS013N5

NOTE:
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-167, "Diagnostic Procedure" .



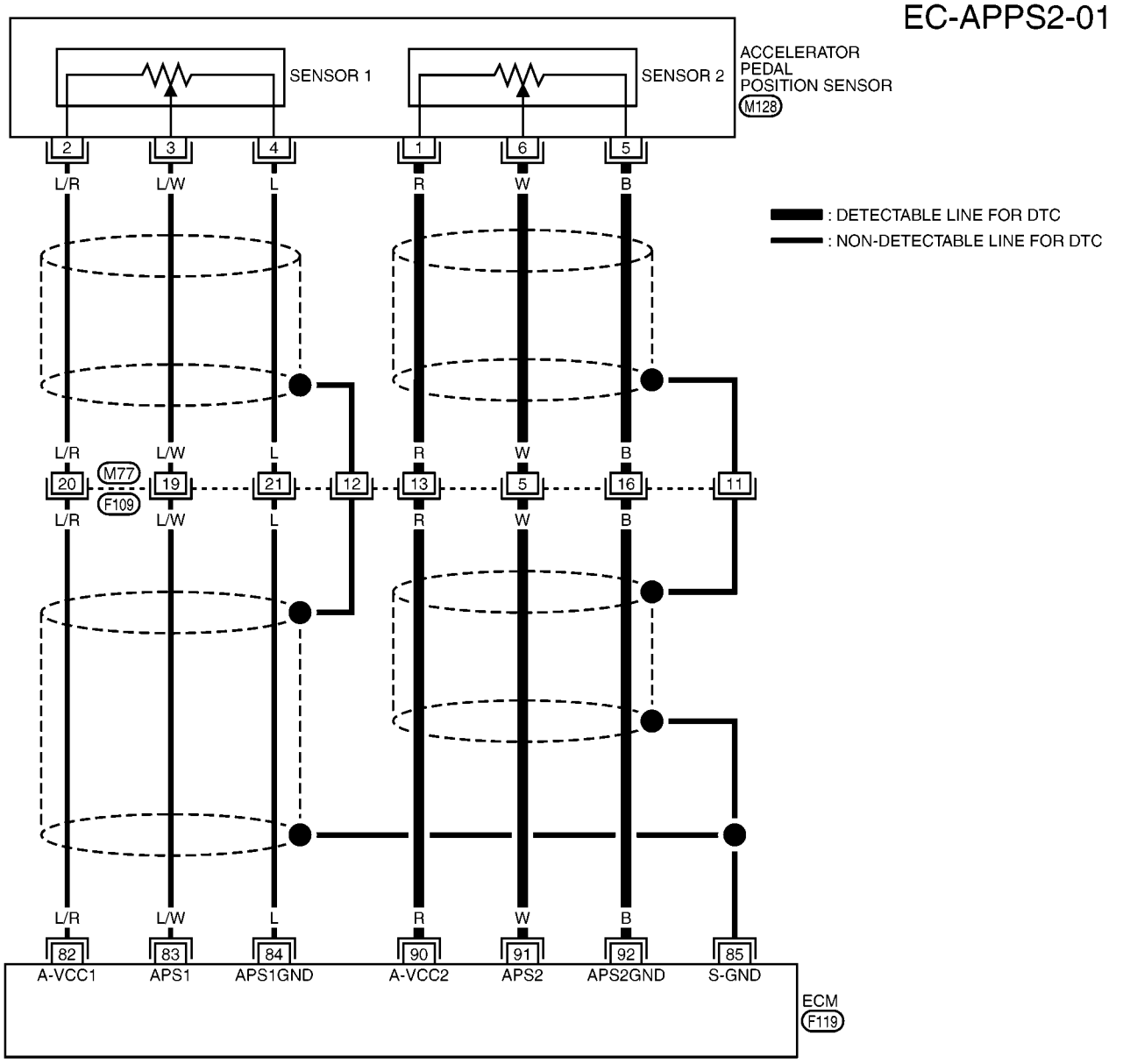
WITH GST

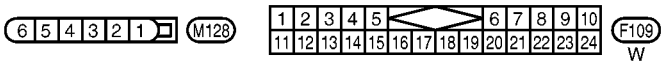
Follow the procedure “WITH CONSULT-II” above.

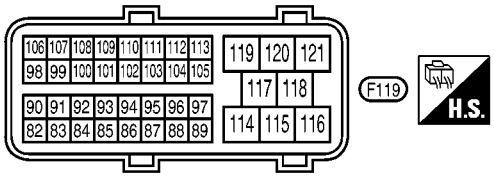
Wiring Diagram

EBS013N6

EC-APPS2-01







MBWA0432E

Diagnostic Procedure

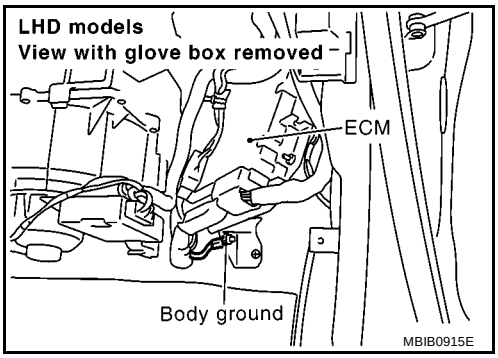
EBS013N7

1. CHCEK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

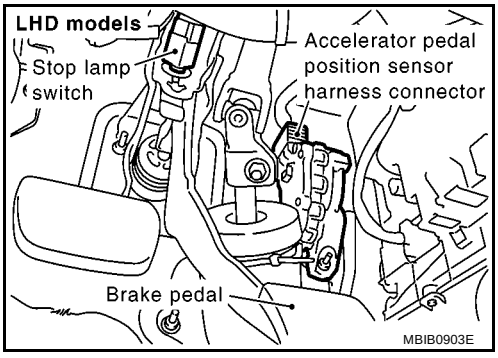
OK or NG

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



2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

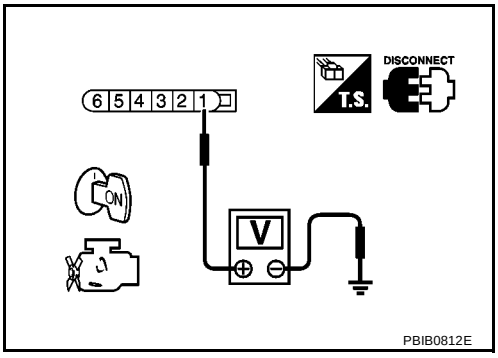


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F109, M77
- Harness for open or short between ECM and APP 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. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 92.
   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 F109, M77
- Harness for open or short between ECM and APP 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. Check harness continuity between ECM terminal 91 and APP sensor terminal 6.
   Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F109, M77
- Harness for open or short between ECM and APP sensor

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

8. CHECK APP SENSOR

Refer to EC-168, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

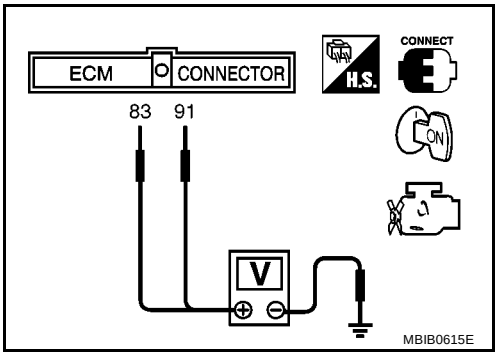
Component Inspection

EBS013N8

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and body ground under the following conditions.



Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.3V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V

4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS013N9

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

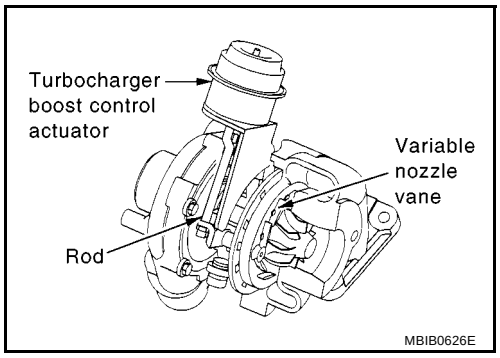
DTC P0234 TC SYSTEM

PFP:14411

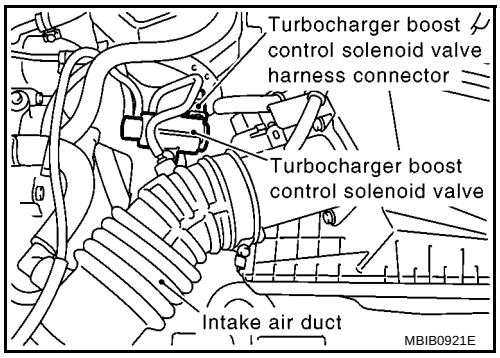
Description

EBS013NA

The load from the turbocharger boost control solenoid valve controls the actuator. By changing the variable nozzle vane opening through the rods, the intake air volume is adjusted.



The turbocharger boost control solenoid valve is moved by ON/OFF pulse from the ECM. The longer the ON pulse, the charge air pressure rises.



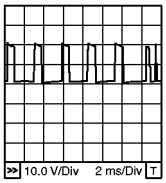
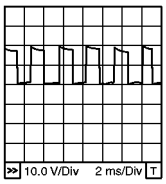
ECM Terminals and Reference Value

EBS013NB

Specification data are reference valves, and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
6	L	Turbocharger boost control solenoid valve	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0889E
			[Ignition switch ON] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0890E

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

On Board Diagnosis Logic

EBS013NC

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

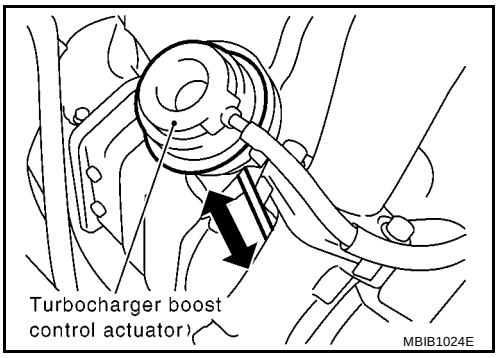
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0234	Turbocharger overboost condition	ECM detects turbocharger boost pressure is excessively high.	● Turbocharger ● Vacuum pump ● Turbocharger boost sensor ● Turbocharger boost control solenoid valve

Overall Function Check

EBS013ND

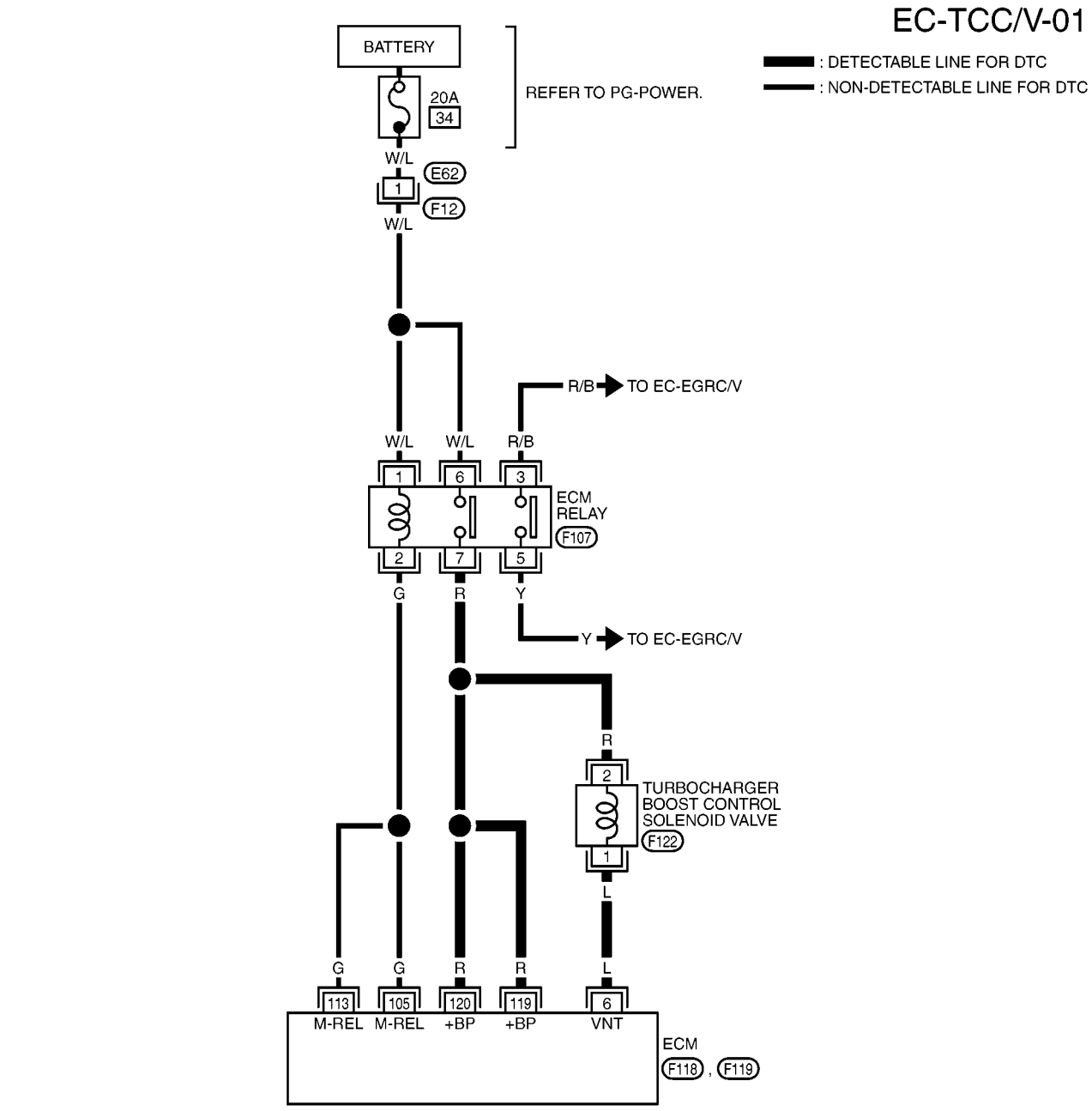
Use this procedure to check the overall function of the turbocharger. During this check, a DTC might not be confirmed.

1. Start engine and let it idle.
2. Make sure that turbocharger control actuator rod moves slightly when engine is started.
3. If NG, go to EC-173, "Diagnostic Procedure" .



Wiring Diagram

EBS013NE



MBWA0617E

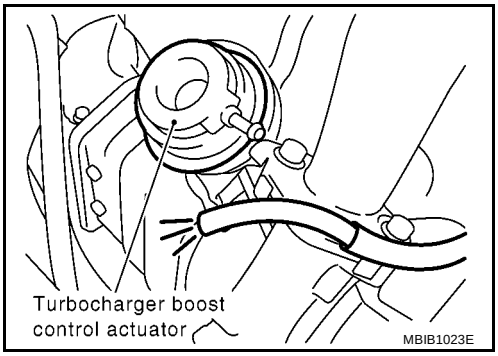
Diagnostic Procedure

EBS013NF

1. CHECK VACUUM SOURCE

1. Turn ignition switch OFF.
2. Disconnect vacuum hose connected to turbocharger control actuator.
3. Start engine and let it idle.
4. Check vacuum hose for vacuum existence.

Vacuum should exist.

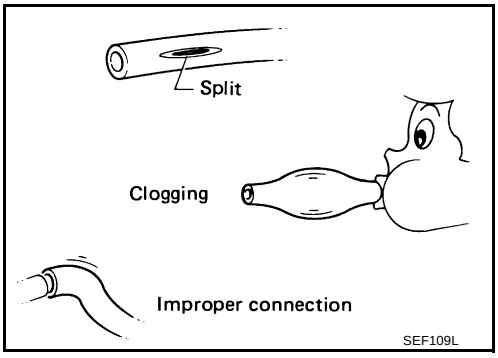


OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

2. CHECK VACUUM HOSES AND VACUUM GALLERY

1. Turn ignition switch OFF.
2. Check vacuum hoses and vacuum gallery for clogging, cracks or improper connection. Refer to EC-22, "Vacuum Hose Drawing" .

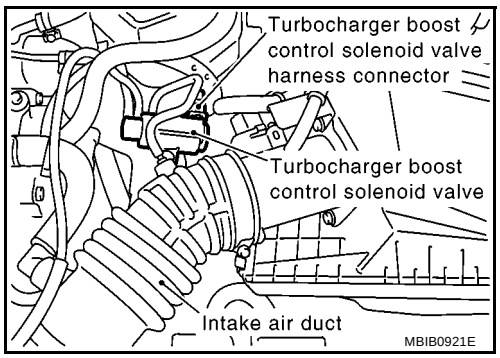


OK or NG

OK >> GO TO 3.
NG >> Repair or replace vacuum hoses and vacuum gallery.

3. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect turbocharger boost control solenoid valve harness connector.
2. Turn ignition switch ON.

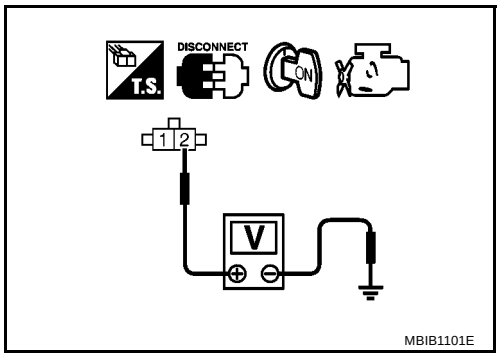


3. Check voltage between turbocharger boost control solenoid valve terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage

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 TURBOCHARGER BOOST 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 6 and turbocharger boost 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 >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK TURBOCHARGE BOOST CONTROL SOLENOID VALVE

Refer to EC-176, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace turbocharger boost control solenoid valve.

6. CHECK VACUUM PUMP

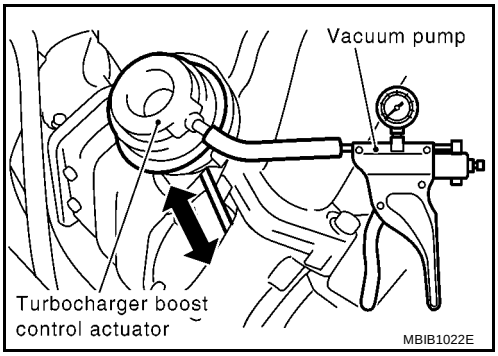
Refer to EM-35, "VACUUM PUMP" .

OK or NG

OK >> GO TO 7.
NG >> Replace vacuum pump assembly.

7. CHECK TURBOCHARGER BOOST CONTROL ACTUATOR

1. Turn ignition switch OFF.
2. Install a vacuum pump to turbocharger boost control actuator.
3. Make sure that the turbocharger boost control actuator rod moves smoothly when applying vacuum of -53.3kPa (-533mbar, -400mmHg, -15.75inHg) and releasing it.



OK or NG

OK >> GO TO 8.
NG >> Replace turbocharger assembly.

8. CHECK TURBOCHARGER BOOST SENSOR

Refer to EC-181, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace turbocharger boost sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

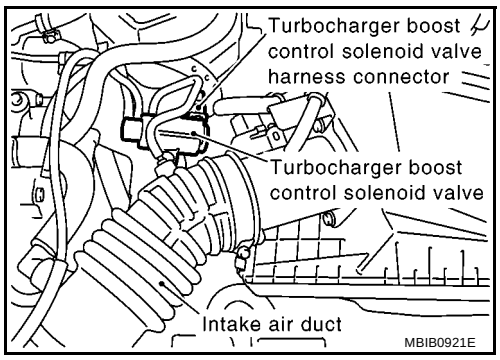
>> **INSPECTION END**

Component Inspection

EBS013NG

TURBOCHARGER BOOST CONTROL SOLENOID VALVE

1. Disconnect turbocharger boost control solenoid valve harness connector.

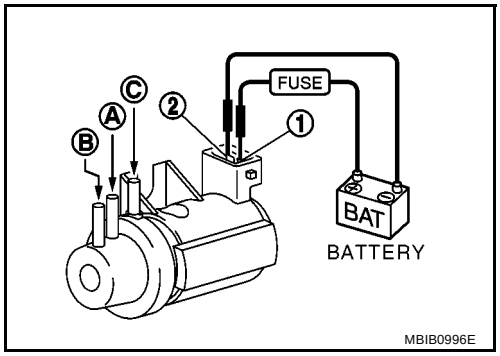


2. Apply 12V direct current between turbocharger boost control solenoid valve terminals.
3. Check air passage continuity of turbocharger boost control solenoid valve under the following conditions.

CONDITIONS	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.

If NG, replace turbocharger boost control solenoid valve.



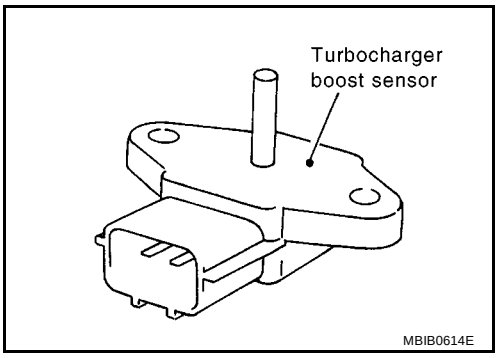
DTC P0237, P0238 TC BOOST SENSOR

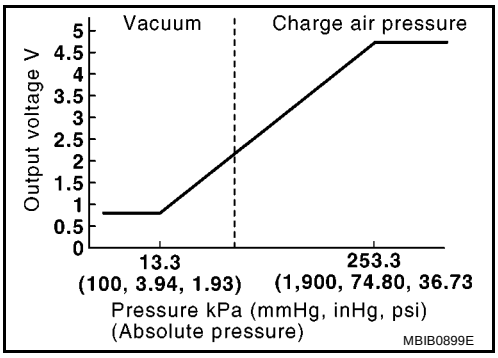
PFP:22365

Component Description

EBS013NH

The turbocharger boost sensor detects pressure in the exit side of the charge air cooler. The sensor output voltage to the ECM increases as pressure increases.





CONSULT-II Reference Value in Data Monitor Mode

EBS013NI

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/M PRES SE [kPa]	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	Approx. 100 kPa
		2,800 rpm	Approx. 126 kPa
		4,000 rpm	Approx. 106 kPa

ECM Terminals and Reference Value

EBS013NJ

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 damage the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
52	Y	Turbocharger boost sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	2.3 - 2.6V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.5 - 2.8V
64	W	Turbocharger boost sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
71	B	Turbocharger boost sensor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013NK

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0237	Turbocharger boost sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Turbocharger boost sensor
P0238	Turbocharger boost sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

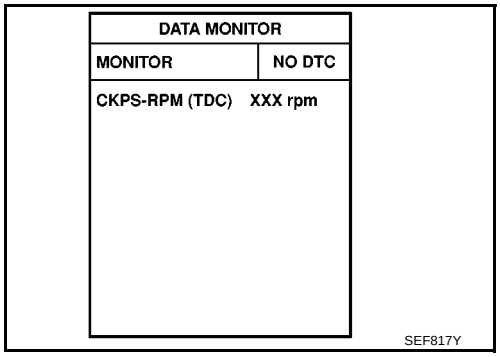
DTC Confirmation Procedure

EBS013NL

NOTE:
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-180, "Diagnostic Procedure"
.



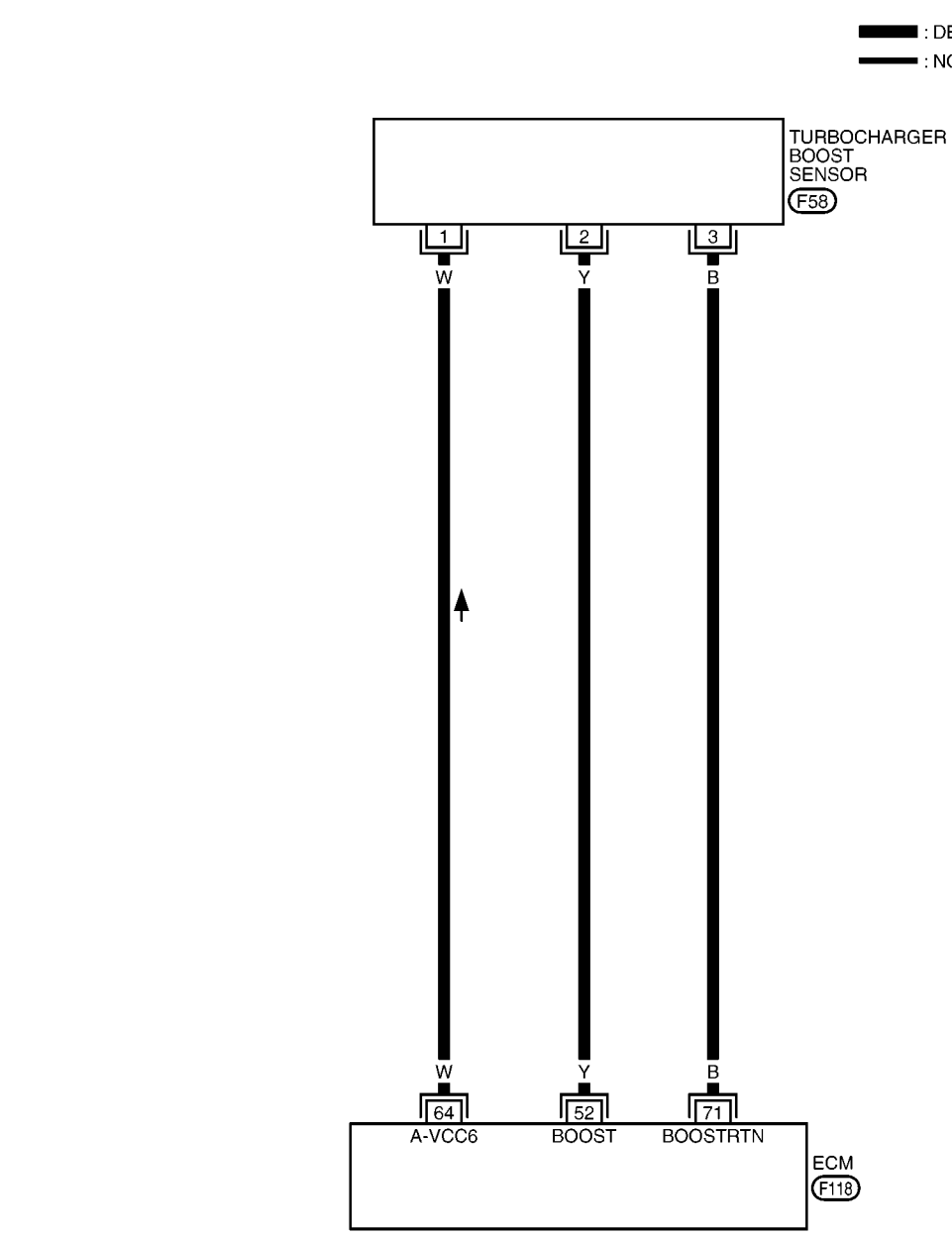
WITH GST

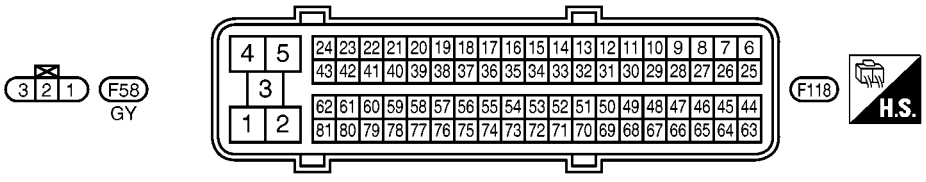
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013NM

EC-BOOST-01





MBWA0378E

Diagnostic Procedure

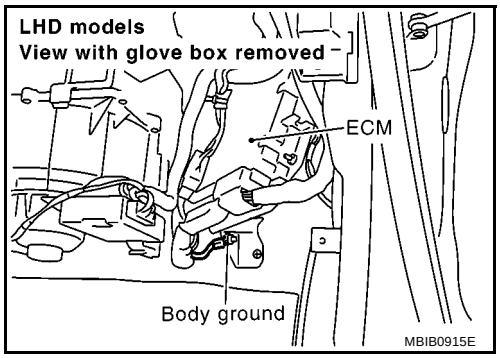
EBS013NN

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

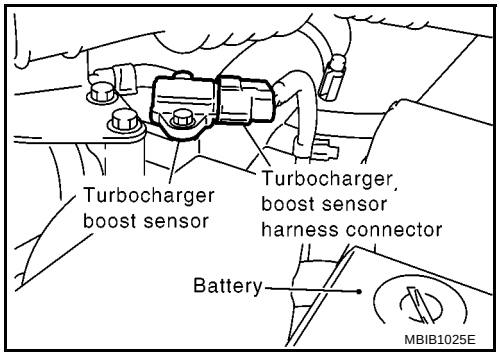
OK or NG

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



2. CHECK TURBOCHARGER BOOST SENSOR POWER SUPPLY CIRCUIT

1. Disconnect turbocharge boost sensor harness connector.
2. Turn ignition switch ON.

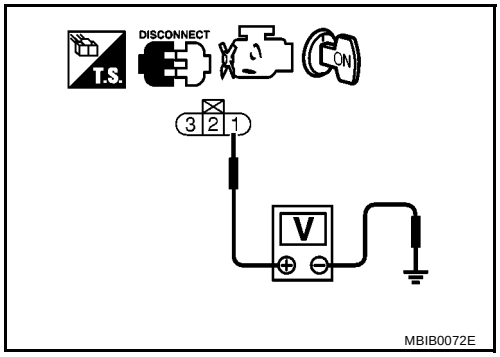


3. Check voltage between turbocharge boost sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 TURBOCHAGER BOOST SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between turbocharger boost sensor terminal 3 and ECM terminal 71. 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 TURBOCHAGER BOOST SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 52 and turbocharger boost sensor terminal 2. Refer to Wiring Diagram.

   Continuity should exist.

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

OK or NG

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

5. CHECK TURBOCHARGER BOOST SENSOR

Refer to EC-181, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace turbocharger boost sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

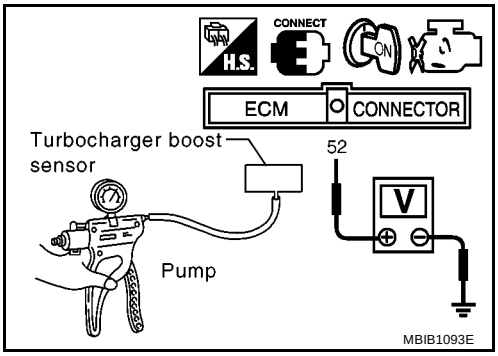
EBS013NO

CHECK TURBOCHARGER BOOST SENSOR

1. Remove turbocharger boost sensor with its harness connected.
2. Turn ignition switch ON.
3. Use pump to apply pressure sensor as shown in the figure.

   CAUTION:
   - **Always calibrate the pressure pump gauge when using it.**
   - **Inspection should be done at room temperature [10-30°C (50-86°F)].**
4. Check the output voltage between turbocharger boost sensor terminal 2 and body ground.

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mbar, 0 mmHg, 0 inHg)	Approximately 2.3V
+40 kPa (400 mbar, 300mmHg, 11.81 inHg)	Approximately 2.9V



Removal and Installation

EBS013NP

TURBOCHARGER BOOST SENSOR

Refer to
EM-17, "CHARGE AIR COOLER".

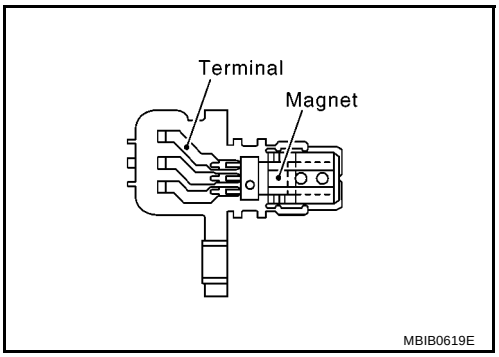
DTC P0335 CKP SENSOR

PFP:23731

Description

EBS013NQ

The crankshaft position sensor monitors engine speed by means of signals from the sensing plate (with 56 protrusions) installed to the fly wheel. The datum signal output is detected 6° signal and sent to the ECM. The sensor signal is used for fuel injection control and fuel injection timing control.



CONSULT-II Reference Value in Data Monitor Mode

EBS013NR

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
CKPS-RPM (TDC)	● Run engine and compare CONSULT-II value with the tachometer indication.	Almost the same speed as the tachometer indication

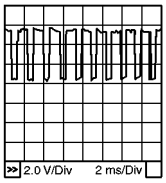
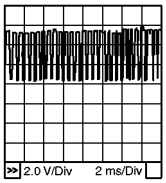
ECM Terminals and Reference Value

EBS013NS

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
44	L	Crankshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
46	L/W	Crankshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0879E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0880E
65	L/R	Crankshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V

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

On Board Diagnosis Logic

EBS013NT

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335	Crankshaft position sensor circuit	Crankshaft position sensor signal is not detect by the ECM when engine is running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Crankshaft position sensor

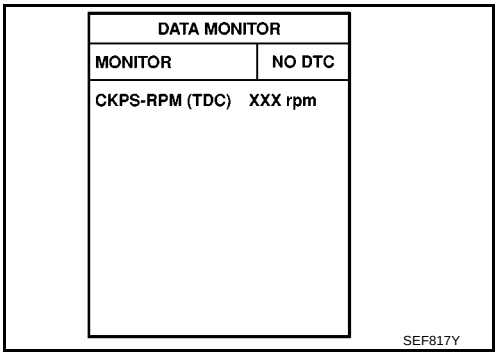
DTC Confirmation Procedure

EBS013NU

NOTE:
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.
   If engine could not start, keep ignition switch at START position for 5 seconds.
4. If 1st trip DTC is detected, go to EC-185, "Diagnostic Procedure"
   .



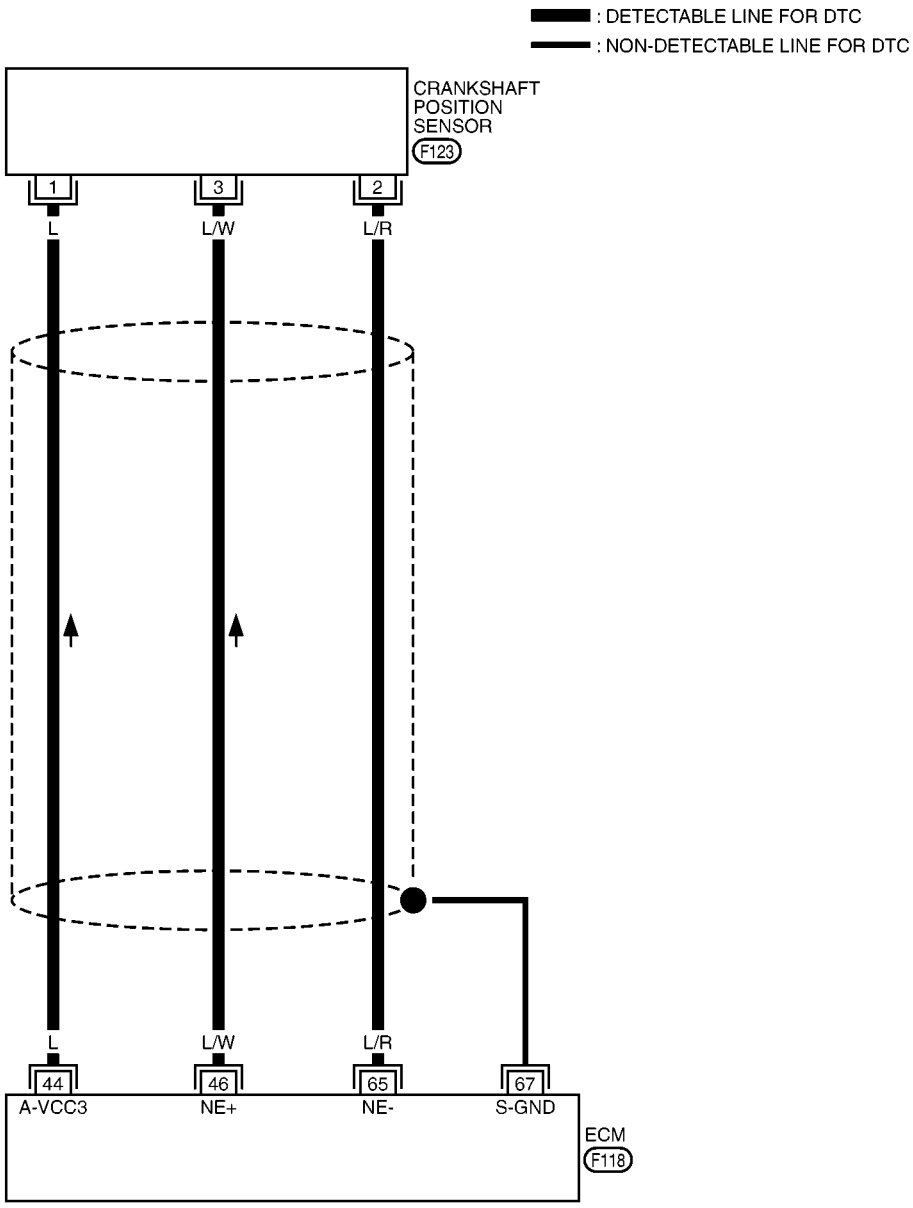
WITH GST

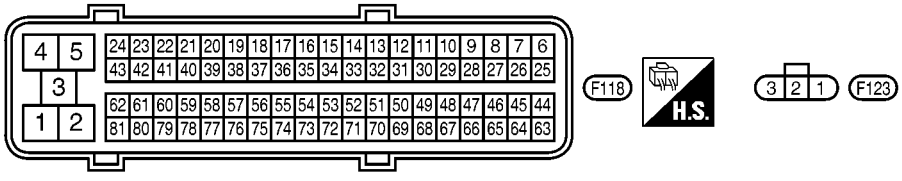
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013NV

EC-CKPS-01





MBWA0379E

Diagnostic Procedure

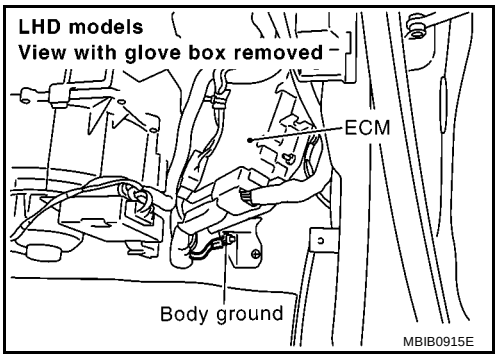
EBS013NW

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

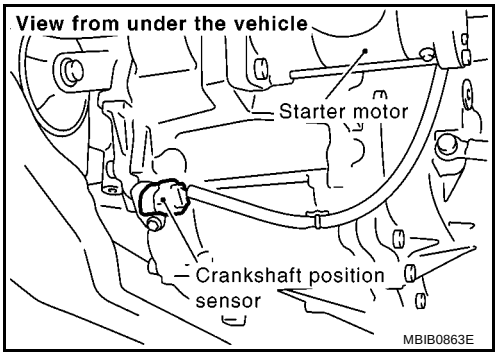
OK or NG

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



2. CHECK CKP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position sensor harness connector.
2. Turn ignition switch ON.

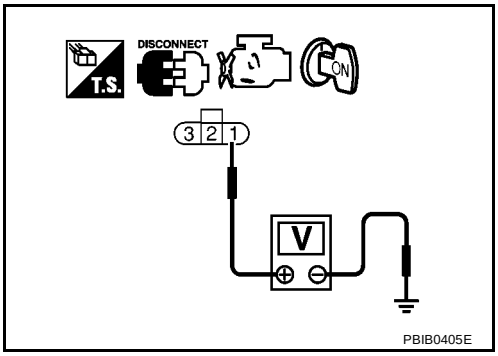


3. Check voltage between CKP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 CKP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 65 and CKP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for and 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 CKP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 46 and CKP sensor terminal 3.
   Refer to Wiring Diagram.

   Continuity should exist.

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

OK or NG

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

5. CHECK CRANKSHAFT POSITION SENSOR

Refer to EC-186, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace crankshaft position sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

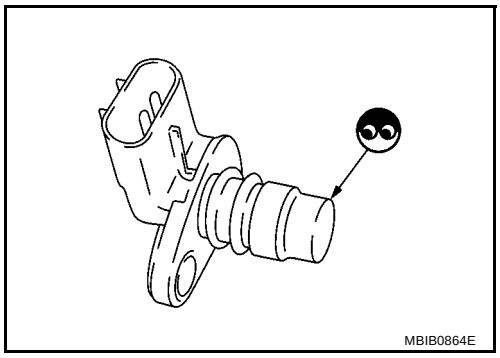
>> **INSPECTION END**

Component Inspection

EBS013NX

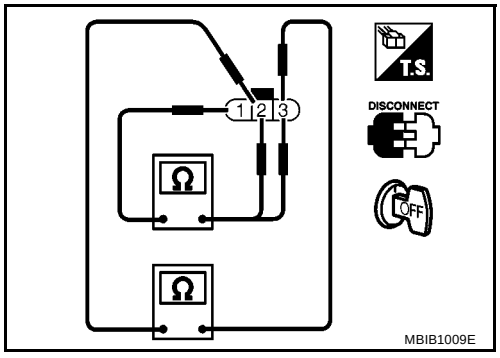
CRANKSHAFT POSITION SENSOR

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.


MBIB0864E

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0
1 (+) - 3 (-)	Except 0 or ∞
2 (+) - 3 (-)	Except 0



MBIB1009E

6. If NG, replace crankshaft position sensor.

Removal and Installation

EBS013NY

CRANKSHAFT POSITION SENSOR

Refer to EM-29, "OIL PAN AND OIL STRAINER" .

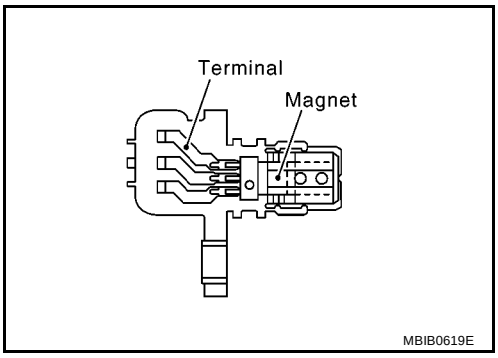
DTC P0336 CKP SENSOR

PFP:23731

Description

EBS013NZ

The crankshaft position sensor monitors engine speed by means of signals from the sensing plate (with 56 protrusions) installed to the fly wheel. The datum signal output is detected 6° signal and sent to the ECM. The sensor signal is used for fuel injection control and fuel injection timing control.



CONSULT-II Reference Value in Data Monitor Mode

EBS013O0

Specification data are reference values.

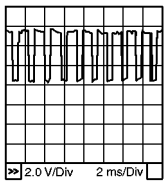
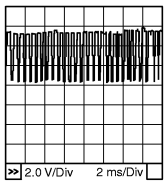
MONITOR ITEM	CONDITION	SPECIFICATION
CKPS·RPM (TDC)	● Tachometer: Connect ● Run engine and compare CONSULT-II value with the tachometer indication.	Almost the same speed as the tachometer indication.

ECM Terminals and Reference Value

EBS013O1

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

CAUTION:
Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
44	L	Crankshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
46	L/W	Crankshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0879E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0880E
65	L/R	Crankshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V

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

On Board Diagnosis Logic

EBS013O2

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0336	Crankshaft position sensor circuit range/performance	Crankshaft position sensor signal is not in the normal pattern when engine is running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Crankshaft position sensor ● Signal plate

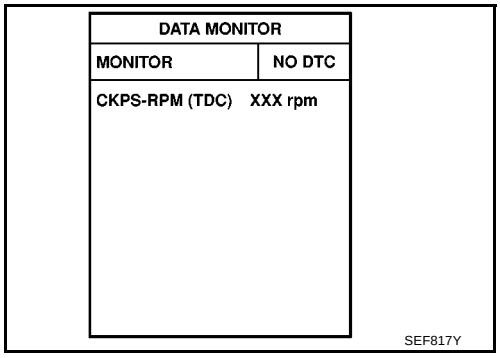
DTC Confirmation Procedure

EBS013O3

NOTE:
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.
   If engine could not start, keep ignition switch at START position for 5 seconds.
4. If 1st trip DTC is detected, go to EC-190, "Diagnostic Procedure"
   .



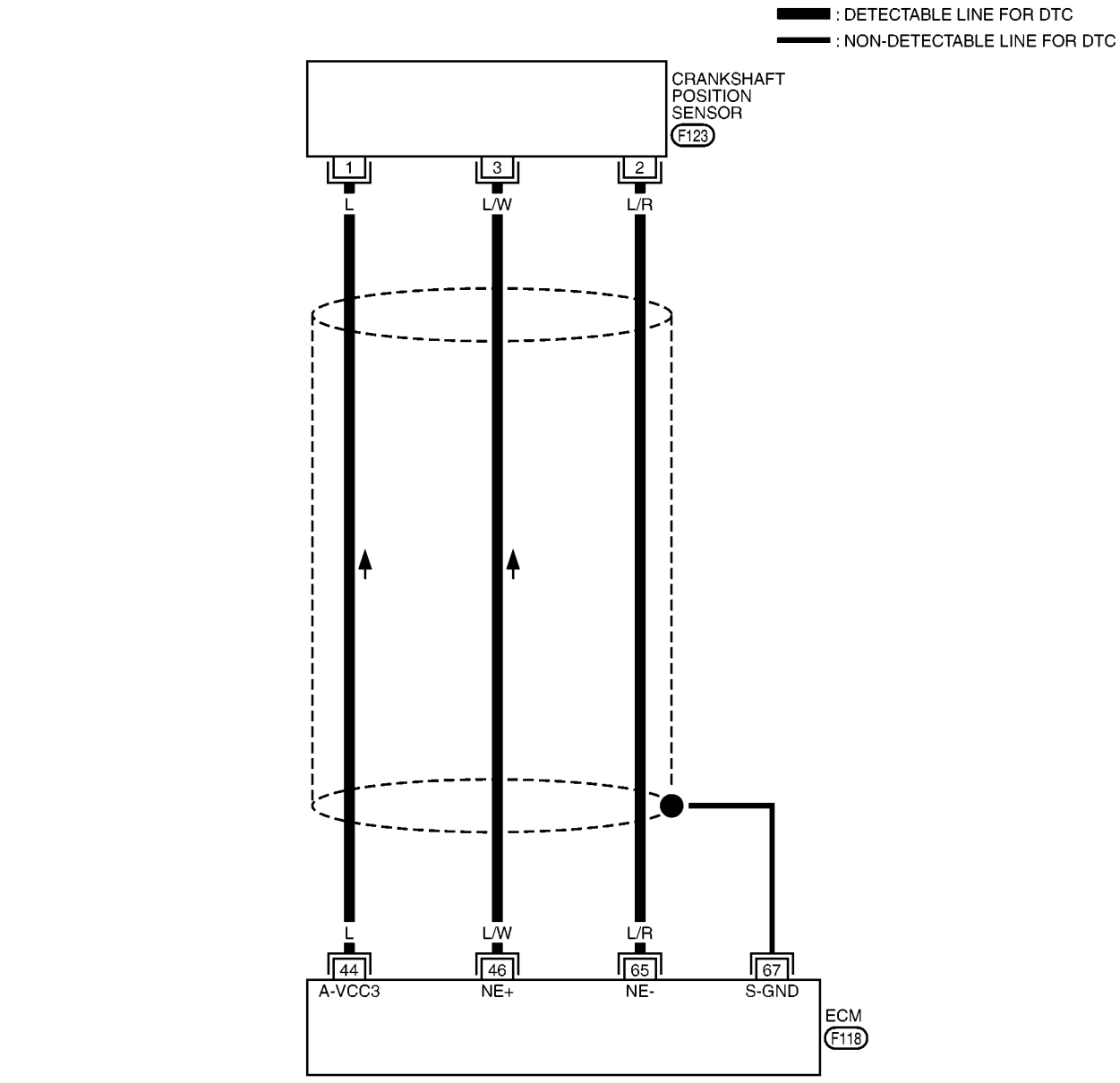
WITH GST

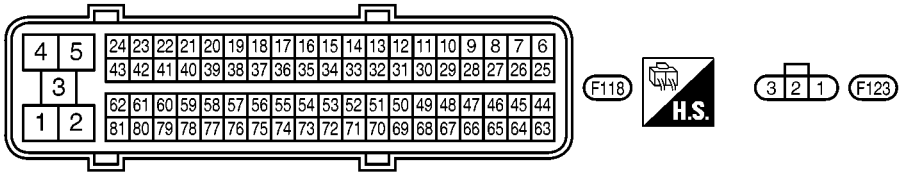
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013O4

EC-CKPS-01





MBWA0379E

Diagnostic Procedure

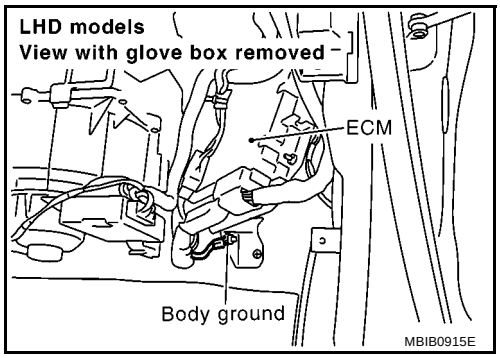
EBS013O5

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

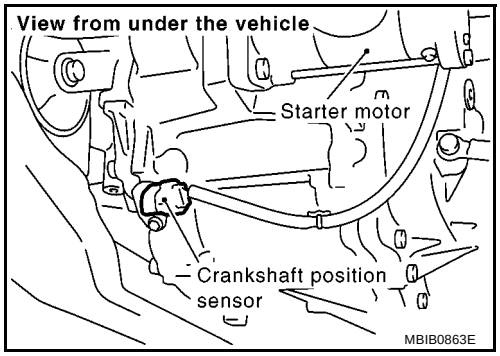
OK or NG

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



2. CHECK CKP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position sensor harness connector.
2. Turn ignition switch ON.



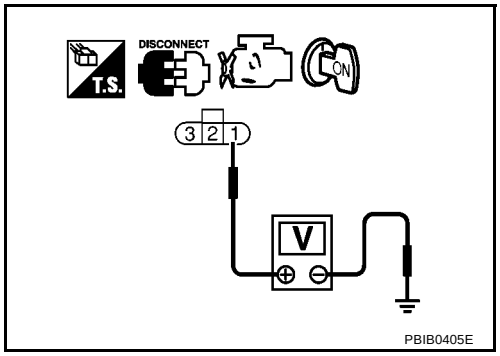
3. Check voltage between CKP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 CKP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 65 and CKP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for and 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 CKP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 46 and CKP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. CHECK CRANKSHAFT POSITION SENSOR

Refer to EC-191, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace crankshaft position sensor.

6. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 7.
NG >> Replace the signal plate.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

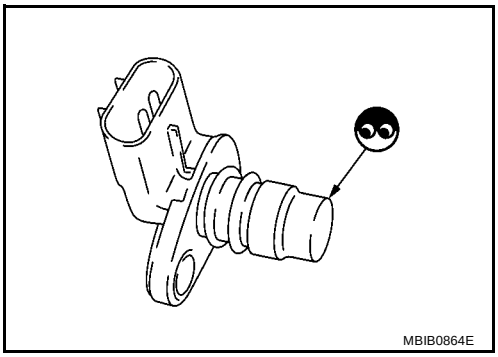
>> **INSPECTION END**

Component Inspection

EBS013O6

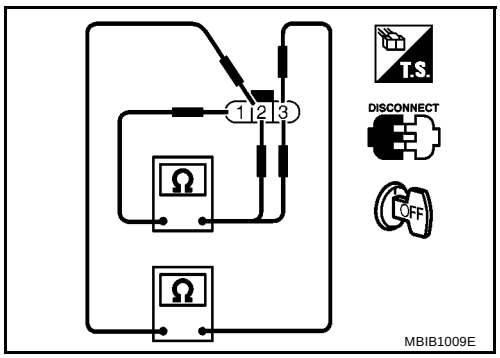
CRANKSHAFT POSITION SENSOR

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0
1 (+) - 3 (-)	Except 0 or ∞
2 (+) - 3 (-)	Except 0



6. If NG, replace crankshaft position sensor.

Removal and Installation

EBS013O7

CRANKSHAFT POSITION SENSOR

Refer to EM-29, "OIL PAN AND OIL STRAINER" .

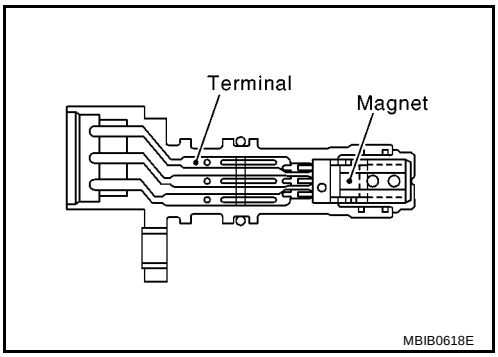
DTC P0340 CMP SENSOR

PFP:23731

Description

EBS013O8

The camshaft position sensor identifies a particular cylinder by means of signals from the sensing plate (with five protrusions) installed to the camshaft. The datum signal output is detected 90° signal and sent to the ECM.

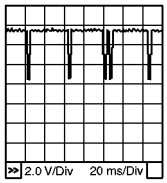
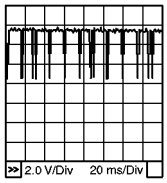


ECM Terminals and Reference Value

EBS013O9

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

CAUTION:
Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
45	R	Camshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
47	B	Camshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0877E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0878E
66	W	Camshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V

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

On Board Diagnosis Logic

EBS013OA

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sensor circuit	Camshaft position sensor signal is not detect by the ECM when engine is running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Camshaft position sensor

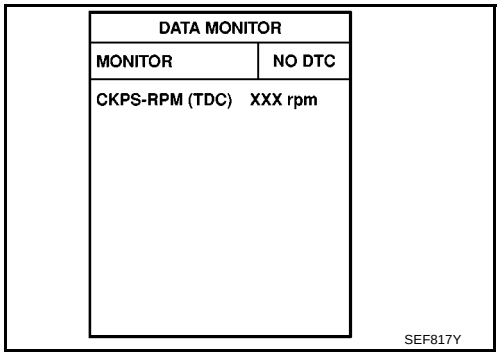
DTC Confirmation Procedure

EBS013OB

NOTE:
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.
   If engine could not start, keep ignition switch at START position for 5 seconds.
4. If 1st trip DTC is detected, go to EC-196, "Diagnostic Procedure"
   .



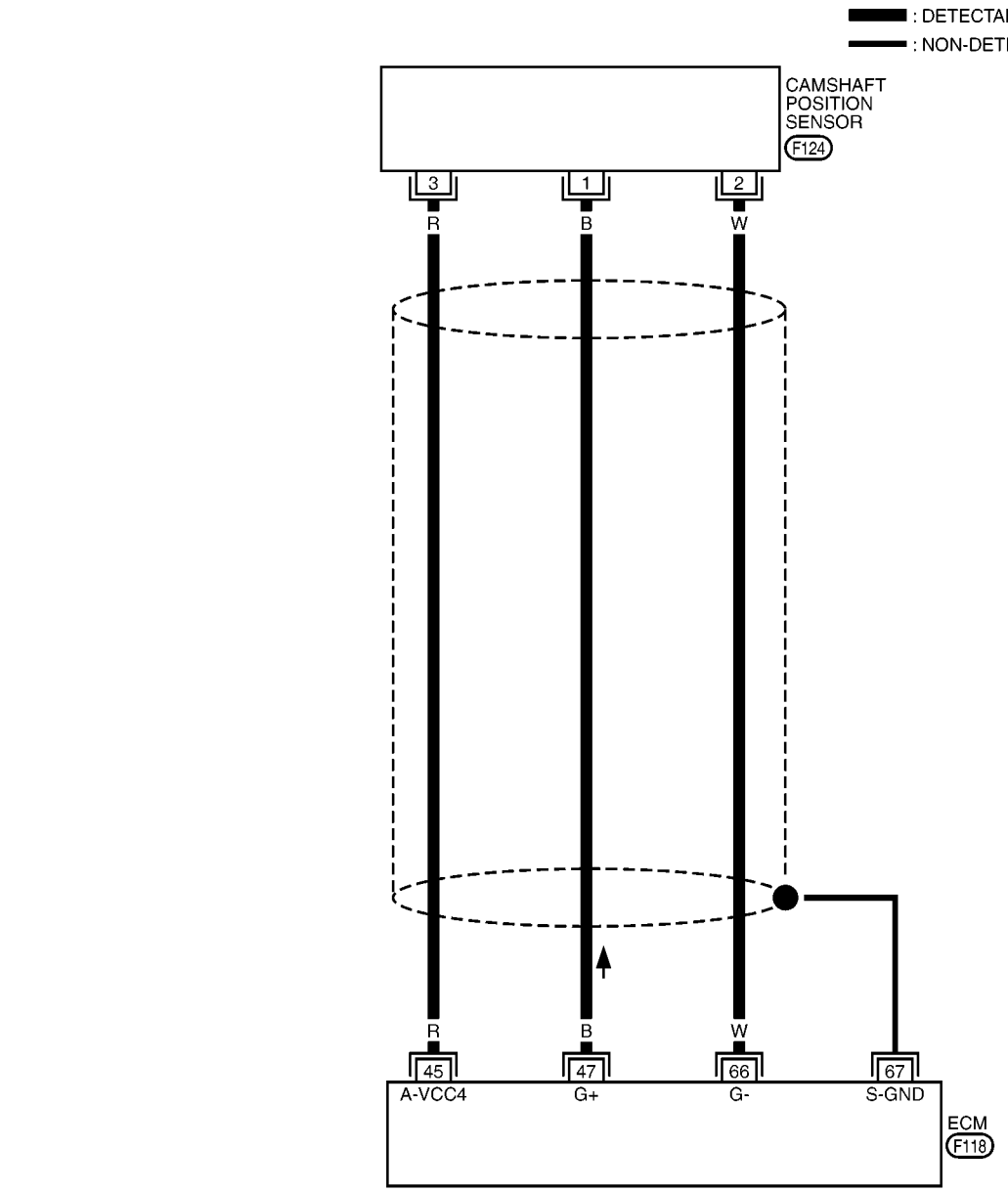
WITH GST

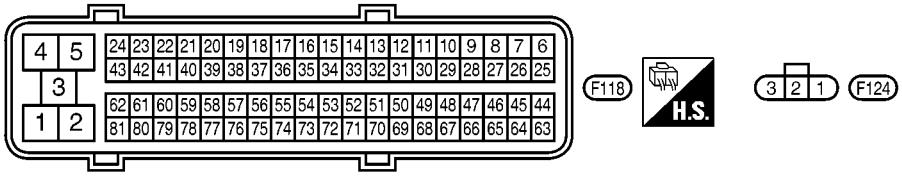
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013OC

EC-CMPS-01





MBWA0380E

Diagnostic Procedure

EBS013OD

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

Yes or No

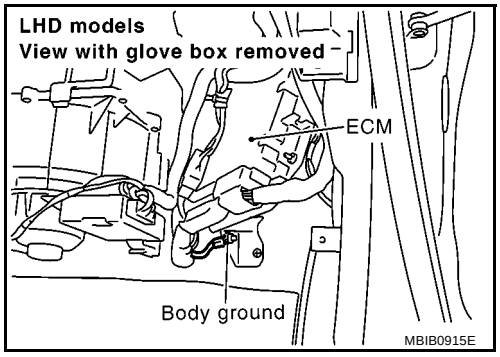
Yes >> GO TO 2.
No >> Check starting system. (Refer to SC-20, "STARTING SYSTEM" .)

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

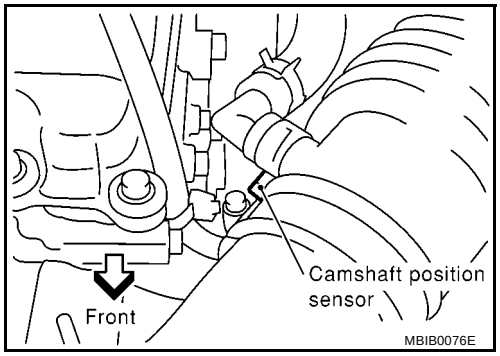
OK or NG

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



3. CHECK CMP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor harness connector.
2. Turn ignition switch ON.

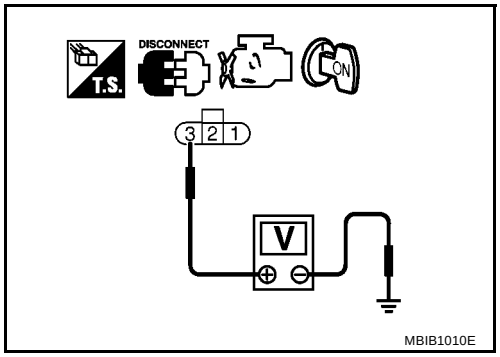


3. Check voltage between CMP sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK CMP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and CMP sensor terminal 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.

5. CHECK CMP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 47 and CMP sensor terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

6. CHECK CAMSHAFT POSITION SENSOR

Refer to EC-197, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace camshaft position sensor.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

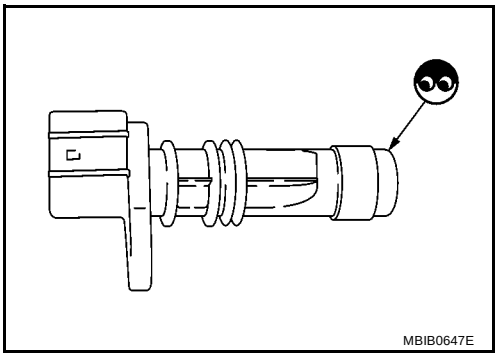
>> **INSPECTION END**

Component Inspection

EBS013OE

CAMSHAFT POSITION SENSOR

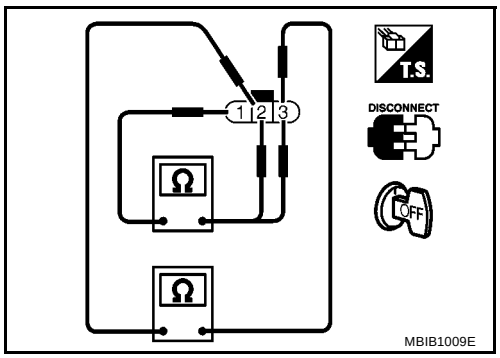
1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0
1 (+) - 3 (-)	
2 (+) - 3 (-)	Except 0 or ∞

6. If NG, replace camshaft position sensor.



Removal and Installation

EBS013OF

CAMSHAFT POSITION SENSOR

Refer to EM-35, "VACUUM PUMP" .

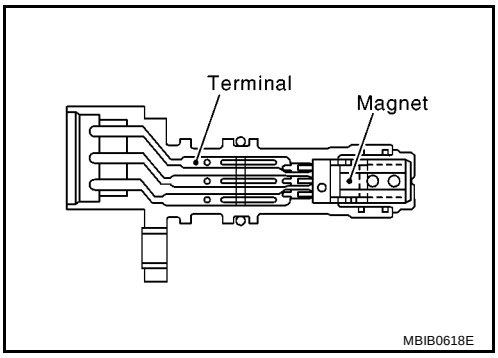
DTC P0341 CMP SENSOR

PFP:23731

Description

EBS013OG

The camshaft position sensor identifies a particular cylinder by means of signals from the sensing plate (with five protrusions) installed to the camshaft. The datum signal output is detected 90° signal and sent to the ECM.

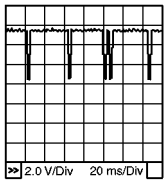
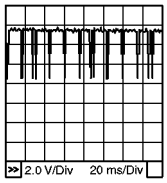


ECM Terminals and Reference Value

EBS013OH

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

CAUTION:
Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
45	R	Camshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
47	B	Camshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0877E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0878E
66	W	Camshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V

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

On Board Diagnosis Logic

EBS013OI

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0341	Camshaft position sensor circuit range/performance	Camshaft position sensor signal is not in the normal pattern when engine is running.	● Harness connectors (The sensor circuit is opener shorted.) ● Camshaft position sensor ● Signal plate

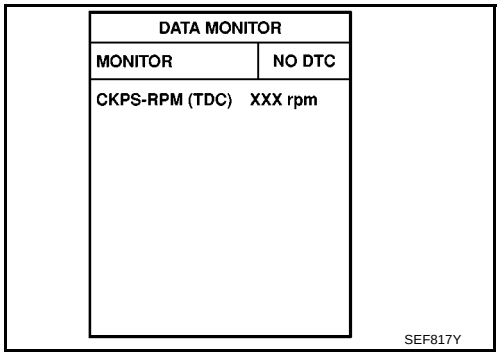
DTC Confirmation Procedure

EBS013OJ

NOTE:
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.
   If engine could not start, keep ignition switch at START position for 5 seconds.
4. If 1st trip DTC is detected, go to EC-202, "Diagnostic Procedure"
   .



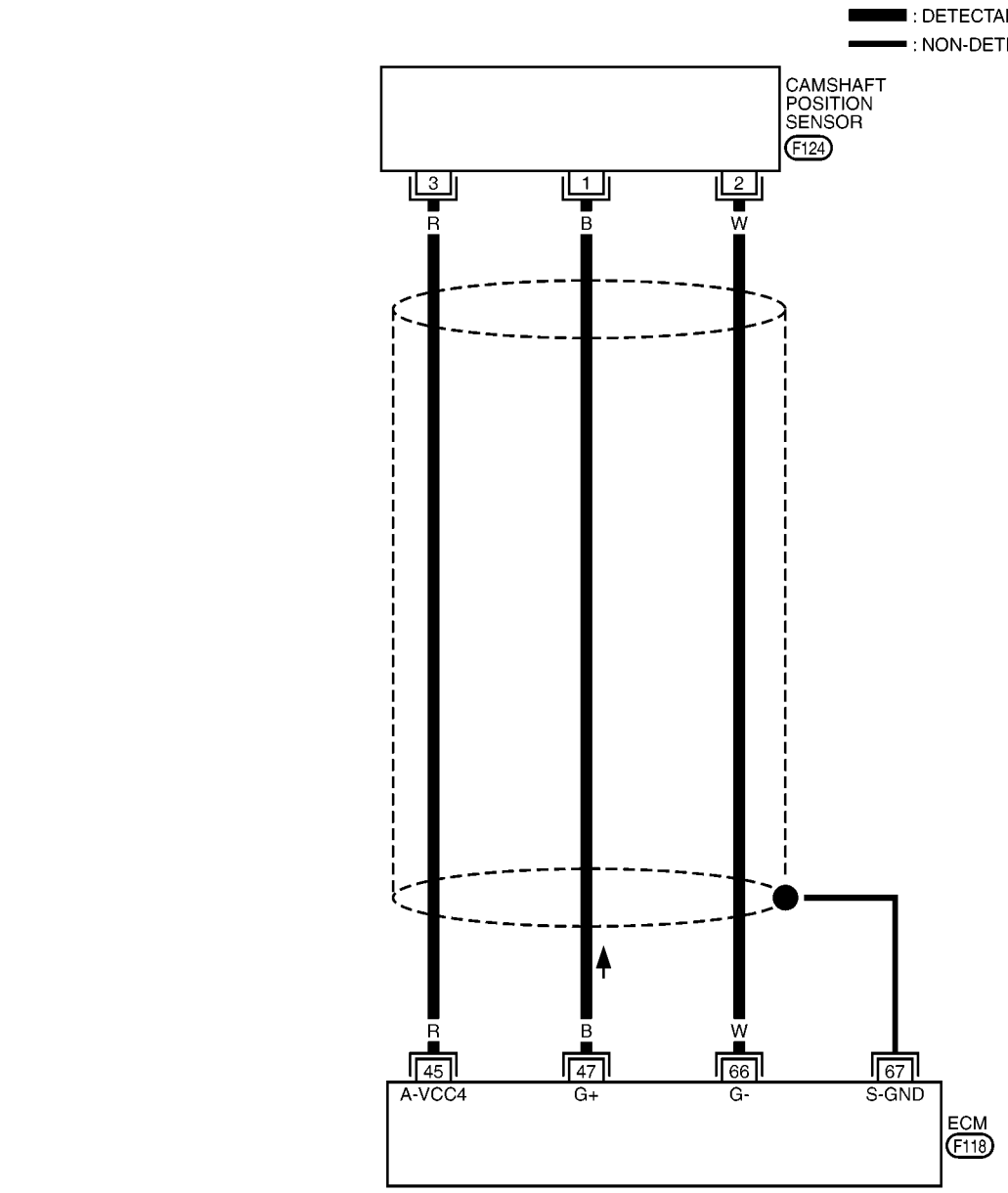
WITH GST

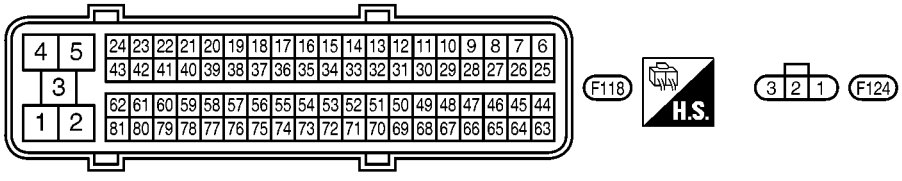
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013OK

EC-CMPS-01





MBWA0380E

Diagnostic Procedure

EBS013OL

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

Yes or No

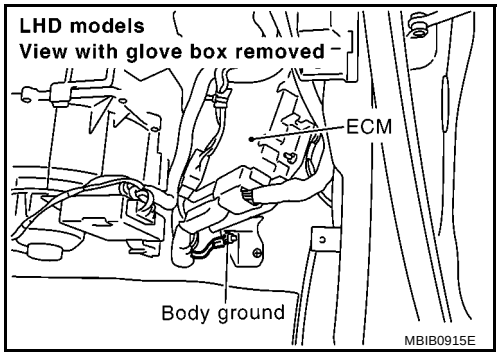
Yes >> GO TO 2.
No >> Check starting system. (Refer to SC-20, "STARTING SYSTEM" .)

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

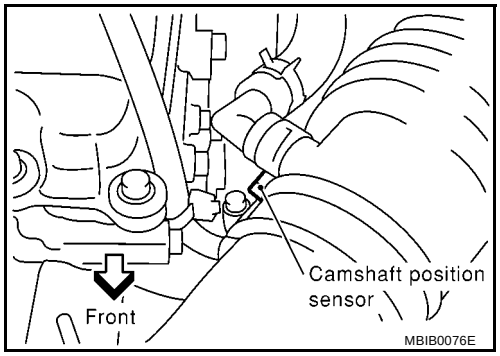
OK or NG

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



3. CHECK CMP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor harness connector.
2. Turn ignition switch ON.

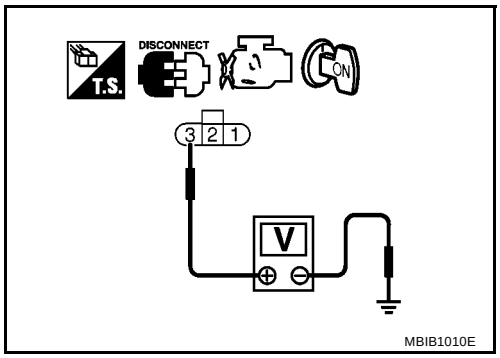


3. Check voltage between CMP sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK CMP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and CMP sensor terminal 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.

5. CHECK CMP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 47 and CMP sensor terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

6. CHECK CAMSHAFT POSITION SENSOR

Refer to EC-204, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace camshaft position sensor.

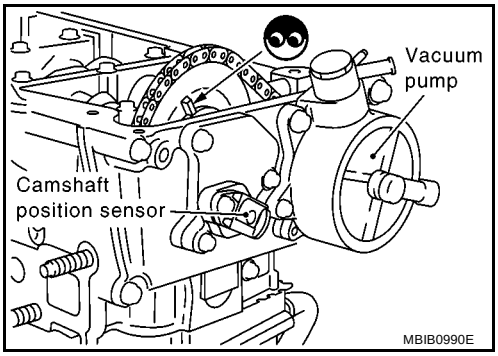
7. CHECK CAMSHAFT (EXHAUST)

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 8.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



8. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

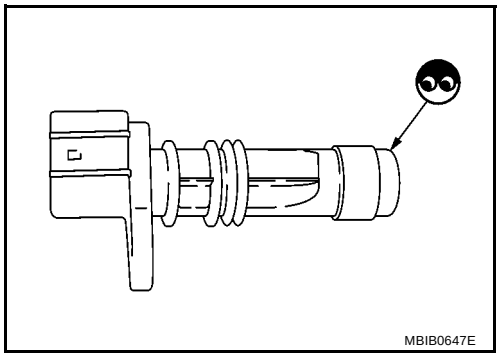
>> **INSPECTION END**

Component Inspection

EBS013OM

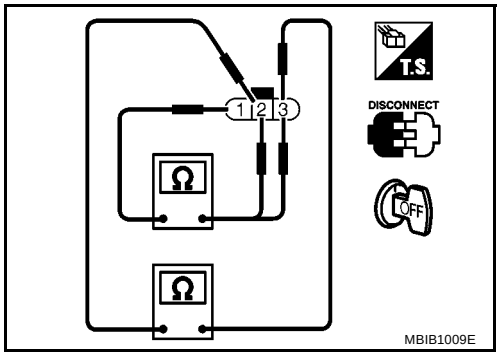
CAMSHAFT POSITION SENSOR

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0
1 (+) - 3 (-)	
2 (+) - 3 (-)	Except 0 or ∞



6. If NG, replace camshaft position sensor.

Removal and Installation

EBS013ON

CAMSHAFT POSITION SENSOR

Refer to EM-35, "VACUUM PUMP" .

DTC P0380 GLOW RELAY

PFP:25230

On Board Diagnosis Logic

EBS013OO

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0380	Glow relay circuit	An excessively low voltage is sent to ECM through glow relay.	● Harness or connectors (The glow relay circuit is open or shorted.) ● Glow relay
		An excessively low voltage is sent to ECM through glow relay.	● Harness or connectors (The glow relay circuit is shorted.) ● Glow relay

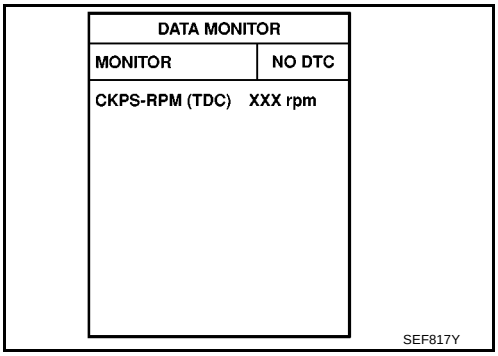
DTC Confirmation Procedure

EBS013OP

NOTE:
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-207, "Diagnostic Procedure"
.

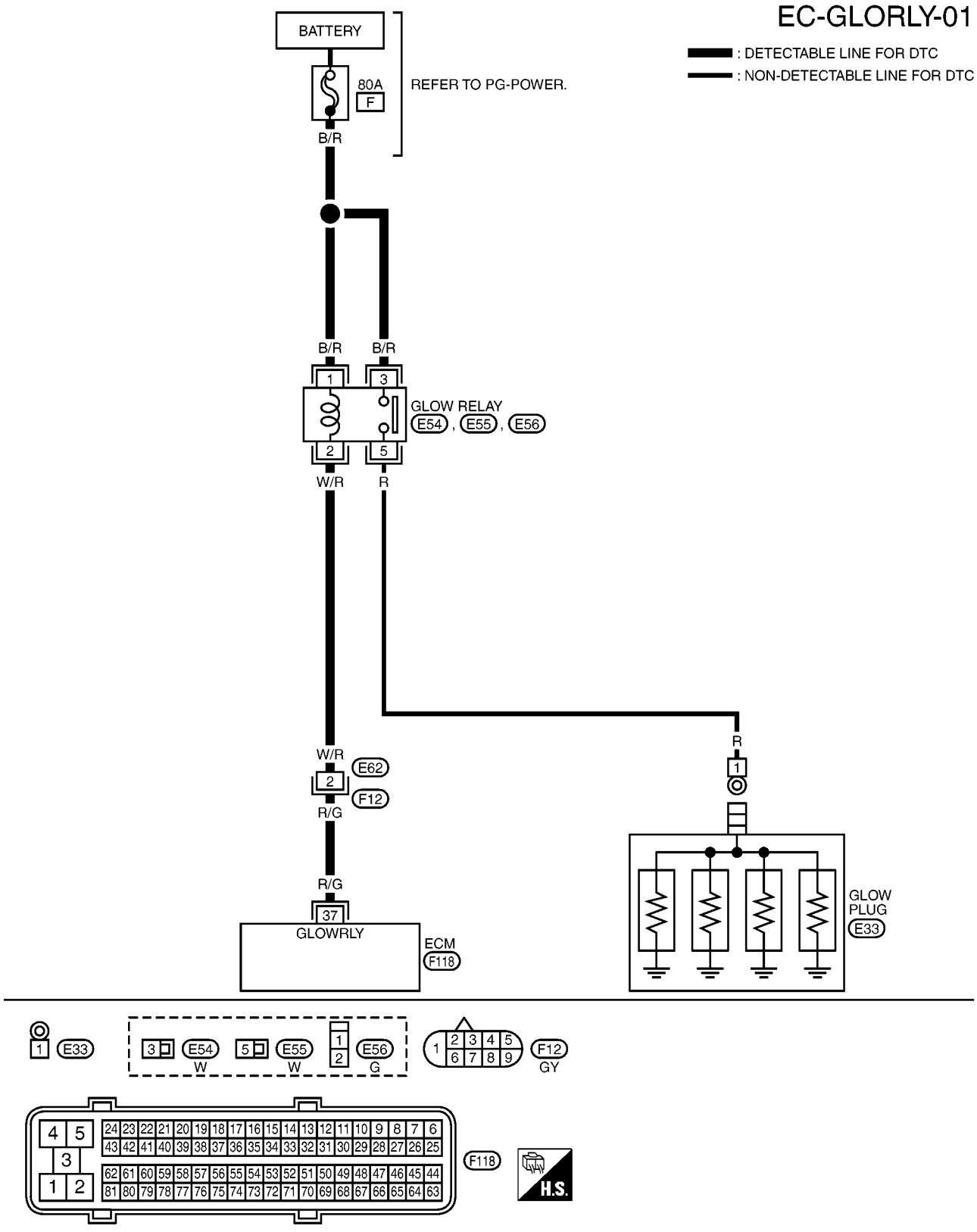


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013OQ



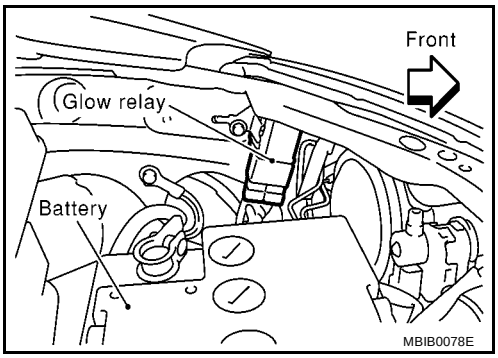
MBWA0615E

Diagnostic Procedure

EBS013OR

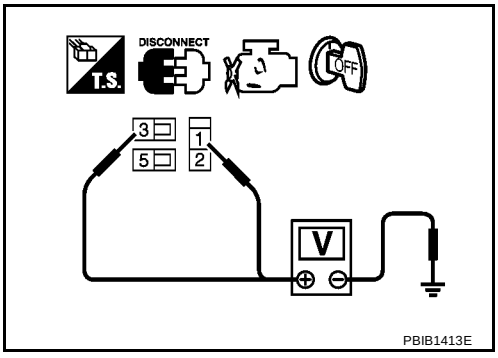
1. CHECK GLOW RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect glow relay.



3. Check voltage between ECM relay terminals 1, 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.

- 80A fusible link
- Harness for open and short between glow relay and battery

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

3. CHECK GLOW RELAY OUTPUT SIGNAL CIRCUIT FOR SHORT TO GROUND

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 37 and glow relay 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 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E62, F12
- Harness for open and short between glow relay and ECM

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

5. CHECK GLOW RELAY

Refer to EC-208, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace glow relay.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

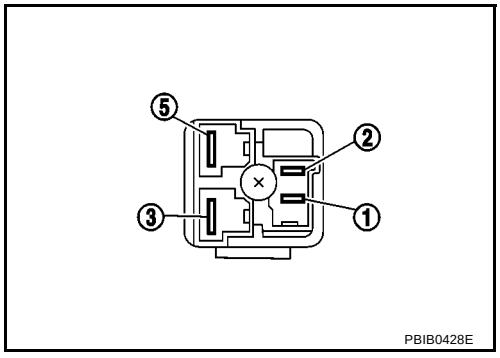
EBS013OS

GLOW RELAY

Check continuity between glow relay terminals 3 and 5 under the following conditions.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

Operation takes less than 1 second.



PBIB0428E

DTC P0404 EGR VOLUME CONTROL VALVE

PFP:14710

Description

EBS013P2

SYSTEM DESCRIPTION

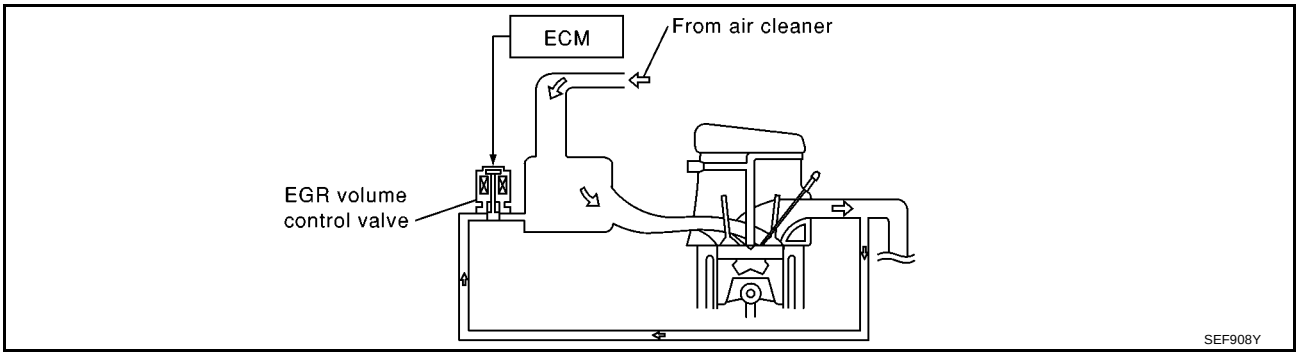
Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor	Engine speed	EGR volume control	EGR volume control valve
Vehicle speed sensor*	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Accelerator pedal position sensor	Accelerator pedal position		
Mass air flow sensor	Amount of intake air		
Air conditioner switch*	Air conditioner operation		

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

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions.

The EGR volume control valve remains close under the following conditions.

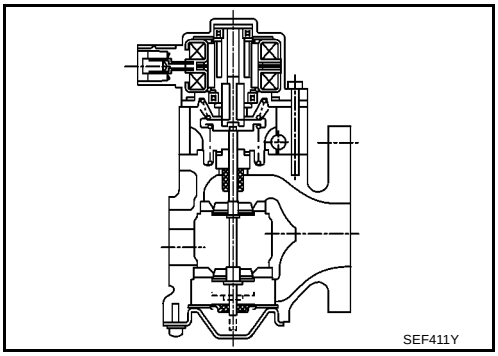
- Engine stopped
- Engine starting
- Low engine coolant temperature
- High engine speed
- Accelerator pedal fully depressed



COMPONENT DESCRIPTION

EGR Volume Control Valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.



CONSULT-II Reference Value in Data Monitor Mode

EBS013P3

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	After 1 minute at idle	More than 10 steps
		Revving engine from idle to 3,600 rpm	0 step

ECM Terminals and Reference Value

EBS013P4

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)
25 26 27 28	GY W/L OR/B GY/B	EGR volume control valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.1 - 14V (Voltage signals of each ECM terminals differ according to the control position of EGR volume control valve.)

On Board Diagnosis Logic

EBS013P5

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0404	Exhaust gas recirculation control circuit range/performance	An improper voltage signal is sent to ECM through EGR volume control valve.	● Harness or connectors (The EGR volume control valve circuit is open or shorted.) ● EGR volume control valve stuck closed

DTC Confirmation Procedure

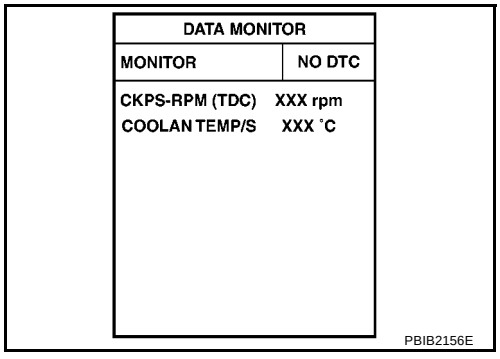
EBS013P6

NOTE:

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

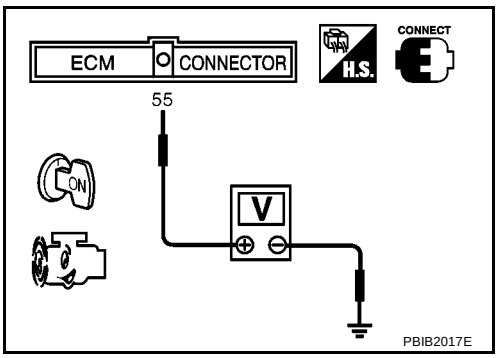
WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine.
3. Maintain the following conditions for at least 20 consecutive seconds.



COOLAN TEMP/S	22 - 87 °C (72 - 189 °F)
Voltage between ECM terminal 55 (Intake air temperature sensor) and ground	0.9 - 4.0V

4. If 1st trip DTC is detected, go to EC-213, "Diagnostic Procedure"
.

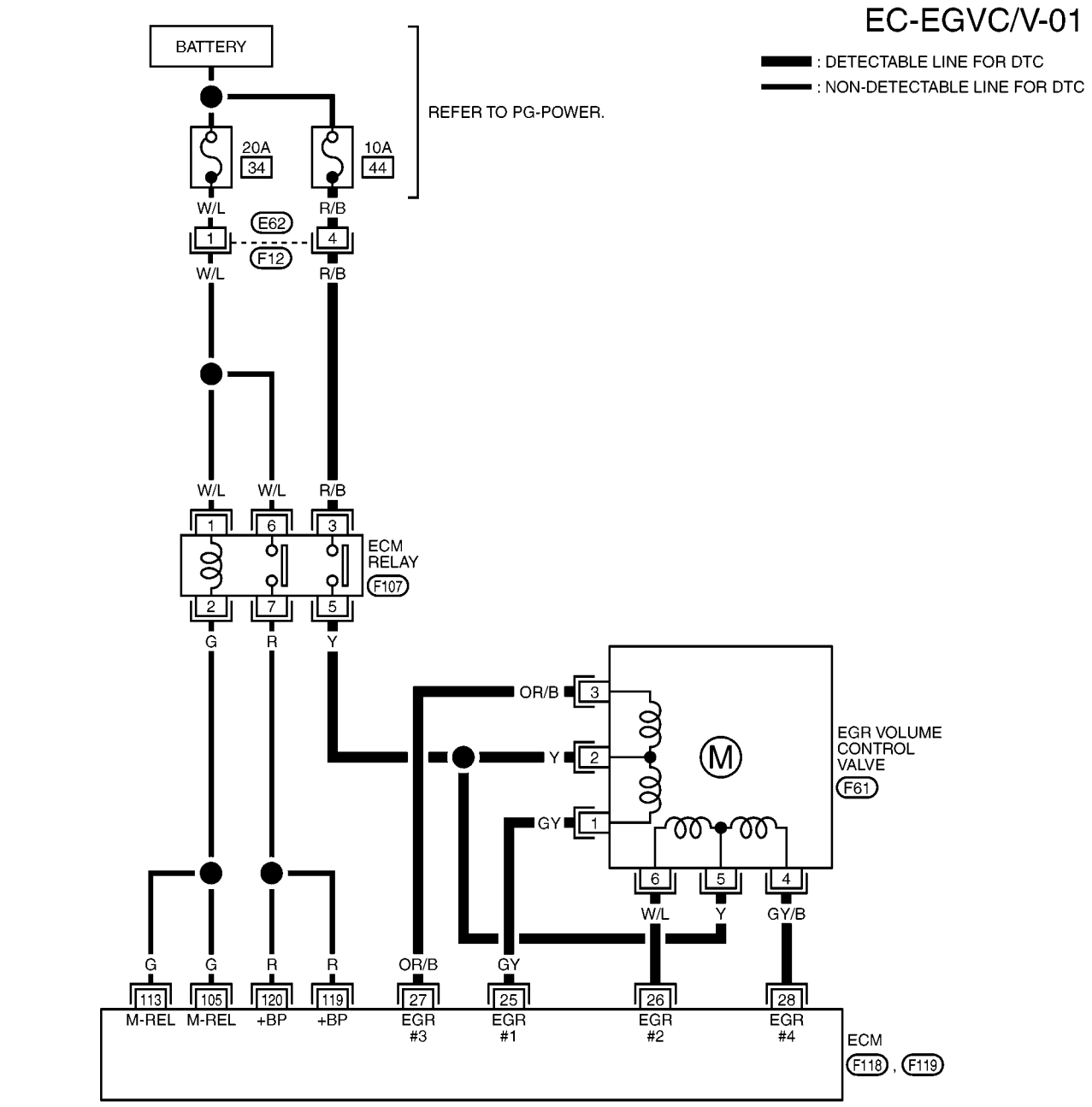


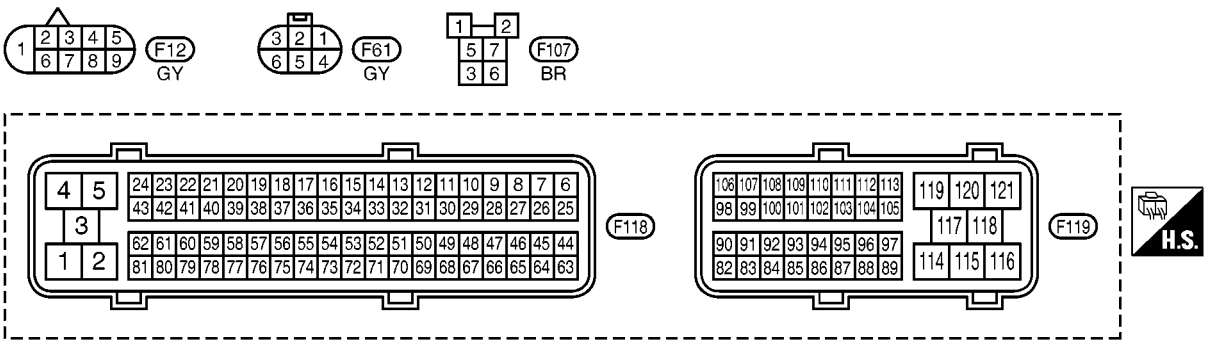
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013P7





MBWA0619E

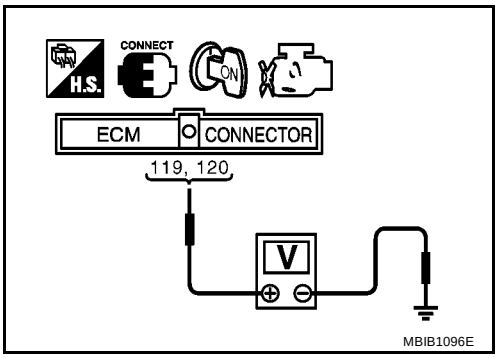
Diagnostic Procedure

EBS016KZ

1. CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: Battery voltage

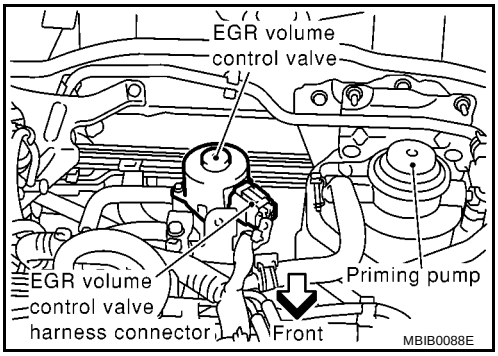


OK or NG

OK >> GO TO 2.
NG >> Go to EC-76, "MAIN POWER SUPPLY AND GROUND CIRCUIT" .

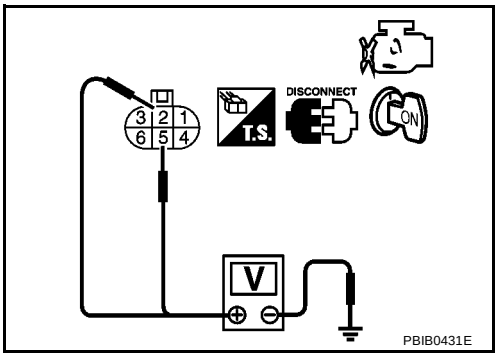
2. CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect EGR volume control valve harness connector.
3. Turn ignition switch ON.



4. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.

Voltage: Battery voltage

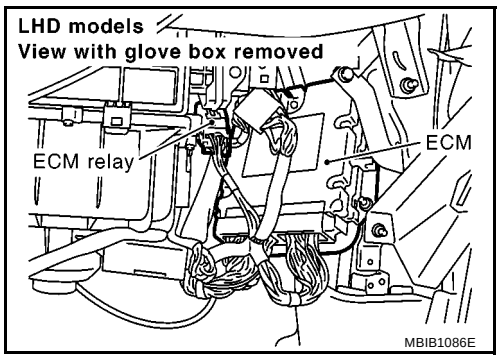


OK or NG

OK >> GO TO 7.
NG >> GO TO 3.

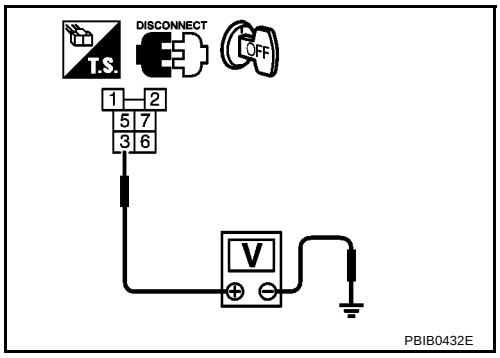
3. CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect ECM relay.



3. Check voltage between ECM relay terminal 3 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 E62, F12
- 10A fuse
- Harness for open or short between ECM relay and battery

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

5. CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT-IV

1. Check harness continuity between ECM relay terminal 5 and EGR volume control valve terminals 2, 5. 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 ECM RELAY

Refer to EC-263, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace ECM relay.

7. CHECK EGR VOLUME 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 terminals and EGR volume control valve terminals as follows. Refer to Wiring Diagram.

ECM terminal	EGR volume control valve terminal
25	1
26	6
27	3
28	4

Continuity should exist.

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

OK or NG

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

8. CHECK EGR VOLUME CONTROL VALVE

Refer to EC-215, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace EGR volume control valve.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

EBS016L0

EGR VOLUME CONTROL VALVE

With CONSULT-II

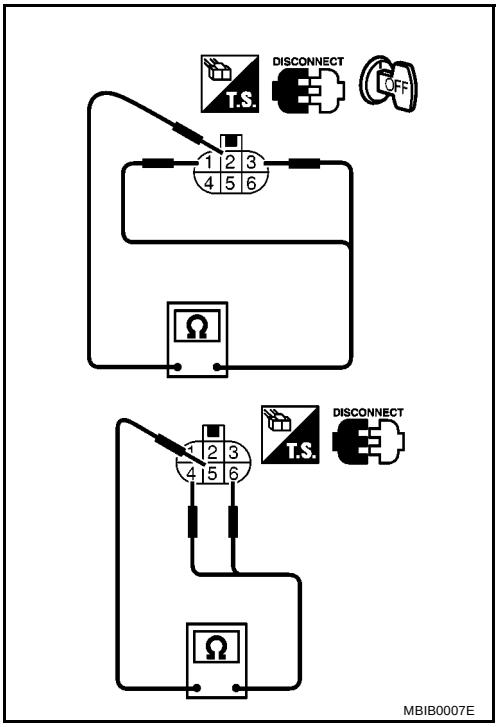
1. Disconnect EGR volume control valve harness connector.

2. Check resistance between the following terminals.
   - terminal 2 and terminals 1, 3
   - terminal 5 and terminals 4, 6

Temperature °C (°F)	Resistance Ω
20 (68)	13 - 17

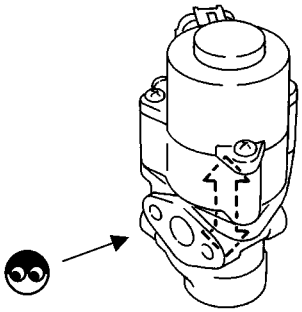
If NG, replace EGR volume control valve.
If OK, go to next step.

3. Remove EGR volume control valve from cylinder head.
4. Reconnect EGR volume control valve harness connector.
5. Turn ignition switch ON.



6. Perform “EGR VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening.

ACTIVE TEST	
EGR VOL CONT/V	20 step
MONITOR	
CKPS-RPM (TDC)	XXX rpm



If NG, replace the EGR volume control valve.

NOTE:
When installing the EGR volume control valve, make sure that the shaft is in the same position before checking.

Without CONSULT-II

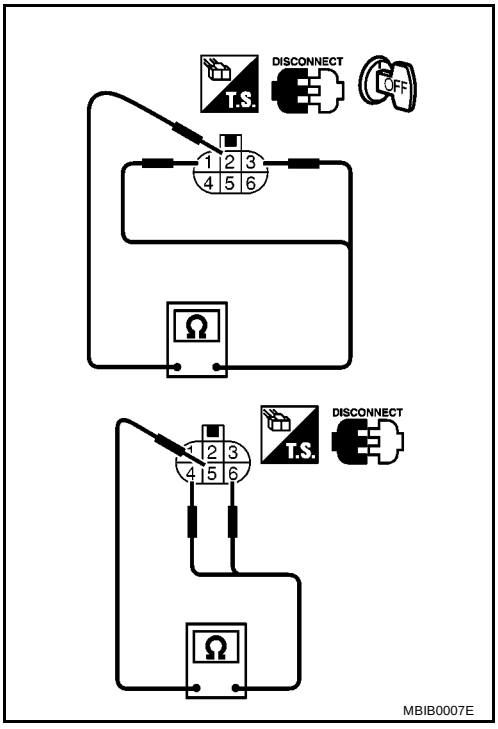
1. Disconnect EGR volume control valve harness connector.

2. Check resistance between the following terminals.
   - terminal 2 and terminals 1, 3
   - terminal 5 and terminals 4, 6

Temperature °C (°F)	Resistance Ω
20 (68)	13 - 17

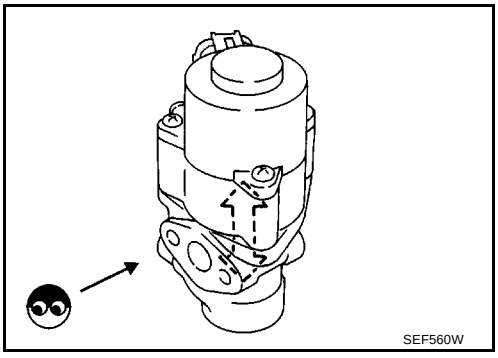
If NG, replace EGR volume control valve.
If OK, go to next step.

3. Remove EGR volume control valve from cylinder head.
4. Reconnect EGR volume control valve harness connector.
5. Turn ignition switch ON and OFF.



6. Check that EGR volume control valve shaft moves smoothy forward and backward according to the ignition switch position.
   If NG, replace EGR volume control valve.

   NOTE:
   When installing the EGR volume control valve, make sure that the shaft is in the same position before checking.



Removal and Installation

EGR VOLUME CONTROL VALVE

EBS016L1

Refer to EM-19, "INTAKE MANIFOLD" .

DTC P0501 ASCD VEHICLE SPEED SENSOR

PFP:24810

Component Description

EBS011VN

The ECM receives vehicle speed sensor signal via CAN communication line. It is sent from combination meter. The ECM uses this signal for ASCD control. Refer to EC-348, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for ASCD functions.

On Board Diagnosis Logic

EBS011VO

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

NOTE:

- **If DTC P0501 is displayed with DTC U1000 first perform the trouble diagnosis for DTC U1000. Refer to EC-83, "DTC U1000 CAN COMMUNICATION LINE" .**

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0501	Vehicle speed sensor range/performance	A change of vehicle speed signal is excessively large during specified time.	● Harness or connectors (The CAN communication line is open or shorted.) ● Combination meter ● ABS actuator and electric unit (control unit) (models without ESP) ● ESP/TCS/ABS control unit (models with ESP) ● Wheel sensor ● ECM

DTC Confirmation Procedure

EBS011VP

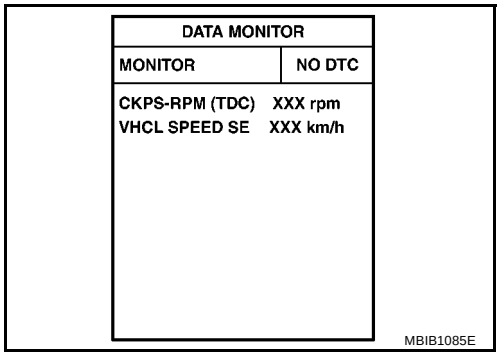
CAUTION:
Always drive vehicle at a safe speed.

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 (ESP switch OFF).
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Drive the vehicle at more than 10 km/h (6 MPH) for at least 5 seconds.
4. If DTC is detected, go to EC-219, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS011VQ

1. CHECK DTC WITH ESP/TCS/ABS CONTROL UNIT (MODELS WITH ESP) OR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (MODELS WITHOUT ESP)

Refer to BRC-47, "TROUBLE DIAGNOSIS" or BRC-8, "TROUBLE DIAGNOSIS" .

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 (LHD MODELS)" or DI-27, "COMBINATION METERS (RHD MODELS)" .

>> **INSPECTION END**

DTC P0502 ASCD VEHICLE SPEED SENSOR

PFP:24810

Component Description

EBS011W5

The ECM receives vehicle speed sensor signal via CAN communication line. It is sent from combination meter. The ECM uses this signal for ASCD control. Refer to EC-348, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for ASCD functions.

On Board Diagnosis Logic

EBS011W6

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

NOTE:

- **If DTC P0502 is displayed with DTC U1000 first perform the trouble diagnosis for DTC U1000. Refer to EC-83, "DTC U1000 CAN COMMUNICATION LINE" .**

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0502	Vehicle speed sensor circuit low input	Vehicle speed signal is excessively low compared with the driving condition.	● Harness or connectors (The CAN communication line is open or shorted.) ● Combination meter ● ABS actuator and electric unit (control unit) (models without ESP) ● ESP/TCS/ABS control unit (models with ESP) ● Wheel sensor ● ECM

DTC Confirmation Procedure

EBS011W7

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.

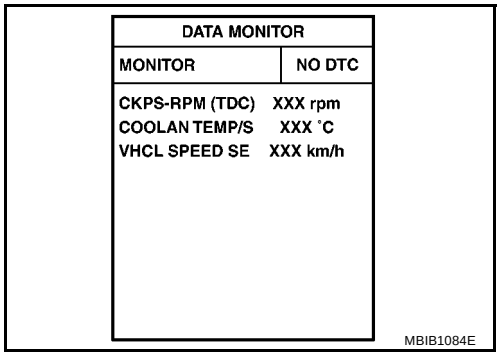
TESTING CONDITION:
Step 3 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature (ESP switch OFF).
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Maintain the following condition for at least 5 seconds.

CKPS·RPM (TDC)	More than 2,800 rpm
COOLAN TEMP/S	More than 60°C (140 °F)
Clutch pedal	Released
Shift lever	1st position

4. If DTC is detected, go to EC-221, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS011W8

1. CHECK DTC WITH ESP/TCS/ABS CONTROL UNIT (MODELS WITH ESP) OR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (MODELS WITHOUT ESP)

Refer to BRC-47, "TROUBLE DIAGNOSIS" or BRC-8, "TROUBLE DIAGNOSIS" .

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 (LHD MODELS)" or DI-27, "COMBINATION METERS (RHD MODELS)" .

>> **INSPECTION END**

DTC P0503 ASCD VEHICLE SPEED SENSOR

PFP:24810

Component Description

EBS011W9

The ECM receives vehicle speed sensor signal via CAN communication line. It is sent from combination meter. The ECM uses this signal for ASCD control. Refer to EC-348, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for ASCD functions.

On Board Diagnosis Logic

EBS011WA

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

NOTE:

- **If DTC P0503 is displayed with DTC U1000 first perform the trouble diagnosis for DTC U1000. Refer to EC-83, "DTC U1000 CAN COMMUNICATION LINE" .**

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0503	Vehicle speed sensor circuit high input	Vehicle speed signal is excessively high compared with the driving condition.	● Harness or connectors (The CAN communication line is open or shorted.) ● Combination meter ● ABS actuator and electric unit (control unit) (models without ESP) ● ESP/TCS/ABS control unit (models with ESP) ● Wheel sensor ● ECM

DTC Confirmation Procedure

EBS011WB

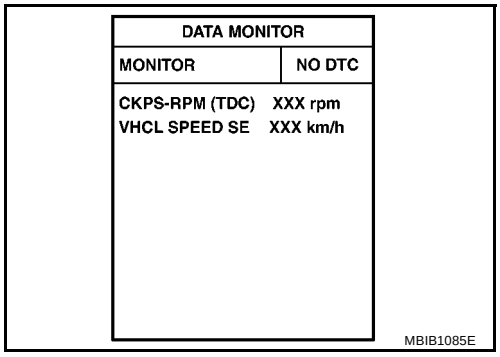
CAUTION:
Always drive vehicle at a safe speed.

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 (ESP switch OFF).
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Drive the vehicle at more than 10 km/h (6 MPH) for at least 5 seconds.
4. If DTC is detected, go to EC-223, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS011WC

1. CHECK DTC WITH ESP/TCS/ABS CONTROL UNIT (MODELS WITH ESP) OR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (MODELS WITHOUT ESP)

Refer to BRC-47, "TROUBLE DIAGNOSIS" or BRC-8, "TROUBLE DIAGNOSIS" .

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 (LHD MODELS)" or DI-27, "COMBINATION METERS (RHD MODELS)" .

>> **INSPECTION END**

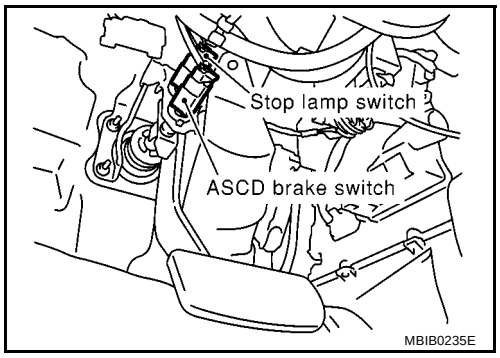
DTC P0504 ASCD BRAKE SWITCH

PFP:25320

Component Description

EBS011V9

When the brake pedal is depressed, ASCD brake switch and stop lamp switch are turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-348, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

EBS011VA

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW (Stop lamp switch)	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
BRAKE SW2 (ASCD brake switch)	● Ignition switch: ON	Brake pedal and clutch pedal: Fully released	OFF
		Brake pedal and/or clutch pedal: Slightly depressed	ON

ECM Terminals and Reference Value

EBS011W2

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)
100	R/G	Stop lamp switch	**[Ignition switch ON]** ● Brake pedal fully released	Approximately 0V
			[Ignition switch ON] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
101	L/Y	ASCD brake switch	**[Ignition switch ON]** ● Brake pedal and clutch pedal fully released	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON] ● Brake pedal and/or clutch pedal depressed	Approximately 0V

On Board Diagnosis Logic

EBS011VB

This self-diagnosis has the one trip detection logic.
The MI will not light up for this diagnosis.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0504	ASCD brake switch	● When the vehicle speed is above 5 km/h (3 MPH), ON signal from the stop lamp switch and OFF signal from the ASCD brake switch are sent to the ECM at the same time.	● 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

EBS011VC

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.

WITH CONSULT-II

1. Start engine (ESP switch OFF).
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Drive the vehicle for at least 5 consecutive seconds under the following condition.

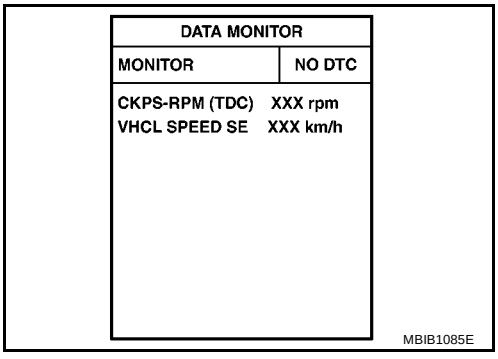
VHCL SPEED SE	More than 5 km/h (3 MPH)
Selector lever	Suitable position

If DTC is detected, go to EC-227, "Diagnostic Procedure" .
If 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 5 km/h (3 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 DTC is detected, go to EC-227, "Diagnostic Procedure" .

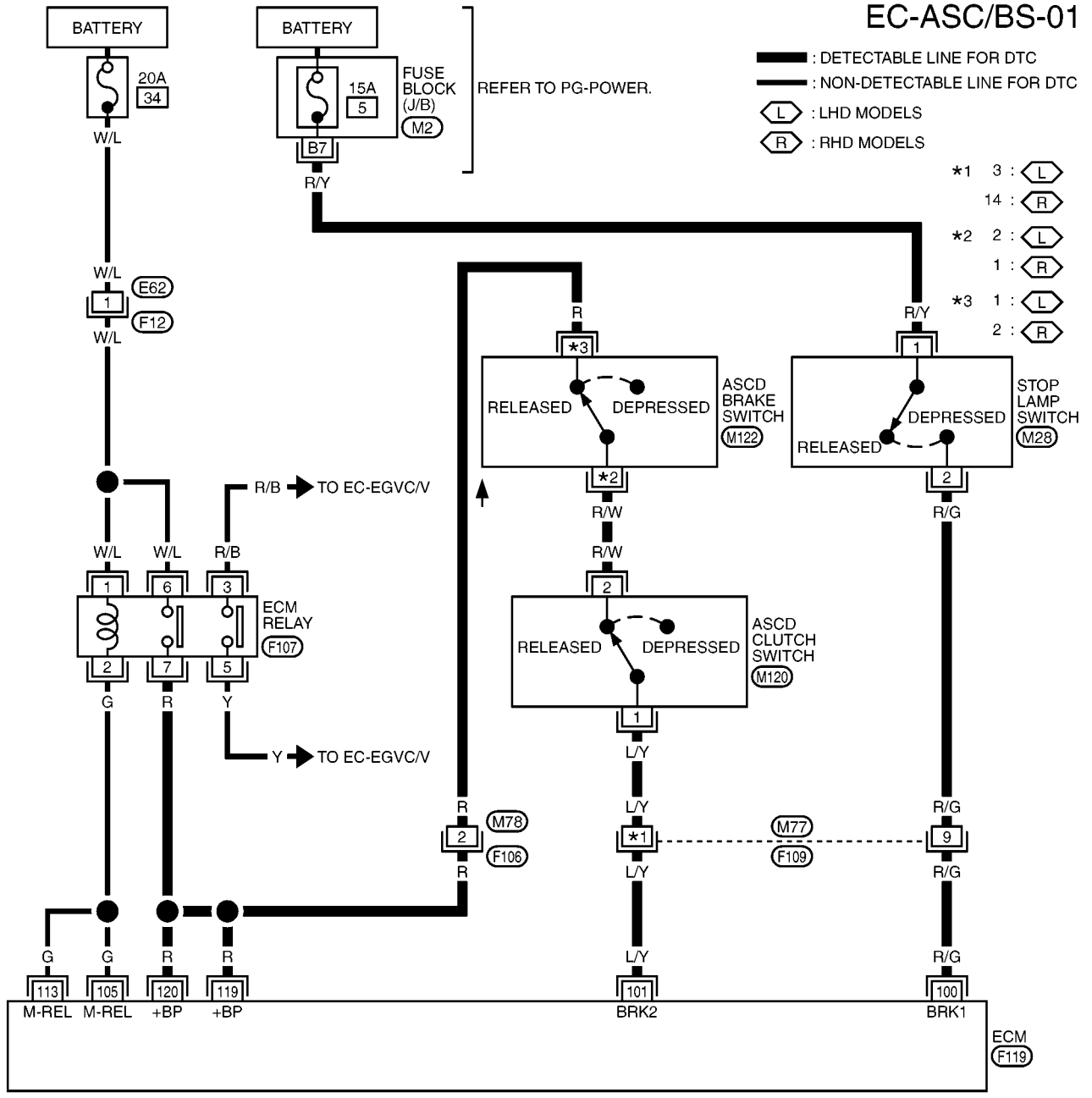


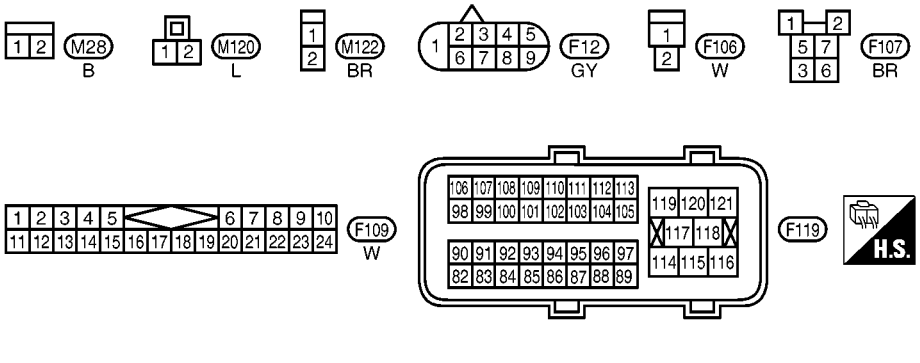
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS011VD





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

MBWA0646E

Diagnostic Procedure

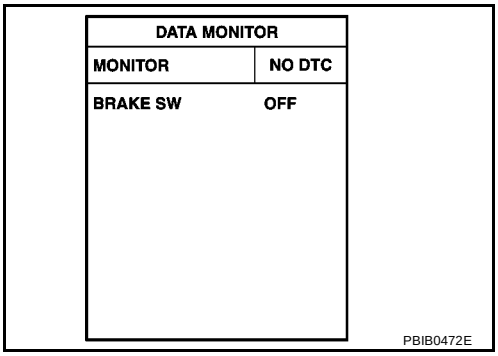
EBS011VE

1. CHECK OVERALL FUNCTION-I

With CONSULT-II

1. Turn ignition switch ON.
2. Select “BRAKE SW” in “DATA MONITOR” mode with CONSULT-II.
3. Check “BRAKE SW” indication under the following conditions.

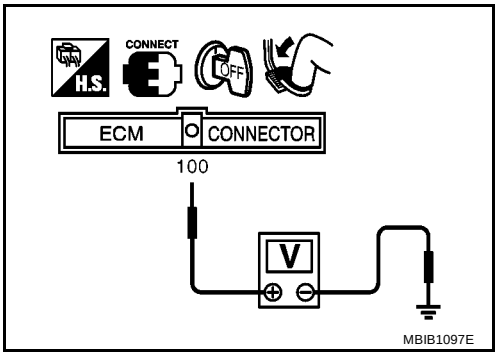
CONDITION	INDICATION
When brake pedal is depressed	ON
When brake pedal is released	OFF



Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 100 and ground under the following conditions.

Condition	Voltage
When brake pedal is depressed	battery voltage
When brake pedal is released	Approximately 0V



OK or NG

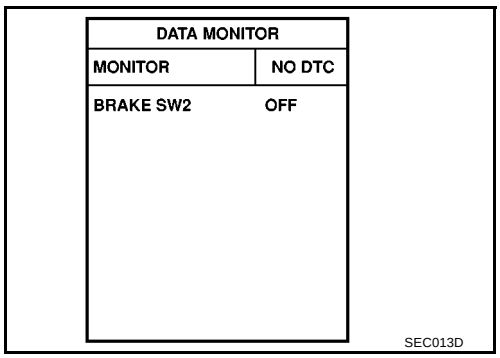
OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

With CONSULT-II

Check “BRAKE SW2” indication in “DATA MONITOR” mode.

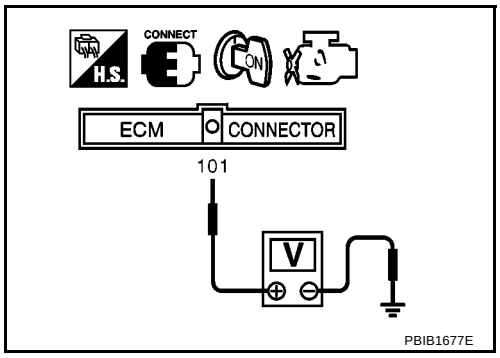
CONDITION	INDICATION
When brake pedal or clutch pedal is depressed	ON
When brake pedal and clutch pedal are released	OFF



Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

Condition	Voltage
When brake pedal or clutch pedal is depressed	Approximately 0V
When brake pedal and clutch pedal are released	Battery voltage

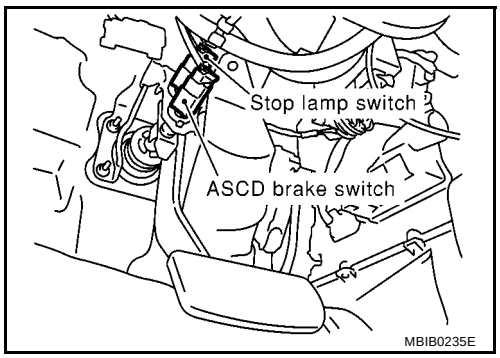


OK or NG

OK >> GO TO 16.
NG >> GO TO 8.

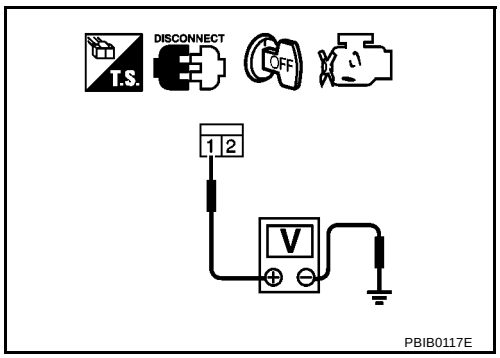
3. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

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 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 15A 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.

5. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 100 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 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- 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.

7. CHECK STOP LAMP SWITCH

Refer to EC-231, "Component Inspection" .

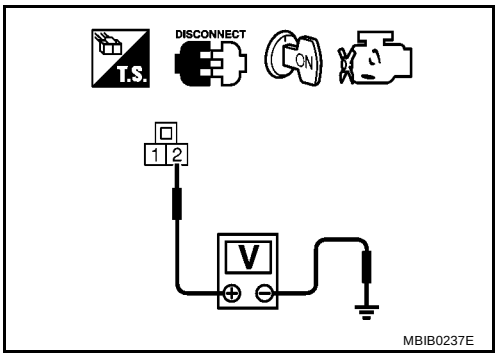
OK or NG

OK >> GO TO 16.
NG >> Replace stop lamp switch.

8. CHECK ASCD BRAKE SWITCH 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 2 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

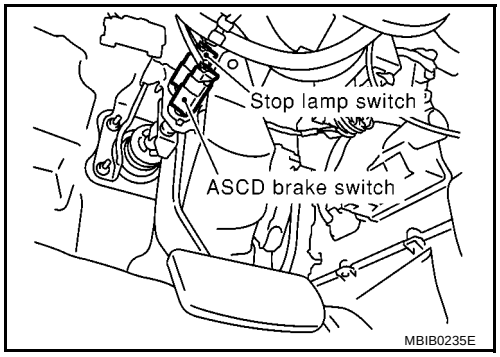


OK or NG

OK >> GO TO 13.
NG >> GO TO 9.

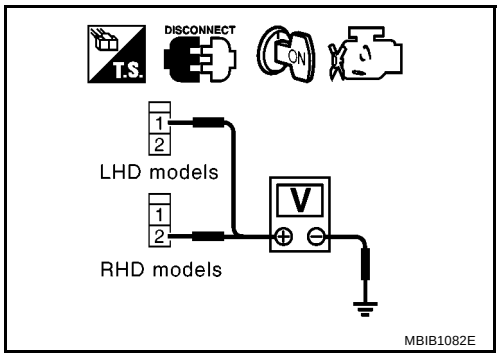
9. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

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 (LHD models) or 2 (RHD models) and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F106, M78
- Harness for open or short between ASCD brake switch and ECM relay
- Harness for open or short between ASCD brake switch and ECM

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

11. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 2 (LHD models) or 1 (RHD models) and ASCD brake clutch switch terminal 2.
   Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ASCD BRAKE SWITCH

Refer to EC-231, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace ASCD brake switch.

13. CHECK ASCD CLUTCH 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 101 and ASCD clutch switch terminal 1. 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 15.
NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and ASCD clutch switch

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

15. CHECK ASCD CLUTCH SWITCH

Refer to EC-231, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace ASCD clutch switch.

16. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

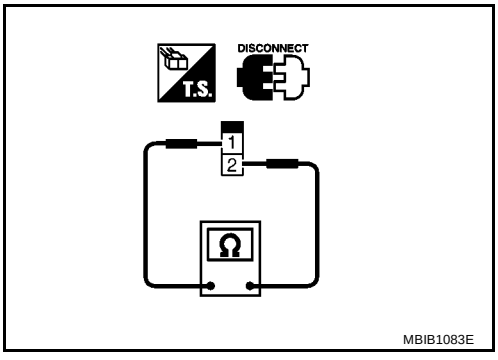
EBS011VF

ASCD BRAKE SWITCH

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.

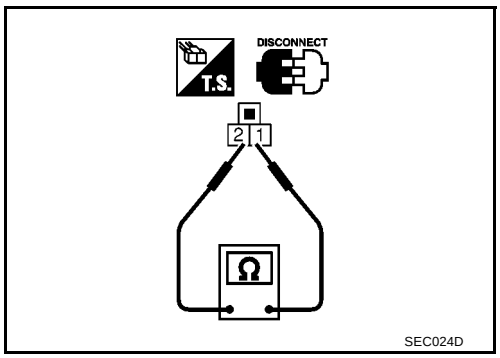


ASCD CLUTCH SWITCH

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.

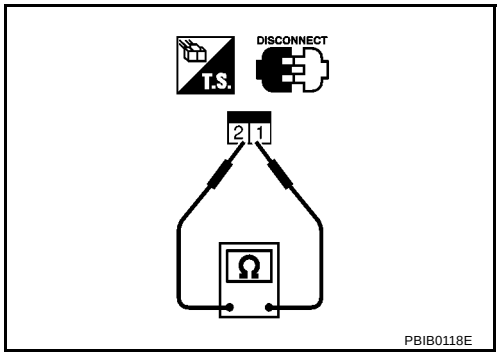


STOP LAMP SWITCH

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.



DTC P0563 BATTERY VOLTAGE

PFP:24410

On Board Diagnosis Logic

EBS013PB

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0563	Battery voltage high	An excessively high voltage from the battery is sent to ECM.	● Battery ● Battery terminal ● Alternator

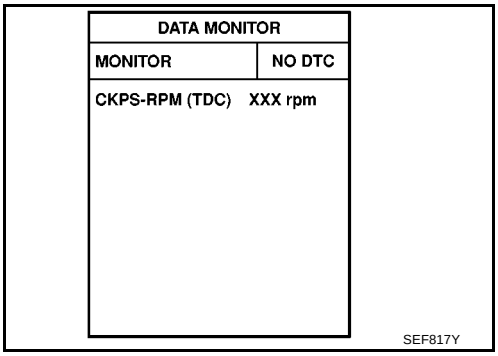
DTC Confirmation Procedure

EBS013PC

NOTE:
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 35 seconds.
4. If DTC is detected, go to EC-233, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013PD

1. INSPECTION START

Are jumper cables connected for the jump starting?

Yes or No

Yes >> GO TO 3.
No >> GO TO 2.

2. CHECK BATTERY AND ALTERNATOR

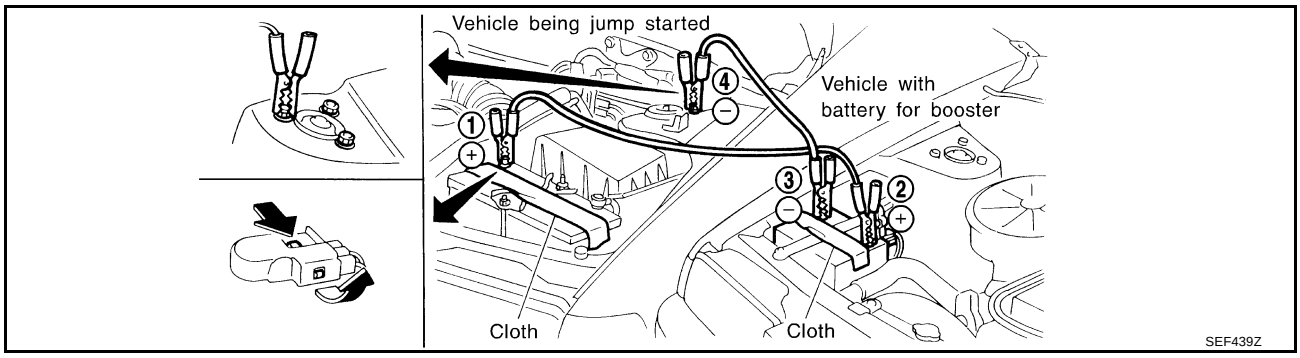
Check that the proper type of battery and alternator is installed.
Refer to , SC-3, "BATTERY" and SC-12, "CHARGING SYSTEM" .

OK or NG

OK >> GO TO 5.
NG >> Replace with a proper one.

3. CHECK JUMPER CABLES INSTALLATION

Check that the jumper cables are connected in the correct sequence.



OK or NG

OK >> GO TO 4.
NG >> Reconnect jumper cables properly.

4. CHECK BATTERY FOR BOOSTER

Check that the battery for the booster is a 12V battery.

OK or NG

OK >> GO TO 5.
NG >> Change the vehicle for booster.

5. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

Perform EC-233, "DTC Confirmation Procedure" , again.

OK or NG

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

6. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EC-35, "NATS (Nissan Anti-theft System)" .
3. Perform Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

7. CHECK ELECTRICAL PARTS DAMAGE

Check the following for damage.

- Wiring harness and harness connectors for burn
- Fuses for short

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace malfunctioning part.

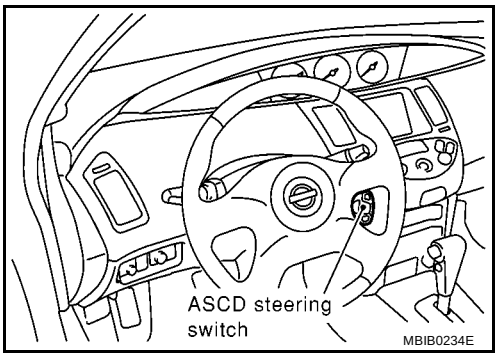
DTC P0580, P0581 ASCD STEERING SWITCH

PFP:25551

Component Description

EBS011VG

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-348, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

EBS011VH

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SET SW	● Ignition switch: ON	SET/COAST switch: Released	OFF
		SET/COAST switch: Pressed	ON
RESUME/ACC SW	● Ignition switch: ON	RESUME/ACCEL switch: Released	OFF
		RESUME/ACCEL switch: Pressed	ON
CANCEL SW	● Ignition switch: ON	CANCEL switch: Released	OFF
		CANCEL switch: Pressed	ON
MAIN SW	● Ignition switch: ON	ON/OFF switch: Released	OFF
		ON/OFF switch: Pressed	ON

ECM Terminals and Reference Value

EBS011W3

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)
102	PU	ASCD steering switch	**[Ignition switch ON]** ● ASCD steering switch is OFF.	Approximately 4.3V
			[Ignition switch ON] ● ON/OFF switch is ON.	Approximately 0.3V
			[Ignition switch ON] ● CANCEL switch is ON.	Approximately 1.3V
			[Ignition switch ON] ● SET/COAST switch is ON.	Approximately 2.3V
			[Ignition switch ON] ● RESUME/ACCEL switch is ON.	Approximately 3.3V
103	B	ASCD steering switch ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS011VI

These self-diagnoses have the one trip detection logic.
The MI will not light up for this diagnosis.

NOTE:
If DTC P0580 or P0581 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-241, "DTC P0605 ECM".

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0580	ASCD steering switch circuit low	● ECM detects that the ASCD steering switch is stuck ON.	● Harness or connectors (The switch circuit is open or shorted.) ● ASCD steering switch ● ECM
P0581	ASCD steering switch circuit high	● An excessively high voltage signal from the ASCD steering switch is sent to ECM.	

DTC Confirmation Procedure

EBS011VJ

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

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 10 seconds.
4. Press ON/OFF switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If DTC is detected, go to EC-238, "Diagnostic Procedure" .

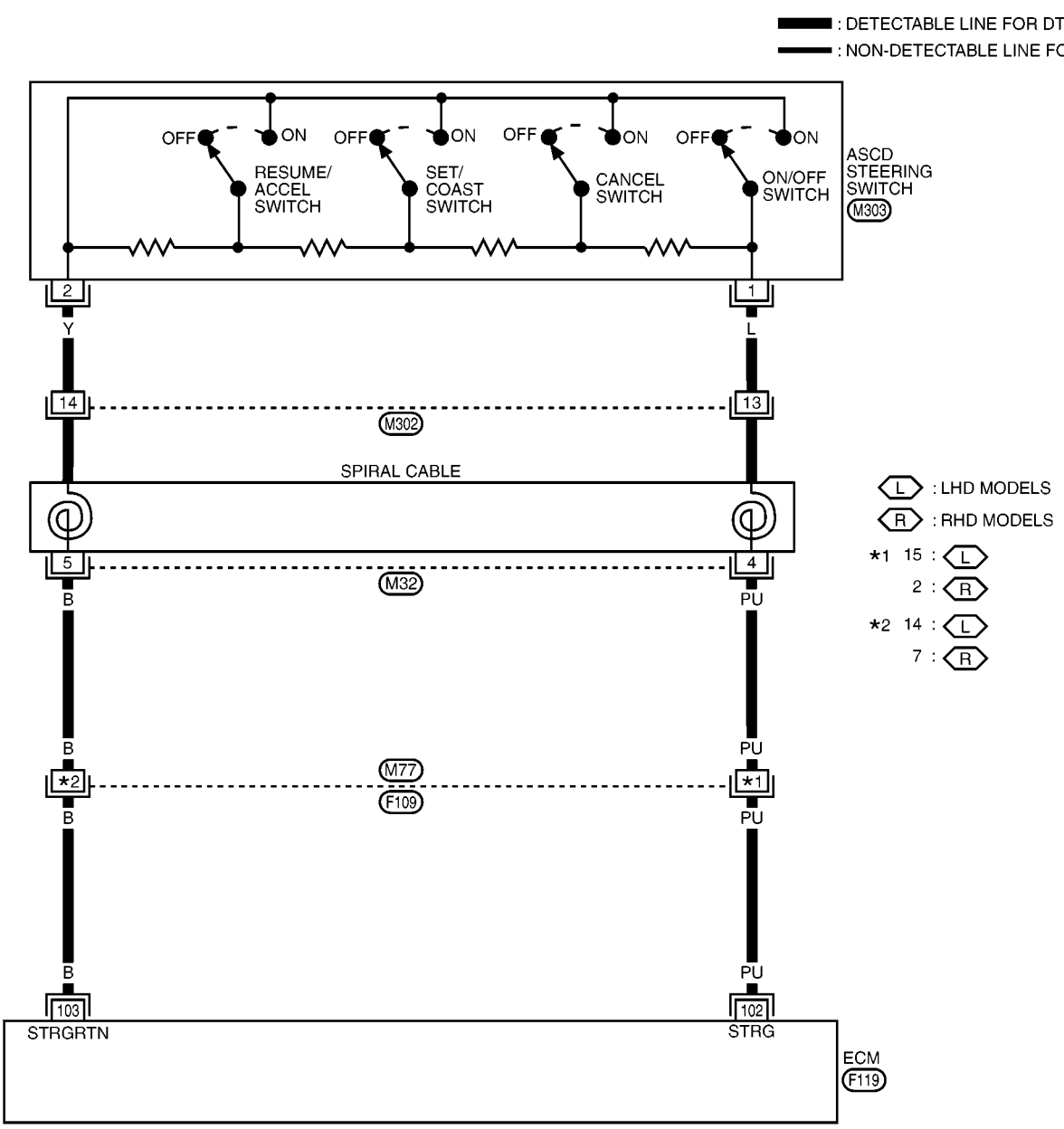
WITH GST

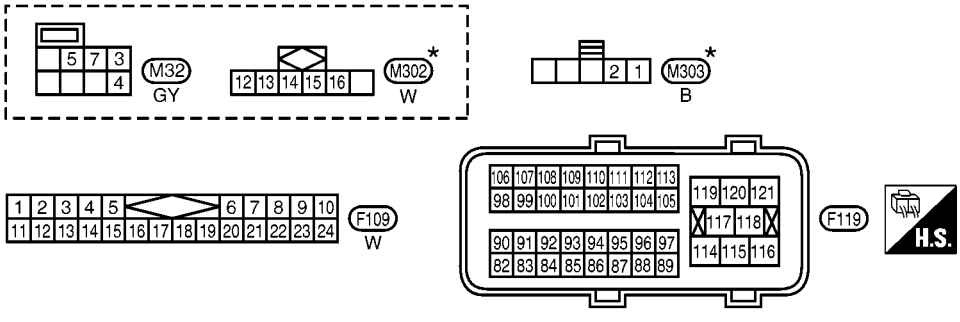
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS011VK

EC-ASC/SW-01





MBWA0608E

Diagnostic Procedure

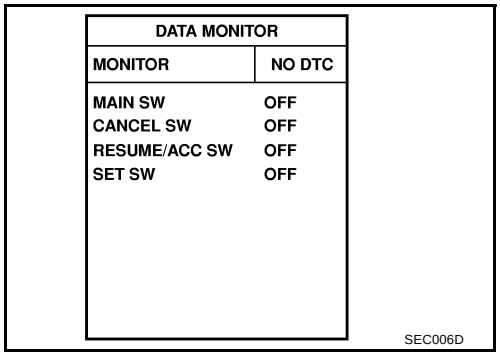
EBS011VL

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.

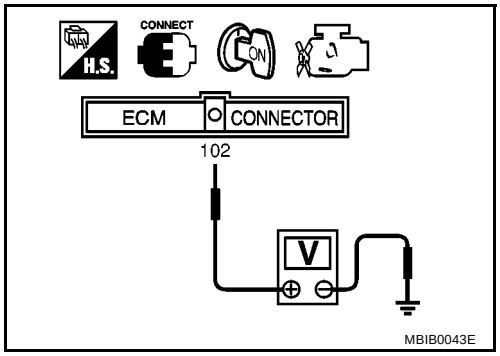
Switch	Monitor item	Condition	Indication
ON/OFF	MAIN SW	Pressed	ON
		Released	OFF
SET/COAST	SET SW	Pressed	ON
		Released	OFF
RESUME/ACCEL	RESUME/ACC SW	Pressed	ON
		Released	OFF
CANCEL	CANCEL SW	Pressed	ON
		Released	OFF



Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 102 and ground under the following conditions.

Switch	Condition	Voltage (V)
ON/OFF	Pressed	Approx. 0.3
	Released	Approx. 4.3
SET/COAST	Pressed	Approx. 2.3
	Released	Approx. 4.3
RESUME/ACCEL	Pressed	Approx. 3.3
	Released	Approx. 4.3
CANCEL	Pressed	Approx. 1.3
	Released	Approx. 4.3



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

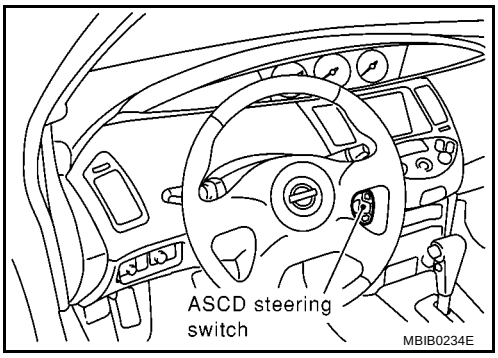
1. Turn ignition switch OFF.
2. Disconnect ASCD steering harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between switch terminal 2 and ECM terminal 103. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Spiral cable
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to ground 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 102 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 M77, F109
- 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-240, "Component Inspection"

OK or NG

OK >> GO TO 7.
NG >> Replace ASCD steering switch.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

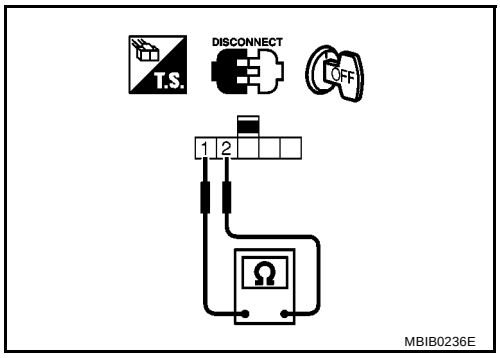
>> **INSPECTION END**

Component Inspection

EBS011VM

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)
ON/OFF	Pressed	Approx. 0
	Released	Approx. 4,000
SET/COAST	Pressed	Approx. 660
	Released	Approx. 4,000
RESUME/ACCEL	Pressed	Approx. 1,480
	Released	Approx. 4,000
CANCEL	Pressed	Approx. 250
	Released	Approx. 4,000

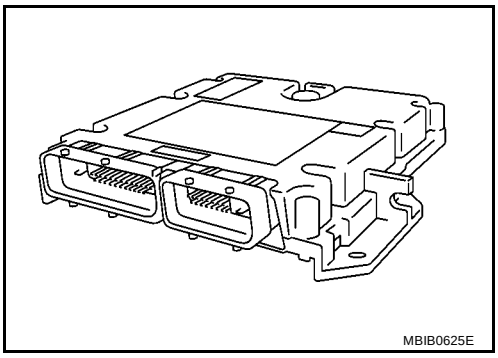
DTC P0605 ECM

PFP:23710

Description

EBS013PE

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.


MBIB0625E

On Board Diagnosis Logic

EBS013PF

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0605	Engine control module (ROM)	ECM ROM is malfunctioning.	● ECM

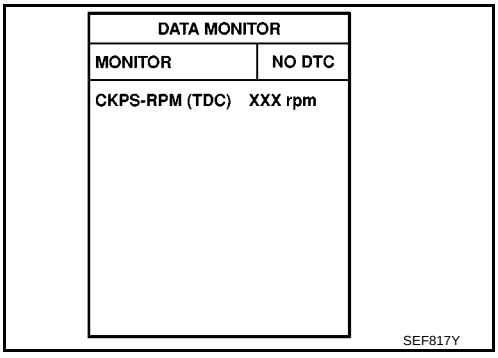
DTC Confirmation Procedure

EBS013PG

NOTE:
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-242, "Diagnostic Procedure"
.



SEF817Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013PH

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 EC-241, "DTC Confirmation Procedure" , again.
5. Is 1st trip DTC P0605 displayed again?

With GST

1. Turn ignition switch ON.
2. Select MODE4 with GST.
3. Touch “ERASE”.
4. Perform EC-241, "DTC Confirmation Procedure" , again.
5. Is 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-35, "NATS (Nissan Anti-theft System)" .
3. Perform Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

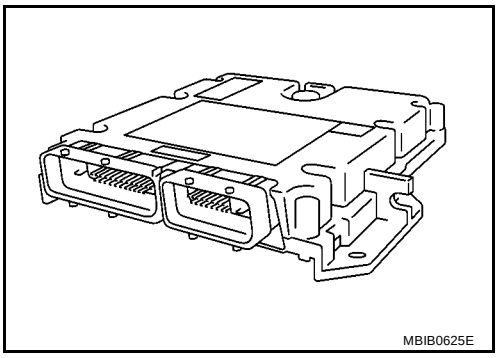
DTC P0606 ECM

PFP:23710

Description

EBS013PI

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.


MBIB0625E

On Board Diagnosis Logic

EBS013PJ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0606	Engine control module (Processor)	ECM calculation function is malfunctioning.	● ECM

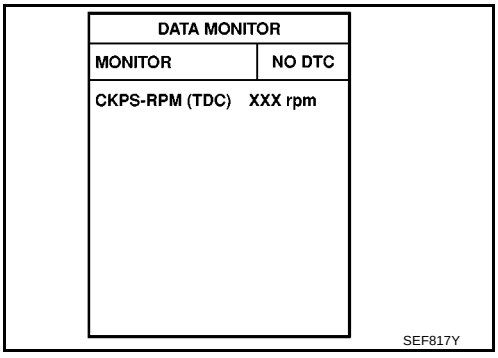
DTC Confirmation Procedure

EBS013PK

NOTE:
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-244, "Diagnostic Procedure" .



SEF817Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013PL

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 EC-243, "DTC Confirmation Procedure" , again.
5. Is 1st trip DTC P0606 displayed again?

With GST

1. Turn ignition switch ON.
2. Select MODE4 with GST.
3. Touch “ERASE”.
4. Perform EC-243, "DTC Confirmation Procedure" , again.
5. Is 1st trip DTC P0606 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-35, "NATS (Nissan Anti-theft System)" .
3. Perform “Fuel Pump Learning Value Clearing”. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

DTC P0628, P0629 FUEL PUMP

PFP:16700

Description

EBS013PM

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel increases, the fuel pump raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to the fuel pump to raise the injection pressure.

CONSULT-II Reference Value in Data Monitor Mode

EBS013PN

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

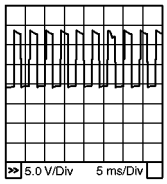
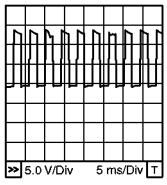
ECM Terminals and Reference Value

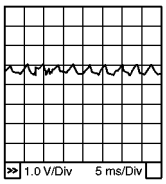
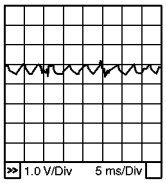
EBS013PO

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS013PP

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0628	Fuel pump control circuit low input	ECM detects a control circuit for the fuel pump is open or short to ground.	● Harness or connectors (The fuel pump circuit is open or shorted.) ● Fuel pump
P0629	Fuel pump control circuit high output	ECM detects a control circuit for the fuel pump is short to power.	

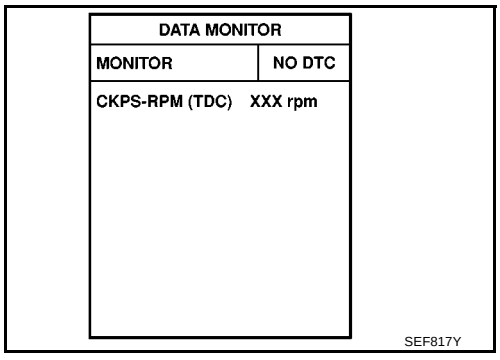
DTC Confirmation Procedure

EBS013PQ

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Let engine idle for at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-248, "Diagnostic Procedure" .



SEF817Y

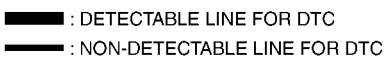
WITH GST

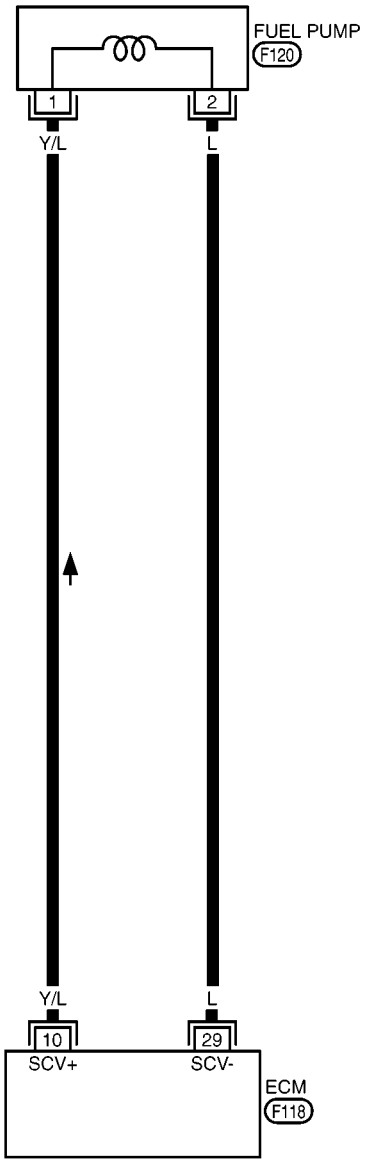
Follow the procedure “WITH CONSULT-II” above.

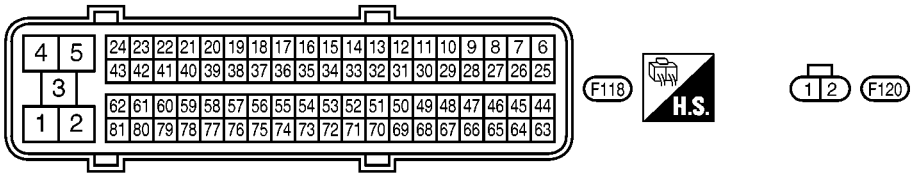
Wiring Diagram

EBS013PR

EC-F/PUMP-01







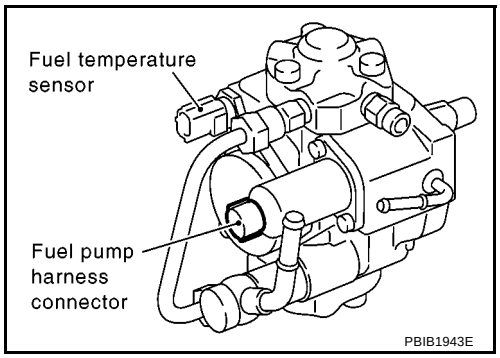
MBWA0396E

Diagnostic Procedure

EBS013PS

1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connector.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 2.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

3. CHECK FUEL PUMP

Refer toEC-249, "Component Inspection" .

OK or NG

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

4. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

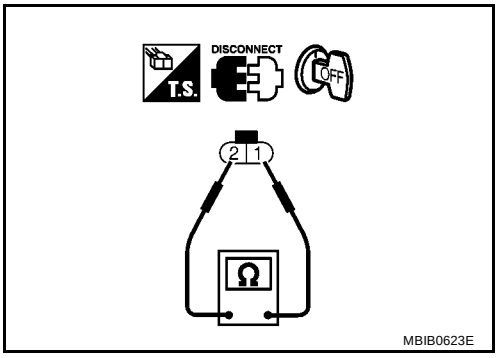
EBS013PT

FUEL PUMP

1. Check continuity between fuel supply pump terminals 1 and 2.

Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS013PU

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

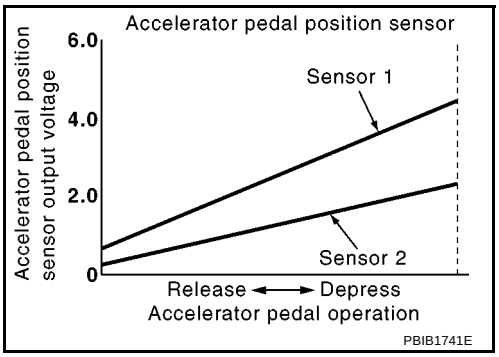
DTC P0642, P0643 SENSOR POWER SUPPLY

PFP:18002

Description

EBS013PV

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS013PW

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS013PX

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013PY

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0642	Accelerator pedal position sensor 1 power supply circuit low	ECM detects a voltage of power source for the APP sensor 1 is excessively low.	● Harness or connectors (The APP sensor 1 power supply circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P0643	Accelerator pedal position sensor 1 power supply circuit high	ECM detects a voltage of power source for the APP sensor 1 is excessively high.	

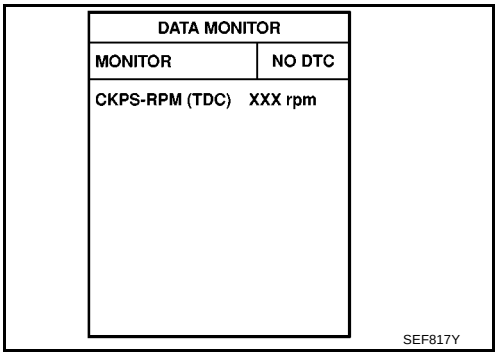
DTC Confirmation Procedure

EBS013PZ

NOTE:
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-253, "Diagnostic Procedure"
.

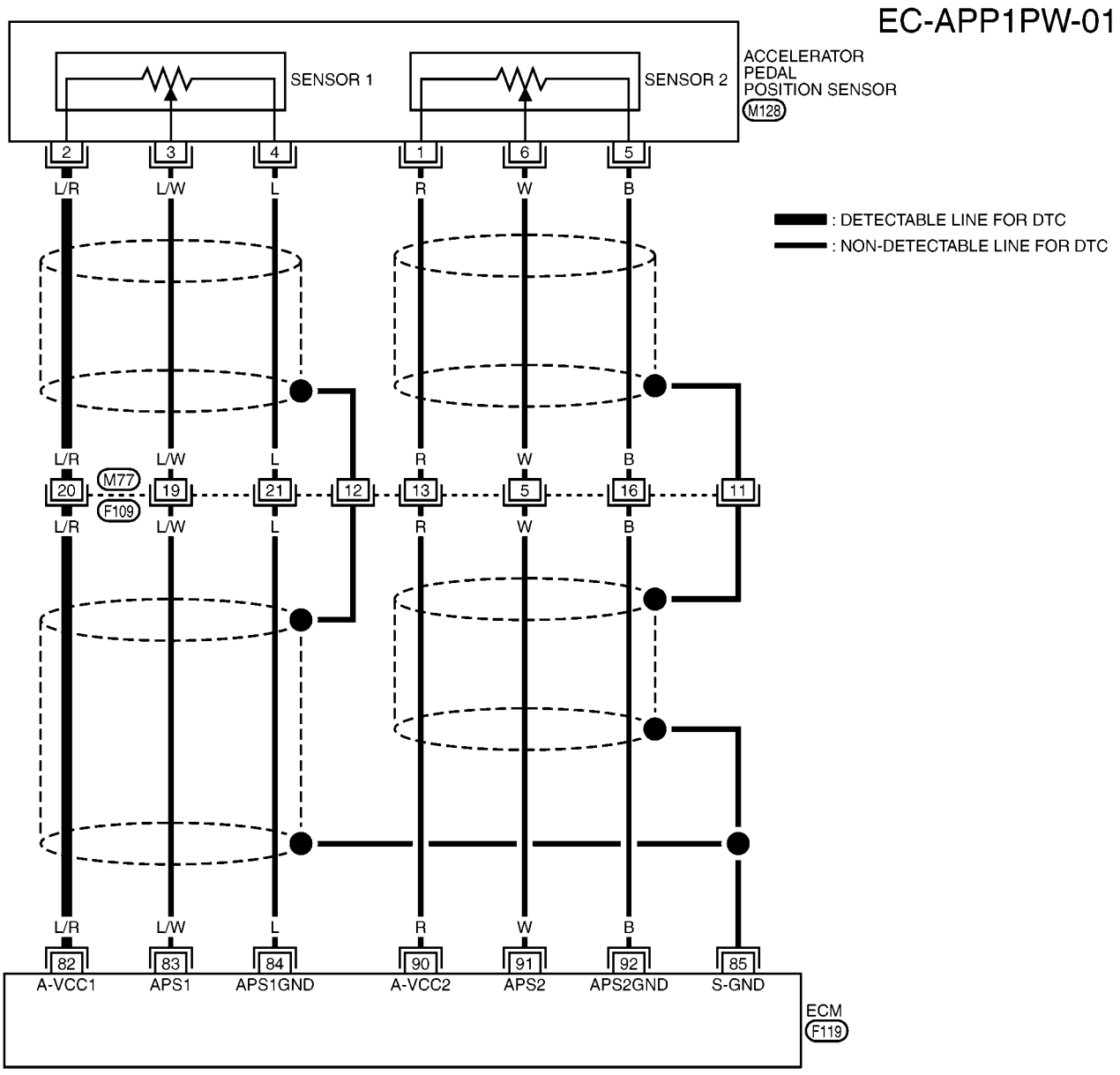


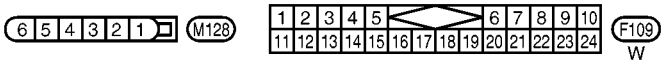
WITH GST

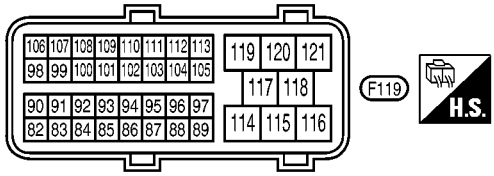
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013Q0







MBWA0434E

Diagnostic Procedure

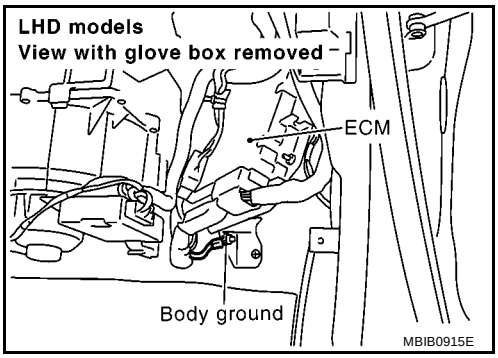
EBS013Q1

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

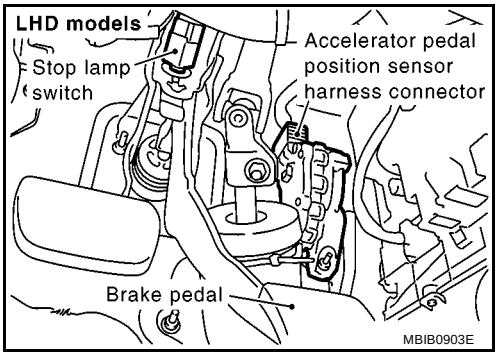
OK or NG

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



2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

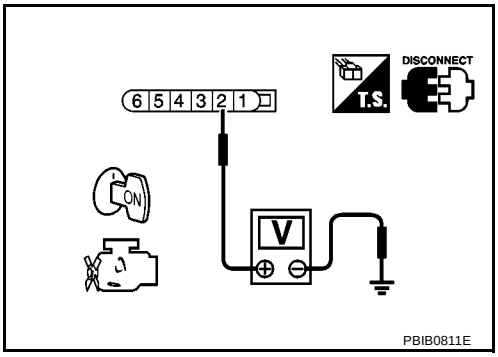


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and APP sensor

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

4. CHECK APP SENSOR

Refer to EC-254, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace accelerator pedal assembly.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

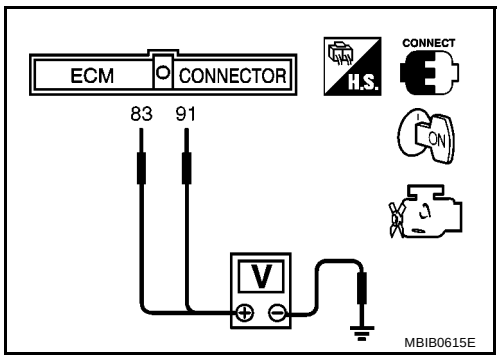
Component Inspection

EBS013Q2

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and body ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.2V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V



4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS013Q3

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

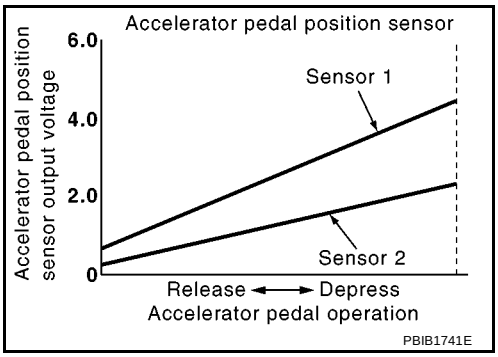
DTC P0652, P0653 SENSOR POWER SUPPLY

PFP:18002

Description

EBS013Q4

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS013Q5

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS013Q6

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013Q7

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0652	Accelerator pedal position sensor 2 power supply circuit low	ECM detects a voltage of power source for the APP sensor 2 is excessively low.	● Harness or connectors (The APP sensor 2 power supply circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2)
P0653	Accelerator pedal position sensor 2 power supply circuit high	ECM detects a voltage of power source for the APP sensor 2 is excessively high.	

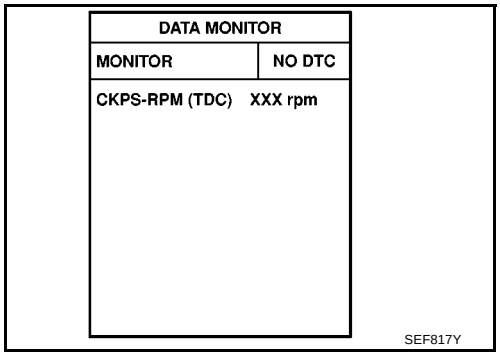
DTC Confirmation Procedure

EBS013Q8

NOTE:
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-258, "Diagnostic Procedure"
.

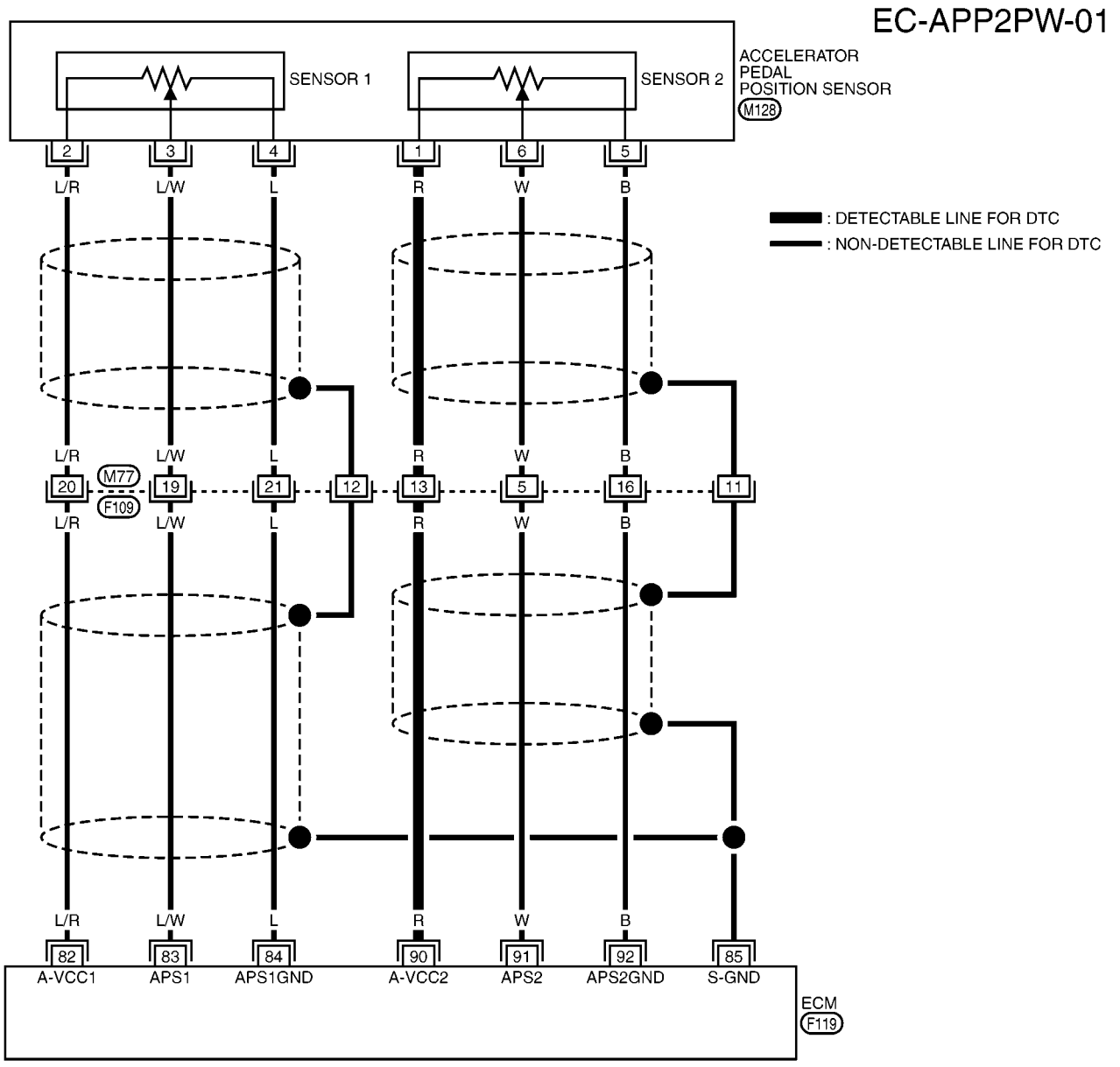


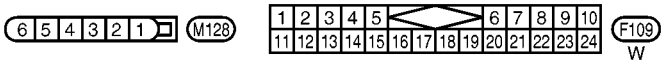
WITH GST

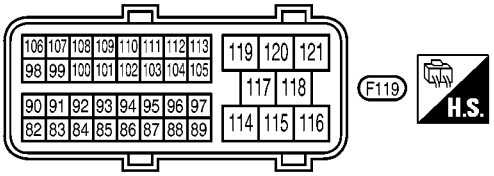
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013Q9







MBWA0435E

Diagnostic Procedure

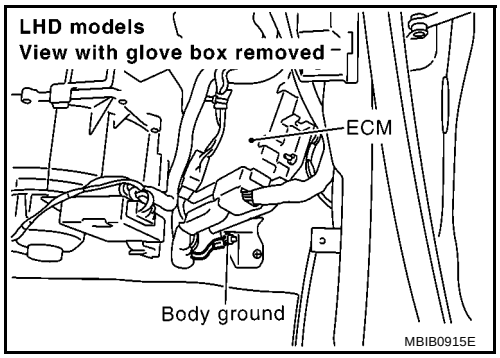
EBS013QA

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

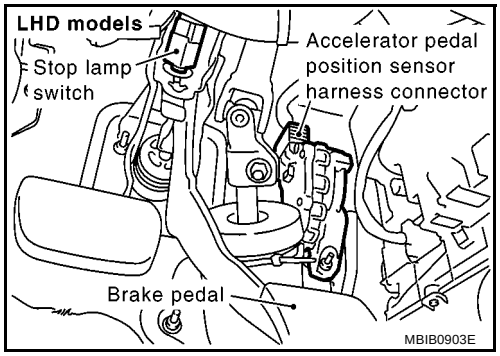
OK or NG

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



2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

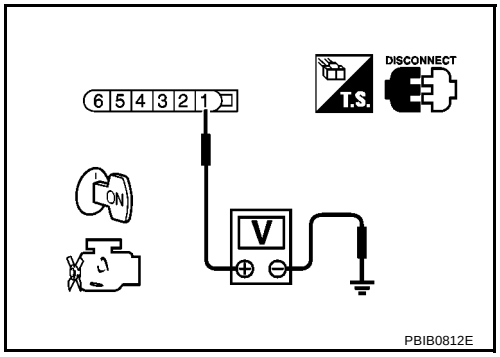


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and APP sensor

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

4. CHECK APP SENSOR

Refer to EC-259, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace accelerator pedal assembly.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

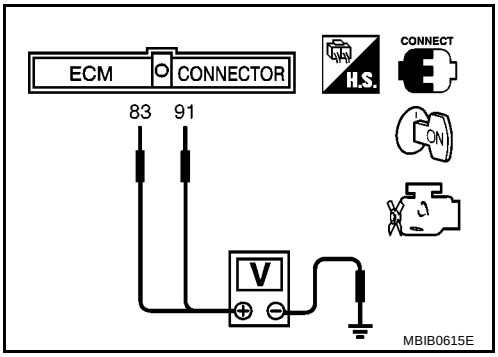
Component Inspection

EBS013QB

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and engine body under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.2V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V



4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS013QC

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

DTC P0686 ECM RELAY

PFP:25230

ECM Terminals and Reference valve

EBS013QD

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)
105	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
113	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	R R	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)

On Board Diagnosis Logic

EBS013QE

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0686	ECM relay circuit	ECM detects ECM relay is stuck closed even if ignition switch OFF.	● Harness or connectors (The ECM relay circuit is shorted.) ● ECM relay

DTC Confirmation Procedure

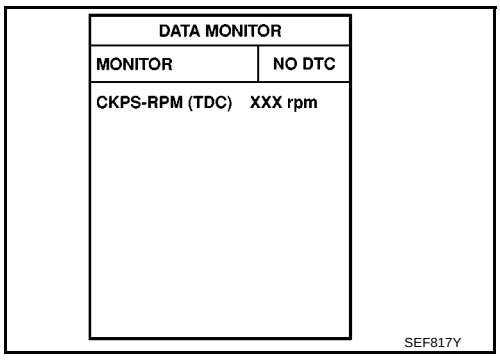
EBS013QF

NOTE:

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 then turn OFF.
2. Wait at least 30 seconds.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. If DTC is detected, go to EC-263, "Diagnostic Procedure" .

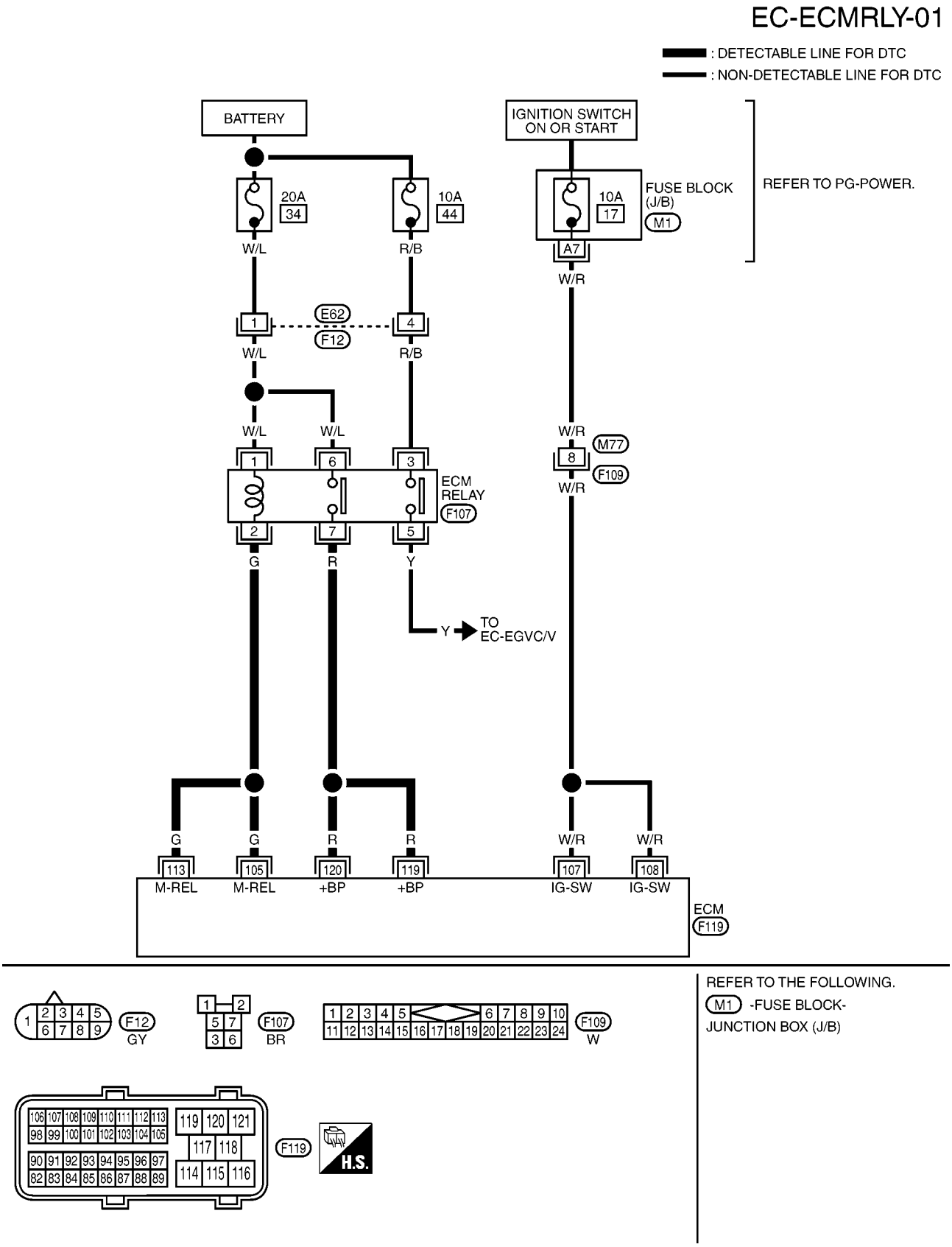


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013QG



MBWA0648E

Diagnostic Procedure

EBS013QH

1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR SHORT TO GROUND

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 105, 113 and ground. Refer to Wiring Diagram.

Continuity should not exist.

OK or NG

OK >> GO TO 2.
NG >> Repair short to ground in harness or connectors.

2. CHECK ECM INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

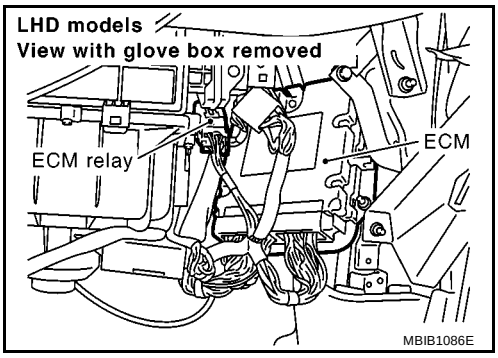
1. Disconnect ECM relay.
2. Check harness continuity between ECM terminals 119, 120 and ECM relay terminal 7. Refer to Wiring Diagram.

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 ECM RELAY

Refer to EC-263, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace ECM relay.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

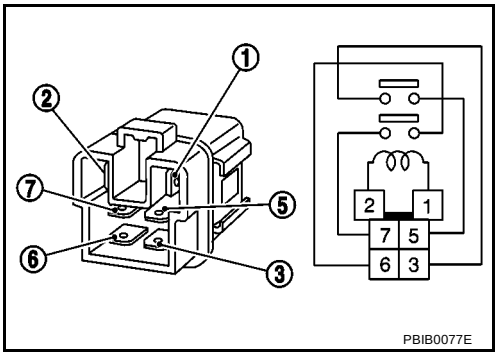
EBS013QI

ECM RELAY

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

3. If NG, replace ECM relay.



DTC P1211 TCS CONTROL UNIT

PFP:47850

Description

EBS013QJ

The malfunction information related to TCS is transferred through the CAN communication line from ESP/TCS/ABS control unit to ECM.

Be sure to erase the malfunction information such as DTC not only for ESP/TCS/ABS control unit but also for ECM after TCS related repair.

On Board Diagnosis Logic

EBS013QK

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211	TCS control unit	ECM receives a malfunction information from ESP/TCS/ABS control unit.	● ESP/TCS/ABS control unit ● TCS related parts

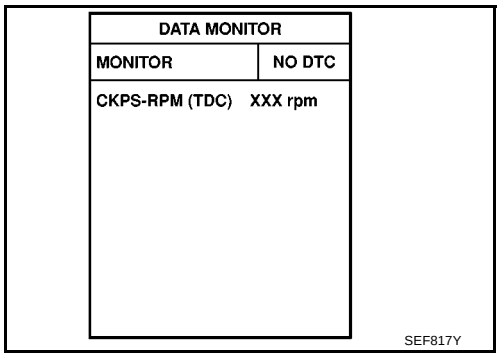
DTC Confirmation Procedure

EBS013QL

NOTE:
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-264, "Diagnostic Procedure" .



WITH GST

Folow the procedure “WITH CONSLT-II” above.

Diagnostic Procedure

EBS013QM

Go to BRC-47, "TROUBLE DIAGNOSIS" (models with ESP system) or BRC-8, "TROUBLE DIAGNOSIS" (models without ESP system).

DTC P1212 TCS COMMUNICATION LINE

PFP:47850

Description

EBS013QN

NOTE:
If DTC P1212 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to EC-83, "DTC U1000 CAN COMMUNICATION LINE" .
This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and ESP/TCS/ABS control unit.
Be sure to erase the malfunction information such as DTC not only for ESP/TCS/ABS control unit but also for ECM after TCS related repair.

On Board Diagnosis Logic

EBS013QO

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212	TCS communication line	ECM can not receive the information from ESP/ TCS/ABS control unit continuously.	● Harness or connectors (The CAN communication line is open or shorted.) ● ESP/TCS/ABS control unit ● Dead (Weak) battery

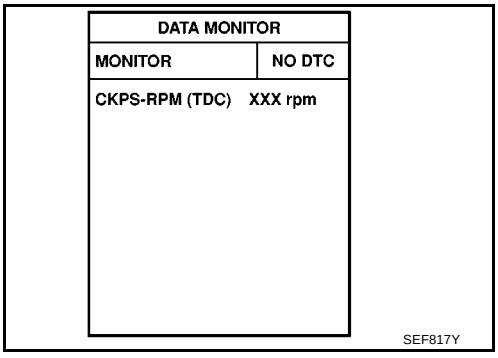
DTC Confirmation Procedure

EBS013QP

NOTE:
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-265, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013QQ

1. CHECK ESP/TCS/ABS CONTROL UNIT FUNCTION

Refer to BRC-47, "TROUBLE DIAGNOSIS" (models with ESP system) or BRC-8, "TROUBLE DIAGNOSIS" (models without ESP system).

>> **INSPECTION END**

DTC P1260 - P1267 FUEL INJECTOR ADJUSTMENT RESISTOR

PFP:16600

Description

EBS013QR

The fuel injector adjustment resistor is built into the fuel injector. The resistance is constant and individual. ECM uses the individual resistance to determine the fuel injection pulse.

ECM Terminals and Reference Value

EBS013QS

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)
59	L/G	Fuel injector adjustment resistor No. 1	**[Ignition switch ON]**	0.5 - 5.1V (There are individual differences between fuel injector adjustment resistors.)
60	L/R	Fuel injector adjustment resistor No. 3		
61	R/Y	Fuel injector adjustment resistor No. 4		
62	LG/W	Fuel injector adjustment resistor No. 2		
78	R	Fuel injector adjustment resistor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013QT

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1260	No. 1 cylinder fuel injector adjustment resistor low input	An excessively low voltage from the No. 1 cylinder fuel injector adjustment resistor is sent to ECM.	● Harness or connectors (The fuel injector adjustment resistor circuit is open or shorted.) ● Fuel injector adjustment resistor
P1261	No. 1 cylinder fuel injector adjustment resistor high input	An excessively high voltage from the No. 1 cylinder fuel injector adjustment resistor is sent to ECM.	
P1262	No. 2 cylinder fuel injector adjustment resistor low input	An excessively low voltage from the No. 2 cylinder fuel injector adjustment resistor is sent to ECM.	
P1263	No. 2 cylinder fuel injector adjustment resistor high input	An excessively high voltage from the No. 2 cylinder fuel injector adjustment resistor is sent to ECM.	
P1264	No. 3 cylinder fuel injector adjustment resistor low input	An excessively low voltage from the No. 3 cylinder fuel injector adjustment resistor is sent to ECM.	
P1265	No. 3 cylinder fuel injector adjustment resistor high input	An excessively high voltage from the No. 3 cylinder fuel injector adjustment resistor is sent to ECM.	
P1266	No. 4 cylinder fuel injector adjustment resistor low input	An excessively low voltage from the No. 4 cylinder fuel injector adjustment resistor is sent to ECM.	
P1267	No. 4 cylinder fuel injector adjustment resistor high input	An excessively high voltage from the No. 4 cylinder fuel injector adjustment resistor is sent to ECM.	

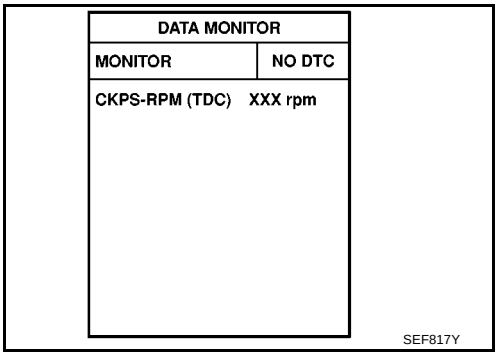
DTC Confirmation Procedure

EBS013QU

NOTE:
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-269, "Diagnostic Procedure"
.



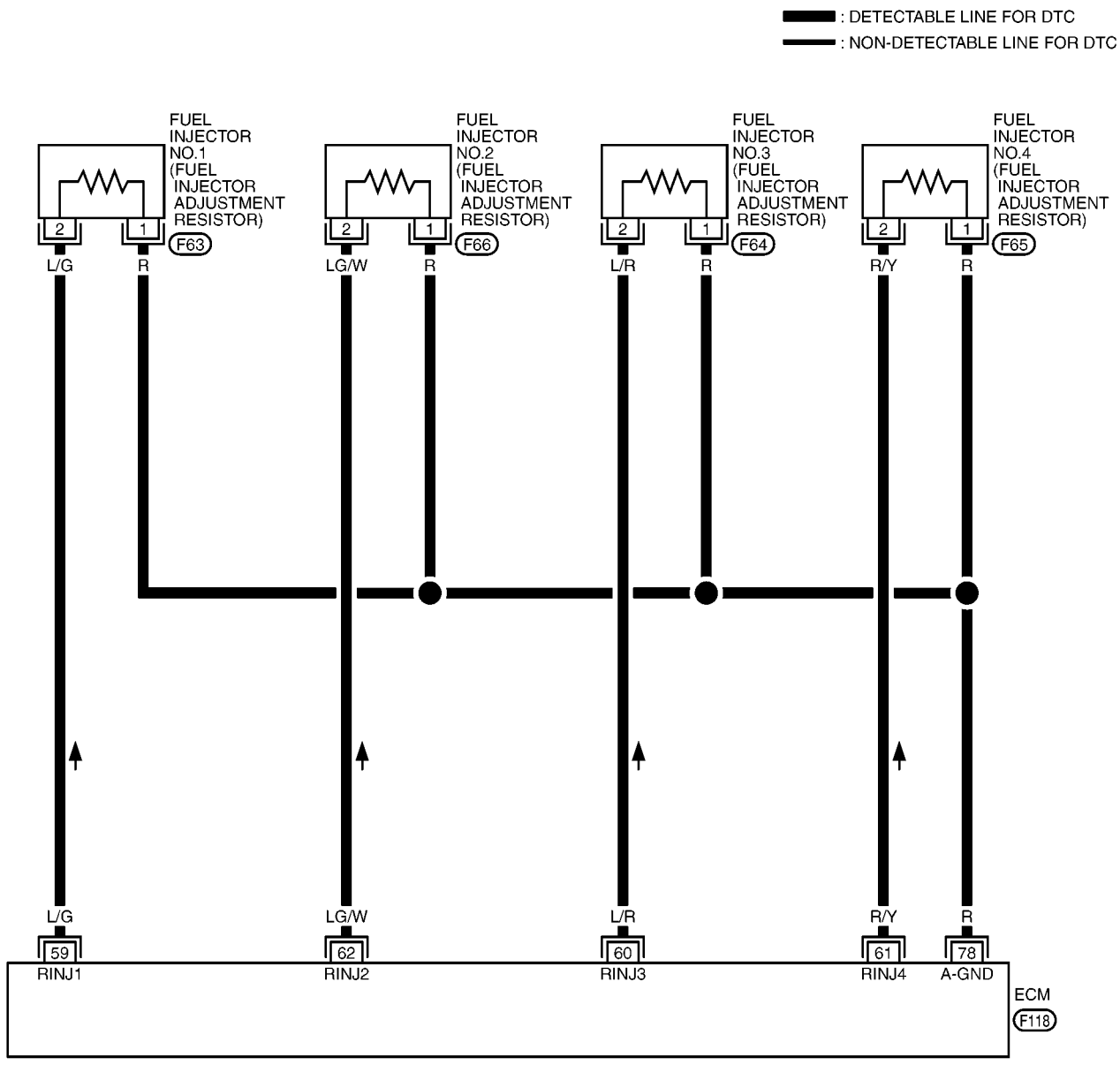
WITH GST

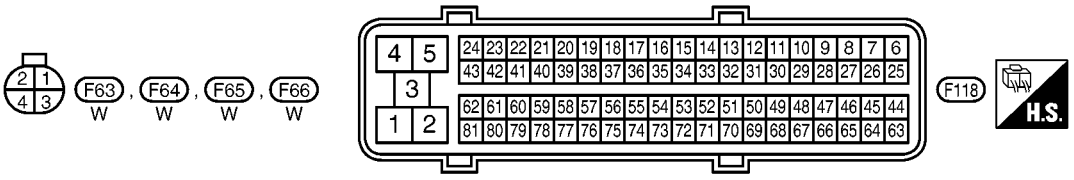
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013QV

EC-FIAR-01





MBWA0635E

Diagnostic Procedure

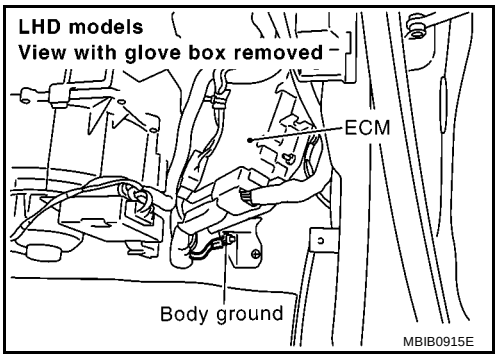
EBS013QW

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

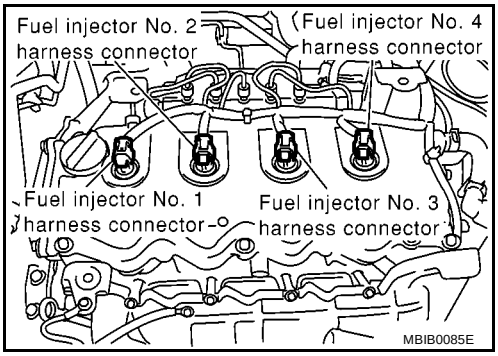
OK or NG

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



2. CHECK FUEL INJECTOR ADJUSTMENT RESISTOR POWER SUPPLY CIRCUIT

1. Disconnect fuel injector harness connector of malfunctioning cylinder.
2. Turn ignition switch ON.

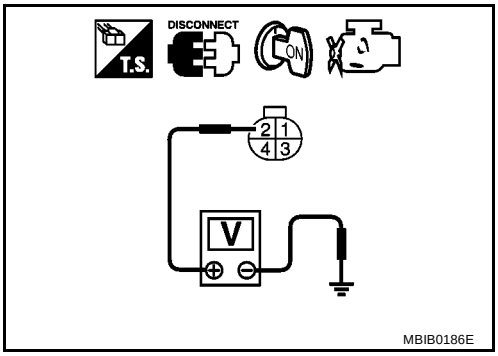


3. Check voltage between fuel injector terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 FUEL INJECTOR ADJUSTMENT RESISTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel injector terminal 1 and ECM terminal 78.

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 FUEL INJECTOR ADJUSTMENT RESISTOR

Refer to EC-270, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace fuel injector.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

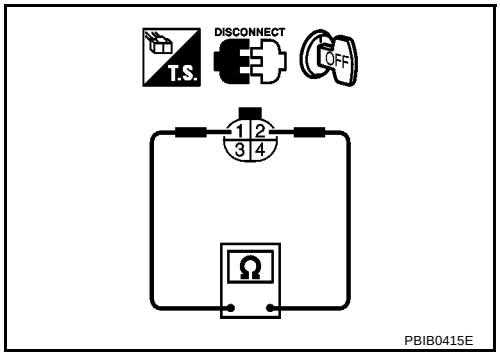
EBS013QX

FUEL INJECTOR ADJUSTMENT RESISTOR

1. Disconnect fuel injector harness connector.
2. Check continuity between terminals as shown in the figure.

Continuity should exist.

If NG, replace fuel injector.



Removal and Installation

EBS013QY

FUEL INJECTOR

Refer to
EM-39, "INJECTION TUBE AND FUEL INJECTOR".

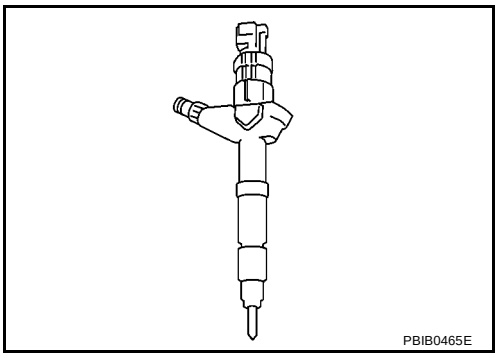
DTC P1268 - P1271 FUEL INJECTOR

PFP:16600

Component Description

EBS013QZ

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


PBIB0465E

CONSULT-II Reference Value in Data Monitor Mode

EBS013R0

Specification data are reference values.

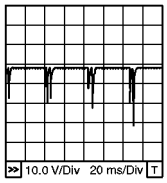
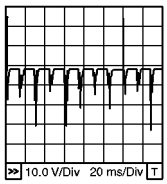
MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec

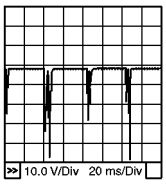
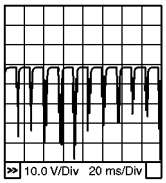
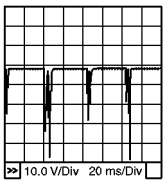
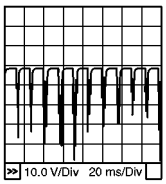
ECM Terminals and Reference Value

EBS013R1

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

CAUTION:
Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
4	O/B	Fuel injector power supply (For cylinder No. 1 and 4)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
5	B	Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

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

On Board Diagnosis Logic

EBS013R2

This self-diagnosis has the one trip detection logic.
The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1268	No. 1 cylinder fuel injector	The valve built into No. 1 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	● Fuel injector
P1269	No. 2 cylinder fuel injector	The valve built into No. 2 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	
P1270	No. 3 cylinder fuel injector	The valve built into No. 3 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	
P1271	No. 4 cylinder fuel injector	The valve built into No. 4 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	

DTC Confirmation Procedure

EBS013R3

CAUTION:

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

NOTE:

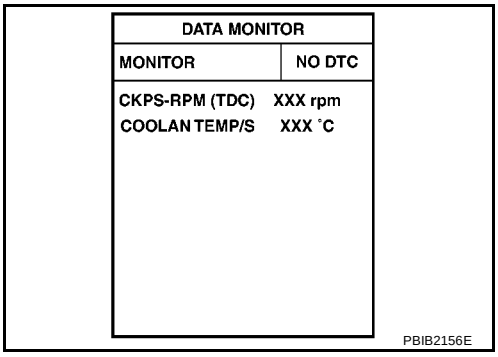
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON, and select “DATA MONITOR” mode with CONSULT-II.
2. Restart engine and let it idle for about 15 minutes.
3. If DTC is detected, go to EC-275, "Diagnostic Procedure" .
   If DTC is not detected, go to next step.
4. Drive vehicle and maintain the following conditions for at least 60 seconds.

CKPS·RPM	700 - 2000 rpm (A constant rotation is maintained)
COOLAN TEMP/S	Less than 75°C (167°F)
Shift lever	Suitable position
Accelerator pedal	Hold the accelerator pedal as steady as possible.

5. If DTC is detected, go to EC-275, "Diagnostic Procedure" .



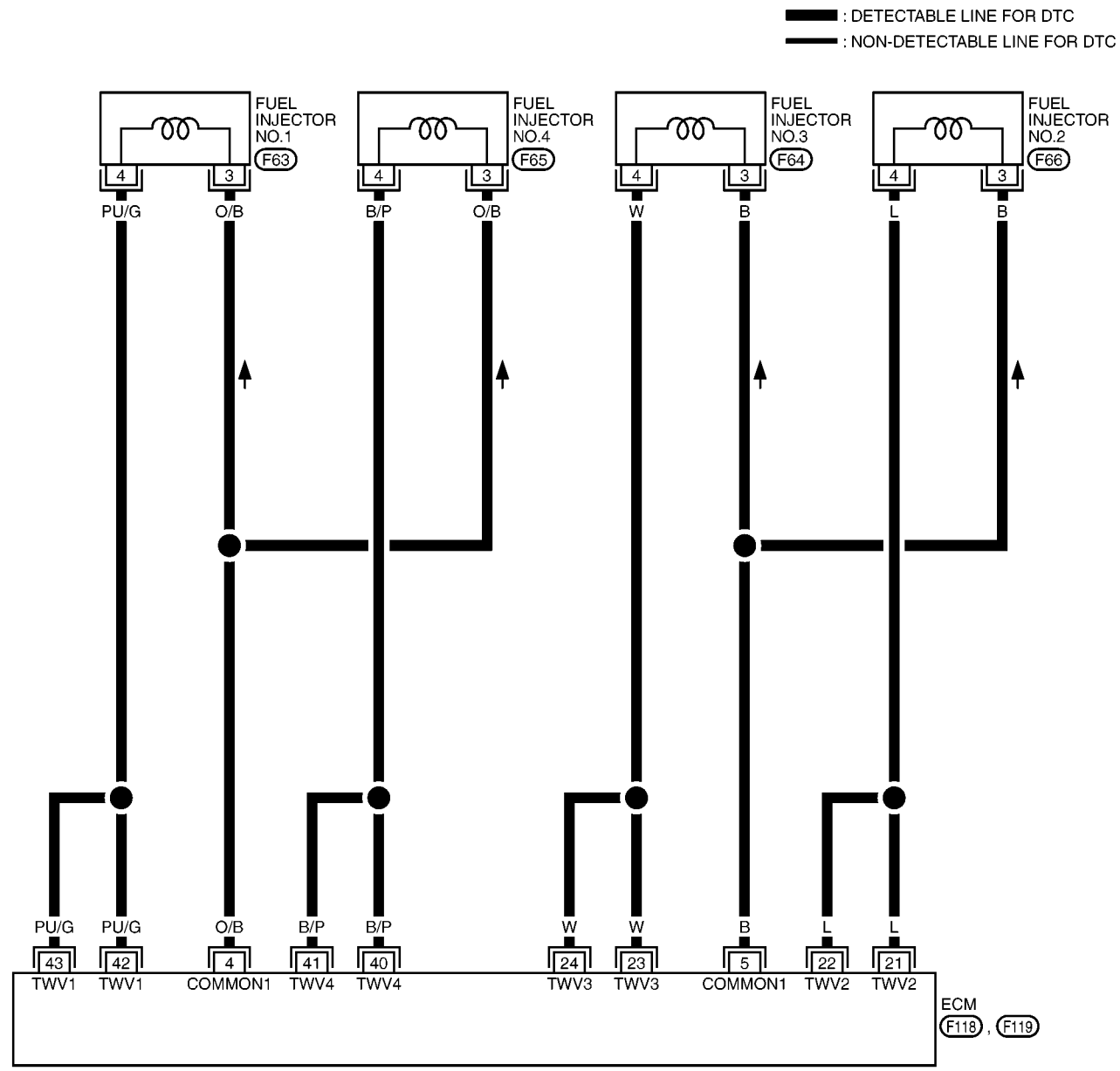
WITHOUT CONSULT-II

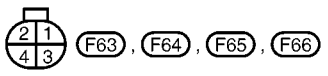
Follow the procedure “WITH CONSULT-II” above.

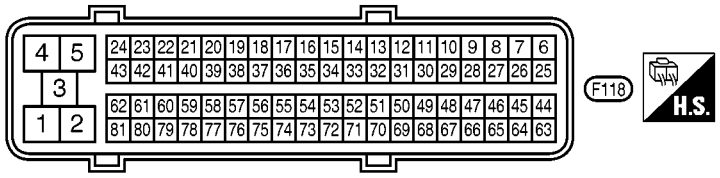
Wiring Diagram

EBS013R4

EC-INJECT-01







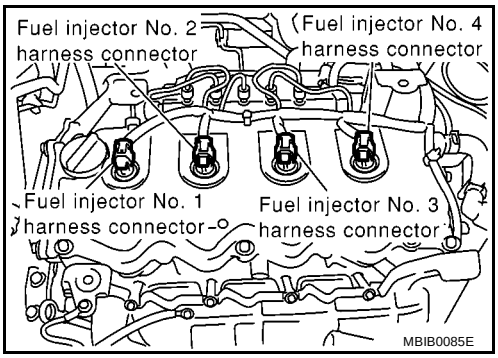
MBWA0634E

Diagnostic Procedure

EBS013R5

1. CHECK FUEL INJECOR POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector harness connector.
4. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.



DTC	Terminal		Cylinder
	ECM	Fuel injector	
P1268	4	3	No.1
P1269	5	3	No.2
P1270	5	3	No.3
P1271	4	3	No.4

Continuity should exist.

5. 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 ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.

DTC	Terminal		Cylinder
	ECM	Fuel injector	
P1268	42, 43	4	No.1
P1269	21, 22	4	No.2
P1270	23, 24	4	No.3
P1271	40, 41	4	No.4

Continuity should exist.

2. 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 FUEL INJECTOR-I

Refer to EC-276, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel injector.

4. CHECK FUEL INJECTOR-II

With CONSULT-II

1. Remove two fuel injectors of malfunctioning cylinder and another cylinder.
2. Install fuel injectors to different cylinder.
3. Reconnect ECM harness connector and fuel injector harness connector.
4. Turn ignition switch ON.
5. Select “SELF DIAG RESULTS” mode with CONSULT-II.
6. Touch “ERASE”.
7. Perform EC-273, "DTC Confirmation Procedure" .
8. Is another DTC displayed?

With GST

1. Remove two fuel injectors of malfunctioning cylinder and another cylinder.
2. Install fuel injectors to different cylinder.
3. Reconnect ECM harness connector and fuel injector harness connector.
4. Turn ignition switch ON.
5. Select MODE4 with GST.
6. Touch “ERASE”.
7. Perform EC-273, "DTC Confirmation Procedure" .
8. Is another DTC displayed?

Yes or No

Yes >> Replace fuel injector of malfunctioning cylinder.
No >> GO TO 5.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

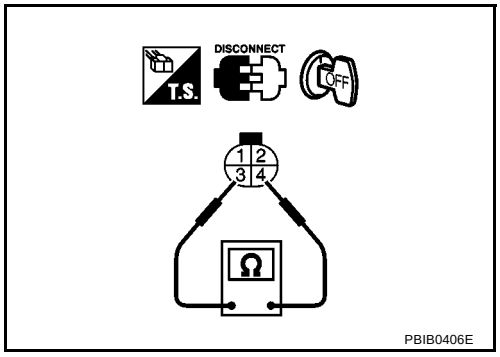
EBS013R6

FUEL INJECTOR

1. Disconnect fuel injector.
2. Check continuity between terminals as shown in the figure.

Continuity should exist.

3. If NG, replace fuel injector.



Removal and Installation

EBS013R7

FUEL INJECTOR

Refer to
EM-39, "INJECTION TUBE AND FUEL INJECTOR".

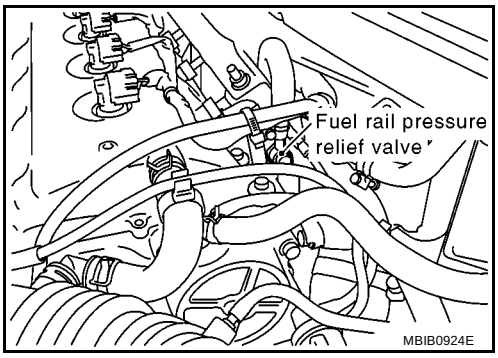
DTC P1272 FUEL PUMP

PFP:16700

Description

EBS013R8

When the fuel pressure in fuel rail increases to excessively high, fuel pressure relief valve opens to carry excess fuel to the return hose.



CONSULT-II Reference Value in Data Monitor Mode

EBS013R9

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

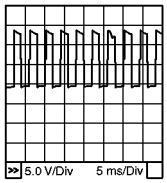
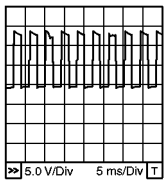
ECM Terminals and Reference Value

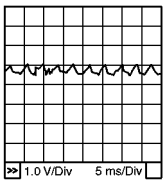
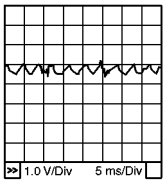
EBS013RA

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS013RB

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1272	Fuel rail pressure relief valve open	Fuel rail pressure relief valve is open because of fuel pressure control system malfunction.	● Harness or connectors (Fuel pump circuit is open or shorted.) ● Fuel pump ● Fuel rail pressure sensor ● Air mixed with fuel ● Lack of fuel

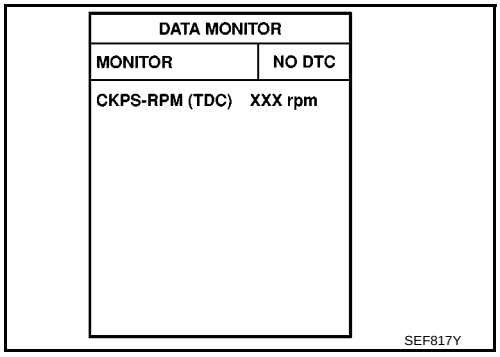
DTC Confirmation Procedure

EBS013RC

NOTE:
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 keep engine speed more than 4,000 rpm for at least 5 seconds, then release the accelerator pedal.
4. If 1st trip DTC is detected, go to EC-280, "Diagnostic Procedure" .



SEF817Y

WITH GST

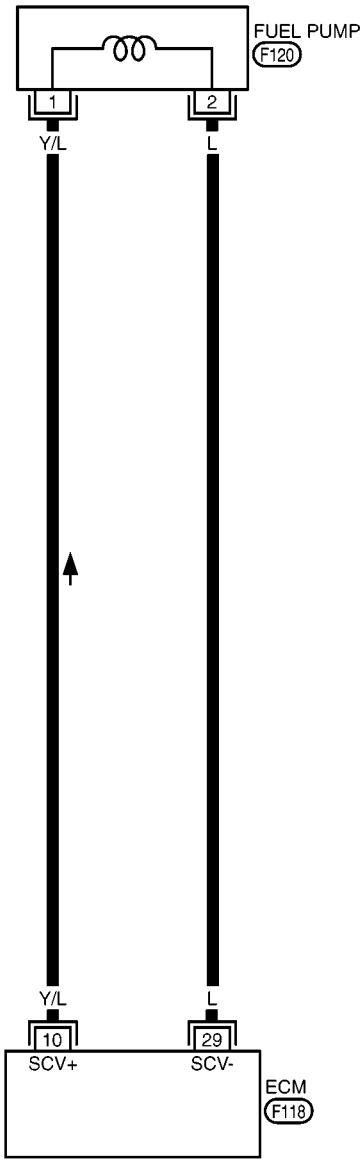
Follow the procedure “WITH CONSULT-II” above.

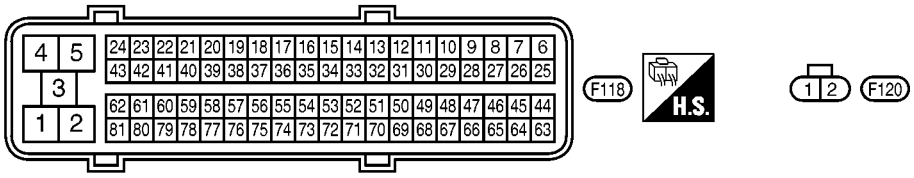
Wiring Diagram

EBS013RD

EC-F/PUMP-01

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





MBWA0396E

Diagnostic Procedure

EBS013RE

1. PERFORM FUEL PUMP LEARNING VALUE CLEARING

NOTE:
If the DTC is detected because of air mixed with fuel (i.e.: caused by lack of fuel), it may become normal by performing following procedure.

With CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select “SELF-DIAG RESULT” mode with CONSULT-II.
5. Touch “ERASE”.
6. Perform EC-278, "DTC Confirmation Procedure" , again.
7. Is 1st trip DTC detected again?

With GST

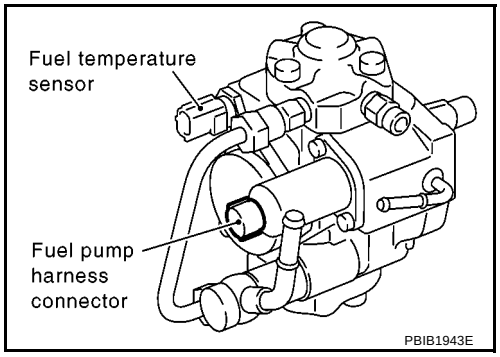
1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select MODE 4 with GST.
5. Touch “ERASE”.
6. Perform EC-278, "DTC Confirmation Procedure" , again.
7. Is 1st trip DTC detected again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connectors.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PUMP

Refer to EC-281, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> GO TO 7.

5. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-138, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace fuel rail.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace.

7. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

Component Inspection

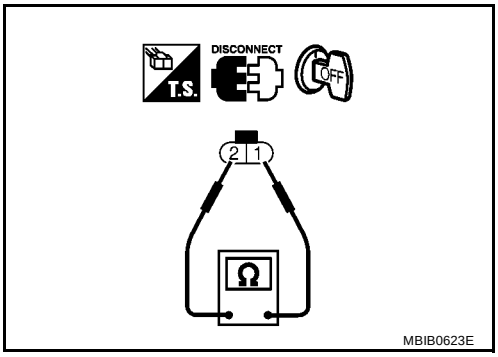
EBS013RF

FUEL PUMP

1. Check continuity between fuel supply pump terminals 1 and 2.

Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS013RG

FUEL RAIL

Refer to
EM-39, "INJECTION TUBE AND FUEL INJECTOR".

FUEL PUMP

Refer to
EM-42, "FUEL PUMP".

DTC P1273 FUEL PUMP

PFP:16700

Description

EBS013RH

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel pump increases, the fuel raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to the fuel pump to raise the injection pressure.

CONSULT-II Reference Value in Data Monitor Mode

EBS013RI

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

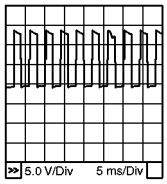
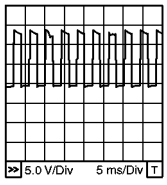
ECM Terminals and Reference Value

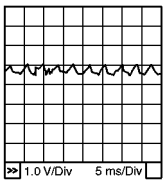
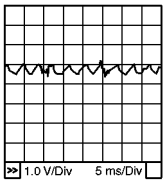
EBS013RJ

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS013RK

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1273	Fuel pump insufficient flow	ECM detects the abnormal pulse of fuel pressure.	● Fuel pump ● Air mixed with fuel ● Lack of fuel ● Fuel rail pressure sensor

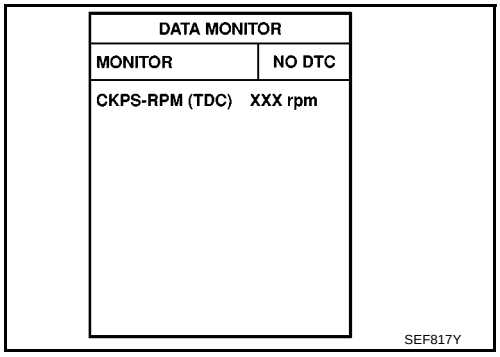
DTC Confirmation Procedure

EBS013RL

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Keep engine speed more than 2,000 rpm for at least 10 seconds.
4. If 1st trip DTC is detected, go to EC-286, "Diagnostic Procedure" .



SEF817Y

WITH GST

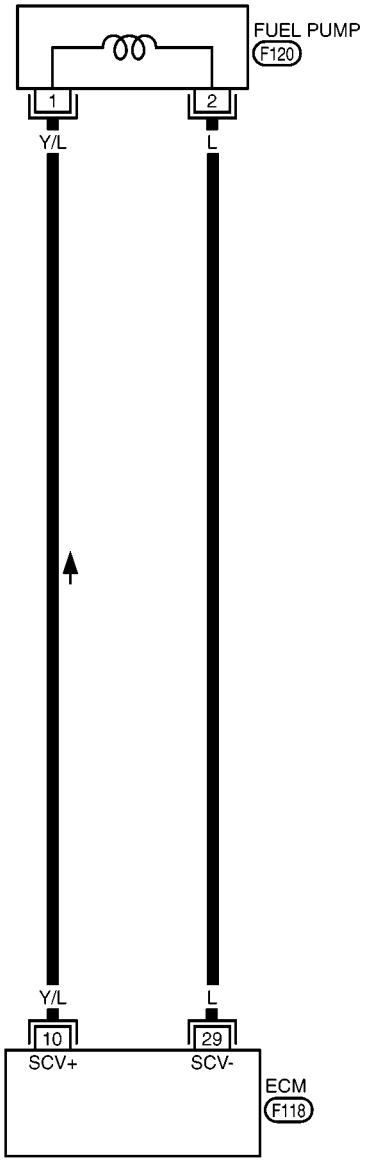
Follow the procedure “WITH CONSULT-II” above.

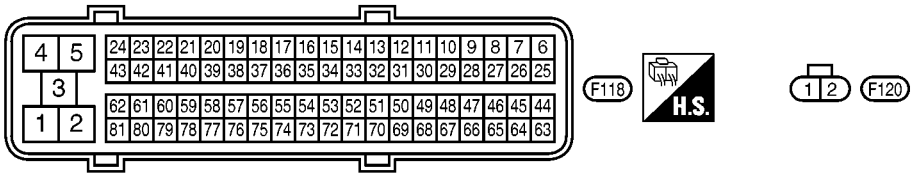
Wiring Diagram

EBS013RM

EC-F/PUMP-01

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





MBWA0396E

Diagnostic Procedure

EBS013RN

1. PERFORM FUEL PUMP LEARNING VALUE CLEARING

NOTE:
If the DTC is detected because of air mixed with fuel (i.e.: caused by lack of fuel), it may become normal by performing following procedure.

With CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select “SELF-DIAG RESULT” mode with CONSULT-II.
5. Touch “ERASE”.
6. Perform EC-284, "DTC Confirmation Procedure" , again.
7. Is 1st trip DTC detected again?

With GST

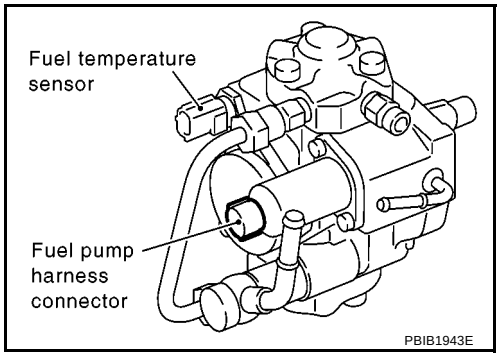
1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select MODE 4 with GST.
5. Touch “ERASE”.
6. Perform EC-284, "DTC Confirmation Procedure" , again.
7. Is 1st trip DTC detected again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connectors.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-138, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace fuel rail.

5. CHECK FUEL PUMP

Refer to EC-287, "Component Inspection" .

OK or NG

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

6. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Valve Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

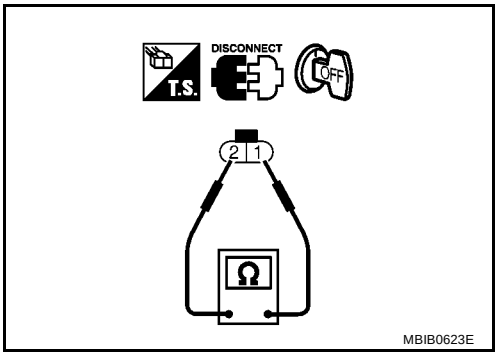
EBS013RO

FUEL PUMP

1. Check continuity between fuel supply pump terminals 1 and 2.

Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS013RP

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P1274 FUEL PUMP

PFP:16700

Description

EBS013RQ

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel increases, the fuel pump raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to the fuel pump to raise the injection pressure.

CONSULT-II Reference Value in Data Monitor Mode

EBS013RR

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

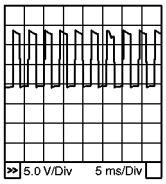
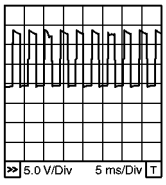
ECM Terminals and Reference Value

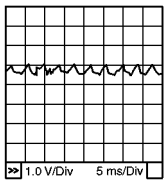
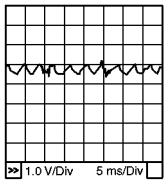
EBS013RS

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS013RT

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1274	Fuel pump protection	Fuel pressure is too much higher than the target value.	● Harness or connectors (The fuel pump circuit is open or shorted.) ● Fuel pump ● Fuel rail pressure sensor

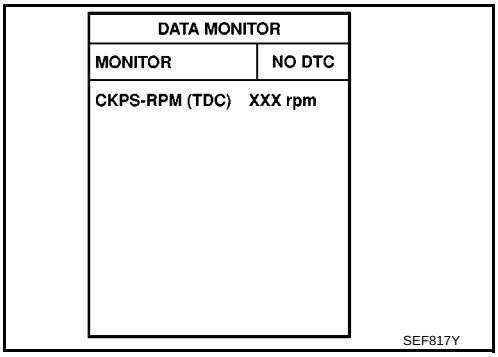
DTC Confirmation Procedure

EBS013RU

NOTE:
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. Tuning ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let idle for at least 5 seconds.
4. If DTC is detected, go to EC-291, "Diagnostic Procedure" .



SEF817Y

WITH GST

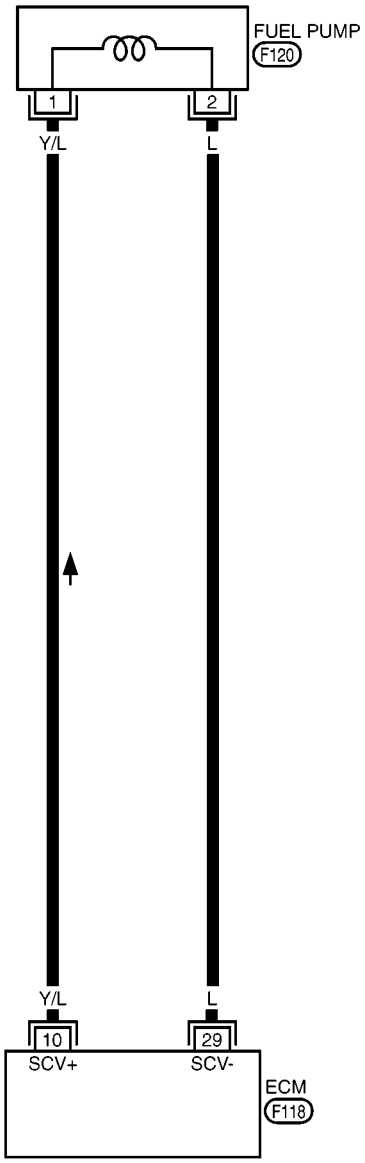
Follow the procedure “WITH CONSULT-II” above.

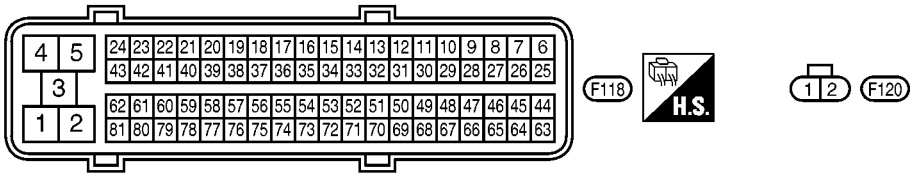
Wiring Diagram

EBS013RV

EC-F/PUMP-01

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





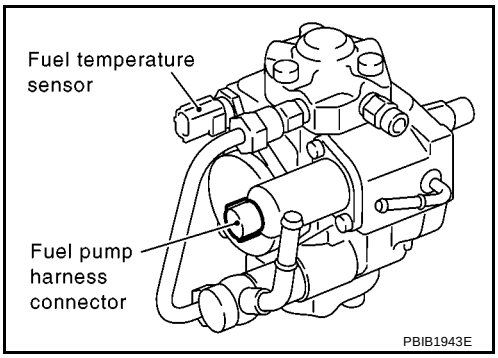
MBWA0396E

Diagnostic Procedure

EBS013RW

1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connectors.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 2.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

3. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-138, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel rail.

4. CHECK FUEL PUMP

Refer to EC-292, "Component Inspection" .

OK or NG

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

5. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Valve Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

6. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

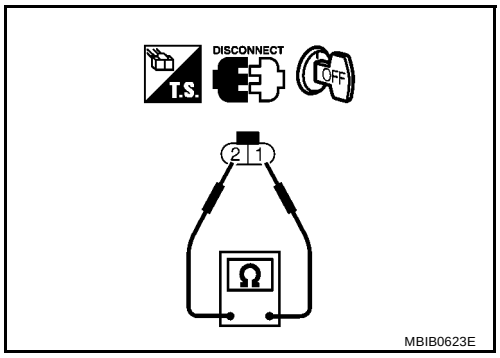
EBS013RX

FUEL PUMP

1. Check continuity between fuel pump terminals 1 and 2.

   Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS013RY

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P1275 FUEL PUMP

PFP:16700

Description

EBS013RZ

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel increases, the fuel pump raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to fuel pump to raise the injection pressure.

CONSULT-II Reference Value in Data Monitor Mode

EBS013S0

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

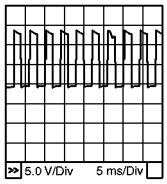
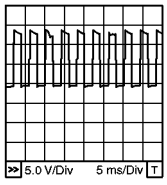
ECM Terminals and Reference Value

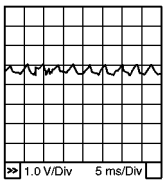
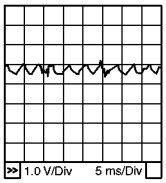
EBS013S1

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS013S2

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1275	Fuel pump exchange	Fuel pressure is too much higher than the target value.	● Harness or connectors (The fuel pump circuit is open or shorted.) ● Fuel pump ● Fuel rail pressure sensor

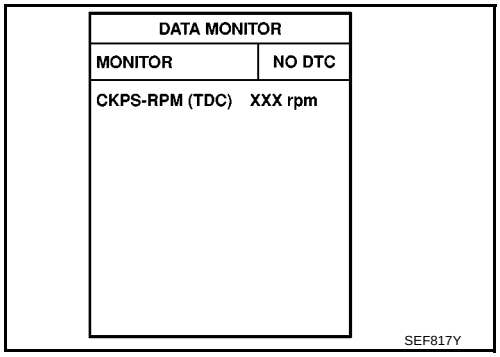
DTC Confirmation Procedure

EBS013S3

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Keep engine speed more than 2,000 rpm for at least 60 seconds.
4. If DTC is detected, go to EC-296, "Diagnostic Procedure" .



SEF817Y

WITH GST

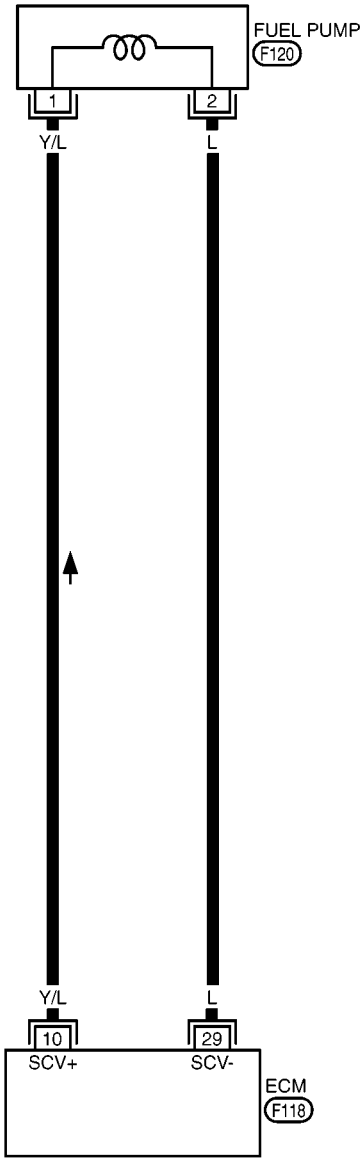
Follow the procedure “WITH CONSULT-II” above.

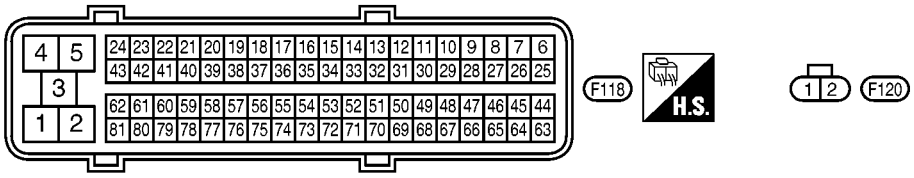
Wiring Diagram

EBS013S4

EC-F/PUMP-01

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





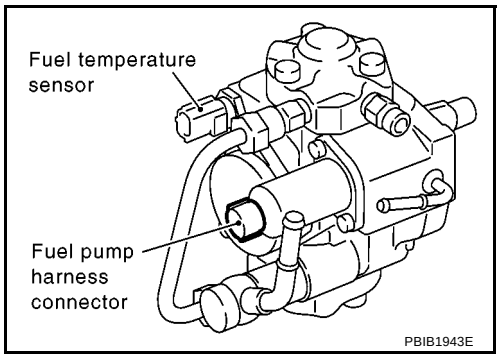
MBWA0396E

Diagnostic Procedure

EBS013S5

1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connectors.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 2.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

3. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-138, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel rail.

4. CHECK FUEL PUMP

Refer to EC-297, "Component Inspection" .

OK or NG

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

5. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Valve Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

6. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

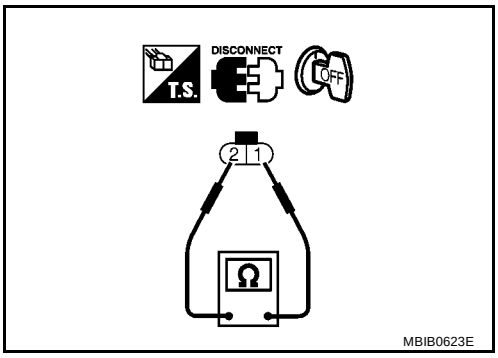
EBS013S6

FUEL PUMP

1. Check continuity between fuel pump terminals 1 and 2.

   Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS013S7

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

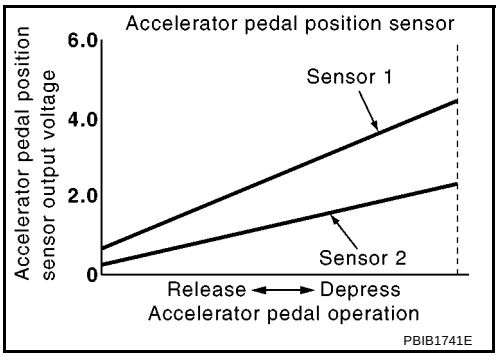
DTC P2135 APP SENSOR

PFP:18002

Description

EBS013S8

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS013S9

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS013SA

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS013SB

This self-diagnosis has the one trip detection logic.
The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135	Accelerator pedal position sensor 1, 2 signal correlation	The correlation between APP sensor 1 signal and APP sensor 2 signal is out of the normal range.	● Harness or connectors (The APP sensor circuit is open or shorted.) ● Accelerator pedal position sensor

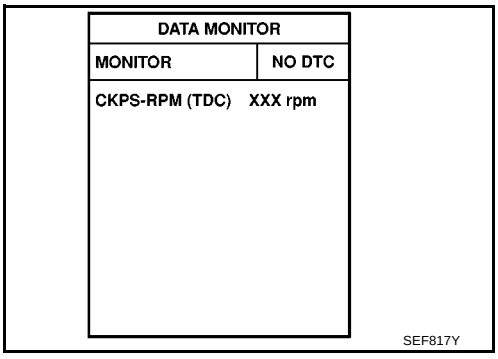
DTC Confirmation Procedure

EBS013SC

NOTE:
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. Depress accelerator pedal slowly spending 5 seconds, and then release it slowly spending 5 seconds.
5. If DTC is detected, go to EC-301, "Diagnostic Procedure" .

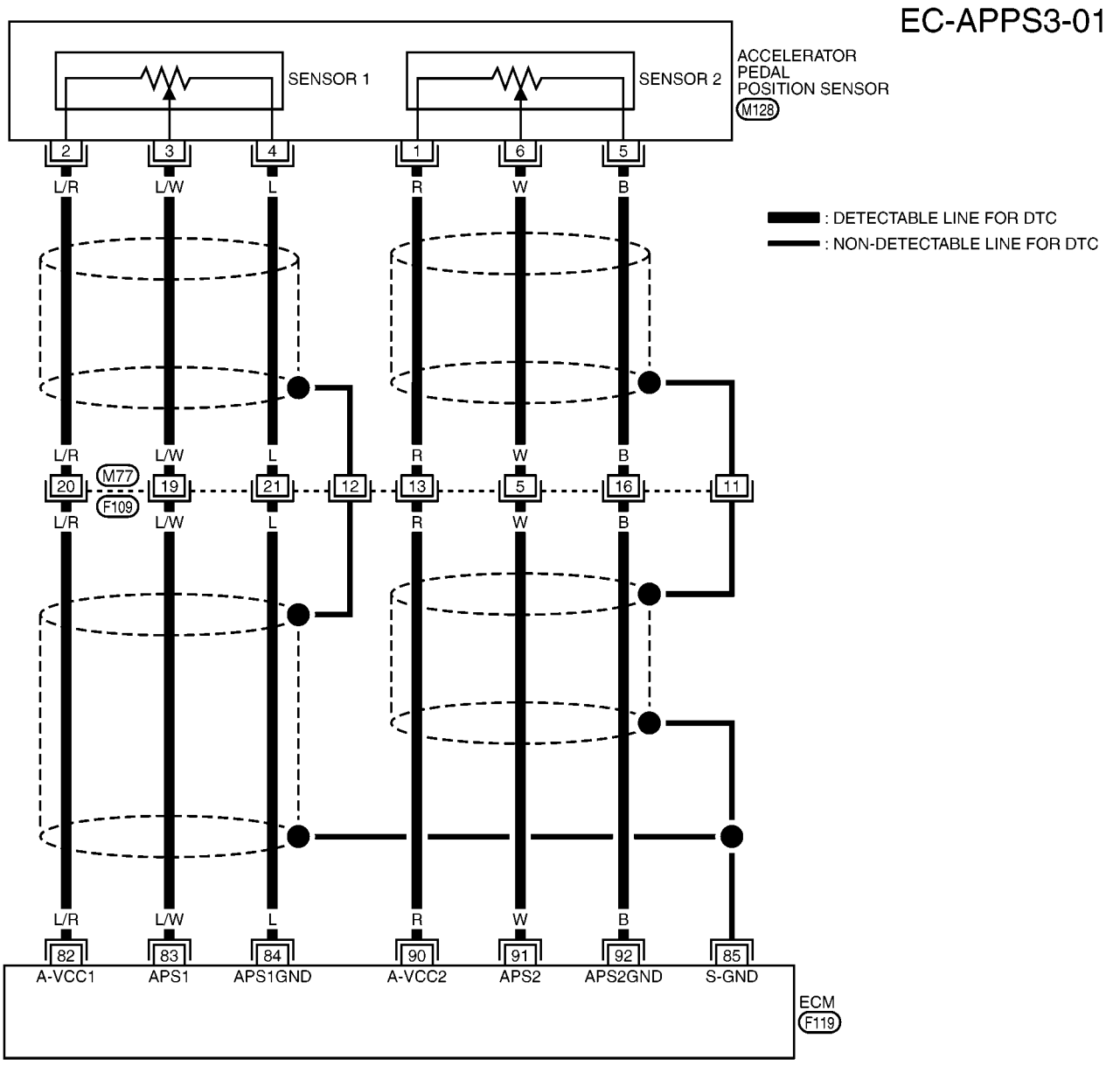


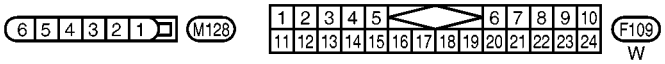
WITH GST

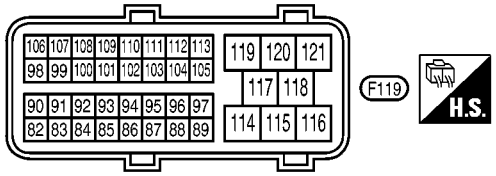
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS013SD







MBWA0433E

Diagnostic Procedure

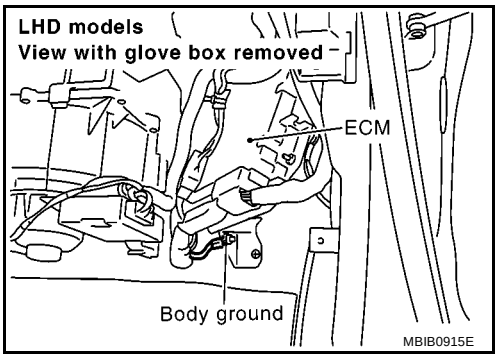
EBS013SE

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

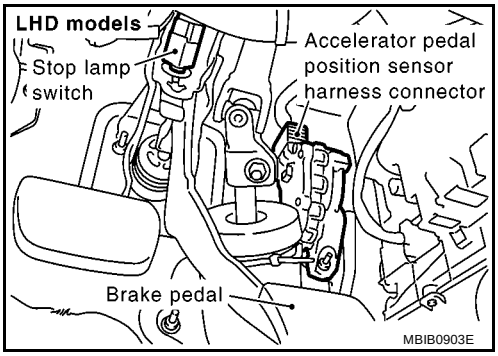
OK or NG

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



2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

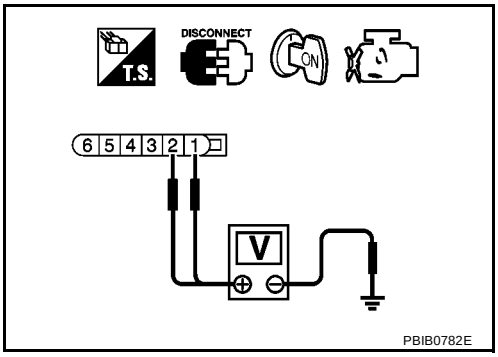


3. Check voltage between APP sensor terminals 1, 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and APP 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. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 4 and ECM terminal 84, APP sensor terminal 5 and ECM terminal 92.
   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 M77, F109
- Harness for open or short between ECM and APP 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. Check harness continuity between ECM terminal 83 and APP sensor terminal 3, ECM terminal 91 and APP sensor terminal 6.
   Refer to Wiring Diagram.

   Continuity should exist.

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

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and APP sensor

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

8. CHECK APP SENSOR

Refer to EC-303, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

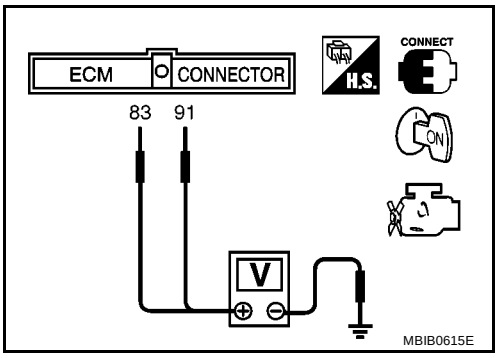
Component Inspection

EBS013SF

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and body ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.2V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V



4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS013SG

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

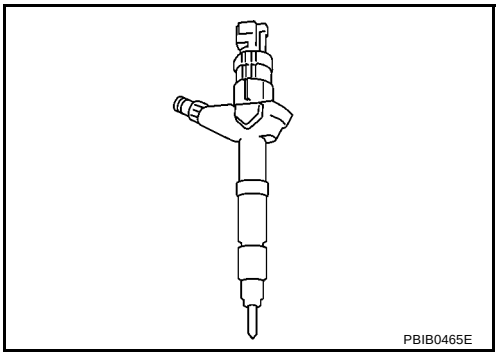
DTC P2146, P2149 FUEL INJECTOR POWER SUPPLY

PFP:16600

Component Description

EBS013SH

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


PBIB0465E

CONSULT-II Reference Value in Data Monitor Mode

EBS013SI

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec

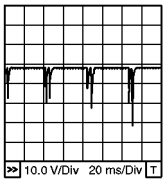
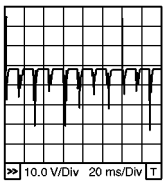
ECM Terminals and Reference Value

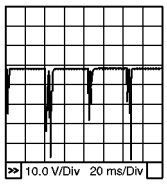
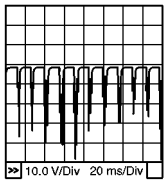
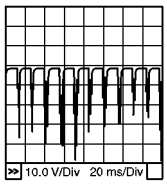
EBS013SJ

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
4	O/B	Fuel injector power supply (For cylinder No. 1 and 4)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
5	B	Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★ G/R
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

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

On Board Diagnosis Logic

EBS013SK

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2146	No. 1 and 4 cylinder fuel injector power supply circuit open	An improper voltage signal is sent to ECM through No. 1 and 4 cylinder fuel injector.	● Harness or connectors (The fuel injector circuit is open.)
P2149	No. 2 and 3 cylinder fuel injector power supply circuit open	An improper voltage signal is sent to ECM through No. 2 and 3 cylinder fuel injector.	

DTC Confirmation Procedure

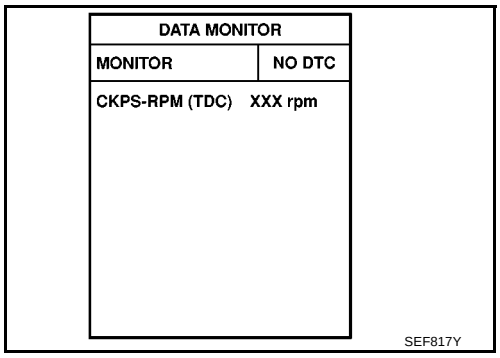
EBS013SL

NOTE:
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 the ambient temperature is more than -20°C (-4°F).

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-308, "Diagnostic Procedure"
   .



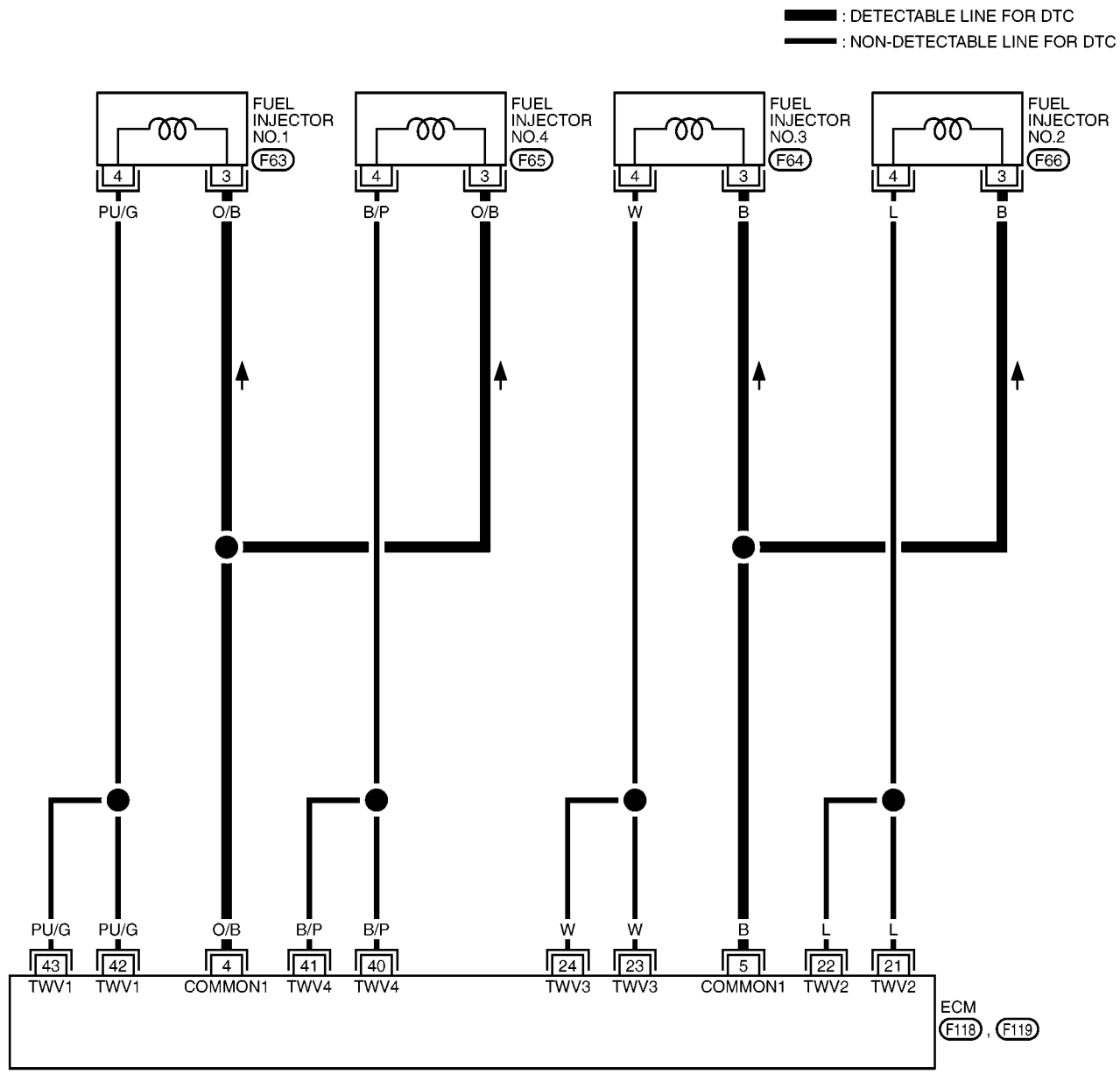
WITH GST

Follow the procedure “WITH CONSULT-II” above.

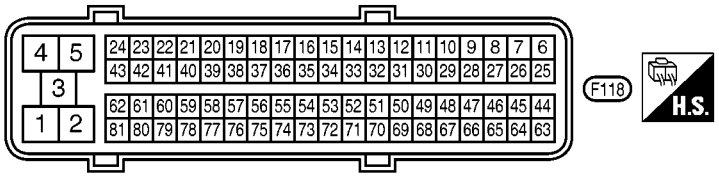
Wiring Diagram

EBS013SM

EC-INJ/PW-01







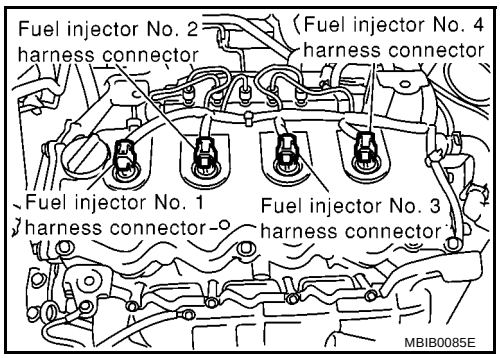
MBWA0636E

Diagnostic Procedure

EBS013SN

1. CHECK FUEL INJECOR POWER CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector harness connector.
4. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder.
   Refer to Wiring Diagram.



Terminal		Cylinder
ECM	Fuel injector	
4	3	No.1
5	3	No.2
5	3	No.3
4	3	No.4

Continuity should exist.

5. 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 INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

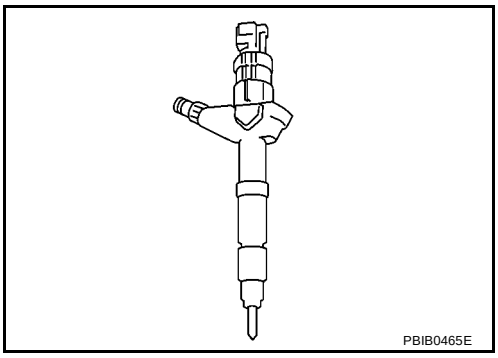
DTC P2147, P2148 FUEL INJECTOR CIRCUIT

PFP:16600

Component Description

EBS013SO

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


PBIB0465E

CONSULT-II Reference Value in Data Monitor Mode

EBS013SP

Specification data are reference values.

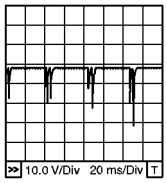
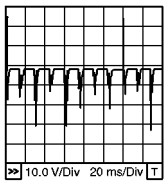
MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec

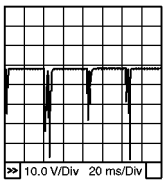
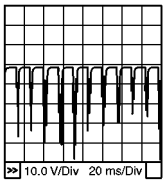
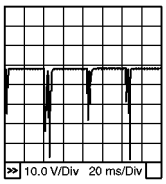
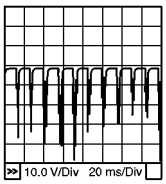
ECM Terminals and Reference Value

EBS013SQ

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

CAUTION:
Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
4	O/B	Fuel injector power supply (For cylinder No. 1 and 4)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
5	B	Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

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

On Board Diagnosis Logic

EBS013SR

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2147	Fuel injector circuit low input	ECM detects the fuel injector circuit is shorted to ground.	● Harness or connectors (The fuel injector circuit is shorted.)
P2148	Fuel injector circuit high input	ECM detects the fuel injector circuit is shorted to power.	

DTC Confirmation Procedure

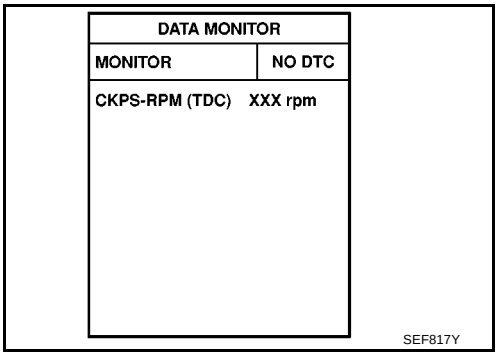
EBS013SS

NOTE:
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-313, "Diagnostic Procedure"
.



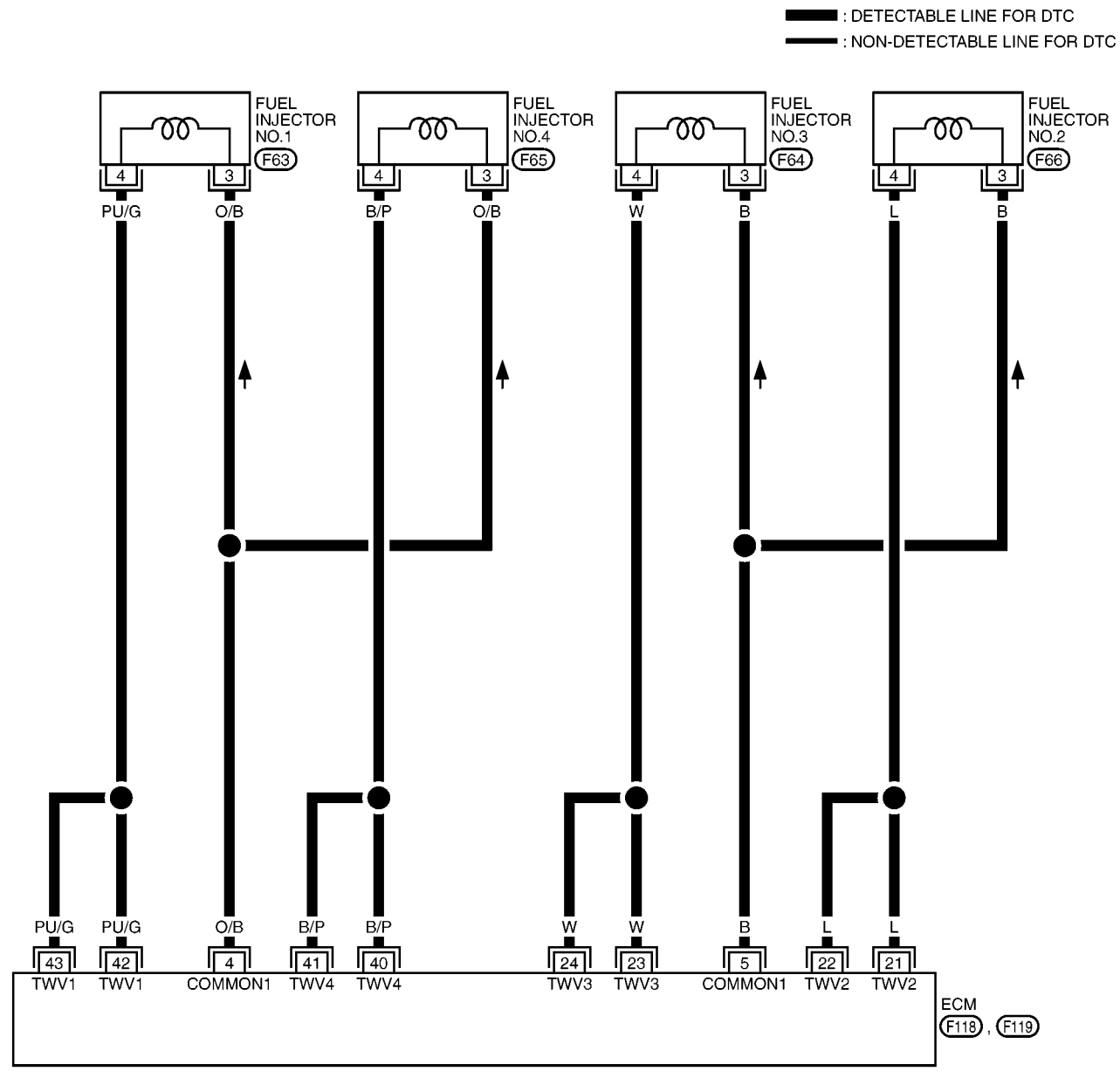
WITH GST

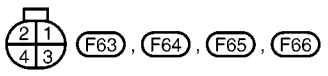
Follow the procedure “WITH CONSULT-II” above.

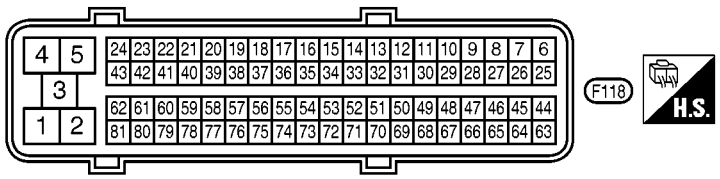
Wiring Diagram

EBS013ST

EC-INJECT-01







MBWA0634E

Diagnostic Procedure

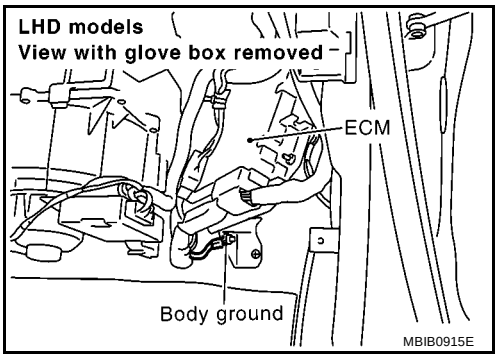
EBS013SU

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-82, "Ground Inspection" .

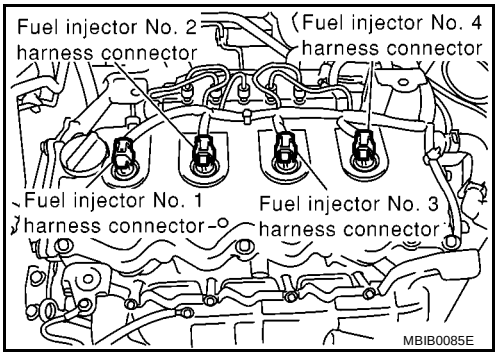
OK or NG

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



2. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Disconnect fuel injector harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder.
   Refer to Wiring Diagram.



Cylinder	Terminal		Continuity
	Fuel injector	ECM	
No.1	3	42, 43	Should not exist
		4	Should exist
	4	42,43	Should exist
		4	Should not exist
No.2	3	21, 22	Should not exist
		5	Should exist
	4	21, 22	Should exist
		5	Should not exist
No.3	3	23, 24	Should not exist
		5	Should exist
	4	23, 24	Should exist
		5	Should not exist
No.4	3	40, 41	Should not exist
		4	Should exist
	4	40, 41	Should exist
		4	Should not exist

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

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK FUEL INJECTOR

Refer to EC-314, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel injector.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

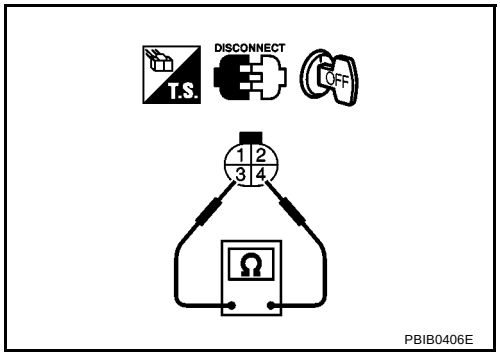
EBS013SV

FUEL INJECTOR

1. Disconnect fuel injector.
2. Check continuity between terminals as shown in the figure.

Continuity should exist.

3. If NG, replace fuel injector.



Removal and Installation

EBS013SW

FUEL INJECTOR

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

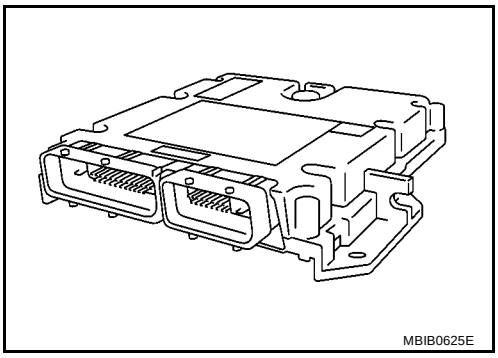
DTC P2228, P2229 BARO SENSOR

PFP:23731

Description

EBS013SX

The barometric pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the microcomputer.


MBIB0625E

On Board Diagnosis Logic

EBS013SY

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2228	Barometric pressure sensor circuit low input	An excessively low voltage from the barometric pressure sensor (built-into ECM) is sent to ECM.	● ECM
P2229	Barometric pressure sensor circuit high input	An excessively high voltage from the barometric pressure sensor (built-into ECM) is sent to ECM.	

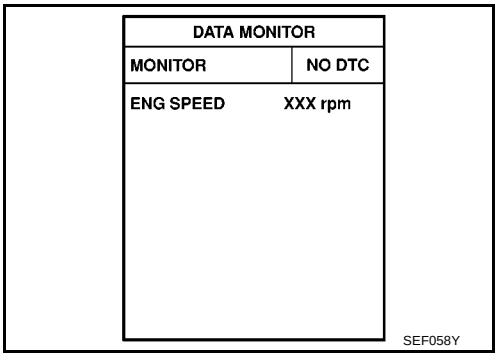
DTC Confirmation Procedure

EBS013SZ

NOTE:
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-316, "Diagnostic Procedure"
.



SEF058Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS013T0

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 EC-315, "DTC Confirmation Procedure" , again.
5. Is 1st trip DTC P2228 or P2229 displayed again?

With GST

1. Turn ignition switch ON.
2. Select MODE4 with GST.
3. Touch “ERASE”.
4. Perform EC-315, "DTC Confirmation Procedure" , again.
5. Is 1st trip DTC P2228 or P2229 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-35, "NATS (Nissan Anti-theft System)" .
3. Perform Fuel Pump Learning Valve Clearing. Refer to EC-29, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

GLOW CONTROL SYSTEM

PFP:25230

Description

EBS013T1

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor	Engine speed	Glow control	Glow lamp Glow relay Glow plugs
Engine coolant temperature sensor	Engine coolant temperature		

When engine coolant temperature is more than approximately 80°C (176°F), the glow relay turns off.
When coolant temperature is lower than approximately 80°C (176°F):

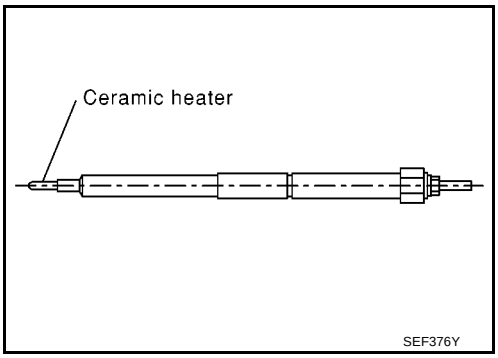
- Ignition switch ON
  After ignition switch has turned to ON, the glow relay turns ON for a certain period of time in relation to engine coolant temperature, allowing current to flow through glow plug.
- Cranking
  The glow relay turns ON, allowing current to flow through glow plug.
- Starting
  After engine has started, current continues to flow through glow plug (after-glow mode) for a certain period in relation to engine coolant temperature.

The glow indicator lamp turns ON for a certain period of time in relation to engine coolant temperature at the time glow relay is turned ON.

COMPONENT DESCRIPTION

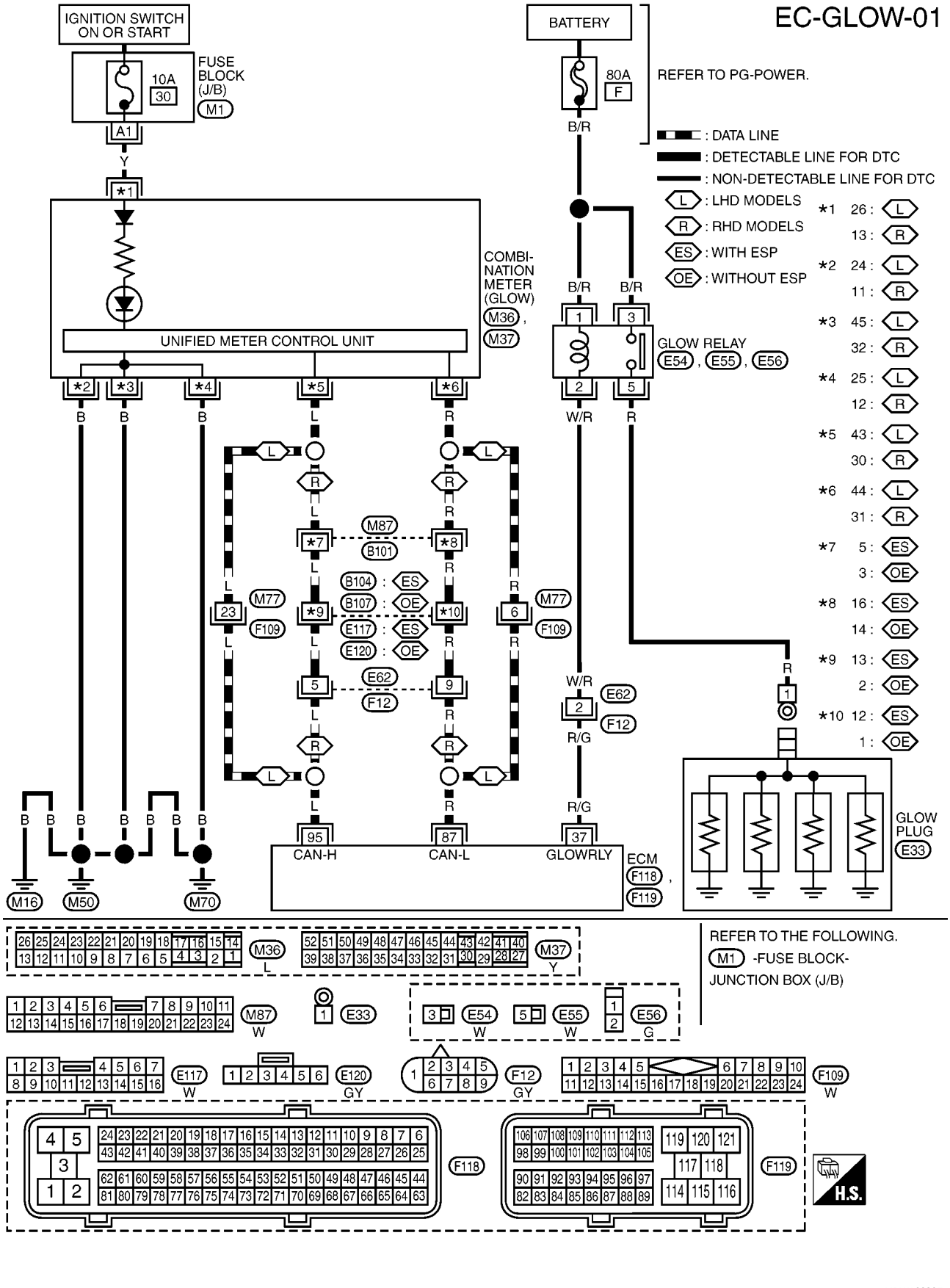
Glow Plug

The glow plug is provided with a ceramic heating element to obtain a high-temperature resistance. It glows in response to a signal sent from the ECM, allowing current to flow through the glow plug via the glow relay.



Wiring Diagram

EBS013T2



MBWA0386E

Diagnostic Procedure

EBS013T3

1. INSPECTION START

Check fuel level, fuel supplying system, starter motor, etc.

OK or NG

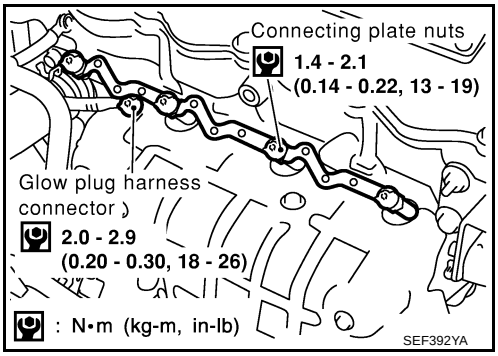
OK >> GO TO 2.
NG >> Correct.

2. CHECK INSTALLATION

Check that glow plug nut and all glow plug connecting plate nuts are installed properly.

OK or NG

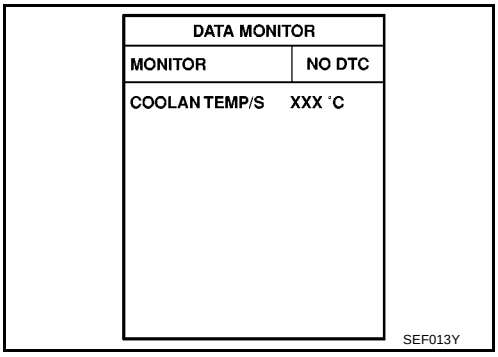
OK >> GO TO 3.
NG >> Install properly.



3. CHECK GLOW INDICATOR LAMP OPERATION

With CONSULT-II

1. Turn ignition switch ON.
2. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
3. Confirm that “COOLAN TEMP/S” indicates below 80°C (176°F). If it indicates above 80°C (176°F), cool down engine.
4. Turn ignition switch OFF, wait at least 5 seconds and then turn ON.
5. Make sure that glow indicator lamp is turned ON for 1.5 seconds or more after turning ignition switch ON, and then glow indicator lamp turned OFF.

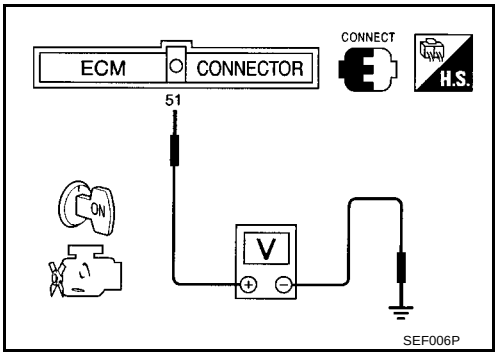


Without CONSULT-II

1. Turn ignition switch ON.
2. Confirm that the voltage between ECM terminal 51 (engine coolant temperature sensor signal) and ground is above 1.53V. If it is below 1.53V, cool down engine.
3. Turn ignition switch OFF, wait at least 5 seconds and then turn ON.
4. Make sure that glow indicator lamp is turned ON for 1.5 seconds or more after turning ignition switch ON, and then glow indicator lamp turned OFF.

OK or NG

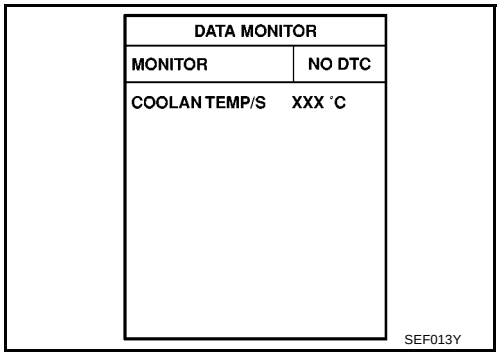
OK >> GO TO 4.
NG >> GO TO 5.



4. CHECK GLOW CONTROL SYSTEM OVERALL FUNCTION

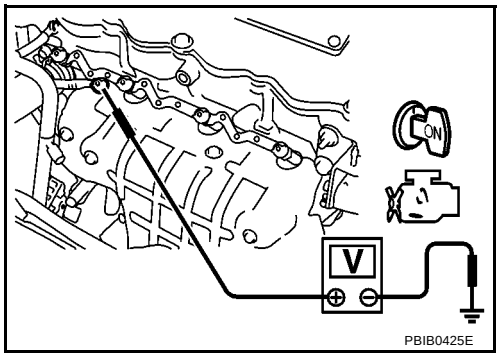
With CONSULT-II

1. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
2. Confirm that “COOLAN TEMP/S” indicates approximately 25°C (77°F). If NG, cool down engine.
3. Turn ignition switch OFF.
4. Set voltmeter probe between glow plug and engine body.
5. Turn ignition switch ON.



6. Check the voltage between glow plug and engine body under the following conditions.

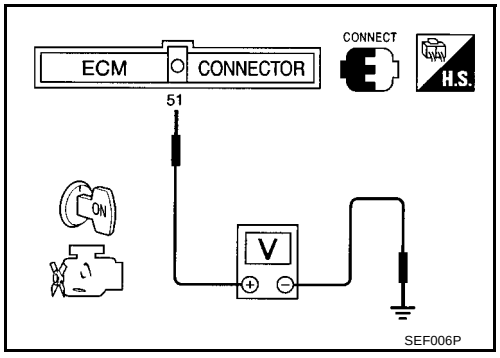
Conditions	Voltage
For 20 seconds after turning ignition switch ON	Battery voltage
More than 20 seconds after turning ignition switch ON	Approx. 0V



Without CONSULT-II

1. Confirm that the voltage between ECM terminal 51 (engine coolant temperature sensor signal) and ground is above 3.62V. If it is below 3.62V, cool down engine.
2. Turn ignition switch OFF.
3. Set voltmeter probe between glow plug and engine body.
4. Turn ignition switch ON.
5. Check the voltage between glow plug and engine body under the following conditions.

Conditions	Voltage
For 20 seconds after turning ignition switch ON	Battery voltage
More than 20 seconds after turning ignition switch ON	Approx. 0V



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

5. CHECK DTC

Check that DTC U1000 is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC U1000, refer to EC-83, "DTC U1000 CAN COMMUNICATION LINE" .
No >> GO TO 6.

6. CHECK COMBINATON METER OPERATION

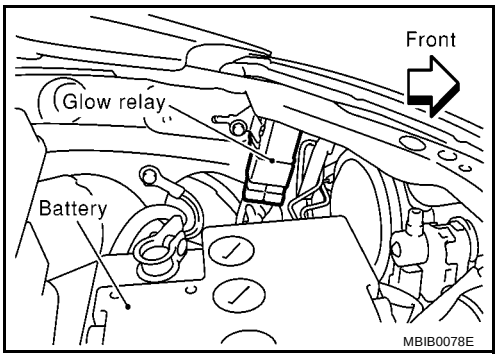
Does combination meter operate normally?

Yes or No

Yes >> GO TO 14.
No >> Check combination meter circuit. Refer to DI-4, "COMBINATION METERS (LHD MODELS)" or DI-27, "COMBINATION METERS (RHD MODELS)" .

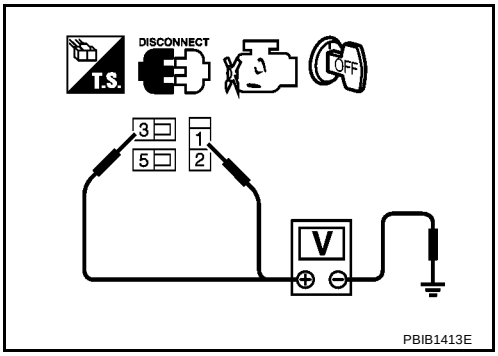
7. CHECK GLOW RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect glow relay.



3. Check voltage between glow relay terminals 1, 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- 80A fusible link
- Harness for open or short between glow relay and battery

>> Repair harness or connectors.

9. CHECK GLOW RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 37 and glow relay 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 11.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E62, F12
- Harness for open or short between glow relay and ECM

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

11. CHECK HARNESS CONTINUITY BETWEEN GLOW RELAY AND GLOW PLUG FOR OPEN AND SHORT

1. Disconnect glow plug harness connector.
2. Check harness continuity between glow relay terminal 5 and glow plug harness connector. 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 GLOW RELAY

Refer to EC-323, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Replace glow relay.

13. CHECK GLOW PLUG

Refer to EC-323, "Component Inspection" .

OK or NG

OK >> GO TO 14.
NG >> Replace glow plug.

14. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

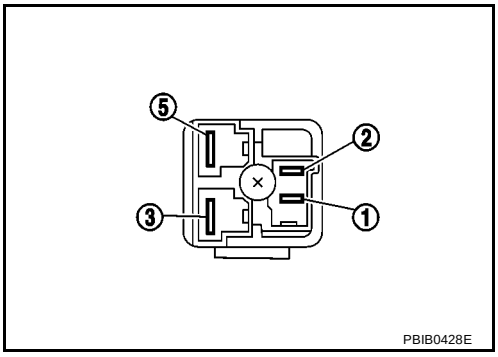
EBS013T4

GLOW RELAY

Check continuity between glow relay terminals 3 and 5 under the following conditions.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

Operation takes less than 1 second.



PBIB0428E

GLOW PLUG

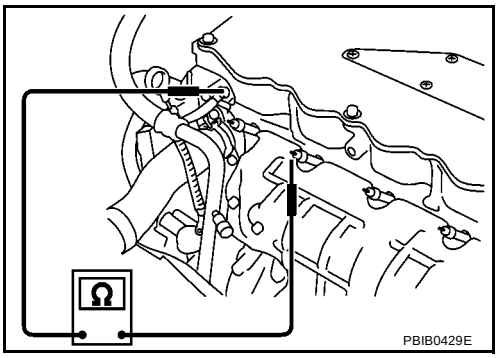
1. Remove glow plug connecting plate.
2. Check glow plug resistance.

Resistance: Approximately 0.8 Ω [at 25°C (77°F)]

NOTE:

- **Do not bump glow plug heating element. If it is bumped, replace glow plug with a new one.**
- **If glow plug is dropped from a height of 10 cm (3.94 in) or higher, replace with a new one.**
- **If glow plug installation hole is contaminated with carbon, remove it with a reamer or suitable tool.**
- **Hand-tighten glow plug by turning it two or three times, then tighten using a tool to specified torque.**

: 20.1 N-m (2.1 kg-m, 15 ft-lb)



PBIB0429E

Removal and Installation

EBS013T5

GLOW PLUG

Refer to EM-34, "GLOW PLUG" .

BRAKE SWITCH

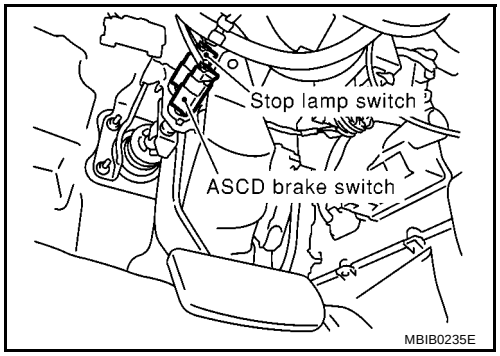
PFP:25230

Description

EBS013T6

STOP LAMP SWITCH

The stop lamp switch is installed to brake pedal bracket. The switch senses brake pedal position and sends an ON-OFF signal to the ECM. The ECM uses the signal to control the fuel injection control system.



ASCD BRAKE SWITCH (MODELS WITH ASCD)

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-348, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.

CONSULT-II Reference Value in Data Monitor Mode

EBS016LE

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW (Stop lamp switch)	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
BRAKE SW2 (ASCD brake switch)	● Ignition switch: ON	Brake pedal and clutch pedal: Fully released	OFF
		Brake pedal and/or clutch pedal: Slightly depressed	ON

ECM Terminals and Reference Value

EBS016LF

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

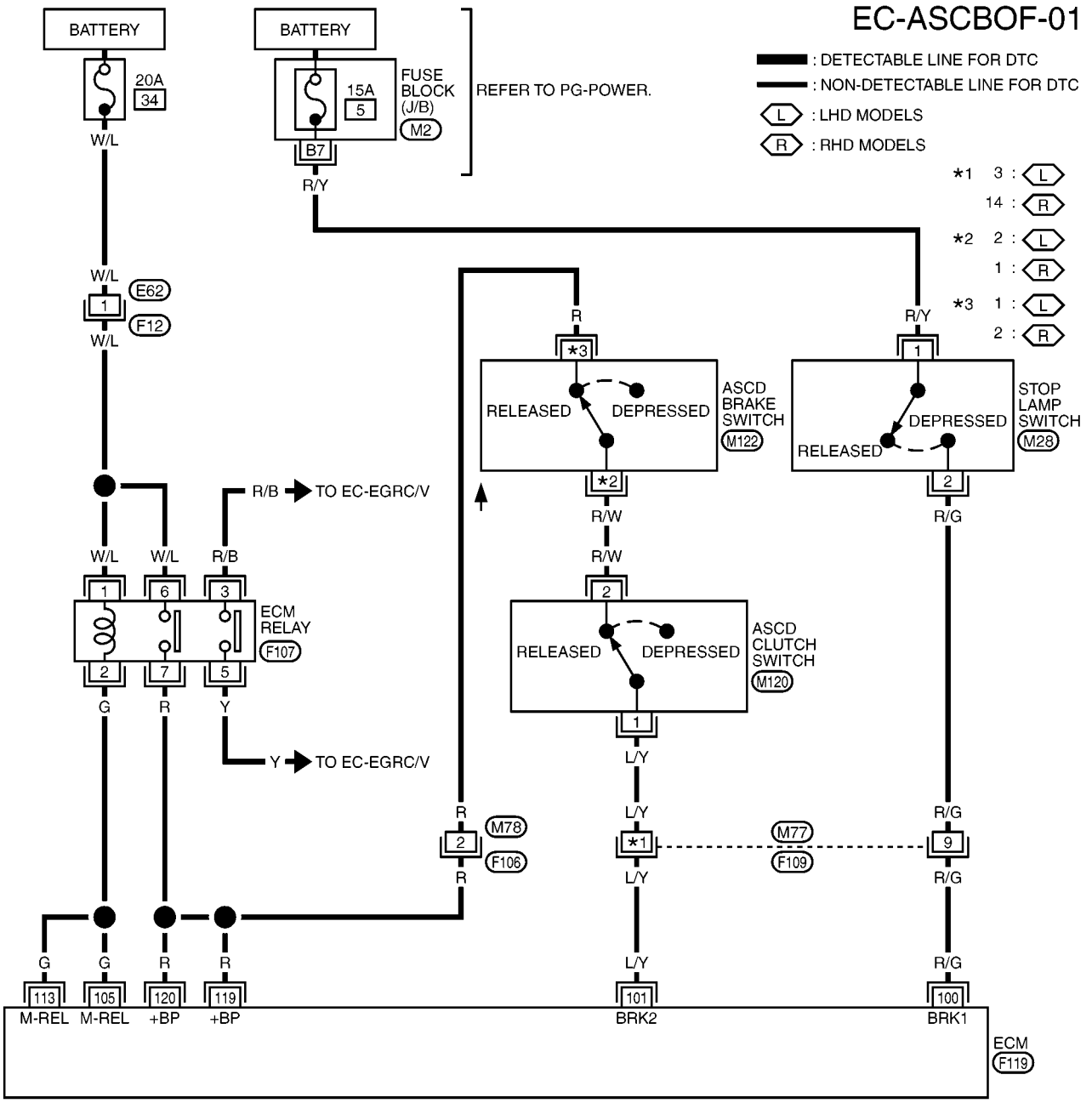
CAUTION:

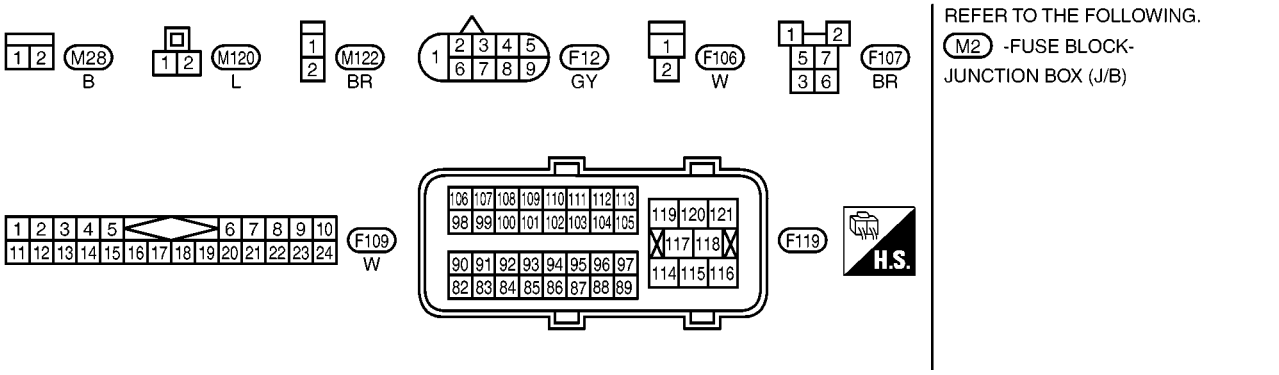
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
100	R/G	Stop lamp switch	**[Ignition switch ON]** ● Brake pedal fully released	Approximately 0V
			[Ignition switch ON] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
101	L/Y	ASCD brake switch	**[Ignition switch ON]** ● Brake pedal and clutch pedal fully released	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON] ● Brake pedal and/or clutch pedal depressed	Approximately 0V

Wiring Diagram

EBS013T9





MBWA0610E

Diagnostic Procedure

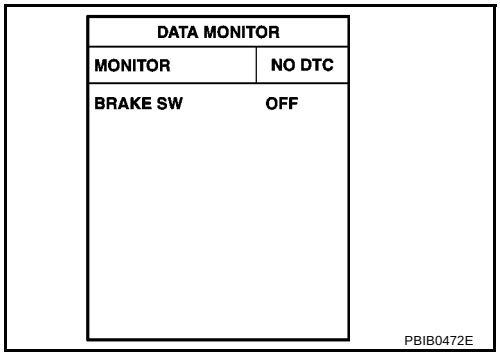
EBS016LA

1. CHECK OVERALL FUNCTION-I

With CONSULT-II

1. Turn ignition switch ON.
2. Select “BRAKE SW” in “DATA MONITOR” mode with CONSULT-II.
3. Check “BRAKE SW” indication under the following conditions.

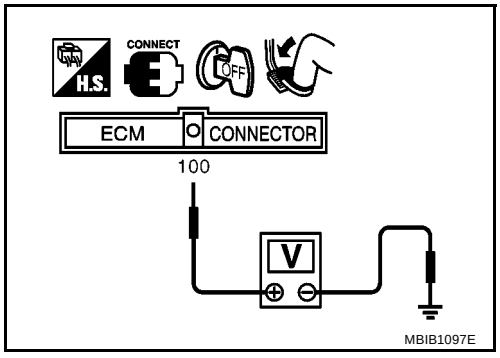
CONDITION	INDICATION
When brake pedal is depressed	ON
When brake pedal is released	OFF



Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 100 and ground under the following conditions.

Condition	Voltage
When brake pedal is depressed	battery voltage
When brake pedal is released	Approximately 0V



OK or NG

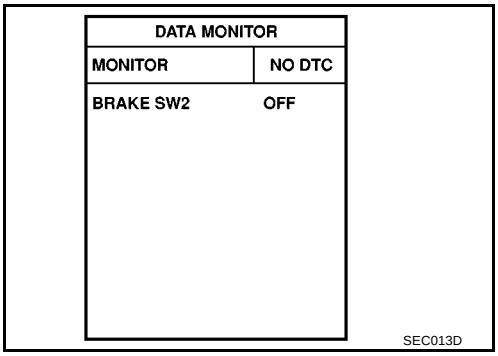
OK (Models with ASCD)>>GO TO 2.
OK (Models without ASCD)>>**INSPECTION END**
NG >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

With CONSULT-II

Check “BRAKE SW2” indication in “DATA MONITOR” mode.

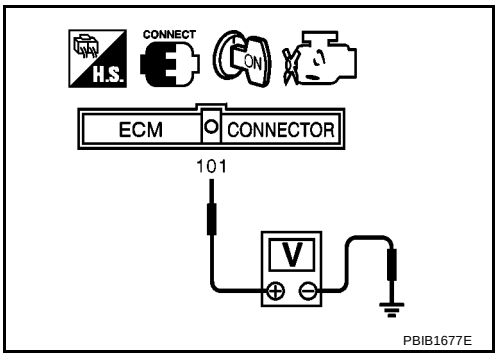
CONDITION	INDICATION
When brake pedal or clutch pedal is depressed	ON
When brake pedal and clutch pedal are released	OFF



Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

Condition	Voltage
When brake pedal or clutch pedal is depressed	Approximately 0V
When brake pedal and clutch pedal are released	Battery voltage

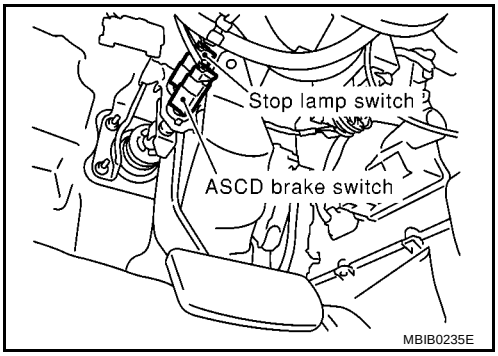


OK or NG

OK >> **INSPECTION END.**
NG >> GO TO 8.

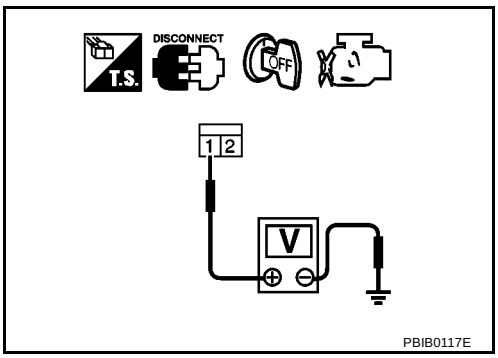
3. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

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 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 15A 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.

5. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 100 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 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- 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.

7. CHECK STOP LAMP SWITCH

Refer to EC-330, "Component Inspection" .

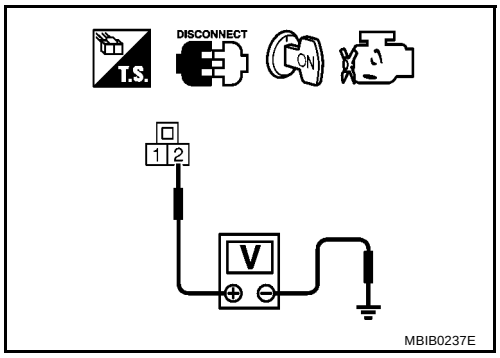
OK or NG

OK >> GO TO 16.
NG >> Replace stop lamp switch.

8. CHECK ASCD BRAKE SWITCH 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 2 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

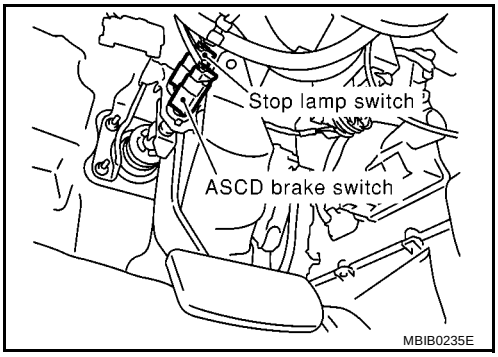


OK or NG

OK >> GO TO 13.
NG >> GO TO 9.

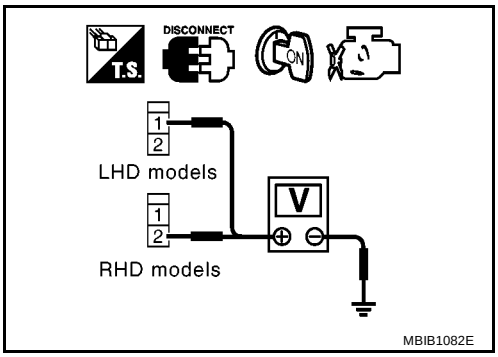
9. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

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 (LHD models) or 2 (RHD models) and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F106, M78
- Harness for open or short between ASCD brake switch and ECM relay
- Harness for open or short between ASCD brake switch and ECM

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

11. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 2 (LHD models) or 1 (RHD models) and ASCD brake clutch switch terminal 2.
   Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ASCD BRAKE SWITCH

Refer to EC-330, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace ASCD brake switch.

13. CHECK ASCD CLUTCH 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 101 and ASCD clutch switch terminal 1. 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 15.
NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and ASCD clutch switch

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

15. CHECK ASCD CLUTCH SWITCH

Refer to EC-330, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace ASCD clutch switch.

16. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

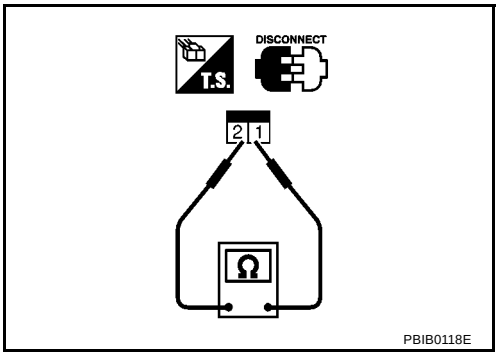
EBS016LB

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.



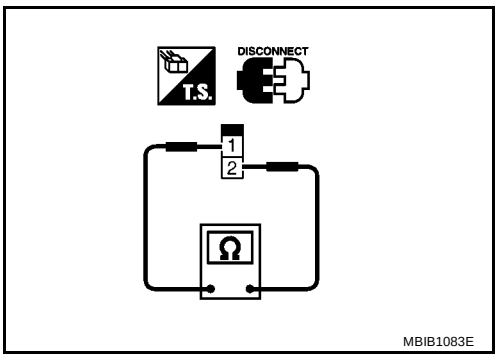
ASCD BRAKE SWITCH

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.

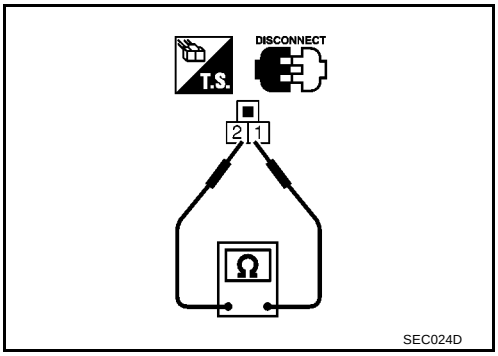


ASCD CLUTCH SWITCH

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.



PNP SWITCH

PFP:32006

Description

EBS013TC

When the gear position is in Neutral, park/neutral position is ON. ECM detects the position because the continuity of the line (the “ON” signal) exists.

CONSULT-II Reference Value in Data Monitor Mode

EBS013TD

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: Neutral position	ON
		Except above	OFF

ECM Terminals and Reference Value

EBS013TE

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

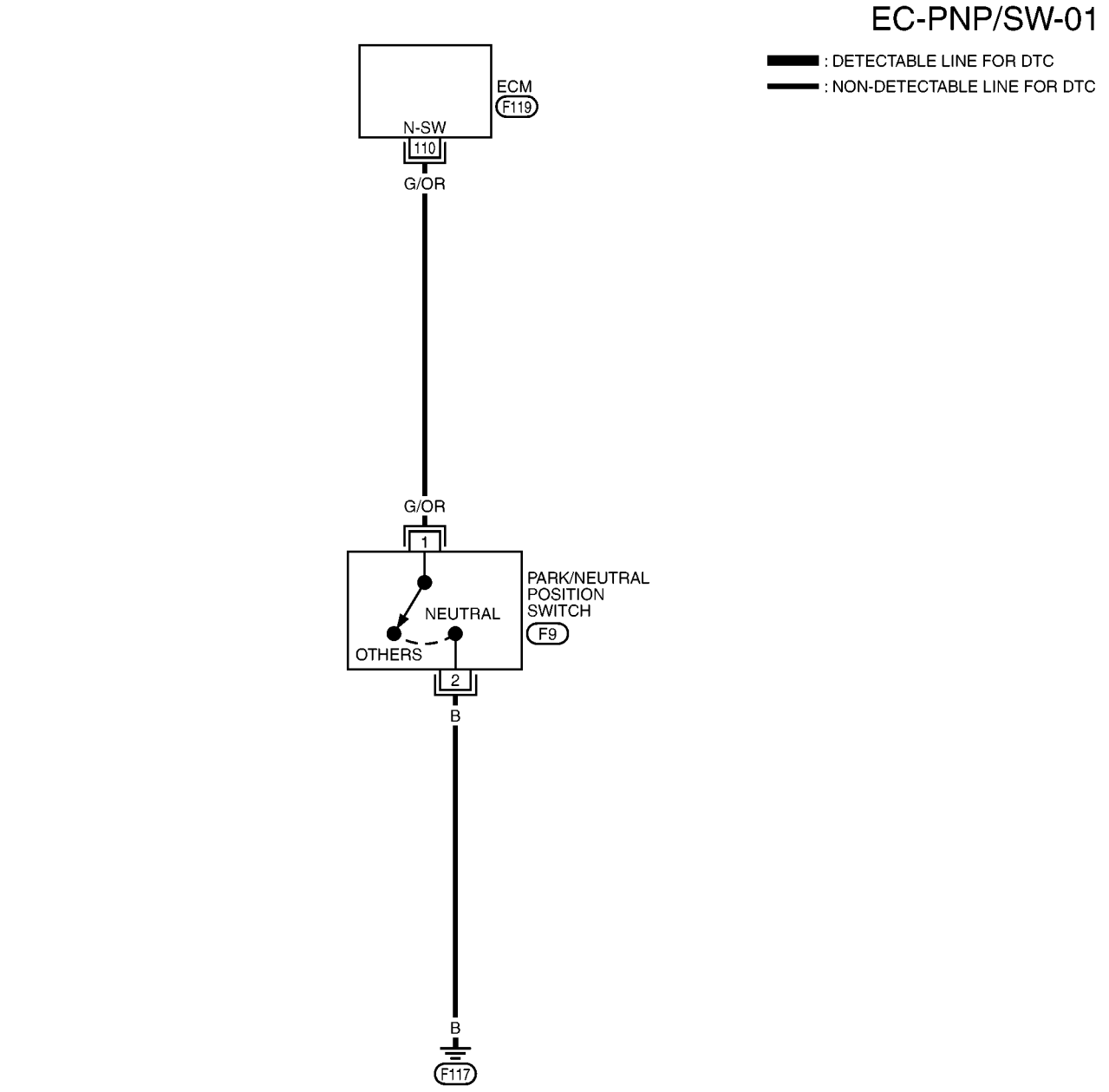
CAUTION:

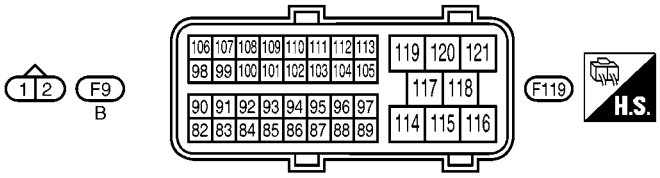
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
110	G/OR	Park/Neutral position switch	**[Ignition switch ON]** ● Gear position is Neutral	Approximately 0V
			[Ignition switch ON] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)

Wiring Diagram

EBS013TF





MBWA0389E

Diagnostic Procedure

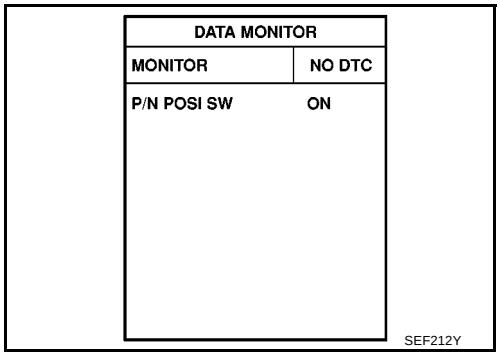
EBS013TG

1. CHECK OVERALL FUNCTION

With CONSULT-II

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II.
3. Check “P/N POSI SW” signal under the following conditions.

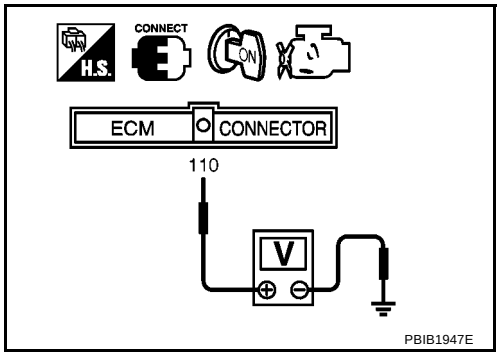
Shift lever position	P/N POSI SW
Neutral position	ON
Except the above position	OFF



Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 110 and ground under the following conditions.

Shift lever position	Voltage
Neutral position	Approximately 0V
Except the above position	Battery voltage



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK PNP SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

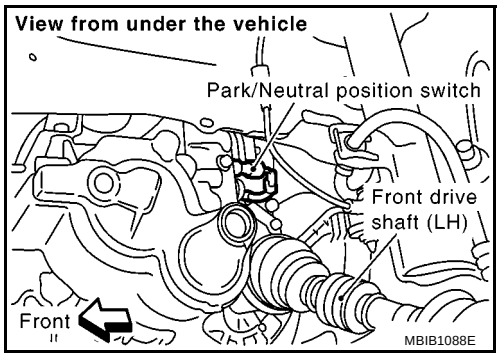
1. Turn ignition switch OFF.
2. Disconnect park/neutral position (PNP) switch harness connector.
3. Check harness continuity between PNP switch terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to power.

OK or NG

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



3. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 110 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 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK PARK/NEUTRAL POSITION SWITCH

Refer to MT-12, "POSITION SWITCH" .

OK or NG

OK >> GO TO 5.
NG >> Replace park/neutral position switch.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

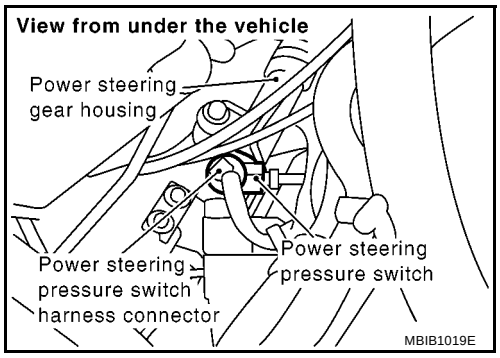
PSP SWITCH

PFP:49761

Component Description

EBS013TH

The power steering pressure switch is attached to the power steering high-pressure tube and detects a power steering load.
When a power steering load is detected, it signals the ECM. The ECM adjusts the fuel injector pulse width to increase the idle speed and adjust for the increased load.



CONSULT-II Reference Value in Data Monitor Mode

EBS013TI

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON

ECM Terminals and Reference Value

EBS013TJ

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

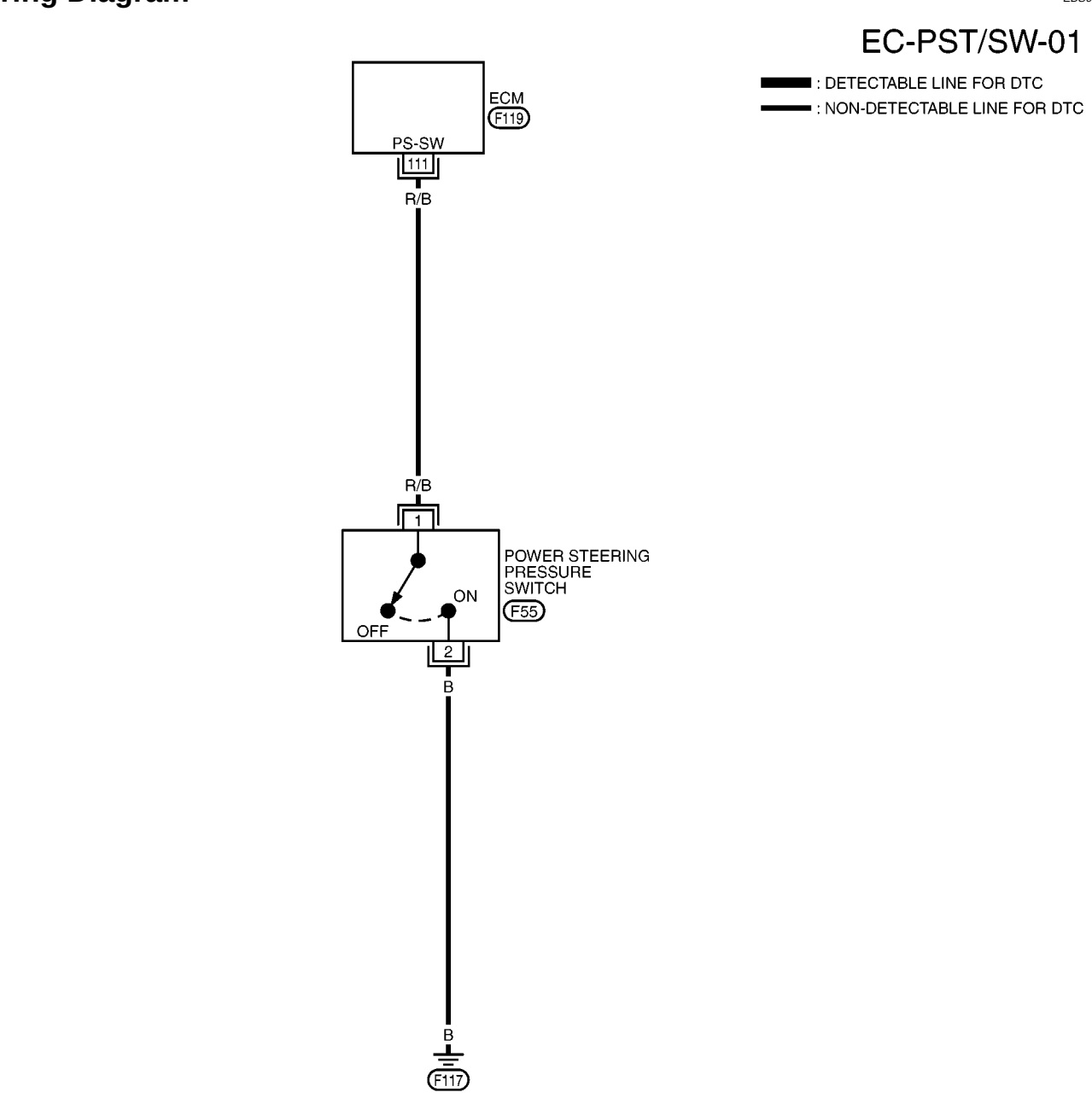
CAUTION:

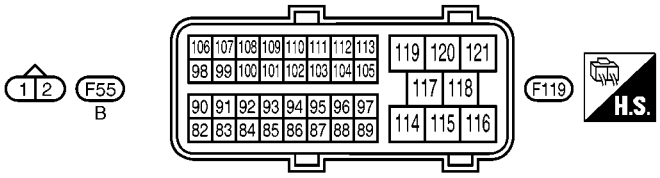
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	R/B	Power steering 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)

Wiring Diagram

EBS013TK





MBWA0391E

Diagnostic Procedure

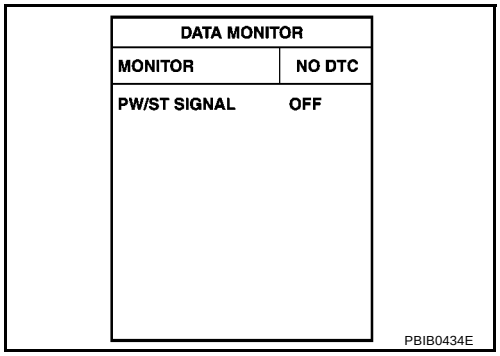
EBS013TL

1. 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.

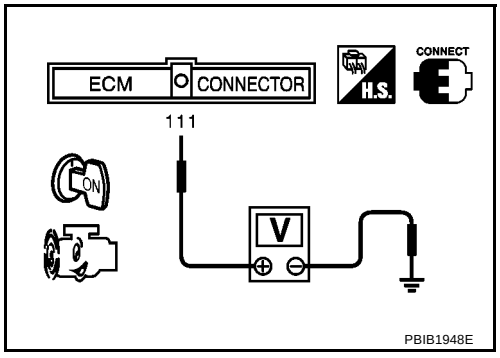
Conditions	PW/ST SIGNAL
Steering wheel is in neutral position	OFF
Steering wheel is turned	ON



Without CONSULT-II

1. Start engine.
2. Check voltage between ECM terminal 111 and ground under the following conditions.

Conditions	Voltage
Steering wheel is in neutral position	Battery voltage
Steering wheel is turned	Approximately 0V



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK POWER STEERING PRESSURE SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

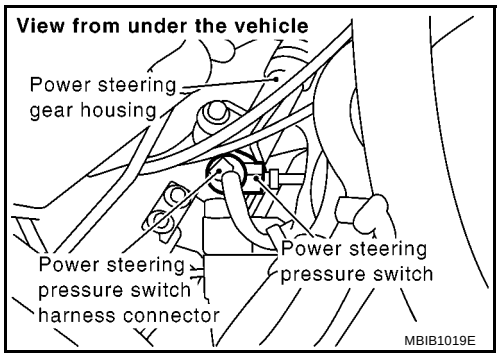
1. Turn ignition switch OFF.
2. Disconnect power steering pressure switch harness connector.
3. Check harness continuity between power steering pressure switch terminal 2 and ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

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



3. CHECK POWER STEERING PRESSURE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 111 and power steering pressure 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 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK POWER STEERING PRESSURE SWITCH

Refer to EC-339, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace power steering pressure switch.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

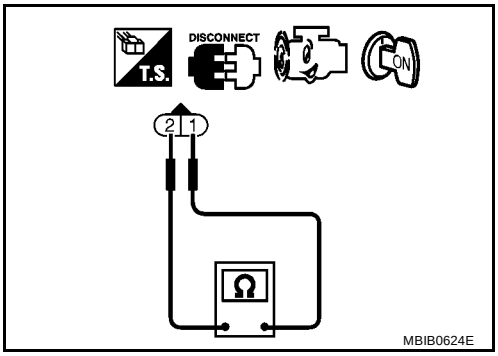
Component Inspection

EBS013TM

POWER STEERING PRESSURE SWITCH

1. Disconnect power steering pressure switch harness connector and then start engine.
2. Check continuity between power steering pressure switch terminal 1 and 2 under the following conditions.

Conditions	Continuity
Steering wheel is being fully turned.	Yes
Steering wheel is not being turned.	No



MBIB0624E

Removal and Installation

EBS013TN

Refer to PS section in P12 ESM (SM2E00-1P12E0E).

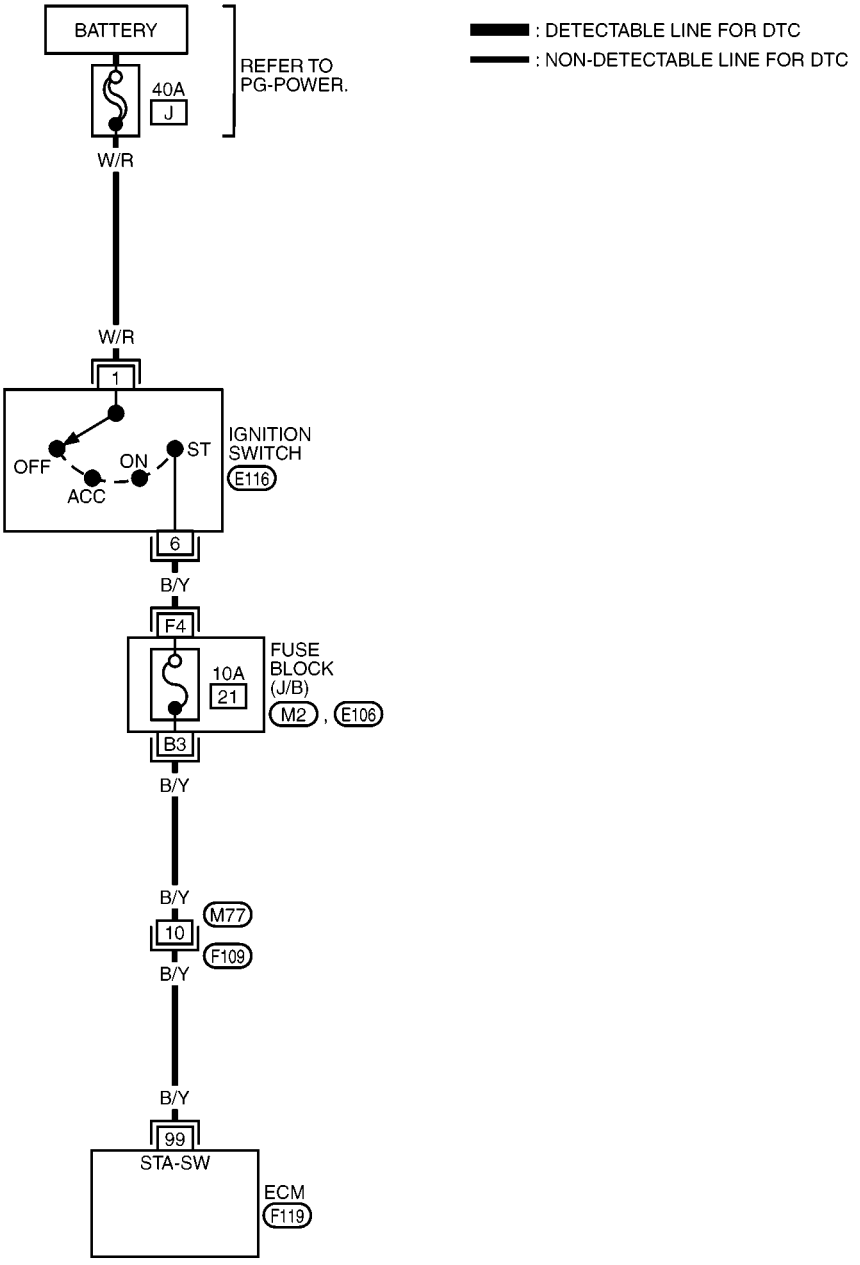
START SIGNAL

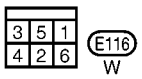
PFP:48750

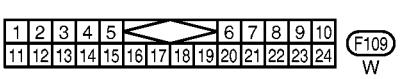
Wiring Diagram

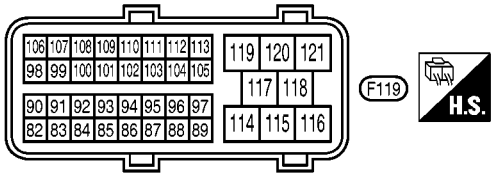
EBS013TO

EC-S/SIG-01









REFER TO THE FOLLOWING.
M2 , E106 -FUSE BLOCK-JUNCTION BOX (J/B)

MBWA0390E

Diagnostic Procedure

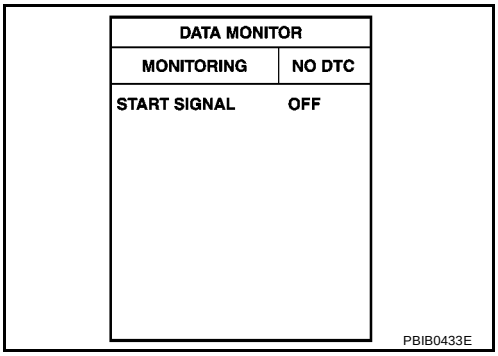
EBS013TP

1. CHECK START SIGNAL OVERALL FUNCTION

With CONSULT-II

1. Turn ignition switch ON.
2. Check “START SIGNAL” in “DATA MONITOR” mode with CONSULT-II under the following conditions.

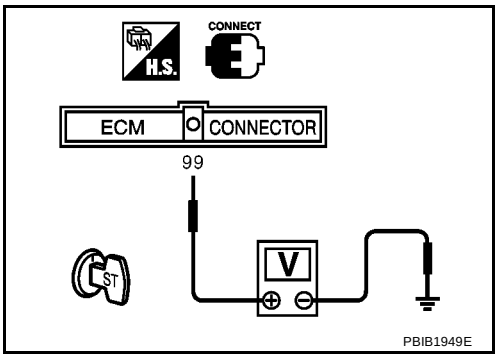
Condition	START SIGNAL
Ignition switch ON	OFF
Ignition switch START	ON



Without CONSULT-II

Check voltage between ECM terminal 99 and ground under the following conditions.

Condition	Voltage
Ignition switch ON	Approximately 0V
Ignition switch START	Battery voltage



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK START SIGNAL INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and ignition switch harness connector.
3. Check harness continuity between ECM terminal 99 and ignition switch terminal 6. 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.

- 10A fuse
- Harness connectors M77, F109
- Fuse block (J/B) connectors M2, E106
- Harness for open or short between ECM and ignition switch

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

4. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

ASCD INDICATOR

PFP:24814

Component Description

EBS011VV

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.
CRUISE indicator illuminates when ON/OFF switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.
SET indicator illuminates when following conditions are met.

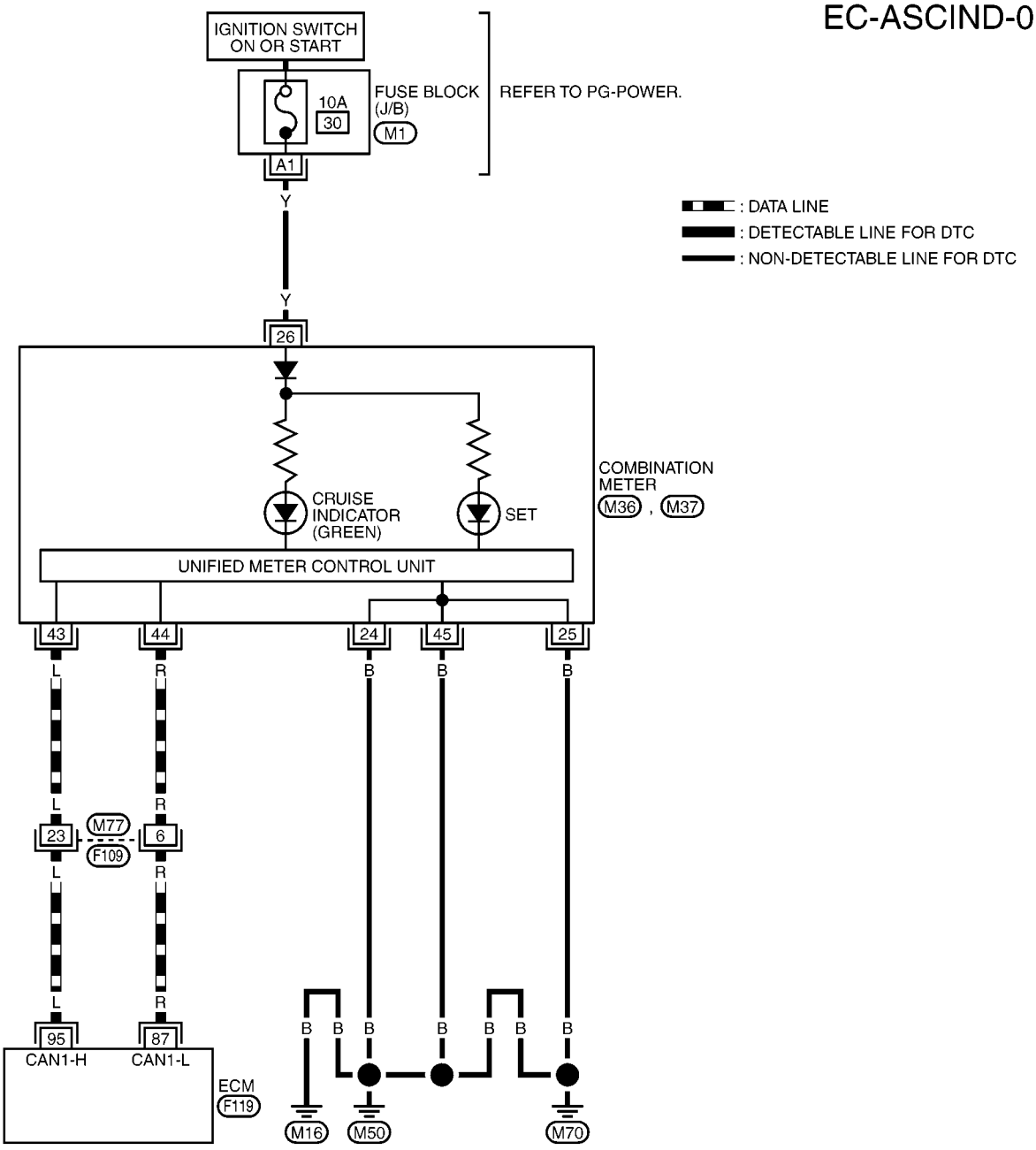
- CRUISE indicator is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

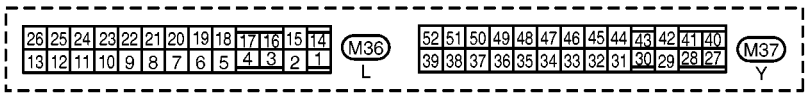
SET indicator remains lit during ASCD control.
Refer to EC-348, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.

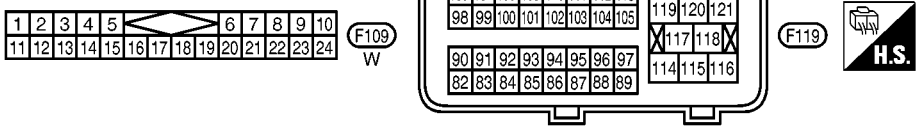
Wiring Diagram—LHD Models

EBS011VX

EC-ASCIND-01





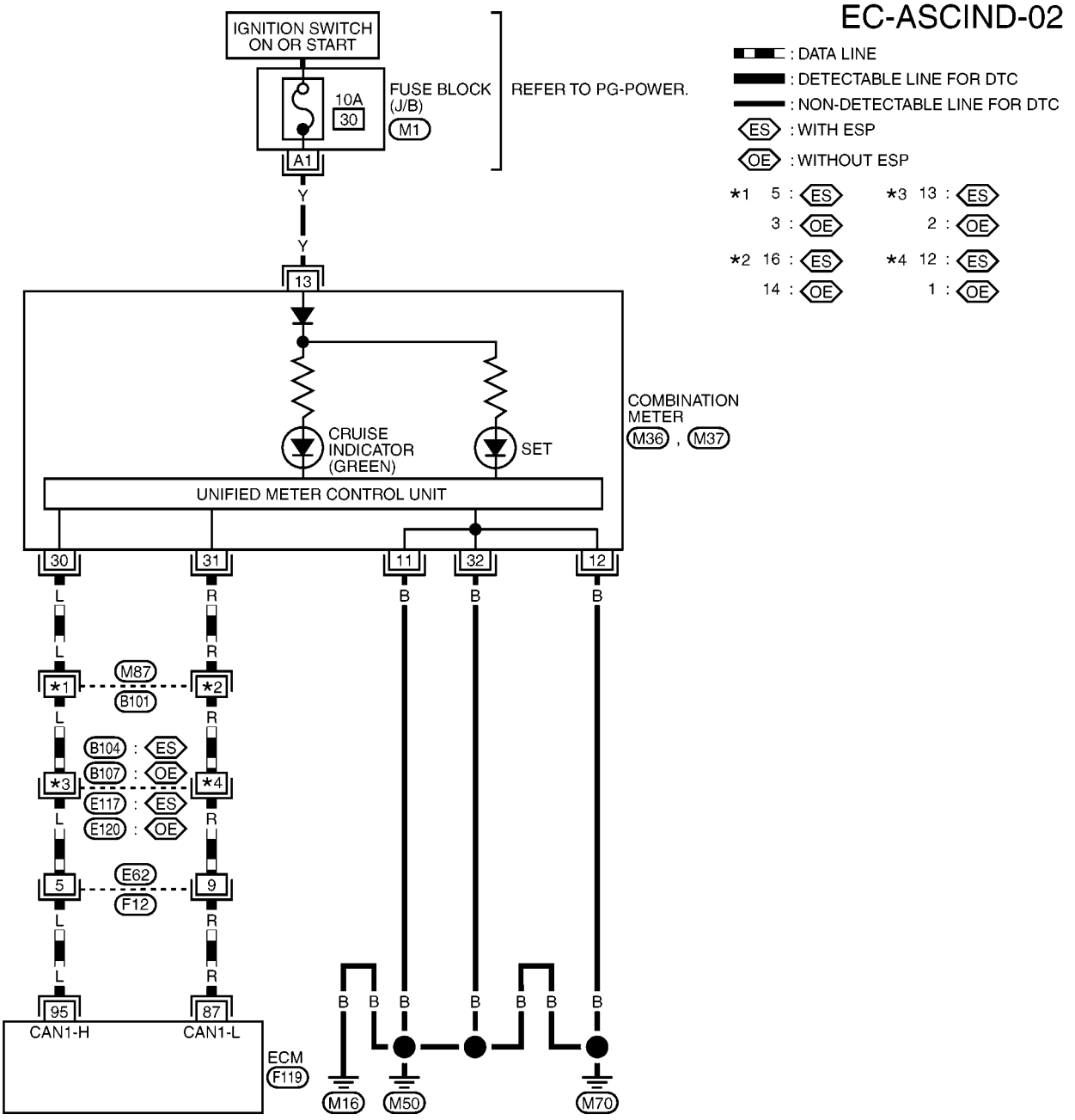


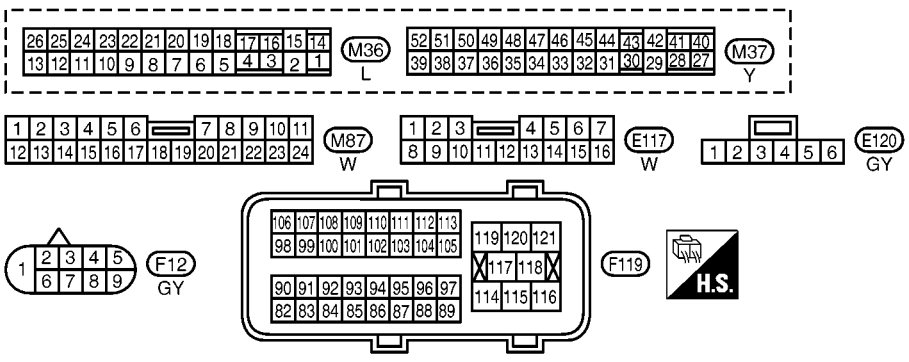
REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-
JUNCTION BOX (J/B)

MBWA0611E

Wiring Diagram—RHD Models

EBS011VY





REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-
JUNCTION BOX (J/B)

MBWA0612E

Diagnostic Procedure

EBS011VZ

1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	● ON/OFF switch: Pressed at the first time→at the 2nd time	ON→OFF
SET LAMP	● ON/OFF switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 185 km/h (115 MPH)	● COAST/SET switch pressed	ON
		● COAST/SET switch released	OFF

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK DTC

Check that DTC U1000 is not displayed.

OK or NG

OK >> Perform trouble diagnoses for DTC U1000. Refer to EC-83, "DTC U1000 CAN COMMUNICATION LINE" .
NG >> 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 (LHD MODELS)" or DI-4, "COMBINATION METERS (LHD MODELS)" .

4. CHECK INTERMITTENT INCIDENT

Refer to EC-75, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

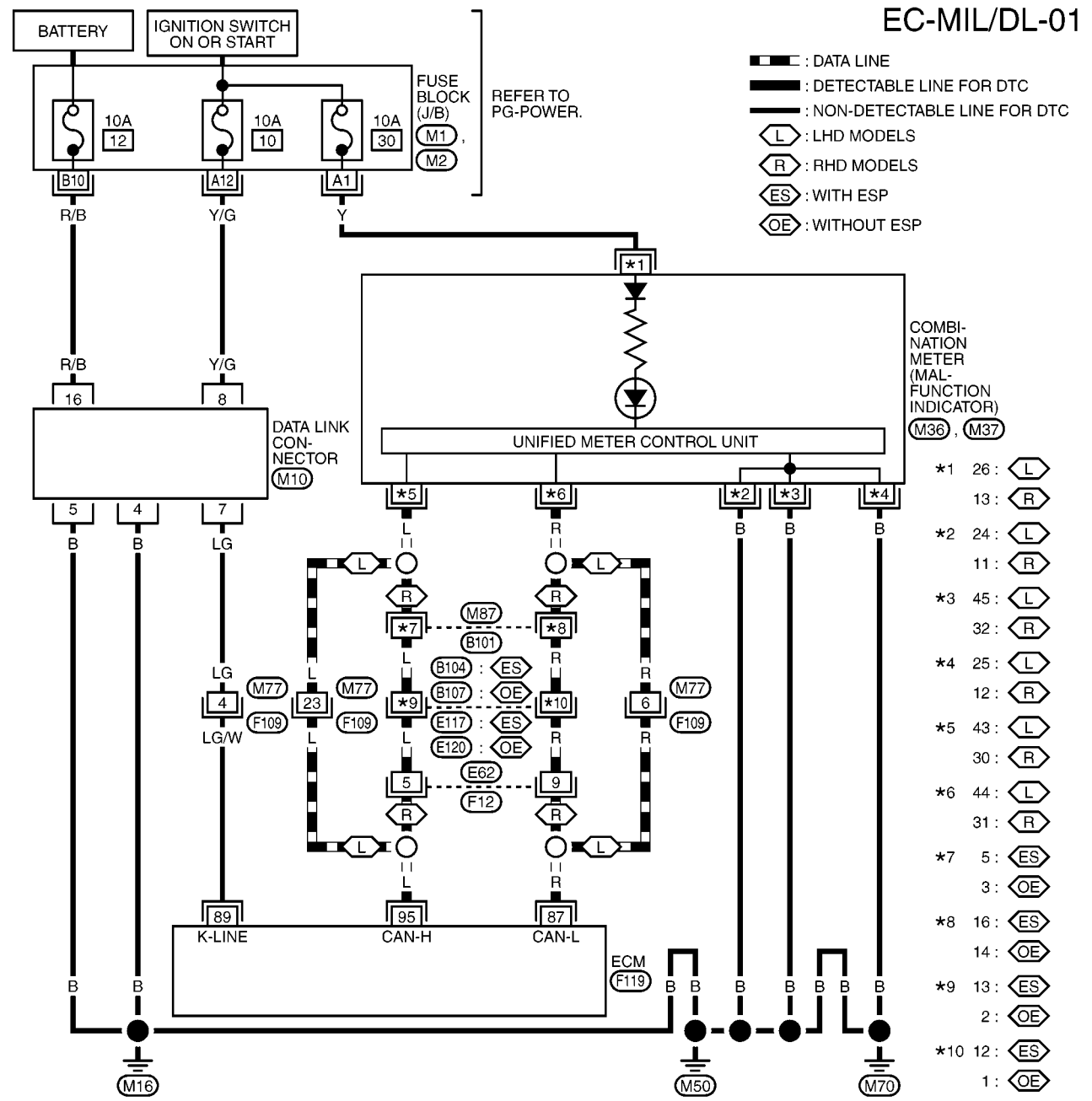
>> **INSPECTION END**

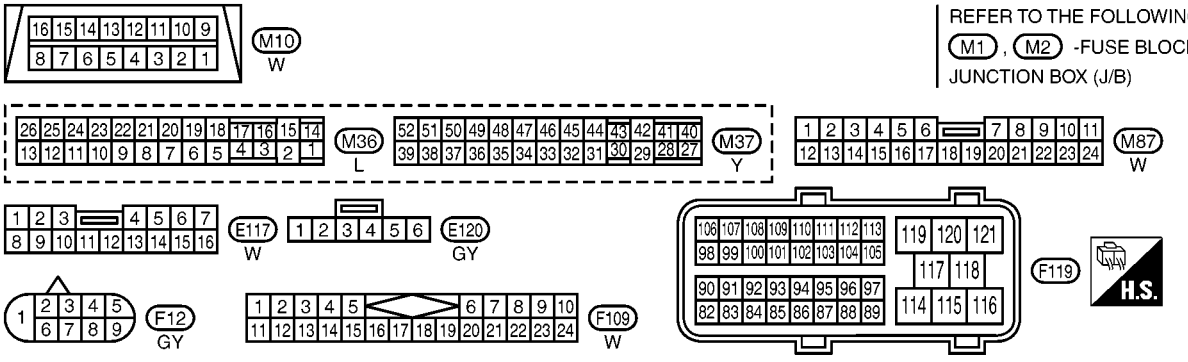
MI & DATA LINK CONNECTORS

PFP:24814

Wiring Diagram

EBS013TQ





MBWA0392E

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PFP:18930

System Description

EBS011W0

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Fuel injector and Fuel pump
Stop lamp switch	Brake pedal operation		
ASCD clutch switch	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Combination meter	Vehicle speed		

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 185 km/h (115 MPH).
ECM controls fuel injection value 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 ON/OFF 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 185 km/h (115 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
- More than 2 switches at ASCD steering switch are depressed at the same time (Set speed will be cleared.).
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to the neutral position
- Vehicle speed increased to 13 km/h higher than the set speed
- Vehicle speed decreased to 13 km/h lower than the set speed
- ESP/TCS system is operated

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

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

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

COAST OPERATION

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 ON/OFF 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
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 185 km/h (115 MPH)

Component Description

EBS011W1

ASCD STEERING SWITCH

Refer to EC-235 .

ASCD BRAKE SWITCH

Refer to EC-224 and EC-324 .

ASCD CLUTCH SWITCH

Refer to EC-224 and EC-324 .

STOP LAMP SWITCH

Refer to EC-224 and EC-324 .

ASCD INDICATOR

Refer to EC-343 .

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00100

General Specifications

EBS013TR

Engine	YD22DDTi
Idle speed	725 ± 25 rpm
Maximum engine speed	4,900 rpm

Mass Air Flow Sensor

EBS013TS

Supply voltage	Battery voltage (11 - 14V)
Ignition switch ON (Engine stopped.)	Approx. 0.4V
Idle (Engine is warmed up to normal operating temperature.)	1.5 - 2.0V
2,000 rpm (Engine is warmed up to normal operating temperature.)	2.2 - 2.7V

Engine Coolant Temperature Sensor

EBS013TT

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

Fuel Rail Pressure Sensor

EBS013TU

Supply voltage	Approximately 5V
Idle (Engine is warmed up to normal operating temperature.)	1.7 - 2.0V
2,000 rpm (Engine is warmed up to normal operating temperature.)	2.0 - 2.3V

Glow Plug

EBS013TV

Resistance [at 25°C (77°F)] Ω	Approximately 0.8

EGR Volume Control Valve

EBS013TW

Resistance [at 25°C (77°F)] Ω	13 - 17

Crankshaft Position Sensor

EBS013TX

Refer to EC-186, "Component Inspection" .

Camshaft Position Sensor

EBS013TY

Refer to EC-197, "Component Inspection" .

INDEX FOR DTC

PFP:00024

Alphabetical Index

EBS0152K

Check if the vehicle is a model with Euro-OBD (E-OBD) system or not by the “Type approval number” on the identification plate. Refer to GI-47, "IDENTIFICATION PLATE" .

NOTE:
If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to EC-416, "DTC U1000 CAN COMMUNICATION LINE" .

X: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*	MI lighting up	Reference page
APP SEN 1/CIRCUIT	P0122	—	EC-442
APP SEN 1/CIRCUIT	P0123	—	EC-442
APP SEN 2/CIRCUIT	P0222	—	EC-478
APP SEN 2/CIRCUIT	P0223	—	EC-478
APP SENSOR	P2135	—	EC-594
BARO SEN/CIRC	P2228	—	EC-611
BARO SEN/CIRC	P2229	—	EC-611
BATTERY VOLTAGE	P0563	—	EC-532
BRAKE SW/CIRCUIT	P0504	—	EC-524
CAN COMM CIRCUIT	U1000	—	EC-416
CKP SEN/CIRCUIT	P0335	×	EC-495
CKP SENSOR	P0336	×	EC-500
CMP SEN/CIRCUIT	P0340	×	EC-506
CMP SENSOR	P0341	×	EC-512
CMP/CKP RELATION	P0016	—	EC-419
CYL1 INJECTOR	P0201	—	EC-458
CYL2 INJECTOR	P0202	—	EC-458
CYL3 INJECTOR	P0203	—	EC-458
CYL4 INJECTOR	P0204	—	EC-458
ECM	P0605	×	EC-539
ECM	P0606	×	EC-541
ECM RELAY	P0686	—	EC-558
ECT SEN/CIRCUIT	P0117	—	EC-437
ECT SEN/CIRCUIT	P0118	—	EC-437
ENG OVER TEMP	P0217	×	EC-464
FRP RELIEF VALVE	P1272	—	EC-574
FRP SEN/CIRC	P0192	—	EC-452
FRP SEN/CIRC	P0193	—	EC-452
FUEL LEAK	P0093	×	EC-425
FUEL PUMP	P0089	—	EC-423
FUEL PUMP	P1273	—	EC-579
FUEL PUMP	P1274	×	EC-584
FUEL PUMP	P1275	×	EC-589
FUEL PUMP/CIRC	P0628	×	EC-543
FUEL PUMP/CIRC	P0629	×	EC-543
FUEL TEMP SEN/CIRC	P0182	—	EC-448
FUEL TEMP SEN/CIRC	P0183	—	EC-448

Items (CONSULT-II screen terms)	DTC*	MI lighting up	Reference page
HIGH FUEL PRESS	P0088	×	EC-421
IAT SEN/CIRCUIT	P0112	—	EC-433
IAT SEN/CIRCUIT	P0113	—	EC-433
INJ ADJ RES/CIRC1	P1260	—	EC-563
INJ ADJ RES/CIRC1	P1261	—	EC-563
INJ ADJ RES/CIRC2	P1262	—	EC-563
INJ ADJ RES/CIRC2	P1263	—	EC-563
INJ ADJ RES/CIRC3	P1264	—	EC-563
INJ ADJ RES/CIRC3	P1265	—	EC-563
INJ ADJ RES/CIRC4	P1266	—	EC-563
INJ ADJ RES/CIRC4	P1267	—	EC-563
INJ PWR/CIRC	P2146	×	EC-600
INJ PWR/CIRC	P2149	×	EC-600
INJECTOR	P0200	×	EC-457
INJECTOR/CIRC	P2147	×	EC-605
INJECTOR/CIRC	P2148	×	EC-605
INJECTOR 1	P1268	—	EC-568
INJECTOR 2	P1269	—	EC-568
INJECTOR 3	P1270	—	EC-568
INJECTOR 4	P1271	—	EC-568
MAF SEN/CIRCUIT	P0102	—	EC-428
MAF SEN/CIRCUIT	P0103	—	EC-428
NATS MALFUNCTION	P1610 - P1617	—	EC-371
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	—	—
SENSOR PWR/CIRC1	P0642	—	EC-548
SENSOR PWR/CIRC1	P0643	—	EC-548
SENSOR PWR/CIRC2	P0652	—	EC-553
SENSOR PWR/CIRC2	P0653	—	EC-553
STRG SW/CIRC	P0580	—	EC-534
STRG SW/CIRC	P0581	—	EC-534
TC BOOST SEN/CIRC	P0237	—	EC-490
TC BOOST SEN/CIRC	P0238	—	EC-490
TC SYSTEM	P0234	—	EC-484
TCS/CIRC	P1212	—	EC-562
TCS C/U FUNCTN	P1211	—	EC-561
VEHICLE SPEED	P0501	—	EC-518
VEHICLE SPEED	P0502	—	EC-520
VEHICLE SPEED	P0503	—	EC-522

*: This number is prescribed by ISO 15031-6.

DTC No. Index

EBS0152L

Check if the vehicle is a model with Euro-OBD (E-OBD) system or not by the “Type approval number” on the identification plate. Refer to GI-47, "IDENTIFICATION PLATE" .

NOTE:
If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to EC-416, "DTC U1000 CAN COMMUNICATION LINE" .

X: Applicable —: Not applicable

DTC*	Items (CONSULT-II screen item)	MI lighting up	Reference page
U1000	CAN COMM CIRCUIT	—	EC-416
P0000	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	—	—
P0016	CMP/CKP RELATION	—	EC-419
P0088	HIGH FUEL PRESS	×	EC-421
P0089	FUEL PUMP	—	EC-423
P0093	FUEL LEAK	×	EC-425
P0102	MAF SEN/CIRCUIT	—	EC-428
P0103	MAF SEN/CIRCUIT	—	EC-428
P0112	IAT SEN/CIRCUIT	—	EC-433
P0113	IAT SEN/CIRCUIT	—	EC-433
P0117	ECT SEN/CIRCUIT	—	EC-437
P0118	ECT SEN/CIRCUIT	—	EC-437
P0122	APP SEN 1/CIRCUIT	—	EC-442
P0123	APP SEN 1/CIRCUIT	—	EC-442
P0182	FUEL TEMP SEN/CIRC	—	EC-448
P0183	FUEL TEMP SEN/CIRC	—	EC-448
P0192	FRP SEN/CIRC	—	EC-452
P0193	FRP SEN/CIRC	—	EC-452
P0200	INJECTOR	×	EC-457
P0201	CYL1 INJECTOR	—	EC-458
P0202	CYL2 INJECTOR	—	EC-458
P0203	CYL3 INJECTOR	—	EC-458
P0204	CYL4 INJECTOR	—	EC-458
P0217	ENG OVER TEMP	×	EC-464
P0222	APP SEN 2/CIRCUIT	—	EC-478
P0223	APP SEN 2/CIRCUIT	—	EC-478
P0234	TC SYSTEM	—	EC-484
P0237	TC BOOST SEN/CIRC	—	EC-490
P0238	TC BOOST SEN/CIRC	—	EC-490
P0335	CKP SEN/CIRCUIT	×	EC-495
P0336	CKP SENSOR	×	EC-500
P0340	CMP SEN/CIRCUIT	×	EC-506
P0341	CMP SENSOR	×	EC-512
P0501	VEHICLE SPEED	—	EC-518
P0502	VEHICLE SPEED	—	EC-520
P0503	VEHICLE SPEED	—	EC-522

DTC*	Items (CONSULT-II screen item)	MI lighting up	Reference page
P0504	BRAKE SW/CIRCUIT	—	EC-524
P0563	BATTERY VOLTAGE	—	EC-532
P0580	STRG SW/CIRC	—	EC-534
P0581	STRG SW/CIRC	—	EC-534
P0605	ECM	×	EC-539
P0606	ECM	×	EC-541
P0628	FUEL PUMP/CIRC	×	EC-543
P0629	FUEL PUMP/CIRC	×	EC-543
P0642	SENSOR PWR/CIRC1	—	EC-548
P0643	SENSOR PWR/CIRC1	—	EC-548
P0652	SENSOR PWR/CIRC2	—	EC-553
P0653	SENSOR PWR/CIRC2	—	EC-553
P0686	ECM RELAY	—	EC-558
P1211	TCS C/U FUNCTN	—	EC-561
P1212	TCS/CIRC	—	EC-562
P1260	INJ ADJ RES/CIRC1	—	EC-563
P1261	INJ ADJ RES/CIRC1	—	EC-563
P1262	INJ ADJ RES/CIRC2	—	EC-563
P1263	INJ ADJ RES/CIRC2	—	EC-563
P1264	INJ ADJ RES/CIRC3	—	EC-563
P1265	INJ ADJ RES/CIRC3	—	EC-563
P1266	INJ ADJ RES/CIRC4	—	EC-563
P1267	INJ ADJ RES/CIRC4	—	EC-563
P1268	INJECTOR 1	—	EC-568
P1269	INJECTOR 2	—	EC-568
P1270	INJECTOR 3	—	EC-568
P1271	INJECTOR 4	—	EC-568
P1272	FRP RELIEF VALVE	—	EC-574
P1273	FUEL PUMP	—	EC-579
P1274	FUEL PUMP	×	EC-584
P1275	FUEL PUMP	×	EC-589
P1610 - P1617	NATS MALFUNTION	—	EC-371
P2135	APP SENSOR	—	EC-594
P2146	INJ PWR/CIRC	×	EC-600
P2147	INJECTOR/CIRC	×	EC-605
P2148	INJECTOR/CIRC	×	EC-605
P2149	INJ PWR/CIRC	×	EC-600
P2228	BARO SEN/CIRC	—	EC-611
P2229	BARO SEN/CIRC	—	EC-611

*: This number is prescribed by ISO 15031-6.

PRECAUTIONS

PFP:00001

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

EBS0152M

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 harnesses or harness connectors.**

On Board Diagnostic (OBD) System of Engine

EBS0152N

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

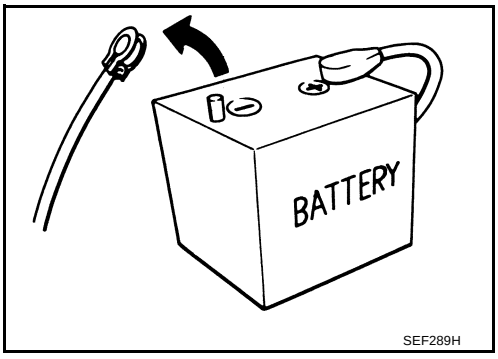
CAUTION:

- **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 MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI 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-108, "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 MI 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 MI to light up due to the malfunction of the fuel system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM before returning the vehicle to the customer.**

Precautions

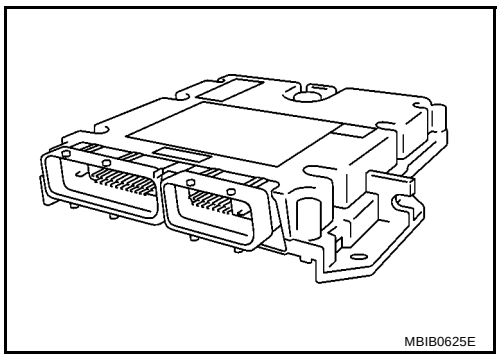
EBS0152O

- **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.**

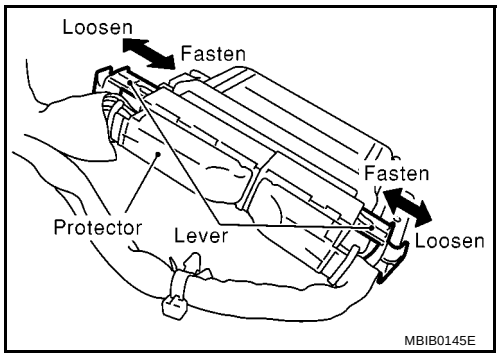


SEF289H

- **Do not disassemble ECM.**

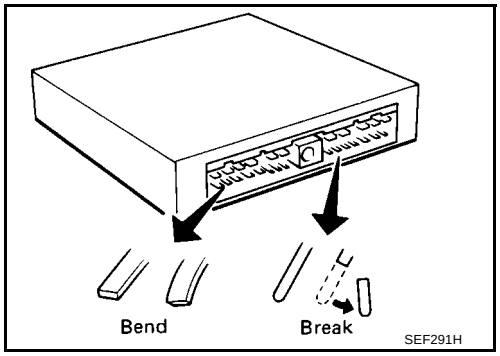

MBIB0625E

- **When connecting ECM harness connector, fasten it securely with levers as far as they will go as shown in the figure.**



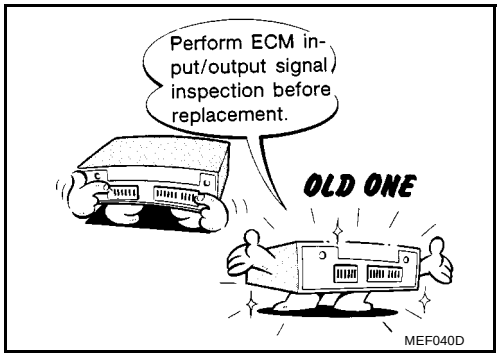
MBIB0145E

- **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 IC's.
- **Keep engine control system harness at least 10cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of IC's, etc.**
- **Keep engine control system parts and harness dry.**



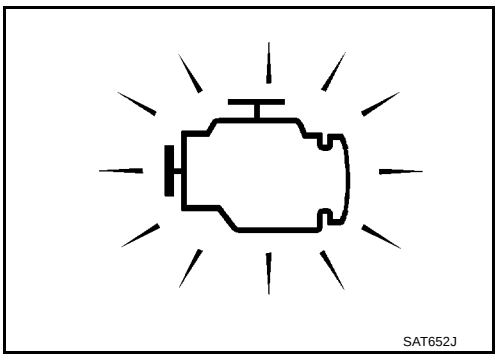
SEF291H

- **Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-391, "ECM Terminals And Reference Value" .**
- **Handle mass air flow sensor carefully to avoid damage.**
- **Do not disassemble mass air flow sensor.**
- **Do not clean mass air flow sensor with any type of detergent.**
- **Even a slight leak in the air intake system can cause serious incidents.**
- **Do not shock or jar the camshaft position sensor, crankshaft position sensor.**

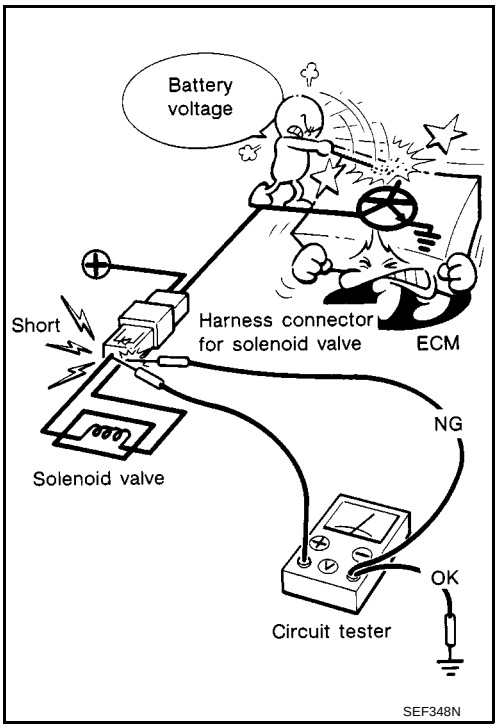


MEF040D

- **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.

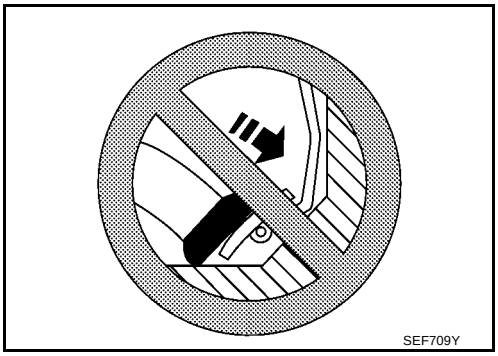

SAT652J

- **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 disassemble fuel pump.**
  If NG, take proper action.
- **Do not disassemble fuel injector.**
  If NG, replace fuel injector.

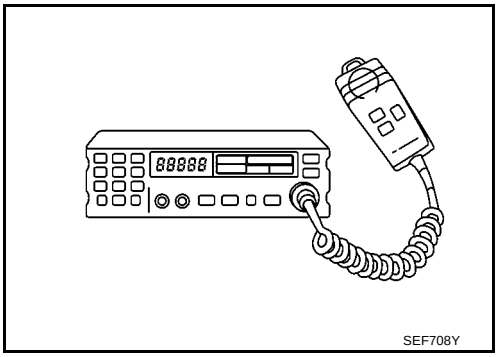


SEF348N

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


SEF709Y

- **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 standingwave radio can be kept smaller.**
  - **Be sure to ground the radio to vehicle body.**


SEF708Y

Wiring Diagrams and Trouble Diagnosis

EBS0152P

When you read Wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams".
- PG-3, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

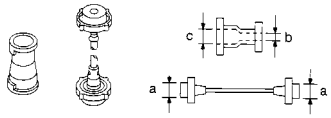
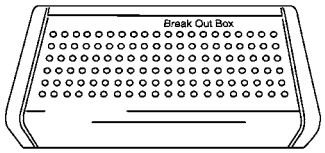
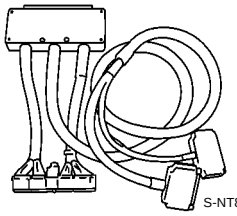
- GI-11, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES".
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident".

PREPARATION

PFP:00002

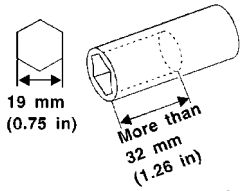
Special Service Tools

EBS0152Q

Tool number Tool name	Description	
EG17650301 Radiator cap tester adapter	 S-NT564	Adapting radiator cap tester to radiator cap and radiator filler neck **a: 28 (1.10) dia.** **b: 31.4 (1.236) dia.** **c: 41.3 (1.626) dia.** Unit: mm (in)
KV109E0010 Break-out box	 S-NT825	Measuring the ECM signals with a circuit tester
KV109E0080 Y-cable adapter	 S-NT826	Measuring the ECM signals with a circuit tester

Commercial Service Tools

EBS0152R

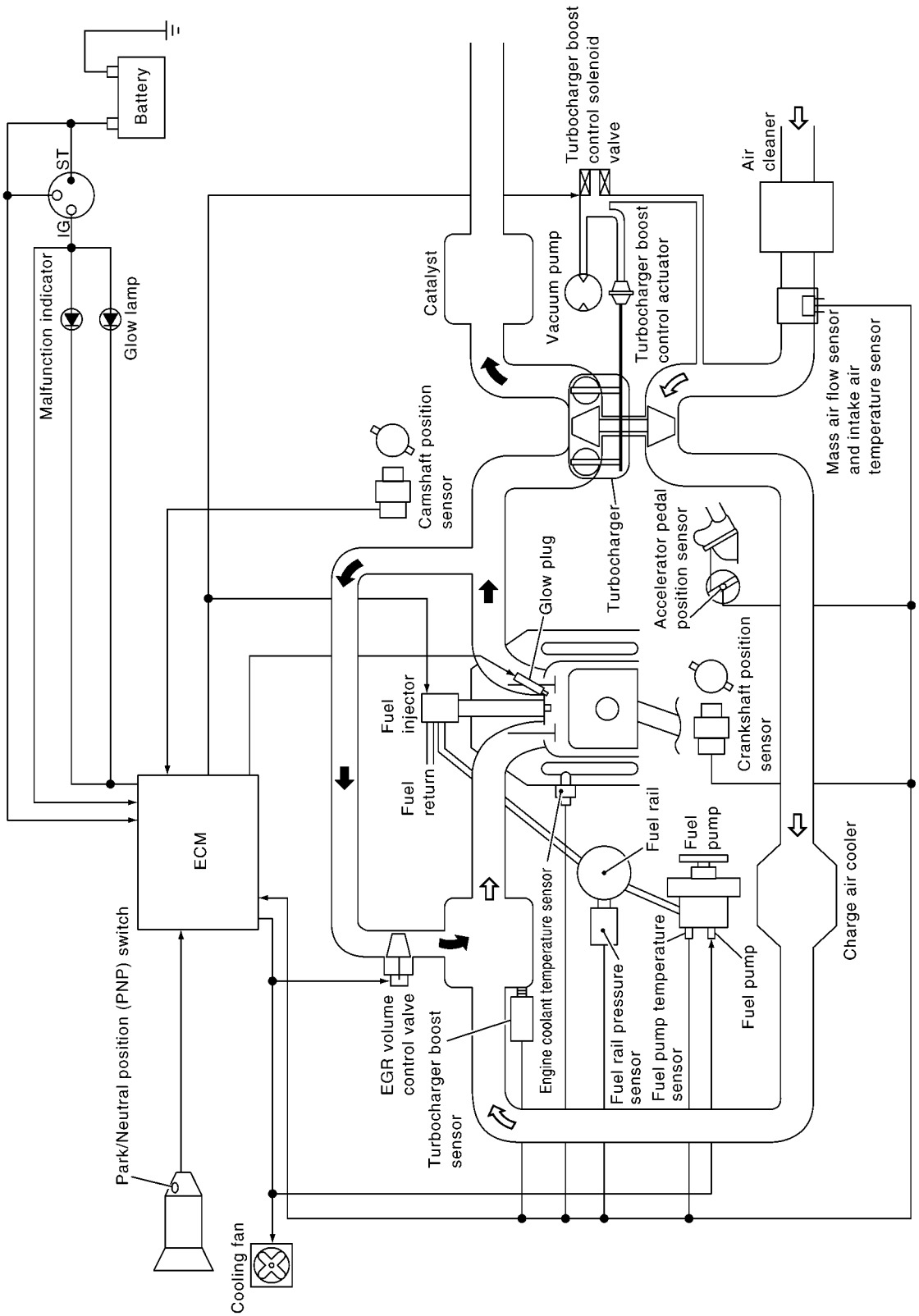
Tool name	Description	
Socket wrench	 S-NT705	Removing and installing engine coolant temperature sensor

ENGINE CONTROL SYSTEM

PFP:23710

System Diagram

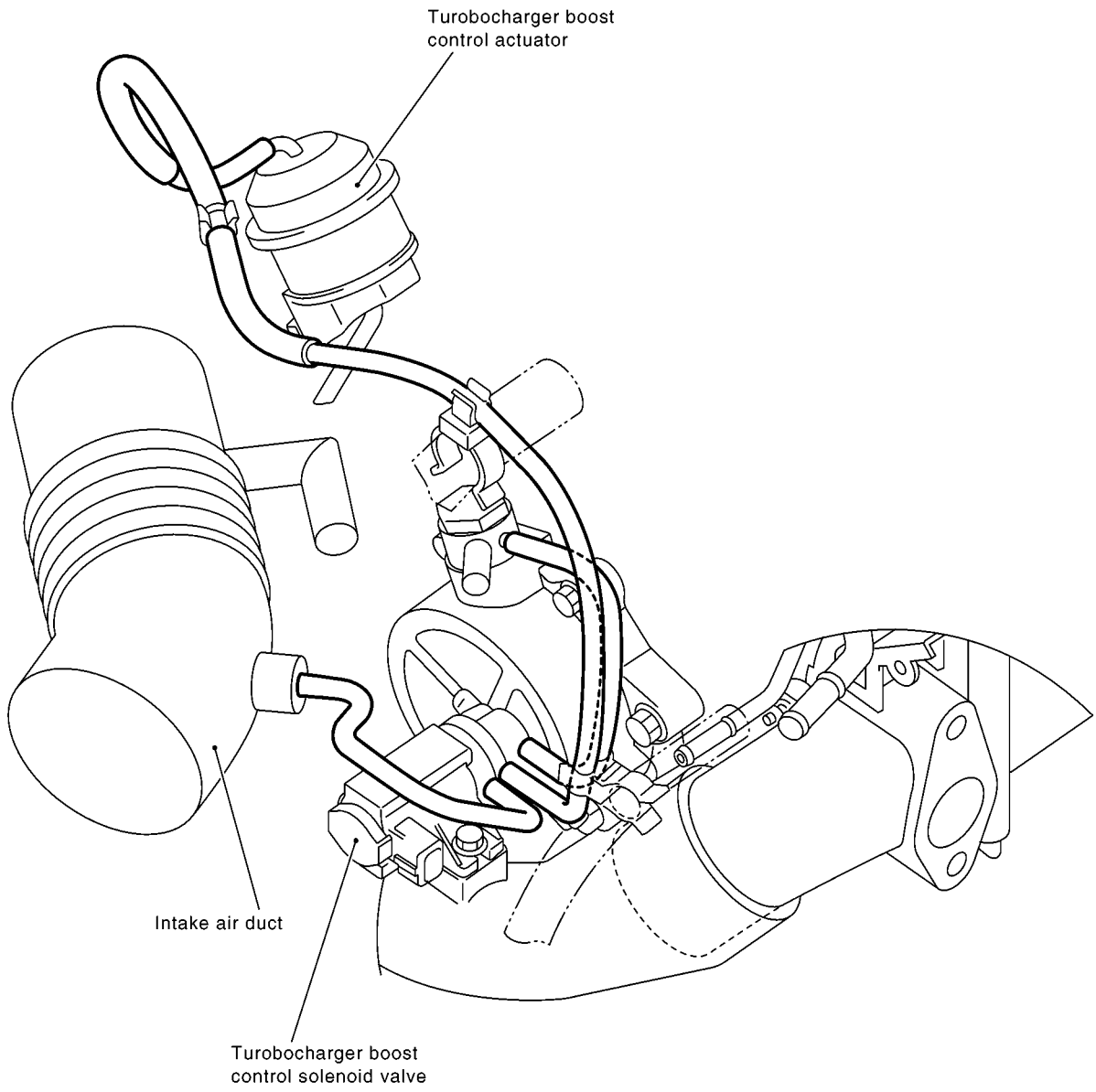
EBS0152S



MBIB0608E

Vacuum Hose Drawing

EBS0152T



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

MBIB0609E

Refer to EC-360, "System Diagram" for Vacuum Control System.

System Chart

EBS0152U

Input (Sensor)	ECM Function	Output (Actuator)
● Accelerator pedal position sensor ● Fuel rail pressure sensor ● Fuel pump temperature sensor ● Engine coolant temperature sensor ● Mass air flow sensor ● Intake air temperature sensor ● Crankshaft position sensor ● Camshaft position sensor ● Turbocharger boost sensor ● Vehicle speed sensor*1 ● ESP/TCS/ABS control unit*1 ● Ignition switch ● ASCD steering switch ● ASCD brake switch ● ASCD clutch switch ● Stop lamp switch ● Air conditioner switch*1 ● Park/neutral position switch ● Battery voltage ● Power steering pressure switch	Fuel injection control	Fuel injector and Fuel pump
	Fuel injection timing control	Fuel injector and Fuel pump
	Fuel cut control	Fuel injector and Fuel pump
	Glow control system	Glow relay and glow indicator lamp*2
	ASCD vehicle speed control	Fuel injector and Fuel pump
	On board diagnostic system	Malfunction indicator (MI)*2
	EGR volume control	EGR volume control valve
	Cooling fan control	Cooling fan relay
	Turbocharger boost control	Turbocharger boost control solenoid valve
	Air conditioning cut control	Air conditioner relay*2

*1: The input signal is sent to the ECM through CAN communication line.
*2: The output signal is sent from the ECM through CAN communication line.

Fuel Injection Control System

EBS0152V

SYSTEM DESCRIPTION

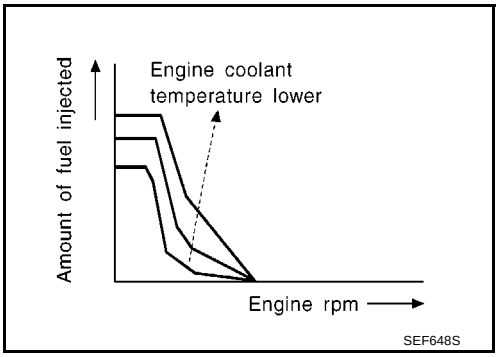
Three types of fuel injection control are provided to accommodate engine operating conditions; normal control, idle control and start control. The ECM determines the appropriate fuel injection control. Under each control, the amount of fuel injected is adjusted to improve engine performance.
Pulse signals are sent to fuel injectors according to the input signals to adjust the amount of fuel injected to preset value.

START CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Engine coolant temperature sensor	Engine coolant temperature	Fuel injection control (start control)	Fuel injector Fuel pump
Crankshaft position sensor	Engine speed		
Camshaft position sensor	Piston position		
Ignition switch	Start signal		
Fuel rail pressure sensor	Fuel rail pressure		

When the ECM receives a start signal from the ignition switch, the ECM adapts the fuel injection system for the start control. The amount of fuel injected at engine starting is a preset program value in the ECM. The program is determined by the engine speed, engine coolant temperature and fuel rail pressure.
For better startability under cool engine conditions, the lower the coolant temperature becomes, the greater the amount of fuel injected. The ECM ends the start control when the engine speed reaches the specific value, and shifts the control to the normal or idle control.



IDLE CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Engine coolant temperature sensor	Engine coolant temperature	Fuel injection control (Idle control)	Fuel injector Fuel pump
Crankshaft position sensor	Engine speed		
Battery	Battery voltage		
Accelerator pedal position sensor	Accelerator pedal position		
Fuel rail pressure sensor	Fuel rail pressure		
Vehicle speed sensor*	Vehicle speed		
Air conditioner switch*	Air conditioner signal		

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

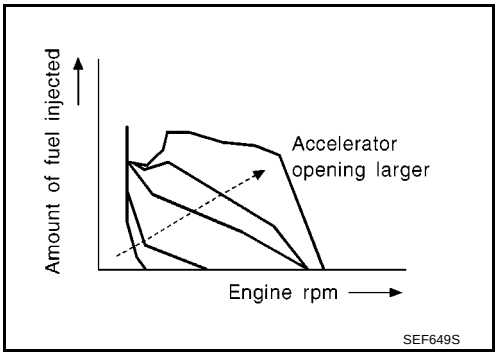
When the ECM determines that the engine speed is at idle, the fuel injection system is adapted for the idle control. The ECM regulates the amount of fuel injected corresponding to changes in load applied to the engine to keep engine speed constant. The ECM also provides the system with a fast idle control in response to the engine coolant temperature signal.

NORMAL CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor	Engine speed	Fuel injection control (Normal control)	Fuel injector Fuel pump
Accelerator pedal position sensor	Accelerator position		
Fuel rail pressure sensor	Fuel rail pressure		

The amount of fuel injected under normal driving conditions is determined according to sensor signals. The crankshaft position sensor detects engine speed, the accelerator pedal position sensor detects accelerator pedal position and fuel rail pressure sensor detects fuel rail pressure. These sensors send signals to the ECM.
The fuel injection data, predetermined by correlation between various engine speeds, accelerator pedal positions and fuel rail pressure are stored in the ECM memory, forming a map. The ECM determines the optimal amount of fuel to be injected using the sensor signals in comparison with the map.



MAXIMUM AMOUNT CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Mass air flow sensor	Amount of intake air	Fuel injection control (Maximum amount control)	Fuel Injector
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor	Engine speed		
Accelerator pedal position sensor	Accelerator pedal position		

The maximum injection amount is controlled to an optimum by the engine speed, intake air amount, engine coolant temperature, and accelerator opening in accordance with the driving conditions.
This prevents the oversupply of the injection amount caused by decreased air density at a high altitude or during a system failure.

DECELERATION CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator
Accelerator pedal position sensor	Accelerator pedal position	Fuel injection control (Deceleration control)	Fuel injector Fuel pump
Crankshaft position sensor	Engine speed		

The ECM sends a fuel cut signal to the fuel injectors and fuel pump during deceleration for better fuel efficiency. The ECM determines the time of deceleration according to signals from the accelerator pedal position sensor and crankshaft position sensor.

Fuel Injection Timing Control System

EBS0152W

DESCRIPTION

The target fuel injection timing in accordance with the engine speed and the fuel injection amount are recorded as a map in the ECM beforehand. The ECM determines the optimum injection timing using sensor signals accordance with the map.

Air Conditioning Cut Control

EBS0152X

INPUT / OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Air conditioner switch*1	Air conditioner ON signal	Air conditioner cut control	Air conditioner relay*2
Accelerator pedal position sensor	Accelerator pedal opening angle		
Vehicle speed sensor*1	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		

*1: The input signal is sent to the ECM through CAN communication line.
*2: The output signal is sent from the ECM through CAN communication line.

SYSTEM DESCRIPTION

This system improves acceleration when the air conditioner is used.
When the accelerator pedal is fully depressed, the air conditioner is turned off for a few seconds.
When engine coolant temperature becomes excessively high, the air conditioner is turned off. This continues until the engine coolant temperature returns to normal.

Fuel Cut Control (At No Load & High Engine Speed)

EBS0152Y

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Vehicle speed sensor*	Vehicle speed	Fuel cut control	Fuel injector
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor	Engine speed		

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

If the engine speed is above 2,800 rpm under no load (for example, the shift position is neutral and engine speed is over 2,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will be operated until the engine speed reaches 1,500 rpm, then fuel cut will be cancelled.

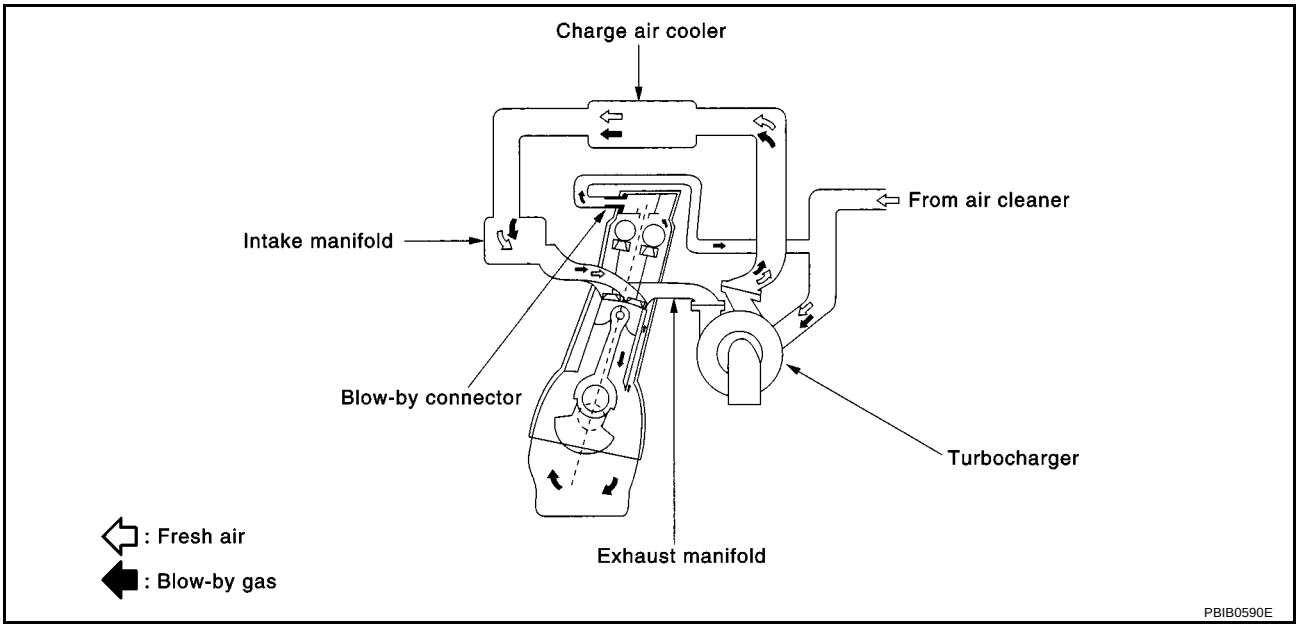
NOTE:
This function is different from deceleration control listed under EC-362, "Fuel Injection Control System" .

Crankcase Ventilation System

EBS0152Z

DESCRIPTION

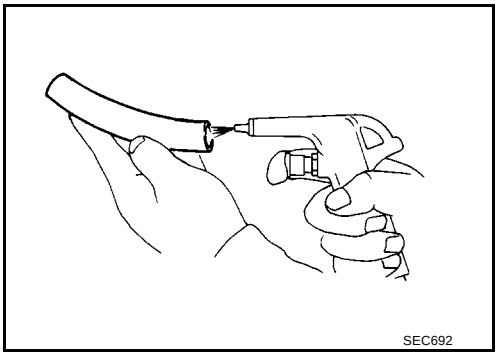
In this system, blow-by gas is sucked into the air duct after oil separation by oil separator in the rocker cover.



INSPECTION

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.



CAN Communication

EBS01530

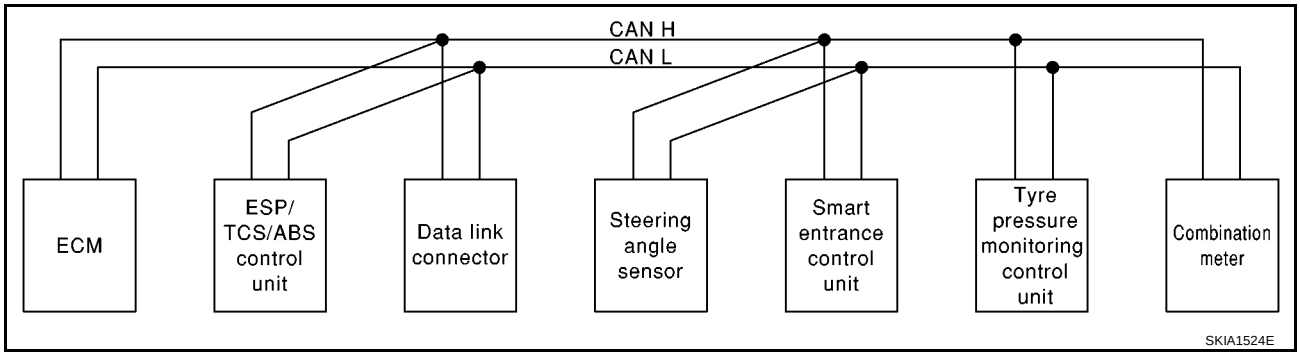
SYSTEM DESCRIPTION

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

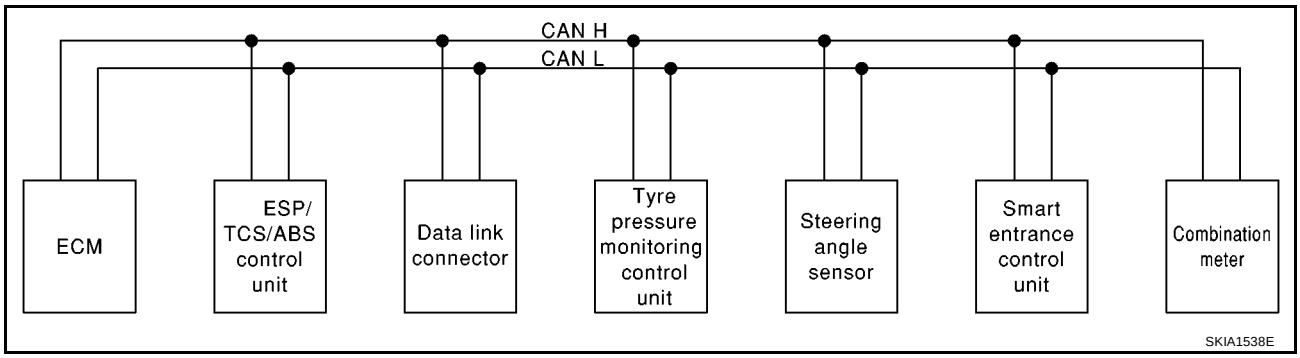
MODELS WITH ESP

System Diagram

- LHD models



- RHD models



Input/Output Signal Chart

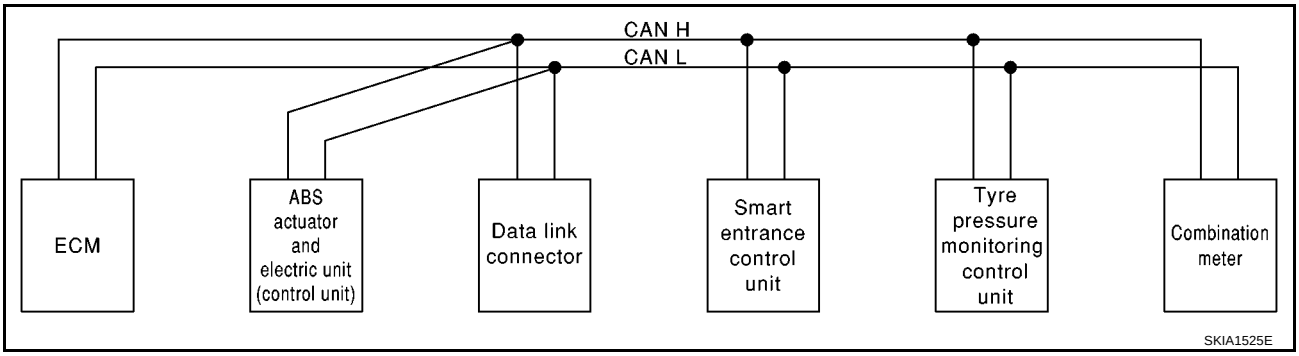
T: Transmit R: Receive

Signals	ECM	ESP/ TCS / ABS control unit	Steering angle sensor	Smart entrance control unit	Tyre pressure monitoring control unit	Combination meter
Engine speed signal	T	R				R
Accelerator pedal position signal	T	R				
Steering angle sensor signal		R	T			
Air conditioner switch signal	R					T
MI signal	T					R
Glow indicator lamp signal	T					R
Engine coolant temperature signal	T					R
Fuel consumption signal	T					R
Vehicle speed signal		T				R
	R				R	T
Seat belt reminder signal				R		T
Lighting switch position signal				T		R
Flashing indicator signal				T		R
Engine cooling fan speed signal	T			R		
Child lock indicator signal				T		R
Door switches state signal				T		R
A/C compressor signal	T			R		
Tyre pressure signal					T	R
ASCD SET lamp signal	T					R
ASCD CRUISE lamp signal	T					R

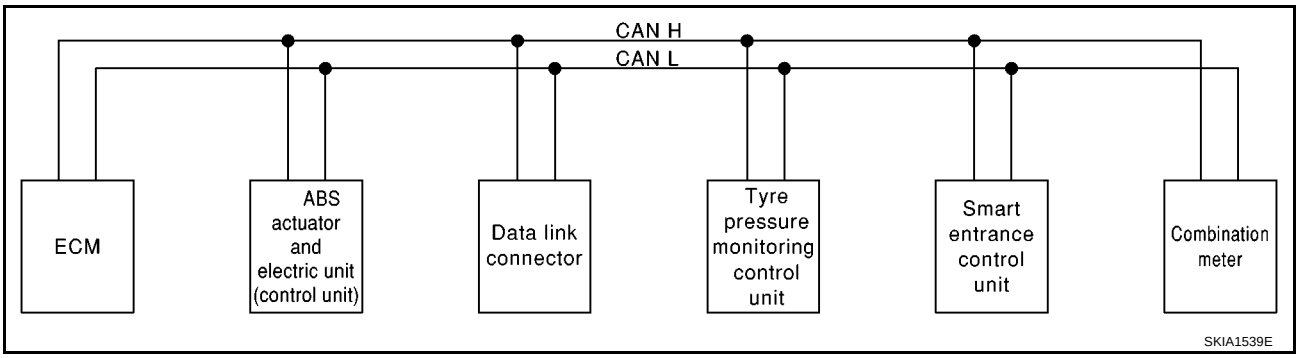
MODELS WITHOUT ESP

System Diagram

- LHD models



- RHD models



Input/Output Signal Chart

T: Transmit R: Receive

Signals	ECM	ABS actuator and electric unit (control unit)	Smart entrance control unit	Tyre pressure monitoring control unit	Combination meter
Engine speed signal	T				R
Air conditioner switch signal	R				T
MI signal	T				R
Glow indicator lamp signal	T				R
Engine coolant temperature signal	T				R
Fuel consumption signal	T				R
Vehicle speed signal		T			R
	R			R	T
Seat belt reminder signal			R		T
Lighting switch position signal			T		R
Flashing indicator signal			T		R
Engine cooling fan speed signal	T		R		
Child lock indicator signal			T		R
Door switches state signal			T		R
A/C compressor signal	T		R		
Tyre pressure signal				T	R
ASCD SET lamp signal	T				R
ASCD CRUISE lamp signal	T				R

BASIC SERVICE PROCEDURE

PFP:00018

Fuel Filter

EBS01531

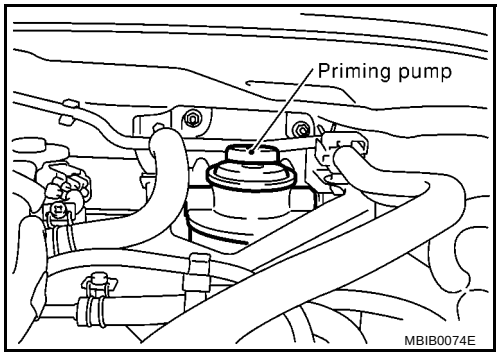
DESCRIPTION

A water draining cock is on the lower side and a priming pump for bleeding air is on the upper side.

AIR BLEEDING

Pump the priming pump to bleed air.

- When air is bled completely, the pumping of the priming pump suddenly becomes heavy. Stop the operation at that time.
- If it is difficult to bleed air by the pumping of the priming pump (the pumping of the priming pump does not become heavy), disconnect the fuel supply hose between the fuel filter and the fuel gallery. Then, perform the operation described above, and make sure that fuel comes out. (Use a pan, etc. so as not to spill fuel. Do not let fuel get on engine and other parts.) After that, connect the hose, then bleed air again.
- Start engine and let it idle for at least 1 minute after performing air bleeding.



WATER DRAINING

1. Remove the fuel filter, filter bracket, protector assembly from the dash panel as follows.

a. Remove the air cleaner case (upper), air duct assembly, and vacuum hose for brake booster (between the vacuum pump and vacuum pipe).

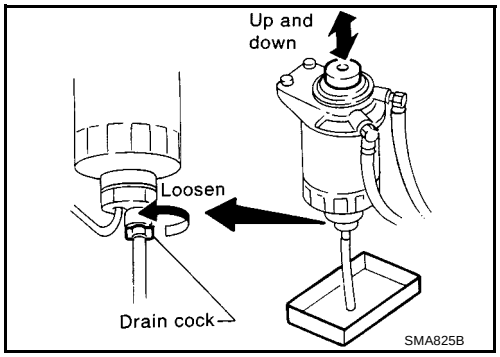
CAUTION:
After the duct is removed, cover the opening with gum tape, etc. to prevent foreign object from getting into the engine during the operation.

b. Remove the mounting nuts on the dash panel, then remove the fuel filter, filter bracket, and protector assembly from the dash panel.

- It is not necessary to disconnect the fuel hose.

2. Using a tool such as a pliers, loosen the water draining cock at the bottom of the fuel filter.
Loosening drain cock four to five turns causes water to start draining.
Do not remove drain cock by loosening it excessively.
If water dose not drain properly, move the priming up and down.

CAUTION:
When the water is drained, the fuel is also drained. Use a pan, etc. to avoid fuel adherence to the rubber parts such as the engine mount insulator.
Do not over-tighten the water draining cock. This will damage the cock thread, resulting in water or fuel leak.



3. Bleed air of the fuel filter. Refer to EC-368, "AIR BLEEDING" .
4. Start the engine.

Fuel Pump Learning Value Clearing

EBS01532

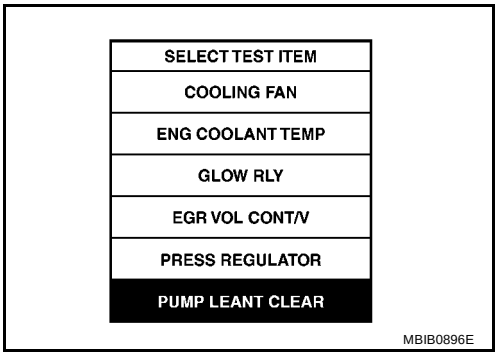
DESCRIPTION

In order to always keep optimum fuel pressure in fuel rail, the ECM controls fuel pump in high precision with monitoring the signal of fuel rail pressure sensor.
Accordingly, the ECM always learns characteristic value of fuel pump. Fuel Pump Learning Value Clearing is an operating to clear the value of the fuel pump learning.
It must be performed after the fuel pump is changed. When the ECM is replaced with brand new one, the Fuel Pump Learning Value Clearing is not necessary to be performed. If the ECM to be replaced has the possibility of learning the characteristic value of fuel pump, the Fuel Pump Learning Value Clearing is necessary to be performed after the ECM has been replaced.

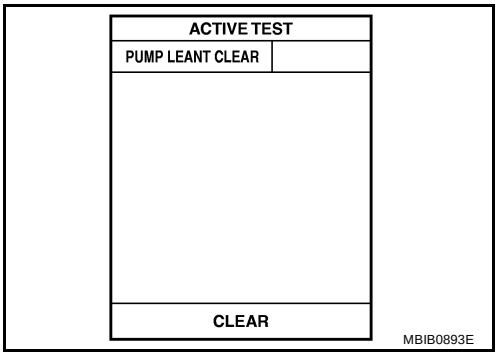
OPERATION PROCEDURE

NOTE:
Remove fuel pump without starting engine after performing Fuel Pump Learning Value Clearing.

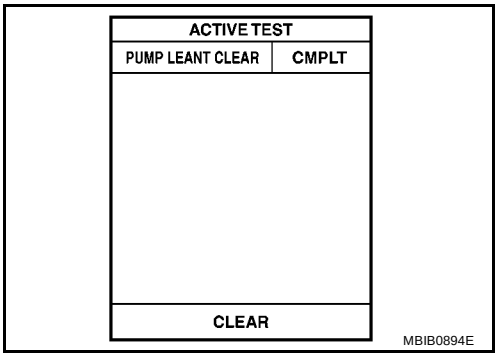
1. Turn ignition switch ON.
2. Select “PUMP LEARNT CLEAR” in “ACTIVE TEST” mode with CONSULT-II.



3. Touch “CLEAR” and wait a few seconds.



4. Make sure that “CMPLT” is displayed on CONSULT-II screen.



ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

DTC and MI Detection Logic

EBS01533

When a malfunction is detected, the malfunction (DTC) and freeze frame data are stored in the ECM memory. The MI will light up each time the ECM detects malfunction. For diagnostic items causing the MI to light up, refer to EC-351, "INDEX FOR DTC" .

Diagnostic Trouble Code (DTC)

EBS01534

HOW TO READ DTC

The DTC can be read by CONSULT-II only.

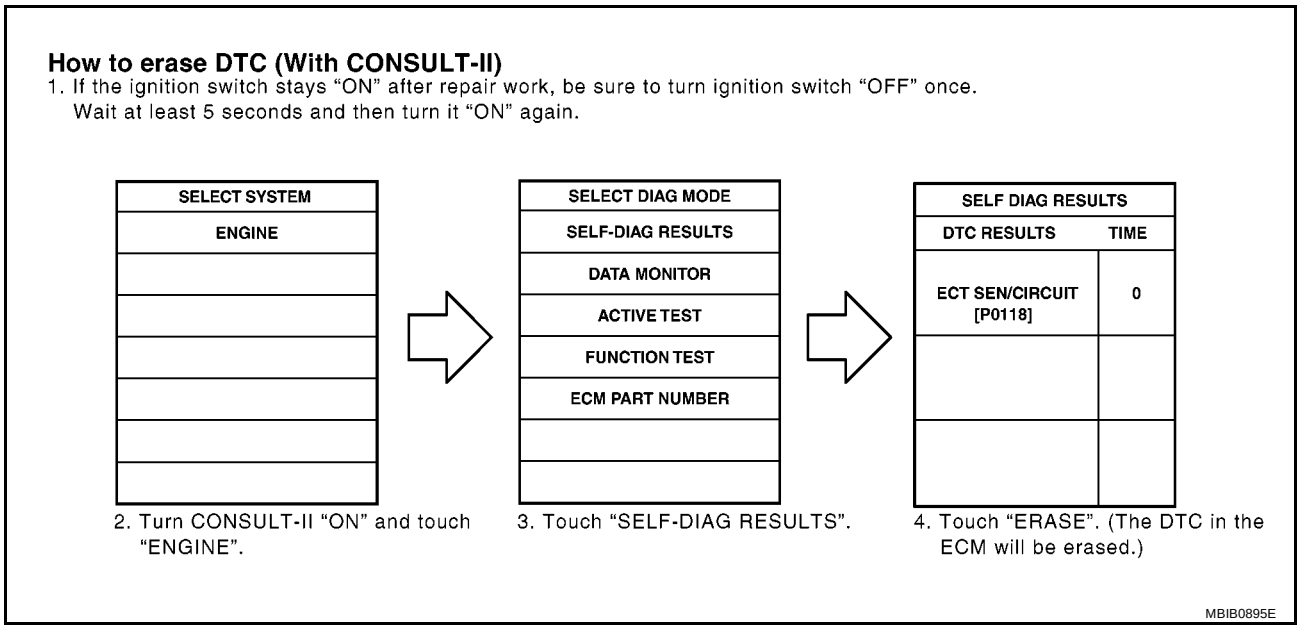
With CONSULT-II

CONSULT-II displays the DTC in "SELF-DIAG RESULTS" mode. Example: P0117, P0335, P1260, etc. These DTCs are prescribed by ISO15031-5.
(CONSULT-II also displays the malfunctioning component or system.)

HOW TO ERASE DTC

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 5 seconds and then turn it ON (engine stopped) again.
2. Touch “ENGINE”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. (The DTC in the ECM will be erased.)



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

Freeze Frame Data

EBS01535

The ECM records the driving conditions such as calculated load value, engine coolant temperature, engine speed, vehicle speed and intake manifold pressure at the moment a malfunction is detected.
The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II. For details, see EC-399 .
Only one set of freeze frame data can be stored in the ECM. If freeze frame data is stored in the ECM memory and another freeze frame data occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.
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-370, "HOW TO ERASE DTC" .

NATS (Nissan Anti-theft System)

EBS01536

- **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 NATS (Nissan Anti-Theft System) in BL section.**
- **Confirm no self-diagnostic results of NATS is displayed before touching "ERASE" in "SELF-DAIG RESULTS" mode with CONSULT-II.**
- **When replacing ECM, initialization of NATS system and registration of all NATS ignition key IDs must be carried out with CONSULT-II using NATS program card.**
  Therefore, be sure to receive all keys from vehicle owner.
  Regarding the procedure of NATS initialization and NATS ignition key ID registration, refer to CONSULT-II operation manual, NATS.

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

SEF543X

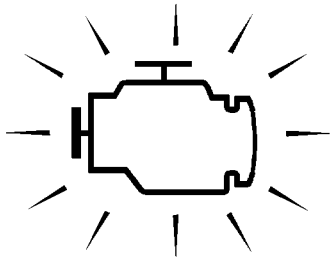
Malfunction Indicator (MI)

EBS01537

DESCRIPTION

The MI is located on the instrument panel.

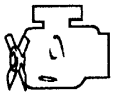
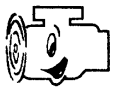
1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   - If the MI does not light up, refer to DI-84, "WARNING LAMPS" or see EC-652 .
2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



SAT652J

On Board Diagnostic System Function

The on board diagnostic system has the following two functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position  Engine stopped 	BULB CHECK	This function checks the MI bulb for damage (blown, open circuit, etc.). If the MI does not come on, check MI circuit. (See EC-652, "MI & DATA LINK CONNECTORS" .)
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When ECM detects a malfunction, the MI will light up to inform the driver that a malfunction has been detected.

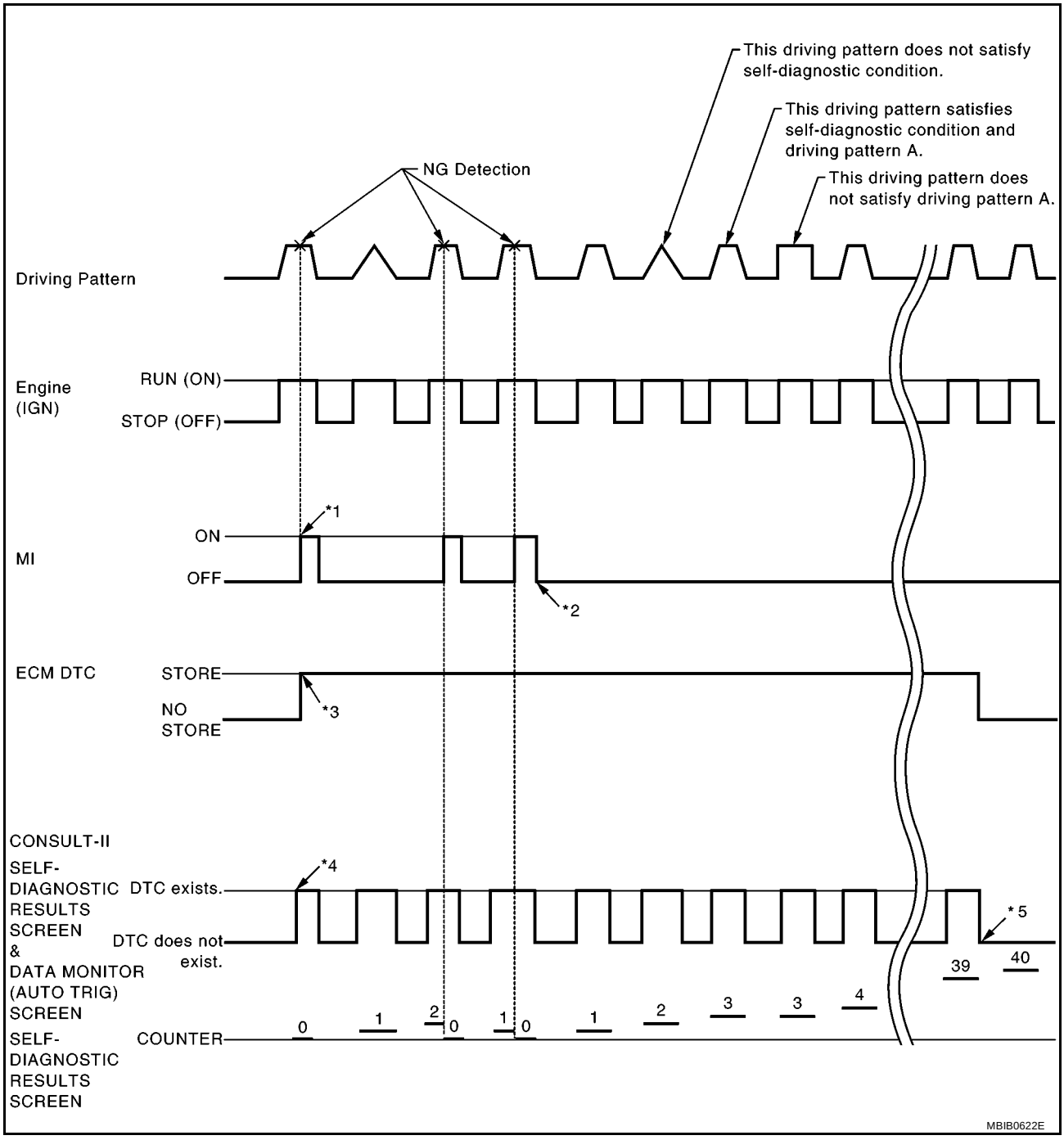
Diagnostic Test Mode I - Bulb Check

In this mode, the MI on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to DI-84, "WARNING LAMPS" or see EC-652 .

Diagnostic Test Mode I - Malfunction Warning

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

Relationship Between MI, DTC, CONSULT-II and Driving Patterns



*1: When a malfunction is detected, MI will light up.

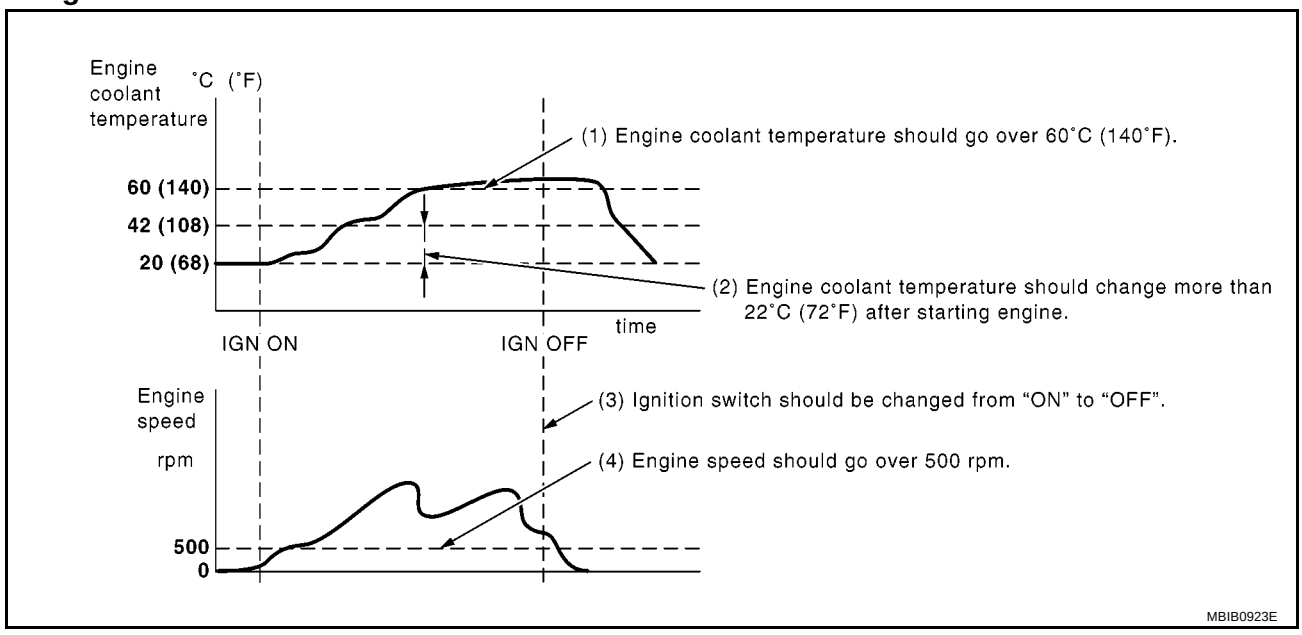
*2: MI will not light up after ignition switch is turned OFF.

*3: When a malfunction is detected for the first time, the DTC will be stored in ECM.

*4: Other screens except SELF-DIAGNOSTIC RESULTS & DATA MONITOR (AUTO TRIG) cannot display the malfunction. DATA MONITOR (AUTO TRIG) can display the malfunction at the moment it is detected.

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

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.

TROUBLE DIAGNOSIS

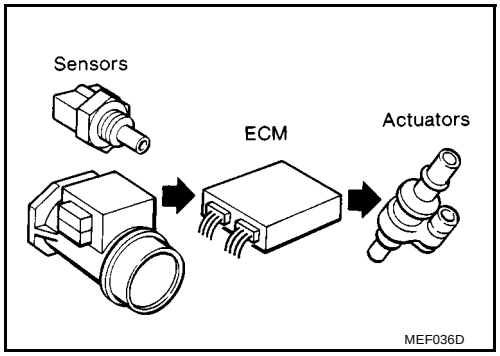
PFP:00004

Trouble Diagnosis Introduction

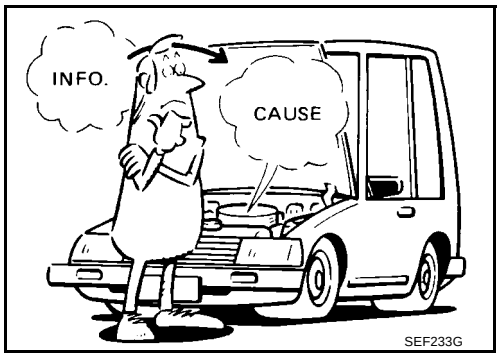
EBS015RN

INTRODUCTION

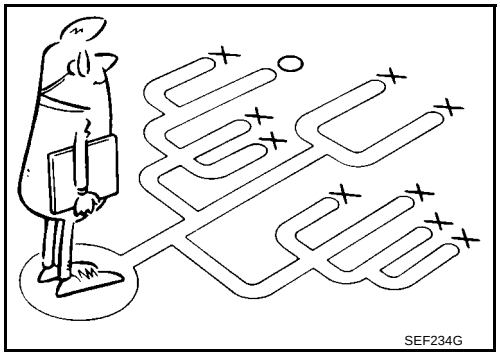
The engine has an ECM to control major systems such as fuel injection control, fuel injection timing control, glow control system, etc. The ECM accepts input signals from sensors and instantly actuators. It is essential that both input and output signals are proper and stable. At the same time, it is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



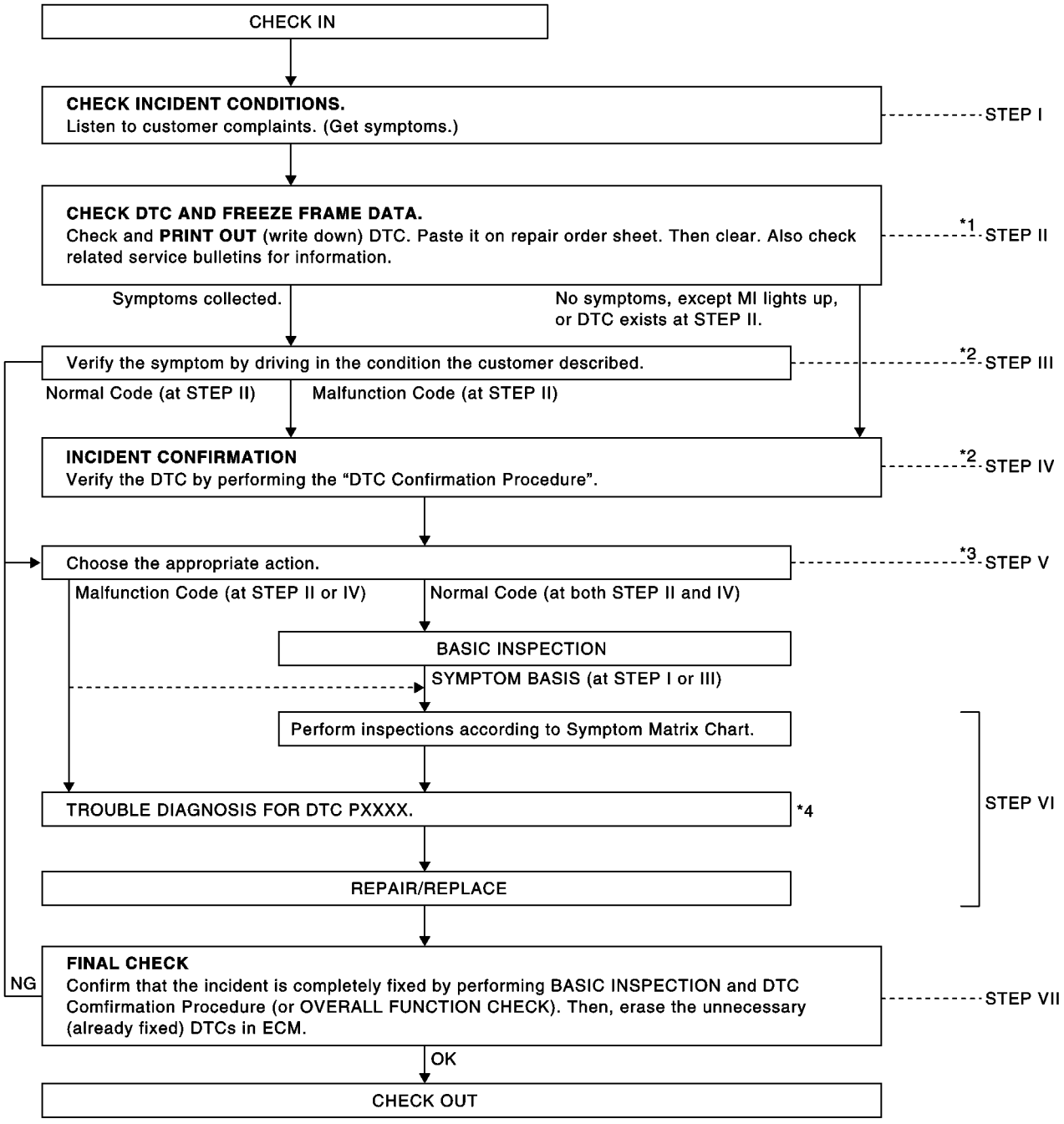
It is much more difficult to diagnose a malfunction that occurs intermittently rather than continuously. Most intermittent malfunctions are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



A visual check only may not find the cause of the incidents. A road test with CONSULT-II or a circuit tester connected should be performed. Follow the EC-375, "WORK FLOW" .
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 incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A Diagnostic Worksheet like the example on next page should be used.
Start your diagnosis by looking for “conventional” incidents first. This will help troubleshoot driveability incidents on an electronically controlled engine vehicle.



WORK FLOW



PBIB0477E

*1 If time data of "SELF-DIAG RESULTS" is other than "0", perform EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*2 If the incident cannot be verified, perform EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*3 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to EC-409, "MAIN POWER SUPPLY AND GROUND CIRCUIT" .

*4 If malfunctioning part cannot be detected, perform EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

Description for Work Flow

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the EC-376, "DIAGNOSTIC WORK SHEET" .
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II) the DTC and the freeze frame data, then erase the DTC. The DTC and the freeze frame data can be used when duplicating the incident at STEP III & IV. Refer to EC-370 . If the incident cannot be verified, perform EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . Study the relationship between the cause, specified by DTC, and the symptom described by the customer. (The “Symptom Matrix Chart” will be useful. Refer to EC-382 .) 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-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . If the malfunction code is detected, skip STEP IV and perform STEP V.
STEP IV	Try to detect the DTC by driving in (or performing) the DTC Confirmation Procedure. Check and read the DTC and the freeze frame data by using CONSULT-II. During the 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-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . In case the DTC Confirmation Procedure is not available, perform the Overall Function Check instead. The 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 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, EC-378 . Then perform inspections according to the Symptom Matrix Chart. Refer to EC-382 .
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-391 or EC-404 . The Diagnostic Procedure in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" , “Circuit Inspection”. Repair or replace the malfunction parts. If the malfunctioning part cannot be detected, perform EC-408, "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 P0000) is detected. If the incident is still detected in the final check, perform STEP VI by using a different method from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) DTC in ECM. (Refer to EC-370 .)

DIAGNOSTIC WORK SHEET

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about an incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one shown below in order to organize all the information for troubleshooting.

KEY POINTS

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

SEF907L

Worksheet Sample

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

MTBL0533

DTC Inspection Priority Chart

EBS01539

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

NOTE:

If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to **EC-416, "DTC U1000 CAN COMMUNICATION LINE"** .

Priority	Detected items (DTC)
1	● U1000 CAN communication line ● P0016 Crankshaft position - camshaft position correlation ● P0102 P0103 Mass air flow sensor ● P0112 P0113 Intake air temperature sensor ● P0117 P0118 Engine coolant temperature sensor ● P0122 P0123 P0222 P0223 P2135 Accelerator pedal position sensor ● P0182 P0183 Fuel pump temperature sensor ● P0192 P0193 Fuel rail pressure sensor ● P0237 P0238 Turbocharger boost sensor ● P0335 P0336 Crankshaft position sensor ● P0340 P0341 Camshaft position sensor ● P0563 Battery voltage ● P0605 P0606 ECM ● P0642 P0643 P0652 P0653 Sensor power supply ● P1260 - P1267 Fuel injector adjustment resistor ● P1610 - P1617 NATS ● P2228 P2229 Barometric pressure sensor
2	● P0089 P0628 P0629 P1272 - P1275 Fuel pump ● P0200 - P0204 P1268 - P1271 P2146 - P2149 Fuel injector ● P0686 ECM relay ● P1212 TCS communication line
3	● P0088 P0093 Fuel system ● P0217 Engine over temperature (OVERHEAT) ● P0234 Turbocharger system ● P0501 P0502 P0503 ASCD vehicle speed sensor ● P0504 ASCD brake switch ● P0580 P0581 ASCD steering switch ● P1211 TCS control unit

Basic Inspection

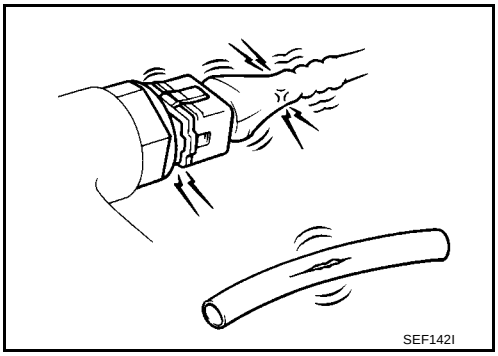
EBS0153A

Precaution:
Perform Basic Inspection without electrical or mechanical loads applied;

- **Headlamp switch is OFF.**
- **On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.**
- **Air conditioner switch is OFF.**
- **Rear defogger switch is OFF.**
- **Steering wheel is in the straight-ahead position, etc.**

1. INSPECTION START

1. Check service records for any recent repairs that may indicate a related incident.
2. Check the current need for scheduled maintenance, especially for fuel filter and air cleaner filter. Refer to MA-7, "PERIODIC MAINTENANCE" .
3. Open engine hood and check the following:
- Harness connectors for improper connections
- Vacuum hoses for splits, kinks, or improper connections
- Wiring for improper connections, pinches, or cuts
4. Start engine and warm it up to the normal operating temperature.


SEF142I

>> GO TO 2.

2. PREPARATION FOR CHECKING IDLE SPEED

With CONSULT-II

Connect CONSULT-II to the data link connector.

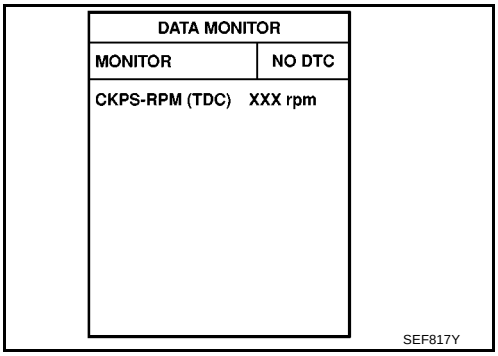
>> GO TO 3.

3. CHECK IDLE SPEED

With CONSULT-II

1. Select “CKPS·RPM (TDC)” in “DATA MONITOR” mode with CONSULT-II.
2. Read idle speed.

725±25 rpm



SEF817Y

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

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. BLEED AIR FROM FUEL SYSTEM

1. Stop engine.
2. Use priming pump to bleed air from fuel system. Refer to EC-368, "AIR BLEEDING" .

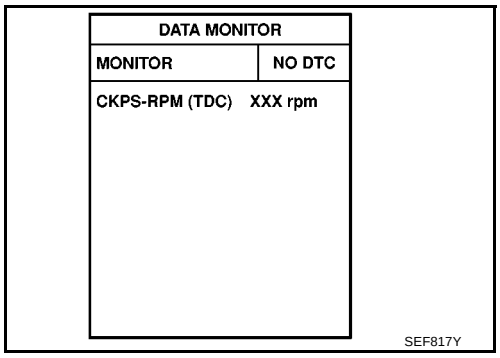
>> GO TO 6.

6. CHECK IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and let it idle.
2. Select “CKPS·RPM (TDC)” in “DATA MONITOR” mode with CONSULT-II.
3. Read idle speed.

725±25 rpm



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. DRAIN WATER FROM FUEL FILTER

Drain water from fuel filter. Refer to EC-368, "WATER DRAINING" .

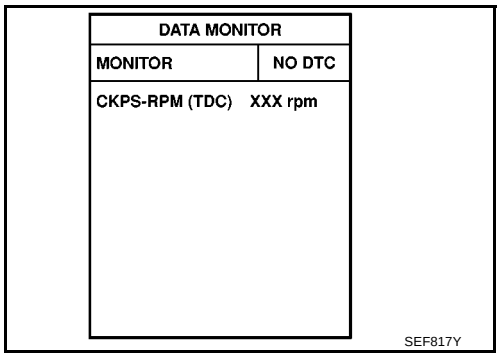
>> GO TO 8.

8. CHECK IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and let it idle.
2. Select “CKPS·RPM (TDC)” in “DATA MONITOR” mode with CONSULT-II.
3. Read idle speed.

725±25 rpm



OK or NG

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

9. CHECK AIR CLEANER FILTER

Check air cleaner filter for clogging or breaks.

OK or NG

OK >> GO TO 10.
NG >> Replace air cleaner filter.

10. CHECK BATTERY VOLTAGE

Check battery voltage.

Voltage: More than 12.13V

OK or NG

OK >> GO TO 12.
NG >> GO TO 11.

11. CHECK BATTERY

Refer to SC-3, "BATTERY" .

OK or NG

OK >> Check charging system. Refer to SC-12 .
NG >> Repair or replace.

12. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-78, "CHECKING COMPRESSION PRESSURE" .

OK or NG

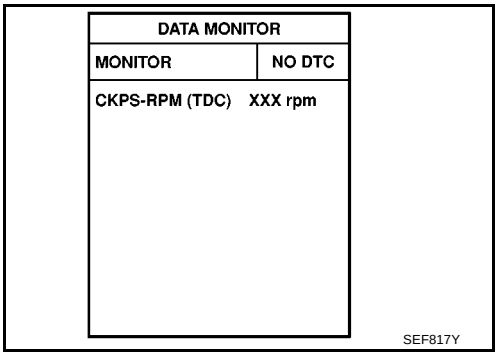
OK >> GO TO 11.
NG >> Follow the instruction of “CHECKING COMPRESSION PRESSURE”.

13. CHECK IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and let it idle.
2. Select “CKPS·RPM (TDC)” in “DATA MONITOR” mode with CONSULT-II.
3. Read idle speed.

725±25 rpm



OK or NG

OK >> **INSPECTION END**
NG >> 1. Replace fuel injector.
2. GO TO 3.

Symptom Matrix Chart

EBS0153B

SYSTEM — Basic engine control system		SYMPTOM: HARD/NO START/RESTART (EXCP. HA)				SYMPTOM: ENGINE STALL			SYMPTOM						Reference page
		NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD	HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING	HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE	LOW IDLE	
Warranty symptom code		AA				AB			AC	AD	AE		AF		
Fuel pump		5	5	5	5	5	5	5	5		5	5		5	—
Fuel injector		3	3	3	3	3	3	3	3	3	4	4	3	3	EC-458
Glow control system		1	1	1	1					1					EC-613
Engine body		3	3	3	3	3	3	3		3	4	4		3	EM-89
EGR system											3	3			EC-620
Air cleaner and duct											3	3			EM-15
Fuel rail pressure relief valve															EC-425
ENGINE CONTROL	Fuel pump circuit	4	4	4	4	4	4	4	4		4	4		4	EC-543
	Fuel injector circuit	1	1	1	1	1	1	1	1	1	1	1	1	1	EC-458
	Mass air flow sensor circuit								1		1	1			EC-428
	Engine coolant temperature circuit			1		1		1						1	EC-437
	Vehicle speed signal circuit											1			LAN-5
	Accelerator pedal position sensor circuit								1		1	1			EC-442, EC-478, EC-594
	Fuel rail pressure sensor circuit														EC-452

SYSTEM — Basic engine control system		SYMPTOM: HARD/NO START/RESTART (EXCP. HA)				SYMPTOM: ENGINE STALL			SYMPTOM						Reference page
		NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD	HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING	HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE	LOW IDLE	
Warranty symptom code		AA				AB			AC	AD	AE		AF		
ENGINE CONTROL	Crankshaft position sensor circuit		1	1	1	1	1	1	1	1	1	1			EC-495
	Camshaft position sensor circuit			3	3										EC-506
	Turbocharger boost sensor circuit								1		1	1			EC-490
	Turbocharger boost control solenoid valve circuit								1		1	1			EC-627
	Start signal circuit	1	1	1	1	1		1	1		1	1			EC-646
	Ignition switch circuit		1			1	1	1							EC-409
	Power supply for ECM circuit		1			1	1	1							EC-409
	Cooling fan relay circuit														EC-464
	EGR volume control valve circuit								1		1	1			EC-620
	Glow relay circuit	1	1	1	1										EC-613
	ECM relay (Self-shutoff) circuit		1				1	1	1						EC-558
	ECM, connector circuit	2	2	2	2	2	2	2	2	2	2	2	2	2	EC-539, EC-541
NATS (Nissan Anti-theft System)			1												EC-371

1 - 5: The numbers refer to the order of inspection.

(continued on next page)

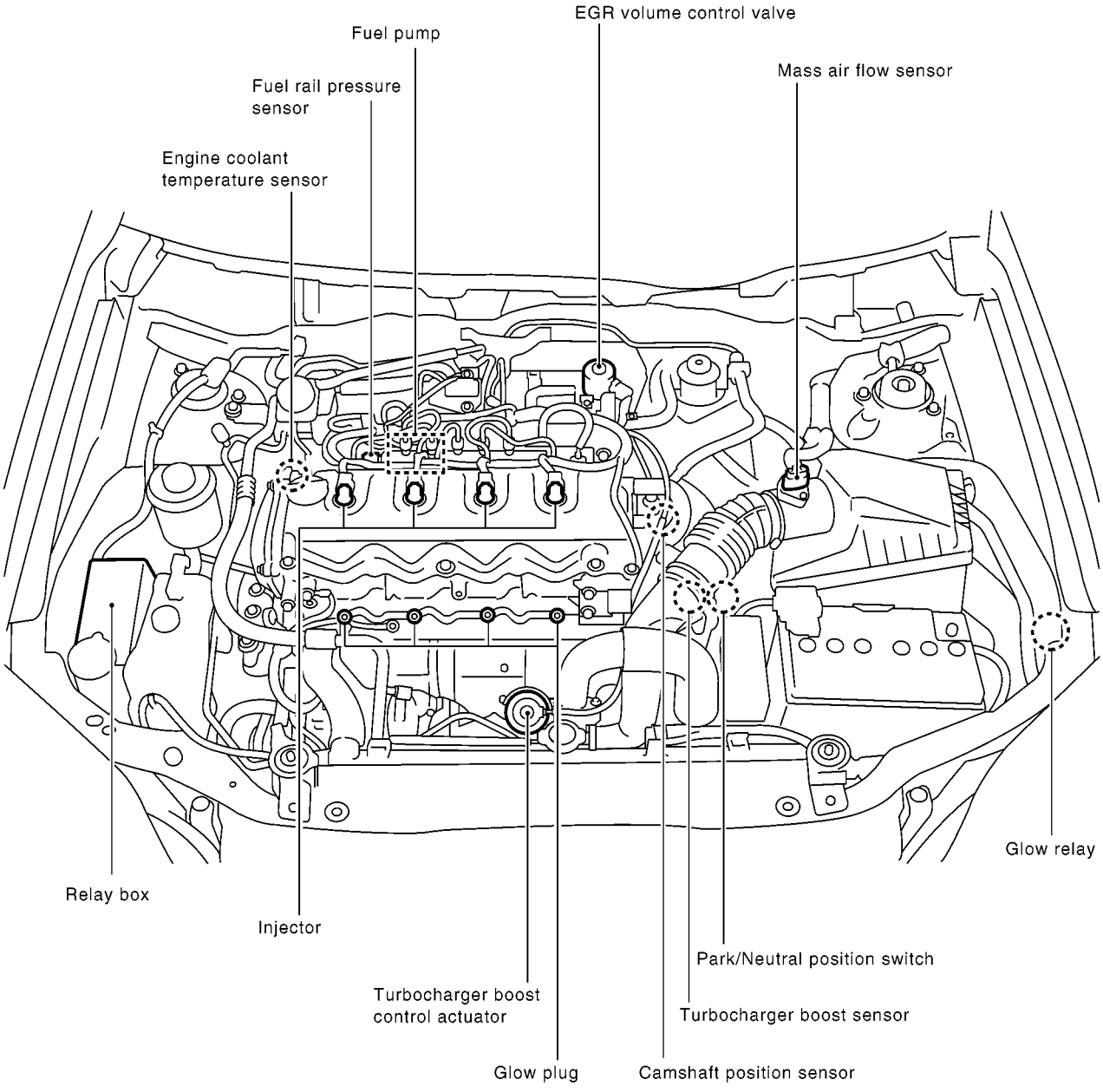
SYSTEM — Basic engine control system		SYMPTOM											Reference page
		ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEAT/HIGH ENGINE COOLANT TEMPERATURE	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	ABNORMAL SMOKE COLOR		DEAD BATTERY (UNDER CHARGE)	Malfunction indicator illuminates.	Can be detected by CONSULT-II?	
								BLACK SMOKE	WHITE SMOKE				
Warranty symptom code		AG	AH	AJ	AK	AL	AM	AP		HA			
Fuel pump		5	5	5		5					1	1	—
Fuel injector		3	3	3		4		4	4		1	1	EC-458
Glow control system									1				EC-613
Engine body			3	3	3	3	1		3				EM-89
EGR system								3					EC-620
Air cleaner and duct								3					EM-15
Fuel rail pressure relief valve													EC-425
ENGINE CONTROL	Fuel pump circuit	4	4	4		4					1	1	EC-543
	Fuel injector circuit	1	1	1		1		1	1		1	1	EC-458
	Mass air flow sensor circuit							1			1	1	EC-428
	Engine coolant temperature circuit	1	1		1						1	1	EC-437
	Vehicle speed signal circuit										1	1	LAN-5
	Accelerator pedal position sensor circuit			1							1	1	EC-442, EC-478, EC-594
	Fuel rail pressure sensor circuit										1	1	EC-452

SYSTEM — Basic engine control system		SYMPTOM											Reference page
		ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEAT/HIGH ENGINE COOLANT TEMPERATURE	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	ABNORMAL SMOKE COLOR		DEAD BATTERY (UNDER CHARGE)	Malfunction indicator illuminates.	Can be detected by CONSULT-II?	
								BLACK SMOKE	WHITE SMOKE				
Warranty symptom code		AG	AH	AJ	AK	AL	AM	AP		HA			
ENGINE CONTROL	Crankshaft position sensor circuit	1	1								1	1	EC-495
	Camshaft position sensor circuit										1	1	EC-506
	Turbocharger boost sensor circuit										1	1	EC-490
	Turbocharger boost control solenoid valve circuit							1	1				EC-627
	Start signal circuit												EC-646
	Ignition switch circuit												EC-409
	Power supply for ECM circuit										1	1	EC-409
	Cooling fan relay circuit				2								EC-464
	EGR volume control valve circuit							1					EC-620
	Glow relay circuit								1				EC-613
	ECM relay (Self-shutoff) circuit											1	EC-558
	ECM, connector circuit	2	2	2	2	2	2	2	2	2	2	2	EC-539, EC-541
NATS (Nissan Anti-theft System)												1	EC-371

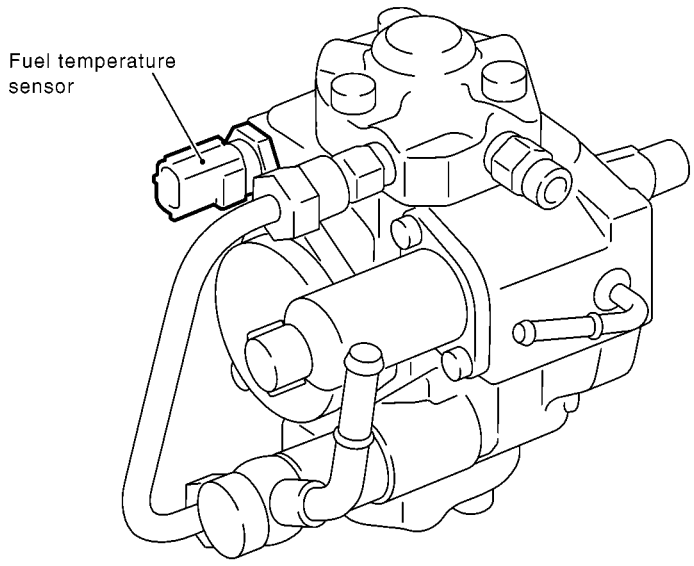
1 - 5: The numbers refer to the order of inspection.

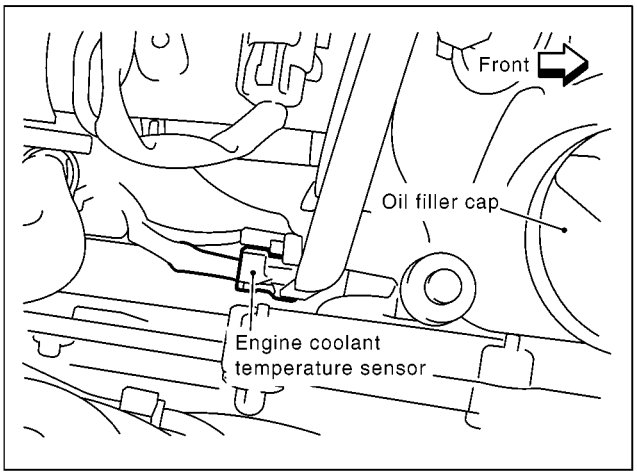
Engine Control Component Parts Location

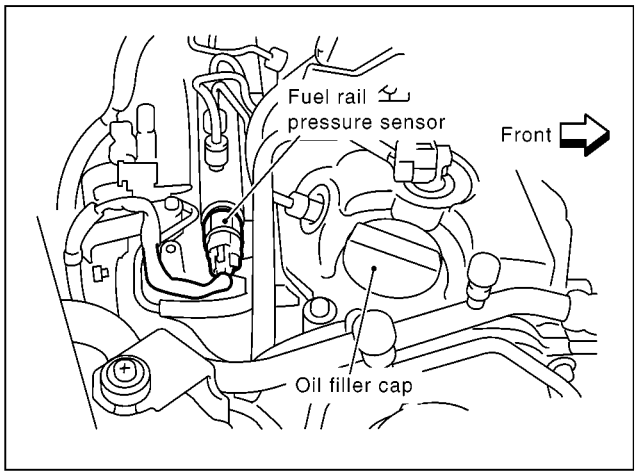
EBS0153C

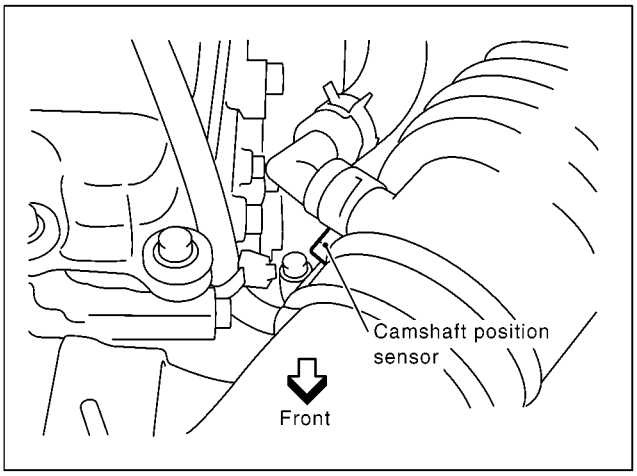


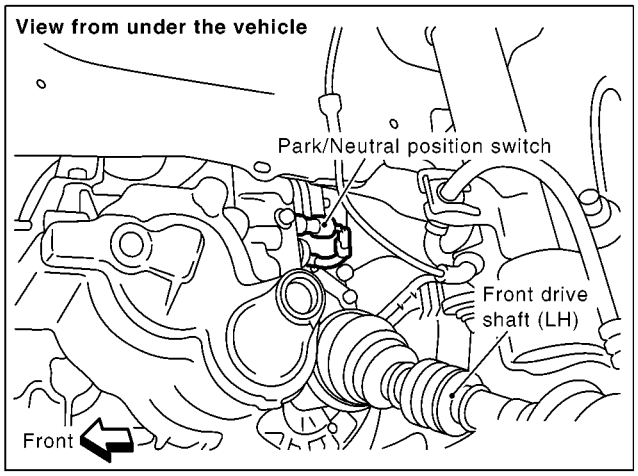
MBIB1089E


Fuel temperature sensor

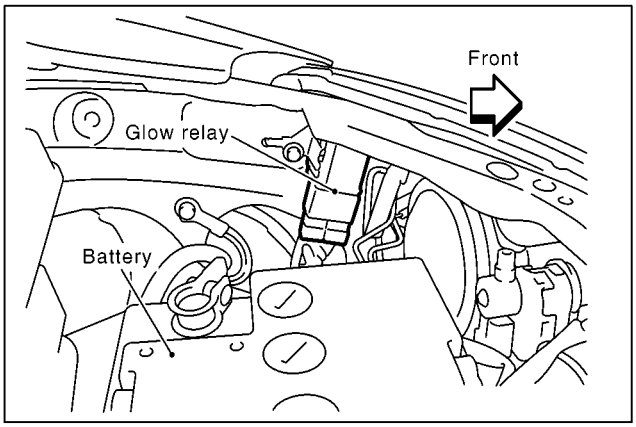

Front
Oil filler cap
Engine coolant temperature sensor

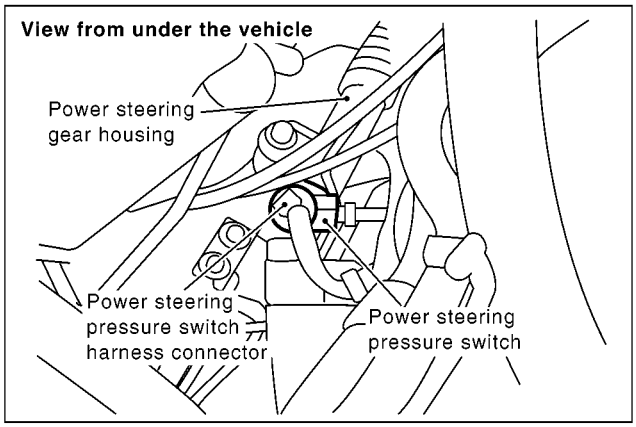

Fuel rail pressure sensor
Front
Oil filler cap

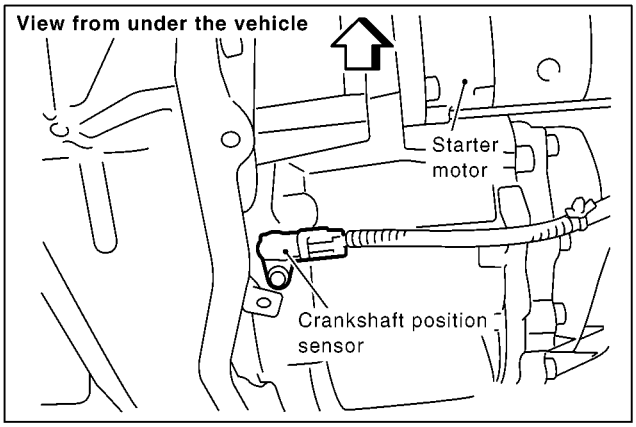

Camshaft position sensor
Front

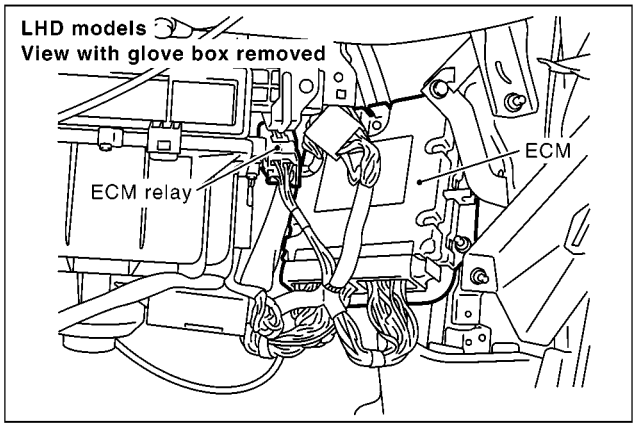

View from under the vehicle
Park/Neutral position switch
Front drive shaft (LH)
Front

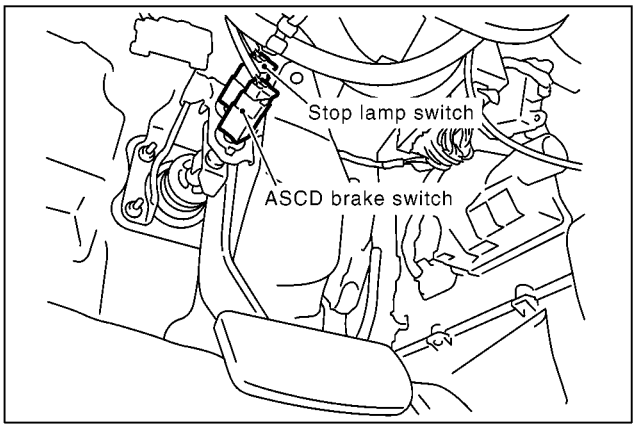
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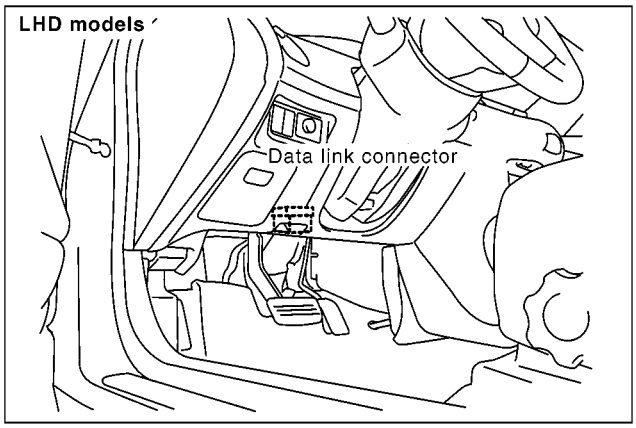

Front
Glow relay
Battery

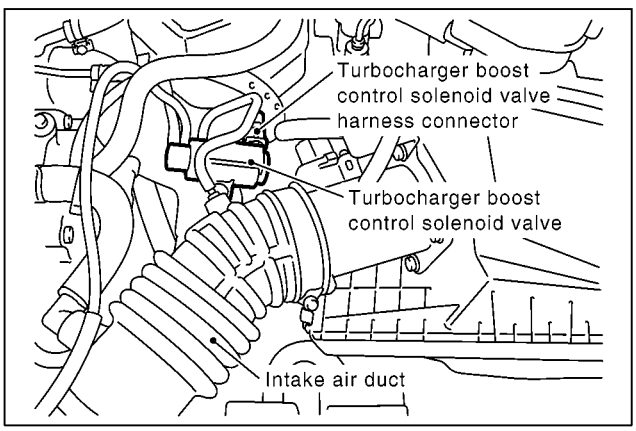

View from under the vehicle
Power steering gear housing
Power steering pressure switch harness connector
Power steering pressure switch

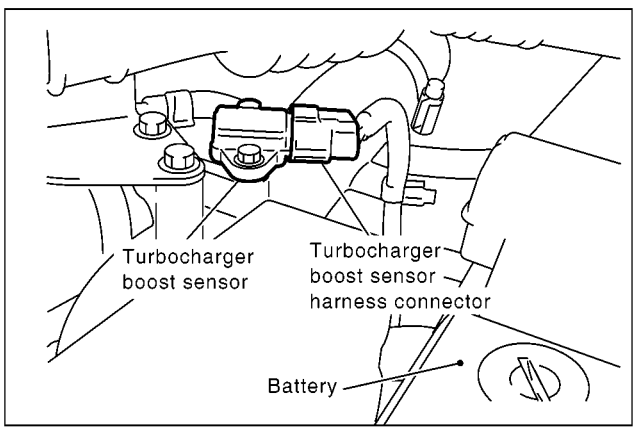

View from under the vehicle
Starter motor
Crankshaft position sensor


LHD models
View with glove box removed
ECM relay
ECM


Stop lamp switch
ASCD brake switch


LHD models
Data link connector

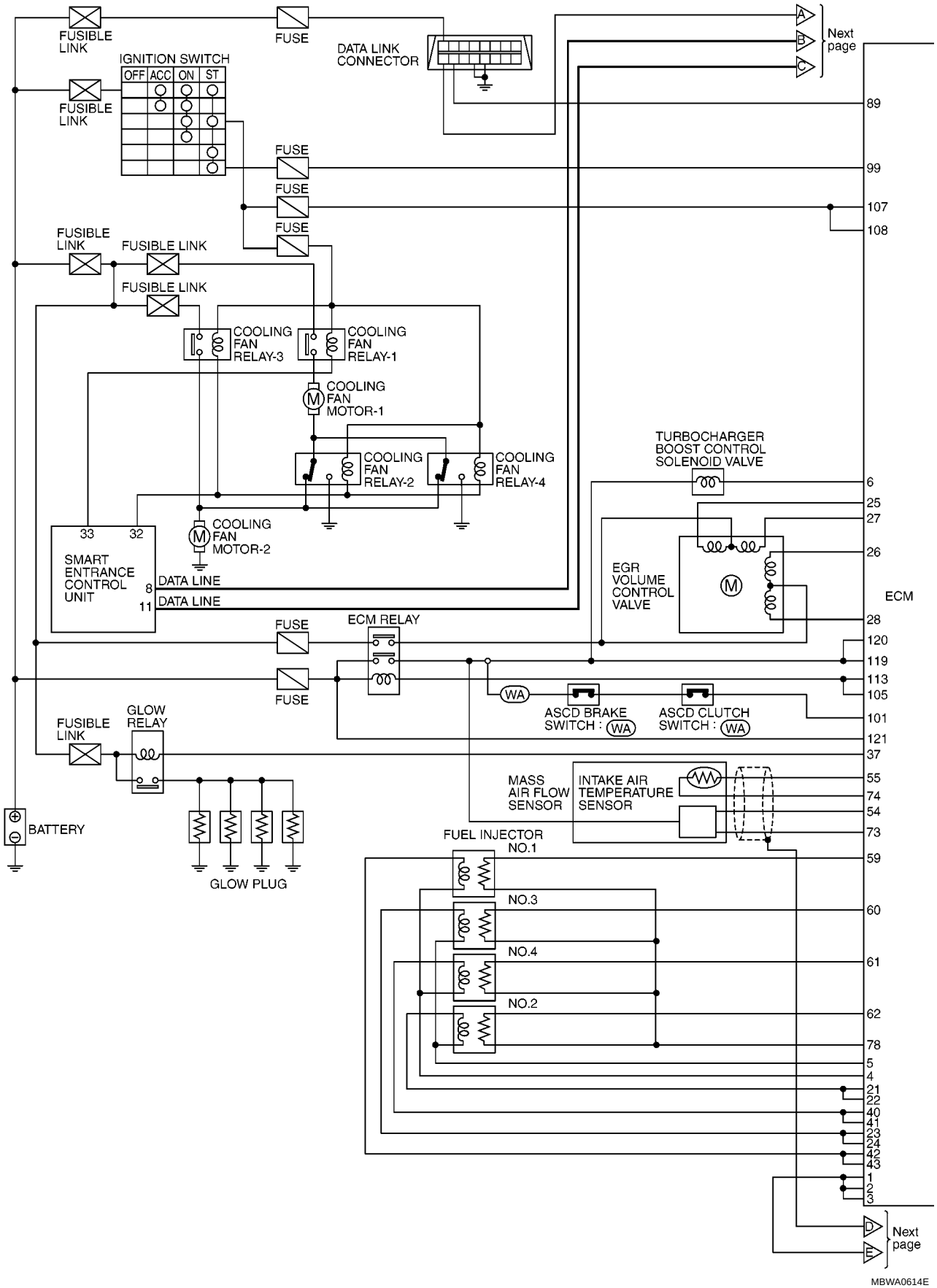

Turbocharger boost control solenoid valve harness connector
Turbocharger boost control solenoid valve
Intake air duct

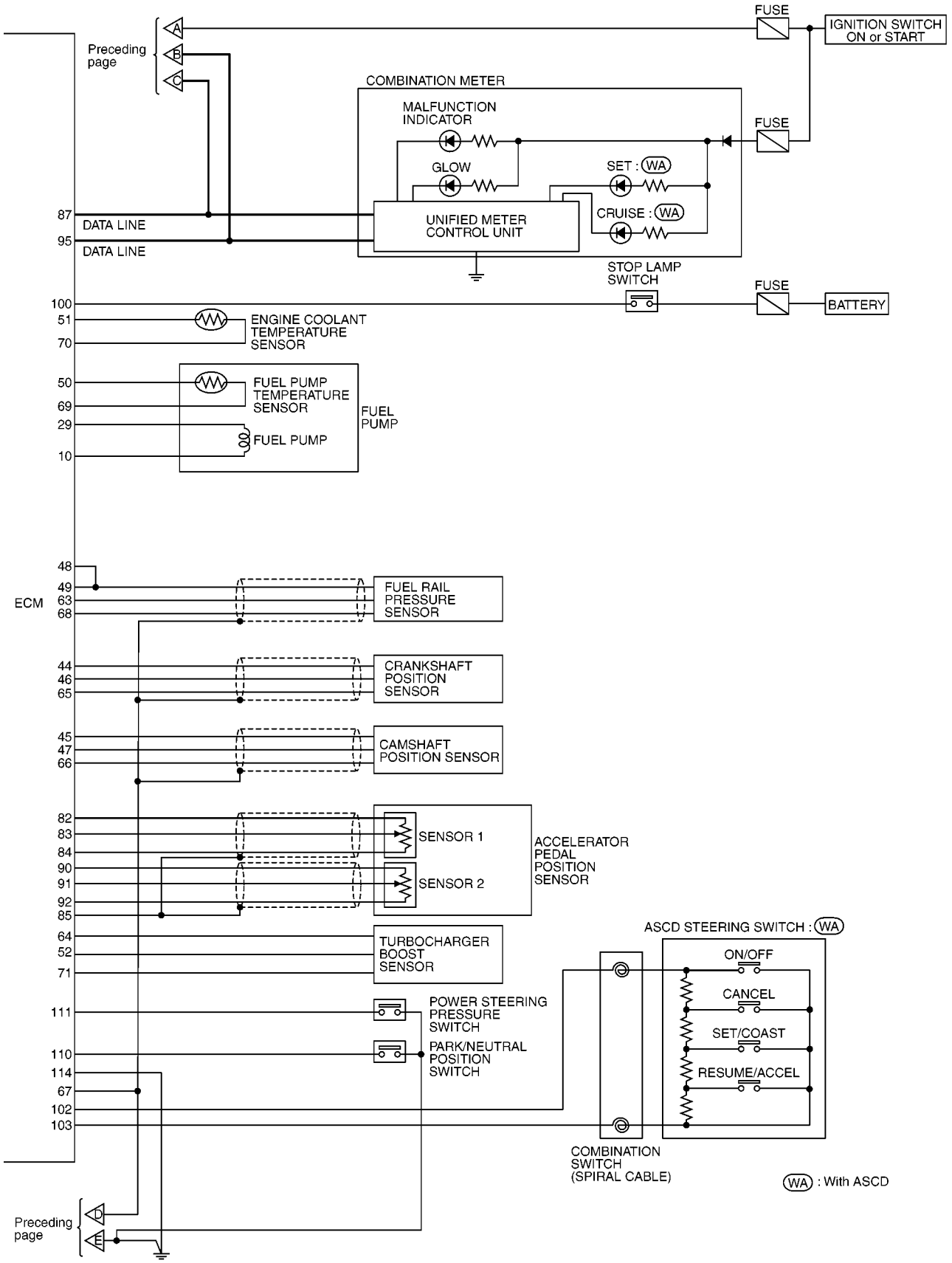

Turbocharger boost sensor
Turbocharger boost sensor harness connector
Battery

MBIB1091E

Circuit Diagram

EBS0153D

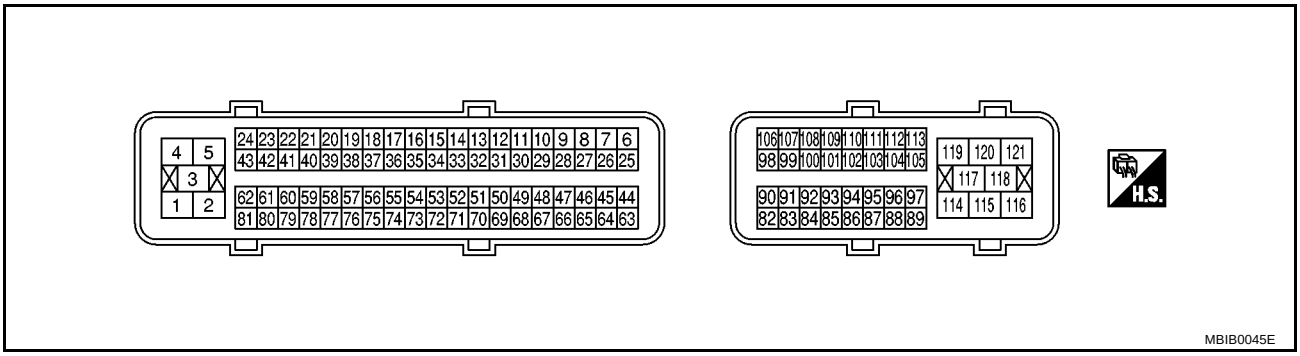



FUSE
IGNITION SWITCH ON or START
Preceding page
A
B
C
COMBINATION METER
MALFUNCTION INDICATOR
FUSE
GLOW
SET : WA
CRUISE : WA
87
DATA LINE
95
DATA LINE
UNIFIED METER CONTROL UNIT
STOP LAMP SWITCH
FUSE
100
BATTERY
51
70
ENGINE COOLANT TEMPERATURE SENSOR
50
69
29
10
FUEL PUMP TEMPERATURE SENSOR
FUEL PUMP
FUEL PUMP
48
49
63
68
ECM
FUEL RAIL PRESSURE SENSOR
44
46
65
CRANKSHAFT POSITION SENSOR
45
47
66
CAMSHAFT POSITION SENSOR
82
83
84
90
91
92
85
SENSOR 1
SENSOR 2
ACCELERATOR PEDAL POSITION SENSOR
ASCD STEERING SWITCH : WA
ON/OFF
CANCEL
SET/COAST
RESUME/ACCEL
64
52
71
TURBOCHARGER BOOST SENSOR
111
POWER STEERING PRESSURE SWITCH
110
PARK/NEUTRAL POSITION SWITCH
114
67
102
103
COMBINATION SWITCH (SPIRAL CABLE)
WA : With ASCD
Preceding page
D
E

MBWA0613E

ECM Harness Connector Terminal Layout

EBS0153E

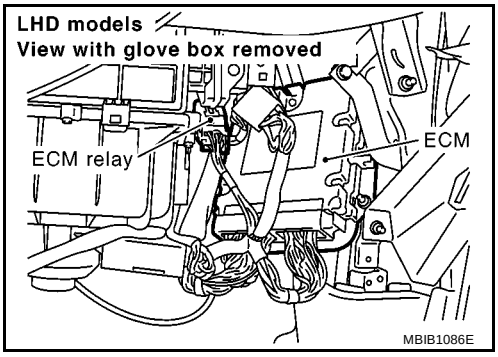


ECM Terminals And Reference Value

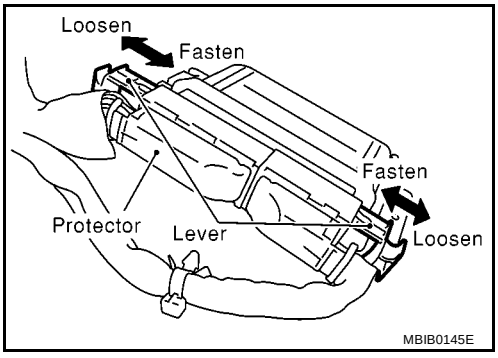
EBS0153F

PREPARATION

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



3. When disconnecting ECM harness connector, loosen it with levers as far as they will go as shown in the figure.
4. Connect a break-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.
   - Use extreme care not to touch 2 pins at one time.
   - Data is for comparison and may not be exact.



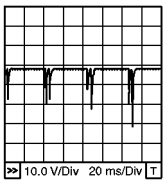
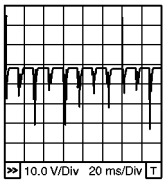
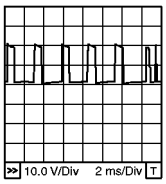
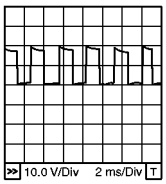
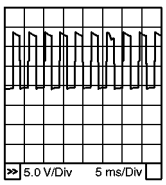
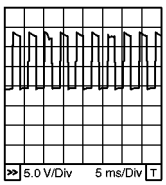
ECM INSPECTION TABLE

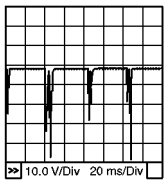
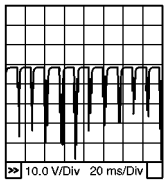
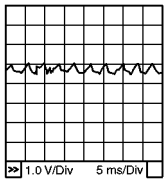
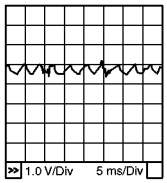
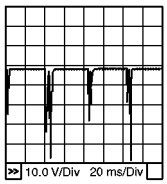
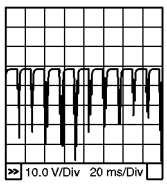
Remarks: Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

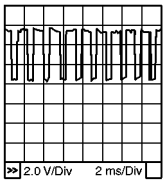
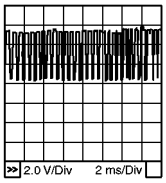
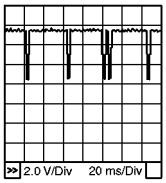
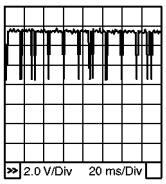
CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
1 2 3	B B B	ECM ground	**[Engine is running]** ● Idle speed	Approximately 0V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
4 5	O/B B	Fuel injector power supply (For cylinder No. 1 and 4) Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E
6	L	Turbocharger boost control solenoid valve	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0889E
			[Ignition switch ON] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0890E
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
25 26 27 28	GY W/L OR/B GY/B	EGR volume control valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.1 - 14V (Voltage signals of each ECM terminals differ according to the control position of EGR volume control valve.)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E
37	R/G	Glow relay	Refer to EC-613, "GLOW CONTROL SYSTEM" .	
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
44	L	Crankshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
45	R	Camshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
46	L/W	Crankshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0879E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0880E
47	B	Camshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0877E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0878E
48 49	R R	Fuel rail pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.7 - 2.0V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.0 - 2.3V
50	PU	Fuel pump temperature sensor	**[Engine is running]** ● **Warm-up condition**	Approximately 0.3 - 5.3V Output voltage varies with fuel pump temperature
51	L/OR	Engine coolant temperature sensor	**[Engine is running]** ● **Warm-up condition**	Approximately 0.3 - 5.3V Output voltage varies with engine coolant temperature

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
52	Y	Turbocharger boost sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	2.3 - 2.6V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.5 - 2.8V
54	W	Mass air flow sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.8 - 2.3V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.5 - 3.0V
55	G	Intake air temperature sensor	**[Engine is running]** ● **Warm-up condition**	Approximately 0.3 - 5.2V Output voltage varies with intake air temperature
59	L/G	Fuel injector adjustment resistor No. 1	**[Ignition switch ON]**	0.5 - 5.1V (There are individual differences between fuel injector adjustment resistors.)
60	L/R	Fuel injector adjustment resistor No. 3		
61	R/Y	Fuel injector adjustment resistor No. 4		
62	LG/W	Fuel injector adjustment resistor No. 2		
63	W	Fuel rail pressure sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
64	W	Turbocharger boost sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
65	L/R	Crankshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
66	W	Camshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
68	B	Fuel rail pressure sensor ground	**[Ignition switch ON]**	Approximately 0.3V
69	B	Fuel pump temperature sensor ground	**[Ignition switch ON]**	Approximately 0.3V
70	B	Engine coolant temperature sensor ground	**[Ignition switch ON]**	Approximately 0.3V
71	B	Turbocharger boost sensor ground	**[Ignition switch ON]**	Approximately 0.3V
73	B	Mass air flow sensor ground	**[Ignition switch ON]**	Approximately 0.3V
74	R	Intake air temperature sensor ground	**[Ignition switch ON]**	Approximately 0.3V
78	R	Fuel injector adjustment resistor ground	**[Ignition switch ON]**	Approximately 0.3V
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
87	R	CAN communication line	**[Ignition switch ON]**	Approximately 2.0 - 2.6V Output voltage varies with the communication status.
89	LG/W	Data link connector	**[Ignition switch ON]** ● CONSULT-II is disconnected.	Approximately 0V - Battery voltage (11 - 14V)
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V
95	L	CAN communication line	**[Ignition switch ON]**	Approximately 2.6 - 3.2V Output voltage varies with the communication status.
99	B/Y	Start signal	**[Ignition switch ON]**	Approximately 0.3V
			[Ignition switch START]	BATTERY VOLTAGE (11 - 14V)
100	R/G	Stop lamp switch	**[Ignition switch ON]** ● Brake pedal fully released	Approximately 0V
			[Ignition switch ON] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
101	L/Y	ASCD brake switch	**[Ignition switch ON]** ● Brake pedal and clutch pedal fully released	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON] ● Brake pedal and/or clutch pedal depressed	Approximately 0V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
102	PU	ASCD steering switch	**[Ignition switch ON]** ● ASCD steering switch is OFF	Approximately 4.3V
			[Ignition switch ON] ● ON/OFF switch is ON.	Approximately 0.3V
			[Ignition switch ON] ● CANCEL switch is ON.	Approximately 1.3V
			[Ignition switch ON] ● SET/COAST switch is ON.	Approximately 2.3V
			[Ignition switch ON] ● RESUME/ACCEL switch is ON.	Approximately 3.3V
103	B	ASCD steering switch ground	**[Ignition switch ON]**	Approximately 0.3V
105	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
107 108	W/R W/R	Ignition switch	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
110	G/OR	Park/Neutral position switch	**[Ignition switch ON]** ● Gear position is Neutral	Approximately 0V
			[Ignition switch ON] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)
111	R/B	Power steering 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)
113	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
114	B	ECM ground	**[Engine is running]** ● Idle speed	Approximately 0V
119 120	R R	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
121	W/L	Power supply for ECM (Back-up)	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)

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

CONSULT-II Function

EBS0153G

FUNCTION

Diagnostic test mode	Function
Self-diagnostic results	Self-diagnostic results such as DTC and freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.

Diagnostic test mode	Function
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.
ECM part number	ECM part number can be read.

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

- Diagnostic trouble codes
- Freeze frame data

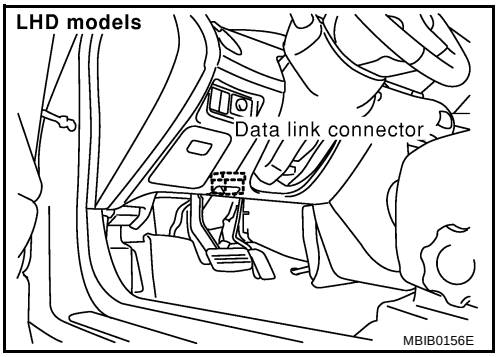
ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item			DIAGNOSTIC TEST MODE			
			SELF-DIAG RESULTS		DATA MON-ITOR	ACTIVE TEST
			DTC	FREEZE FRAME DATA		
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor	×	×	×	
		Camshaft position sensor	×			
		Engine coolant temperature sensor	×	×	×	×
		Vehicle speed sensor	×	×	×	
		Fuel pump temperature sensor	×		×	
		Accelerator pedal position sensor 1	×		×	
		Accelerator pedal position sensor 2	×		×	
		Fuel rail pressure sensor	×		×	
		Mass air flow sensor	×		×	
		Intake air temperature sensor	×			
		Turbocharger boost sensor	×	×	×	
		Battery voltage	×		×	
		Park/neutral position (PNP) switch			×	
		Power steering pressure switch			×	
		Stop lamp switch	×		×	
		Barometric pressure sensor (built-into ECM)	×		×	
		Fuel injector adjustment resistor	×			
		ASCD steering switch	×		×	
		ASCD brake switch	×		×	
		ASCD clutch switch	×		×	
	OUTPUT	Fuel pump	×		×	×
		Fuel injector	×		×	×
		Glow relay			×	×
		Cooling fan relay	×		×	×
		EGR volume control valve			×	×

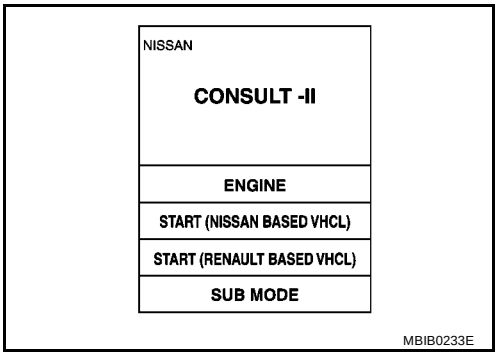
X: Applicable

INSPECTION PROCEDURE

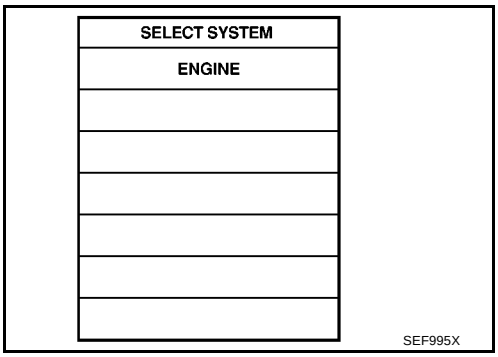
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located under the driver side dash panel.
3. Turn ignition switch ON.



4. Touch “START (NISSAN BASED VHCL)”.

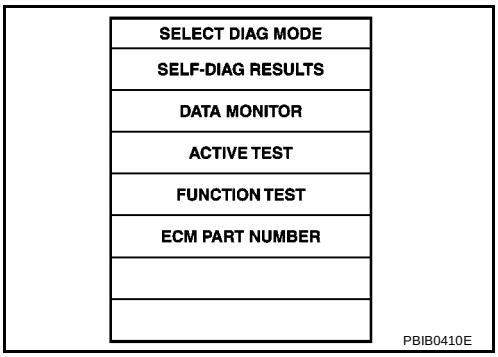


5. Touch “ENGINE”.
   If “ENGINE” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit/For YD Engine Models" .



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

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



SELF-DIAGNOSTIC MODE

Self Diagnostic Item

Regarding items detected in “SELF-DIAG RESULTS” mode, refer to — EC-351, "INDEX FOR DTC" .

Freeze Frame Data

Freeze frame data item	Description
DIAG TROUBLE CODE [PXXXX]	● The engine control component part/control system has a trouble code, it is displayed as “PXXXX”. (Refer to EC-351, "INDEX FOR DTC" .)
CAL/LD VALUE [%]	● The calculated load value at the moment a malfunction is detected is displayed.

Freeze frame data item	Description
COOLANT TEMP [°C] or [°F]	● The engine coolant temperature at the moment a malfunction is detected is displayed.
ENGINE SPEED [rpm]	● The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	● The vehicle speed at the moment a malfunction is detected is displayed.
INT MANI PRES [kPa]	● The intake manifold pressure at the moment a malfunction is detected is displayed.

DATA MONITOR MODE

MONITOR ITEM	ECM INPUT SIG-NAL	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	CONDITION	SPECIFICATION
CKPS·RPM (TDC) [rpm]	×	×		● The engine speed computed from the crankshaft position sensor signal is displayed.	
COOLAN TEMP/S [°C] or [°F]	×	×		● The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	When the engine coolant temperature circuit is open or short, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
VHCL SPEED SE [km/h] or [mph]	×	×		● The vehicle speed computed form the vehicle speed sensor signal is displayed.	
FUEL TEMP SEN [°C] or [°F]	×	×		● The fuel temperature (determined by the signal voltage of the fuel pump temperature sensor) is displayed.	
ACCEL POS SEN [V]	×	×		● The accelerator pedal position sensor 1 signal voltage is displayed.	
ACCEL SEN 2 [V]	×	×		● The accelerator pedal position sensor 2 signal voltage is displayed.	
ACT CR PRESS [MPa]	×	×		● The Fuel rail pressure (determined by the signal voltage of the fuel rail pressure sensor) is displayed.	
BATTERY VOLT [V]	×	×		● The power supply voltage of ECM is displayed.	
P/N POSI SW [ON/OFF]	×	×		● Indicates [ON/OFF] condition from the park/neutral position switch signal.	
START SIGNAL [ON/OFF]	×	×		● indicates [ON/OFF] condition from the starter signal.	
PW/ST SIGNAL [ON/OFF]	×			● indicates [ON/OFF] condition from the power steering pressure switch signal.	[OFF] is always displayed for models without power steering pressure switch.
BRAKE SW [ON/OFF]	×	×		● indicates [ON/OFF] condition from the stop lamp switch signal.	
BRAKE SW2 [ON/OFF]	×	×		● indicates [ON/OFF] condition from the ASCD brake switch and ASCD clutch switch signal.	
IGN SW [ON/OFF]	×	×		● Indicates [ON/OFF] condition from ignition switch signal.	

MONITOR ITEM	ECM INPUT SIG-NAL	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	CONDITION	SPECIFICATION
MAS AIR/FL SE [V]	×	×		● The signal voltage of the mass air flow sensor is displayed.	
MAIN INJ WID [msec]		×		● Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	
PUMP CURRENT [mA]		×		● Indicates the fuel pump power supply current from the ECM.	
GLOW RLY [ON/OFF]		×		● The glow relay control condition (determined by ECM according to the input signal) is displayed.	
COOLING FAN [LOW/HI/OFF]		×		● Indicates the control condition of the cooling fans (determined by ECM according to the input signal). LOW ... Operates at low speed. HI ... Operates at high speed. OFF ... Stopped	
EGR VOL CON/V [step]		×		● Indicates the EGR volume control value computed by the ECM according to the input signals. ● The opening becomes larger as the value increases.	
INT/A VOLUME [mg/]				● The intake air volume computed from the mass air flow sensor signal is displayed.	
BARO SEN [kPa]	×	×		● The barometric pressure (determined by the signal voltage from the absolute pressure sensor built into the ECM) is displayed.	
INT/M PRES SE [kPa]				● Turbocharger boost (determined by the signal voltage from the turbocharger boost sensor) is displayed.	
CYL COUNT [1/2/3/4]				● The cylinder being injected is displayed. 1 ... Cylinder No.1 is injected. 2 ... Cylinder No.2 is injected. 3 ... Cylinder No.3 is injected. 4 ... Cylinder No.4 is injected.	
SET SW [ON/OFF]	×			● Indicates [ON/OFF] condition from SET/COAST switch signal.	
RESUME/ACC SW [ON/OFF]	×			● Indicates [ON/OFF] condition from RESUME/ACCEL switch signal.	
CANCEL SW [ON/OFF]	×			● Indicates [ON/OFF] condition from CANCEL switch signal.	
MAIN SW [ON/OFF]	×			● Indicates [ON/OFF] condition from ON/OFF switch signal.	

MONITOR ITEM	ECM INPUT SIG-NAL	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	CONDITION	SPECIFICATION
Voltage [V]				Voltage, frequency, duty cycle or pulse width measured by the probe.	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. [Hz] or [%]
Frequency [msec], [Hz] or [%]					
DUTY-HI					
DUTY-LOW					
PLS WIDTH-HI					
PLS WIDTH-LOW					
CAN COMM [OK/NG]			×	● Indicates the communication condition of CAN communication line.	● 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.

ACTIVE TEST MODE

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
POWER BALANCE	● 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.	● Harness and connectors ● Compression ● Fuel injector
COOLING FAN *	● Ignition switch: ON ● Operate the cooling fan at LOW, HI speed and turn OFF using CONSULT-II.	Cooling fan moves at LOW, HI speed and stops.	● Harness and connector ● Cooling fan motor ● Cooling fan relay
ENG COOLANT TEMP	● Engine: Return to the original trouble condition ● Change the engine coolant temperature using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Engine coolant temperature sensor ● Fuel injector
GLOW RLY	● Ignition switch: ON (Engine stopped) ● Turn the glow relay ON and OFF using CONSULT-II and listen to operating sound.	Glow relay makes the operating sound.	● Harness and connector ● Glow relay

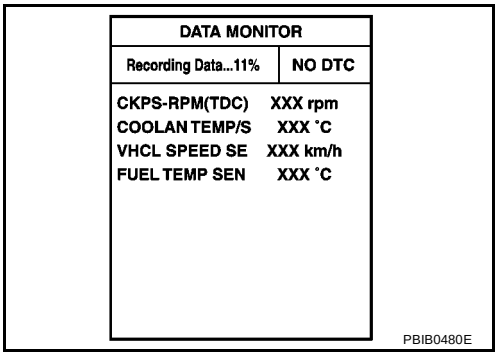
TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
EGR VOL CONT/V	● Ignition switch: ON ● Change EGR volume control valve opening step using CONSULT-II.	EGR volume control valve makes an operating sound.	● Harness and connector ● EGR volume control valve
PRES REGULATOR	● Ignition switch: ON ● Change fuel rail pressure using CONSULT-II	Fuel leaks.	● Fuel line ● Fuel pressure relief valve
PUMP LEANT CLEAR	● This mode is used for performing Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .		

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

REAL TIME DIAGNOSIS IN DATA MONITOR MODE

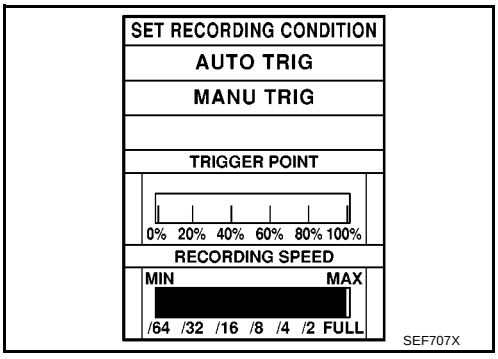
CONSULT-II has two kinds of triggers and they can be selected by touching “SETTING” in “DATA MONITOR” mode.

1. “AUTO TRIG” (Automatic trigger):



– The malfunction will be identified on the CONSULT-II screen in real time.
In other words, DTC 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 in the figure, 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 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.

Use these triggers as follows:

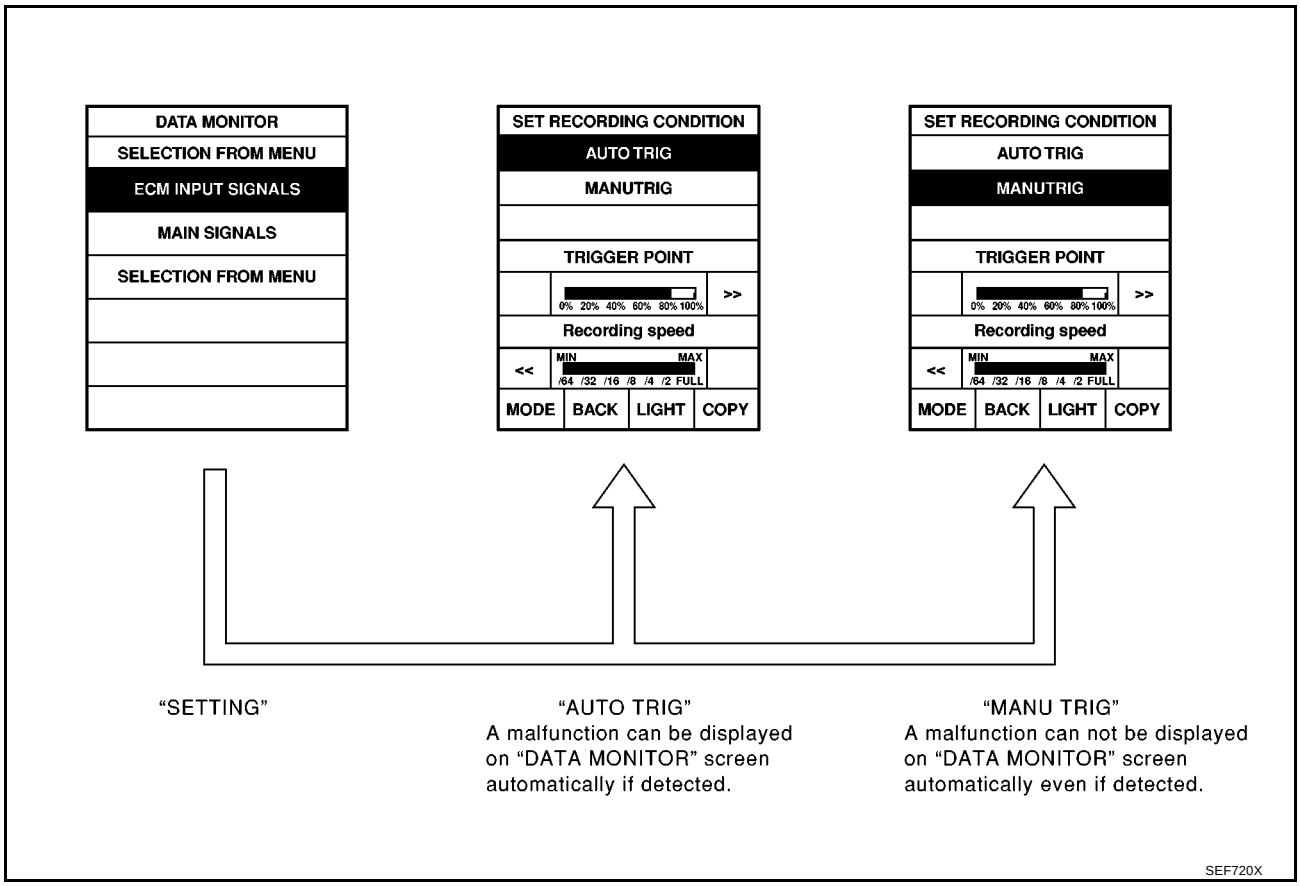
1. “AUTO TRIG”

– While trying to detect the 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 will be displayed. Refer to GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" , “INCIDENT SIMULATION TESTS”.

2. “MANU TRIG”

– If the malfunction is displayed as soon as “DATA MONITOR” is selected, reset CONSULT-II to “MANU TRIG”. By selecting “MANU TRIG” you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



FUNCTION TEST

This mode is used to inform customers of their vehicle condition of periodic maintenance.

CONSULT-II Reference Value in Data Monitor Mode

EBS0153I

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.

MONITOR ITEM	CONDITION		SPECIFICATION
CKPS-RPM (TDC)	● Run engine and compare CONSULT-II value with the tachometer indication.		Almost the same speed as the tachometer indication
COOLAN TEMP/S	● Engine: After warming up		More than 70°C (158°F)
VHCL SPEED SE	● Turn drive wheels and compare CONSULT-II value with the speedometer indication		Almost the same speed as the speedometer indication
FUEL TEMP SEN	● Engine: After warming up		More than 40°C (104°F)
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V
MAS AIR/FL SE*	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1.5 - 2.0V
		2,000 rpm	2.2 - 2.7V
BATTERY VOLT	● Ignition switch: ON (Engine stopped)		11 - 14V

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: Neutral position	ON
		Except above	OFF
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → 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
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
BRAKE SW2	● Ignition switch: ON	Brake pedal and clutch pedal: Fully released	OFF
		Brake pedal and/or clutch pedal: Slightly depressed	ON
IGN SW	● Ignition switch: ON → OFF		ON → OFF
ACT CR PRESS	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	20 - 30 MPa
		2,000 rpm	45 - 55 MPa
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec
GLOW RLY	Refer to EC-613, "GLOW CONTROL SYSTEM" .		
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA
COOLING FAN	● When cooling fan is stopped.		OFF
	● When cooling fans operate at low speed.		LOW
	● When cooling fans operate at high speed.		HI
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	After 1 minute at idle	More than 10 steps
		Revving engine from idle to 3,600 rpm	0 step
INT/A VOLUME	● Engine: After warming up, idle the engine		150 - 450 mg/st
INT/M PRES SE [kPa]	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	Approx. 100 kPa
		2,800 rpm	Approx. 126 kPa
		4,000 rpm	Approx. 106 kPa
BARO SEN	● Ignition switch: ON		Altitude Approx. 0m: Approx. 100.62 kPa (1.0062 bar, 1.026 kg/cm^2 , 14.59 psi) Approx. 1,000 m: Approx. 88.95 kPa (0.8895 bar, 0.907 kg/cm^2 , 12.90 psi) Approx. 1,500 m: Approx. 83.16 kPa (0.8316 bar, 0.848 kg/cm^2 , 12.06 psi) Approx. 2,000 m: Approx. 78.36 kPa (0.7836 bar, 0.799 kg/cm^2 , 11.36 psi)

MONITOR ITEM	CONDITION		SPECIFICATION
CYL COUNT	● Engine is running		1 → 3 → 4 → 2
SET SW	● Ignition switch: ON	SET/COAST switch: Released	OFF
		SET/COAST switch: Pressed	ON
RESUME/ACC SW	● Ignition switch: ON	RESUME/ACCEL switch: Released	OFF
		RESUME/ACCEL switch: Pressed	ON
CANCEL SW	● Ignition switch: ON	CANCEL switch: Released	OFF
		CANCEL switch: Pressed	ON
MAIN SW	● Ignition switch: ON	ON/OFF switch: Released	OFF
		ON/OFF switch: Pressed	ON

NOTE:
Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.
*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

Major Sensor Reference Graph in Data Monitor Mode

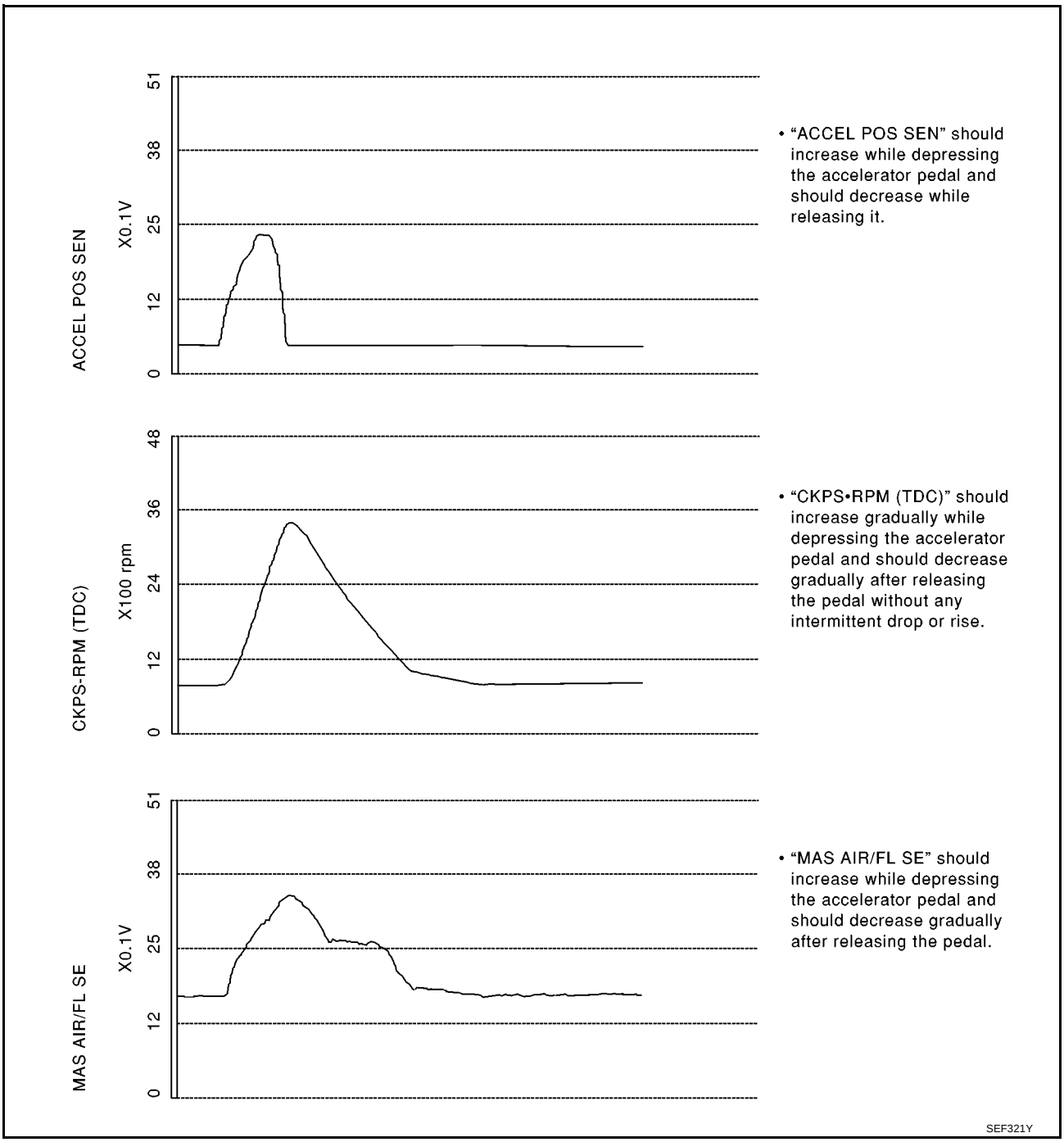
EBS0153J

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

ACCEL POS SEN, “CKPS·RPM (TDC)”, “MAS AIR/FL SE”

Below is the data for “ACCEL POS SEN”, “CKPS·RPM (TDC)” and “MAS AIR/FL SE” when revving engine quickly up to 3,000 rpm under no load after warming up engine to the normal operating temperature.

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



TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

Description

EBS0153K

Intermittent incidents (I/I) may occur. In many cases, the incident resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on DTC 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 malfunctioning 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”.
III	The symptom described by the customer does not recur.
IV	DTC does not appear during the DTC Confirmation Procedure.
VI	The Diagnostic Procedure for XXXX does not indicate the malfunctioning area.

Diagnostic Procedure

EBS0153L

1. INSPECTION START

Erase DTCs. Refer to EC-370, "HOW TO ERASE DTC" .

>> GO TO 2.

2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.
Refer to GI-24, "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-24, "How to Perform Efficient Diagnosis for an Electrical Incident" , “INCIDENT SIMULATION TESTS”.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace.

MAIN POWER SUPPLY AND GROUND CIRCUIT

PFP:24110

ECM Terminals and Reference Value

EBS0153M

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

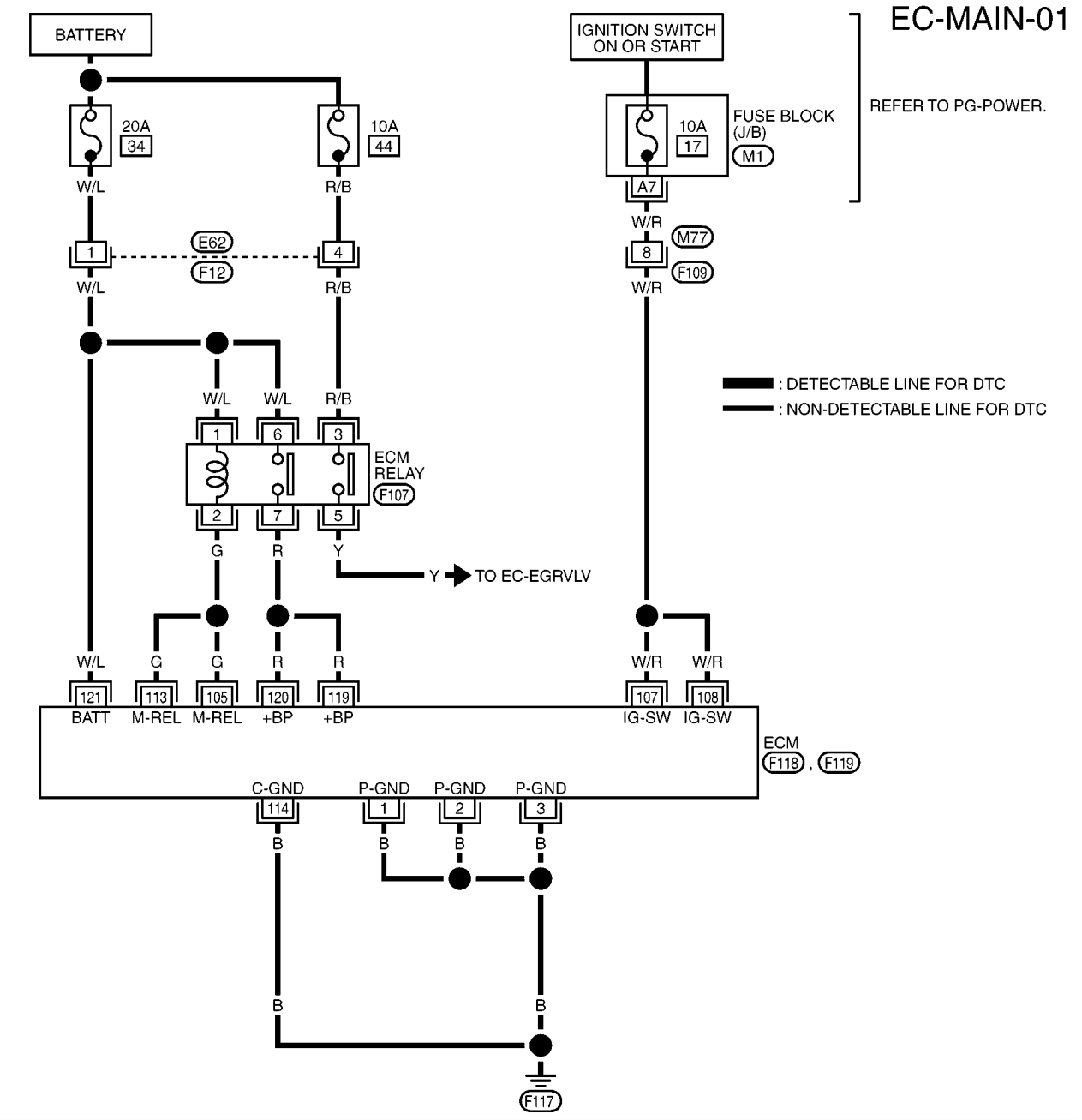
CAUTION:

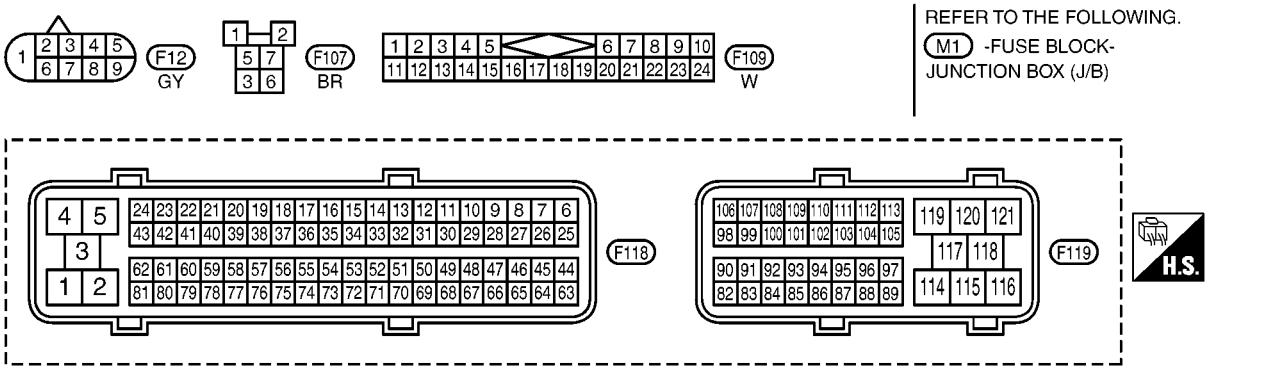
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
1 2 3	B B B	ECM ground	**[Engine is running]** ● Idle speed	Approximately 0V
105	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
107 108	W/R W/R	Ignition switch	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
113	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
114	B	ECM ground	**[Engine is running]** ● Idle speed	Approximately 0V
119 120	R R	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
121	W/L	Power supply for ECM (Back-up)	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)

Wiring Diagram

EBS0153N





MBWA0643E

Diagnostic Procedure

EBS0153O

1. INSPECTION START

Start engine.
Is engine running?

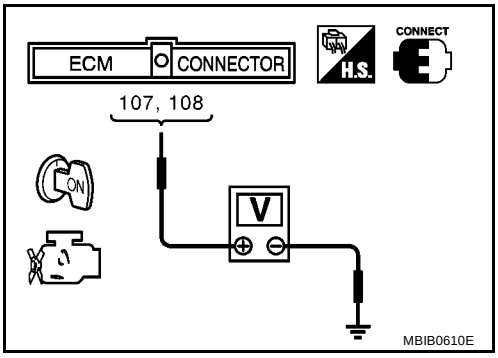
Yes or No

Yes >> GO TO 6.
No >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between ECM terminals 107, 108 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.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness connectors M77, F109
- Harness for open or short between ECM and fuse

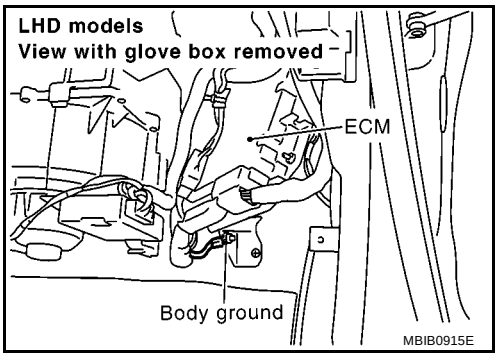
>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body. Refer to EC-415, "Ground Inspection" .

OK or NG

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



5. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 2, 3, 114 and body ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

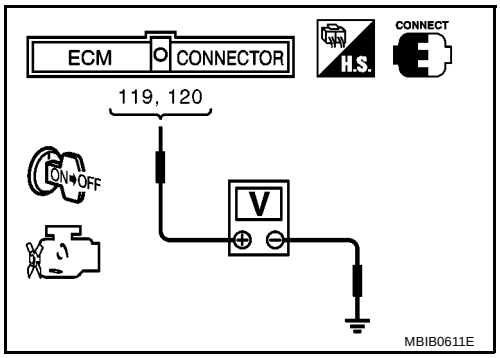
OK or NG

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

6. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connector.
2. Turn ignition switch ON and then OFF.
3. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

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

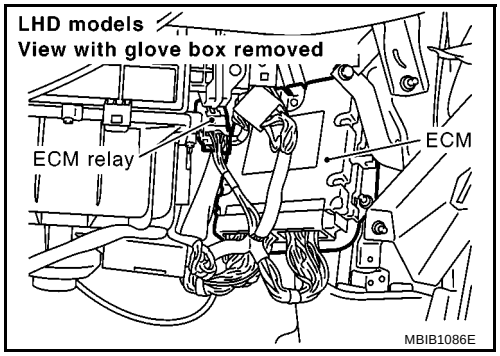


OK or NG

OK >> GO TO 12.
NG (Battery voltage does not exist)>>GO TO 7.
NG (Battery voltage exists for more then a few seconds)>>GO TO 9.

7. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Disconnect ECM relay.

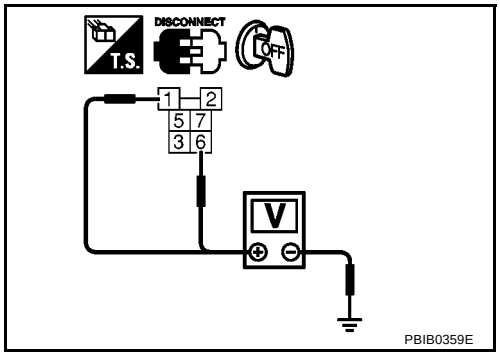


2. Check voltage between relay terminals 1, 6 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 9.
NG >> GO TO 8.



8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E62, F12
- 20A fuse
- Harness for open or short between ECM relay and battery

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

9. CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 105, 113 and ECM relay terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Check harness continuity between ECM terminals 119, 120 and ECM relay terminal 7. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 11.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK ECM RELAY

Refer to EC-414, "Component Inspection" .

OK or NG

OK >> GO TO 12.
NG >> Replace ECM relay.

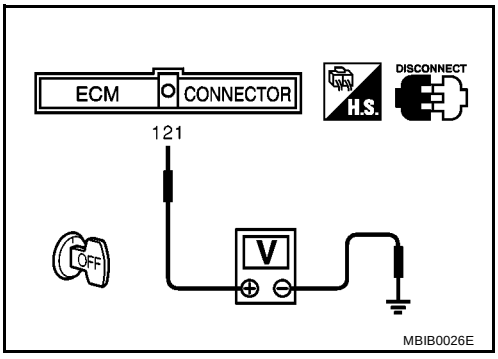
12. CHECK ECM POWER SUPPLY CIRCUIT-V

Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 14.
NG >> GO TO 13.



13. DETECT MALFUNCTIONING PART

Check the following.

- 20A fuse
- Harness connectors E62, F12
- Harness for open or short between ECM and fuse

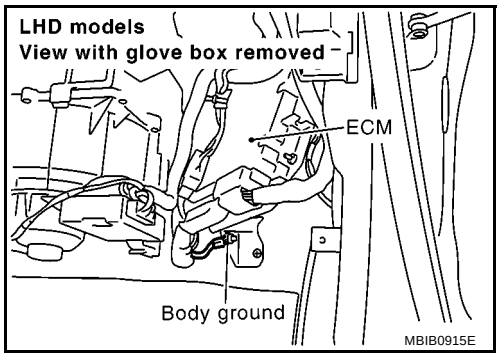
>> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body. Refer to EC-415, "Ground Inspection" .

OK or NG

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



15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminals 1, 2, 3, 114 and body ground. Refer to Wiring Diagram.

Continuity should exist.

2. 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-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

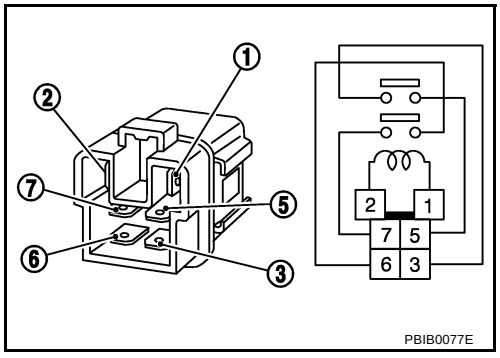
EBS0153P

ECM RELAY

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

3. If NG, replace ECM relay.



Ground Inspection

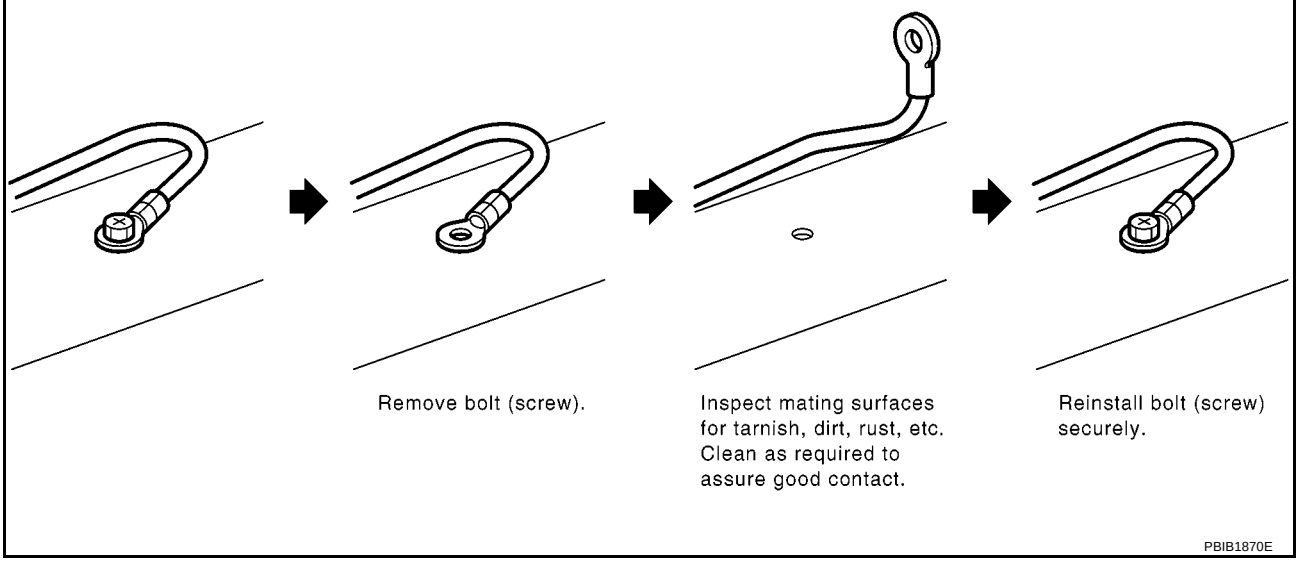
EBS0153Q

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.
Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.
When inspecting a ground connection follow these rules:

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

For detailed ground distribution information, refer to “Ground Distribution” in PG section.

Ground Inspection



DTC U1000 CAN COMMUNICATION LINE

PFP:23710

Description

EBS0153R

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

EBS0153S

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

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

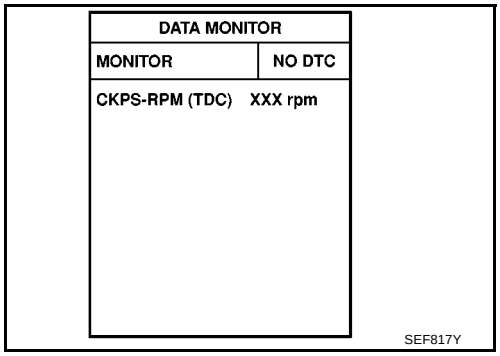
DTC Confirmation Procedure

EBS0153T

NOTE:
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 3 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If DTC is detected, go to EC-418, "Diagnostic Procedure" .

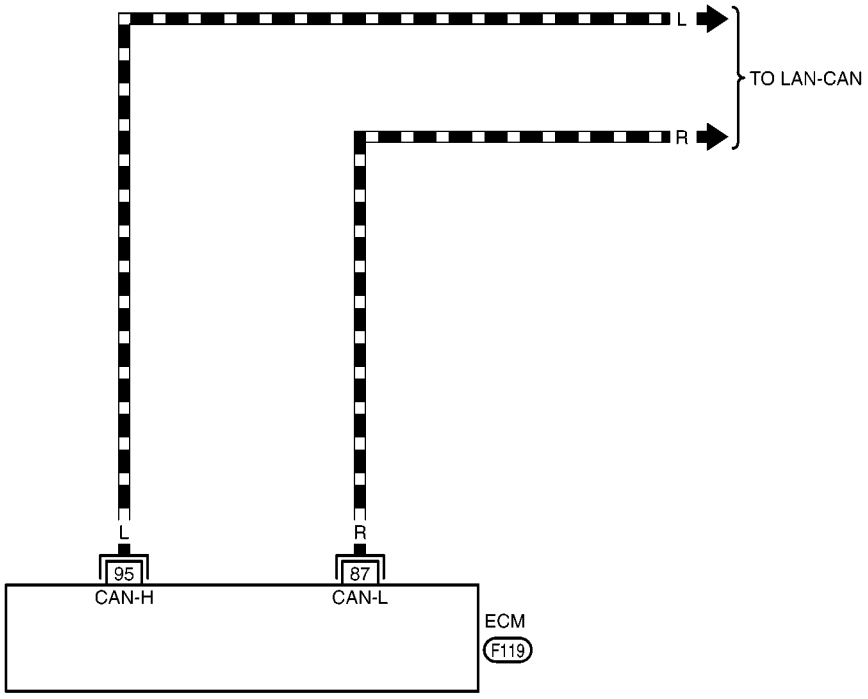


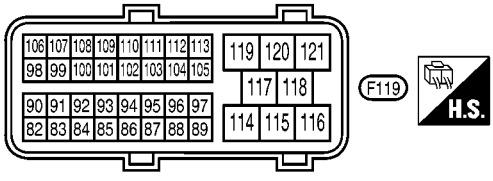
Wiring Diagram

EBS0153U

EC-CAN-01

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





MBWA0370E

Diagnostic Procedure

EBS0153V

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 ESP

OK data

DATA MONITOR	
MONITOR	
CAN COMM	OK
CAN CIRC 1	OK
CAN CIRC 2	UNKWN
CAN CIRC 3	OK
CAN CIRC 4	OK
CAN CIRC 5	UNKWN
CAN CIRC 6	UNKWN
CAN CIRC 7	UNKWN

NG data

DATA MONITOR	
MONITOR	
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

MBIB0868E

Models without ESP

OK data

DATA MONITOR	
MONITOR	
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	UNKWN
CAN CIRC 7	UNKWN

NG data

DATA MONITOR	
MONITOR	
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

MBIB0009E

>> Go to LAN-5, "CAN COMMUNICATION" .

DTC P0016 CKP - CMP CORRELATION

PFP:10328

On Board Diagnosis Logic

EBS0153W

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0016	Crankshaft position - camshaft position correlation	The correlation between crankshaft position sensor signal and camshaft position sensor signal is out of the normal range.	● Camshaft position sensor ● Crankshaft position sensor ● Timing chain ● Signal plate

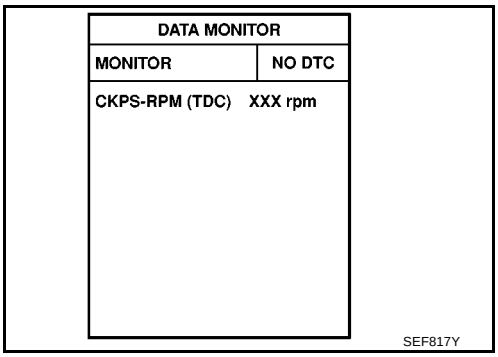
DTC Confirmation Procedure

EBS0153X

NOTE:
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 DTC is detected, go to EC-419, "Diagnostic Procedure" .



Diagnostic Procedure

EBS0153Y

1. CHECK CAMSHAFT POSITION SENSOR

Refer to EC-510, "Component Inspection" .

OK or NG

OK >> GO TO 2.
NG >> Replace camshaft position sensor.

2. CHECK SPROCKET

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 3.
NG >> Remove debris and clean the signal plate or replace sprocket.

3. CHECK CRANKSHAFT POSITION SENSOR

Refer to EC-499, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace crankshaft position sensor.

4. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 5.
NG >> Replace the signal plate.

5. CHECK TIMING CHAIN

Refer to EM-63, "SECONDARY TIMING CHAIN" , EM-68, "PRIMARY TIMING CHAIN" and EM-35, "VACUUM PUMP" .

OK or NG

OK >> GO TO 6.
NG >> Replace timing chain.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

DTC P0088 FUEL SYSTEM

PFP:17520

On Board Diagnosis Logic

EBS0153Z

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0088	Fuel rail pressure too high	Fuel pressure is too much higher than the specified value.	● Fuel pump ● Fuel injector ● Fuel rail pressure sensor

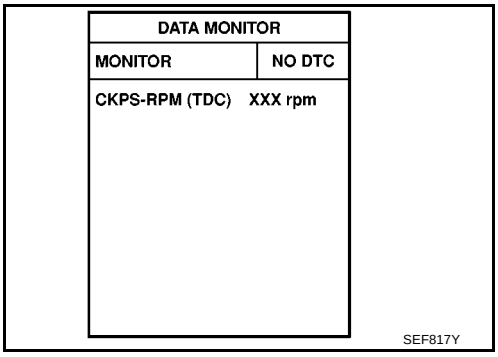
DTC Confirmation Procedure

EBS01540

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Keep engine speed more than 2,000 rpm for at least 20 seconds.
4. If DTC is detected, go to EC-421, "Diagnostic Procedure" .



Diagnostic Procedure

EBS01541

1. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-456, "Component Inspection" .

OK or NG

OK >> GO TO 2.
NG >> Replace fuel rail.

2. CHECK FUEL INJECTOR

Refer to EC-463, "Component Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Replace fuel injector.

3. CHECK FUEL PUMP

Refer to EC-547, "Component Inspection" .

OK or NG

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

4. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Removal and Installation

EBS01542

FUEL INJECTOR

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P0089 FUEL PUMP

PFP:16700

On Board Diagnosis Logic

EBS01543

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0089	Fuel pump performance	Fuel pressure is too much higher than the target value.	● Fuel pump ● Air mixed with fuel ● Lack of fuel ● Fuel rail pressure sensor

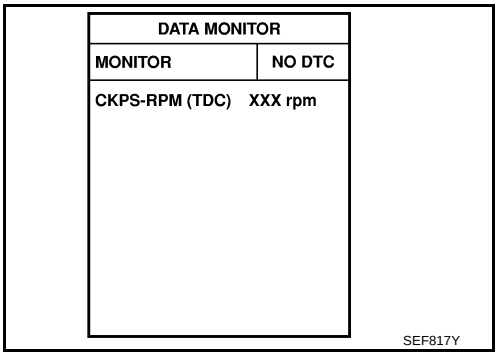
DTC Confirmation Procedure

EBS01544

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Let engine idle for at least 30 seconds.
4. If DTC is detected, go to EC-423, "Diagnostic Procedure" .



Diagnostic Procedure

EBS01545

1. PERFORM FUEL PUMP LEARNING VALUE CLEARING

NOTE:
If the DTC is detected because of air mixed with fuel (i.e.: caused by lack of fuel), it may become normal by performing following procedure.

With CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select “SELF-DIAG RESULT” mode with CONSULT-II.
5. Touch “ERASE”.
6. Perform EC-423, "DTC Confirmation Procedure" , again.
7. Is DTC detected again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-456, "Component Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Replace fuel rail.

3. CHECK FUEL PUMP

Perform EC-544, "DTC Confirmation Procedure" .

OK or NG

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

4. REPLACE FUEL PUMP

1. Replace Fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Removal and Installation

EBS01546

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P0093 FUEL SYSTEM

PFP:17520

On Board Diagnosis Logic

EBS01547

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0093	Fuel system leak	ECM detects a fuel system leak. (The relation between the output voltage to the fuel pump and input voltage from the fuel rail pressure sensor is out of the normal range.)	● Fuel pump ● Fuel rail ● Fuel pipe ● Fuel rail pressure relief valve ● Air mixed with fuel ● Lack of fuel

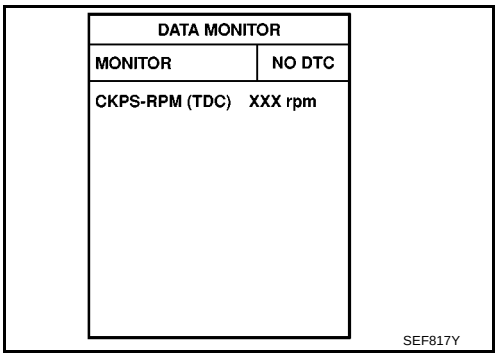
DTC Confirmation Procedure

EBS01548

NOTE:
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 keep engine speed more than 4,000 rpm for at least 5 seconds.
4. If DTC is detected, go to EC-425, "Diagnostic Procedure" .



Diagnostic Procedure

EBS01549

1. PERFORM FUEL PUMP LEARNING VALUE CLEARING

NOTE:
If the DTC is detected because of air mixed with fuel (i.e.: caused by lack of fuel), it may become normal by performing following procedure.

With CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select “SELF-DIAG RESULT” mode with CONSULT-II.
5. Touch “ERASE”.
6. Perform EC-425, "DTC Confirmation Procedure" , again.
7. Is DTC detected again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. CHECK FUEL LINE FOR LEAK

1. Start engine.
2. Visually check the following for fuel leak.
- Fuel tube from fuel pump to fuel rail
- Fuel rail
- Fuel tube from fuel rail to fuel injector
3. Also check for improper connection or pinches.

OK or NG

OK >> GO TO 3.
NG >> Repair malfunctioning part.

3. CHECK FUEL RAIL PRESSURE RELIEF VALVE

Refer to EC-426, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel rail.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

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

5. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

Component Inspection

EBS0154A

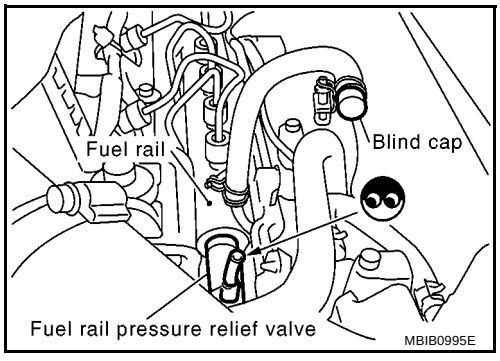
FUEL RAIL PRESSURE RELIEF VALVE

With CONSULT-II

WARNING:

- **Confirm that the engine is cooled down and there are no fire hazards near the vehicle.**
- **Prepare pans or saucers under the disconnected fuel line because the fuel may spill out.**

1. Turn ignition switch OFF.
2. Remove fuel hose from fuel rail pressure relief valve.
3. Attach a blind cap or plug to removed hose.
4. Turn ignition switch ON.



5. Select “PRES REGULATOR” in “ACTIVE TEST MODE” with CONSULT-II.
6. Start engine and keep engine speed 2,000 rpm.
7. Raise fuel pressure to 160 MPa with touching “UP” or “Qu” on the CONSULT-II screen.
8. Confirm that the fuel does not come out from the fuel rail pressure relief valve.

WARNING:

- **Be careful not to allow leaked fuel to contaminate engine compartment. Especially, ensure to keep engine mount insulator clear of fuel.**
- **If the fuel comes out, stop the engine immediately.**

ACTIVE TEST	
PRES REGULATOR	XXX MPa
MONITOR	
CKPS-RPM (TDC)	XXX rpm
ACT CR PRESS	XXX MPa

PBIB0587E

Removal and Installation

EBS0154B

FUEL RAIL

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

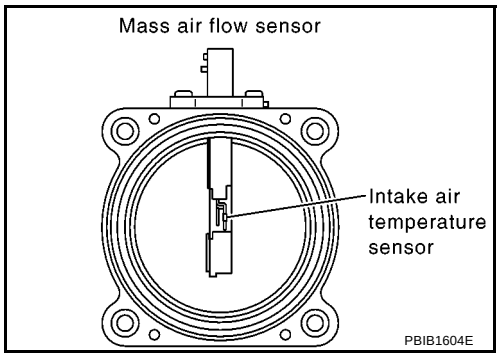
DTC P0102, P0103 MAF SENSOR

PFP:22680

Component Description

EBS0154C

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. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

EBS0154D

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS AIR/FL SE*	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1.5 - 2.0V
		2,000 rpm	2.2 - 2.7V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS0154E

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)
54	W	Mass air flow sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.8 - 2.3V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.5 - 3.0V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
73	B	Mass air flow sensor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS0154F

The MI will not light up for these self-diagnoses.

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

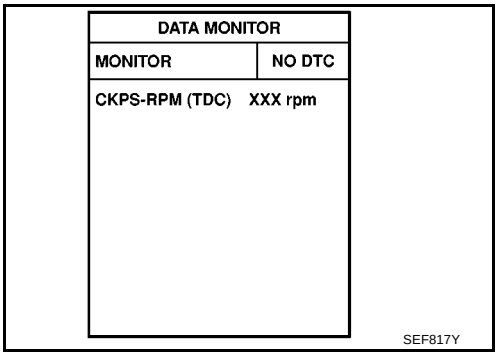
DTC Confirmation Procedure

EBS0154G

NOTE:
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

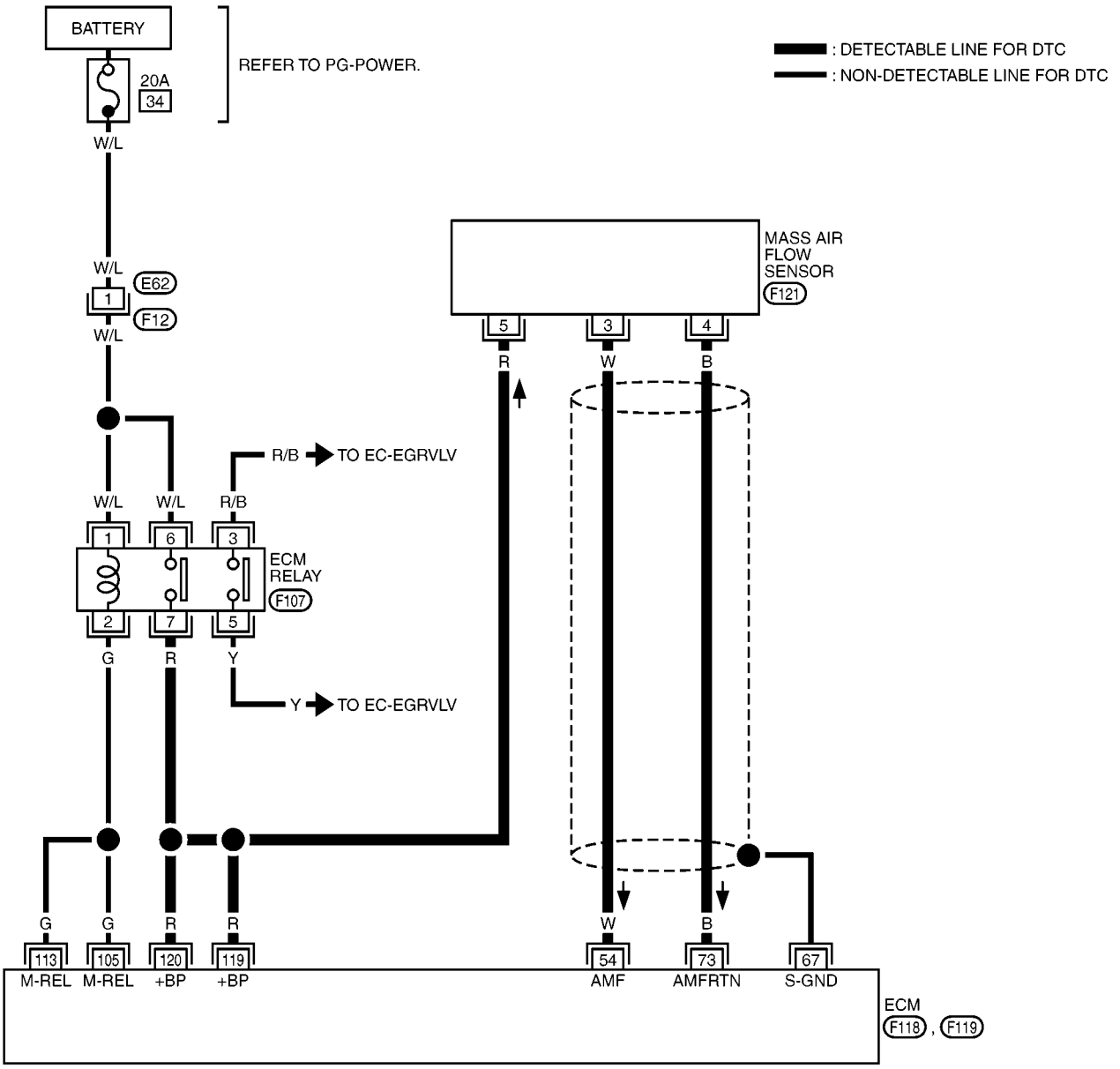
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-431, "Diagnostic Procedure" .

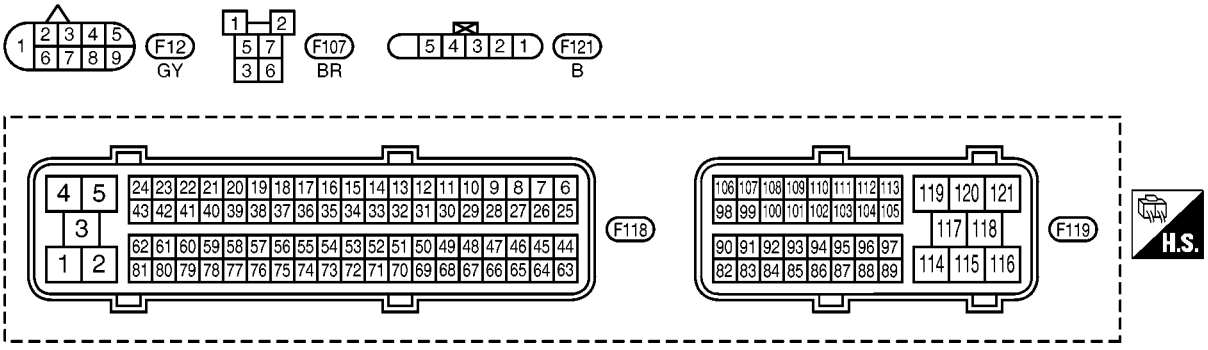


Wiring Diagram

EBS0154H

EC-MAFS-01





MBWA0645E

Diagnostic Procedure

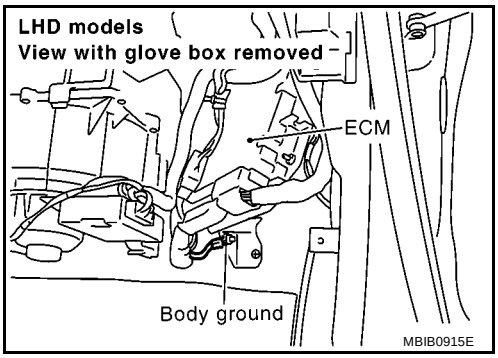
EBS0154I

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

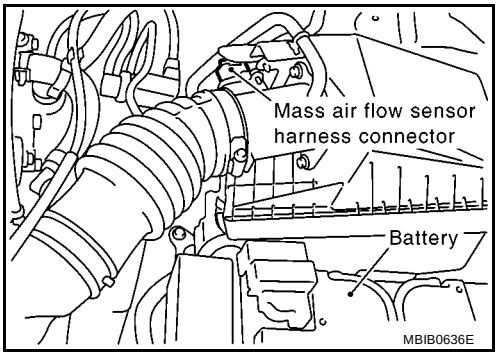
OK or NG

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



2. CHECK MAFS POWER SUPPLY CIRCUIT

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

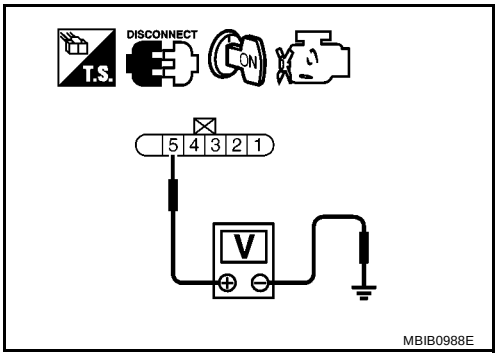


3. Check voltage between mass air flow sensor terminal 5 and ground with CONSULT-II or tester.

Voltage: Battery voltage

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 MAFS GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between mass air flow sensor terminal 4 and ECM terminal 73. 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 MAFS INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between mass air flow sensor terminal 3 and ECM terminal 54. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. CHECK MASS AIR FLOW SENSOR

Refer to EC-432, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace mass air flow sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

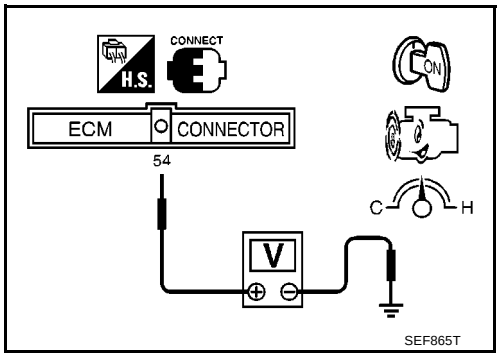
Component Inspection

EBS0154J

MASS AIR FLOW SENSOR

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 54 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch ON (Engine stopped.)	Approx. 0.7
Idle (Engine is warmed up to normal operating temperature.)	1.8 - 2.3
2,000 rpm (Engine is warmed up to normal operating temperature.)	2.5 - 3.0



4. If the voltage is out of specification, disconnect MAF sensor harness connector and connect it again.
Then repeat above check.

Removal and Installation

EBS0154K

MASS AIR FLOW SENSOR

Refer to EM-15, "AIR CLEANER AND AIR DUCT" .

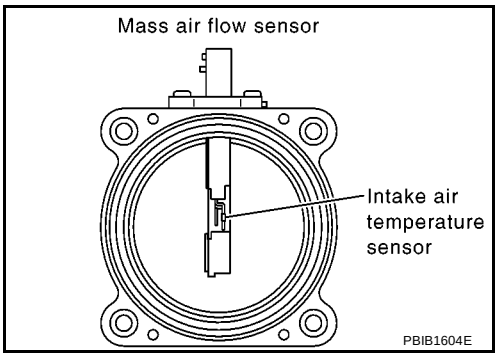
DTC P0112, P0113 IAT SENSOR

PFP:22630

Component Description

EBS0154L

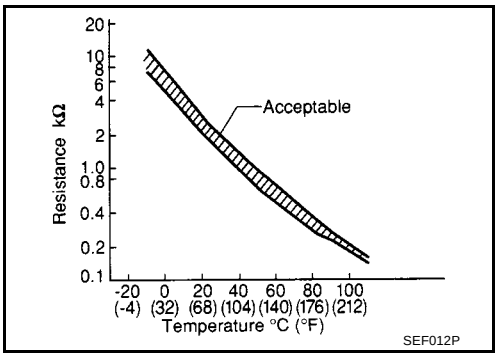
The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.73	7.9 - 9.3
25 (77)	3.62	1.9 - 2.1
80 (176)	1.53	0.31 - 0.37

*: This data is reference values and is measured between ECM terminal 55 (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

EBS0154M

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air temperature sensor
P0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

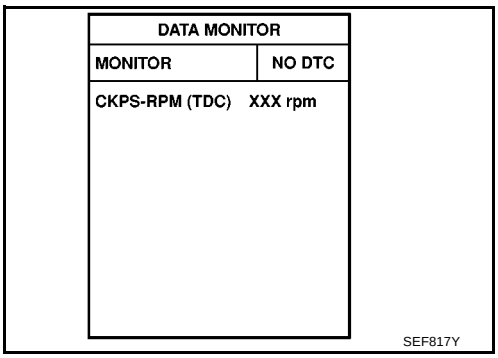
DTC Confirmation Procedure

EBS0154N

NOTE:
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

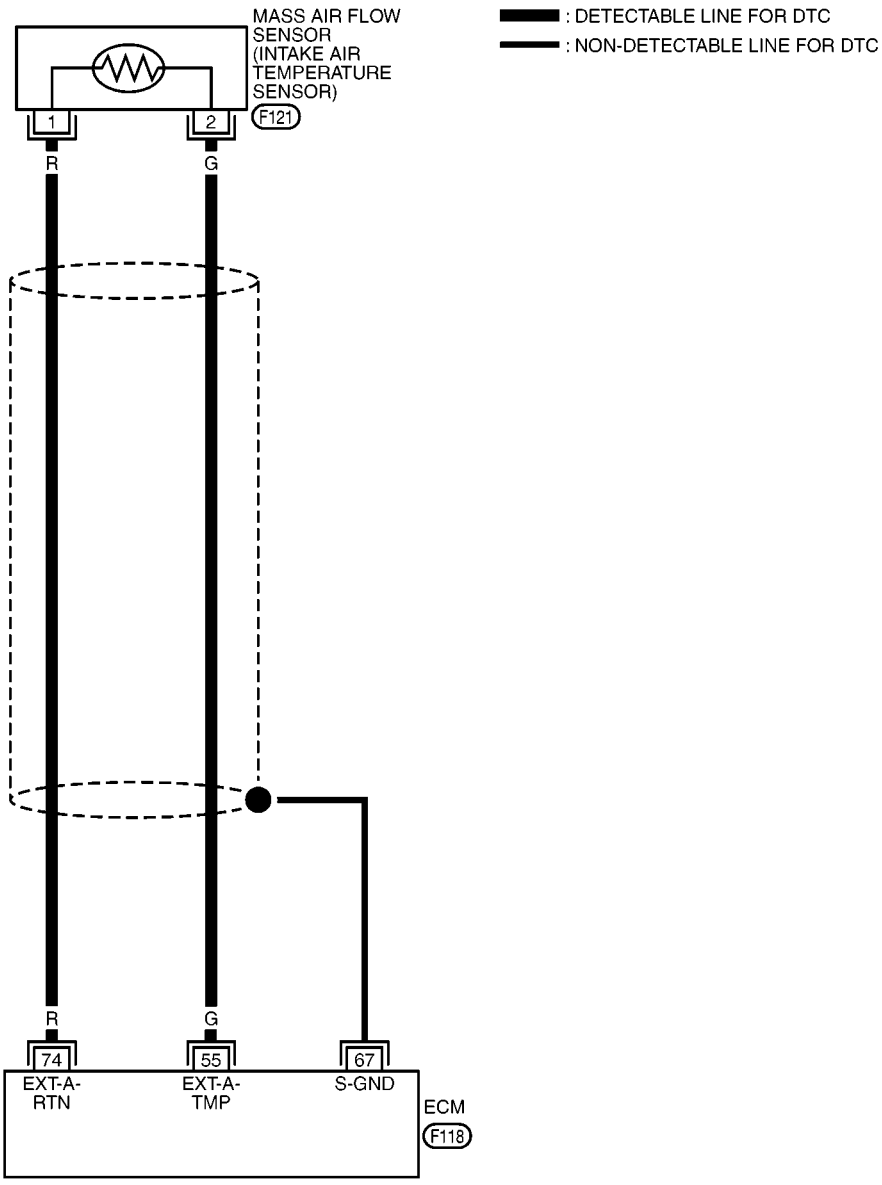
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-435, "Diagnostic Procedure" .

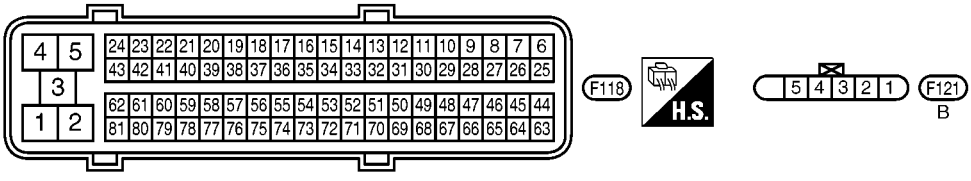


Wiring Diagram

EBS0154O

EC-IATS-01





MBWA0372E

Diagnostic Procedure

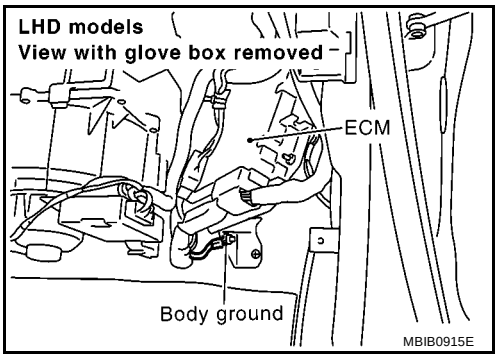
EBS0154P

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

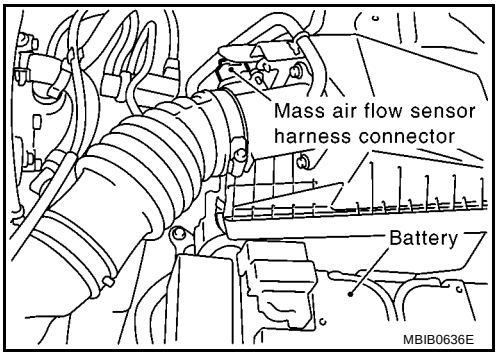
OK or NG

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



2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

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

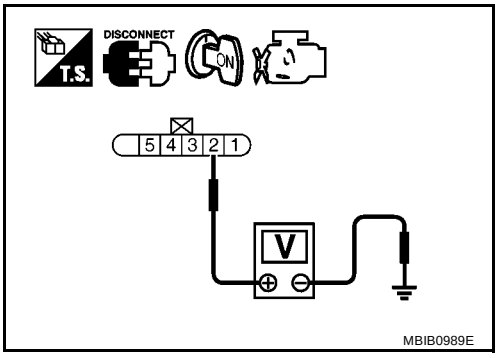


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connectors.



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

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 1 and ECM terminal 74. 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 AIR TEMPERATURE SENSOR

Refer to EC-436, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace mass air flow sensor (with intake air temperature sensor).

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

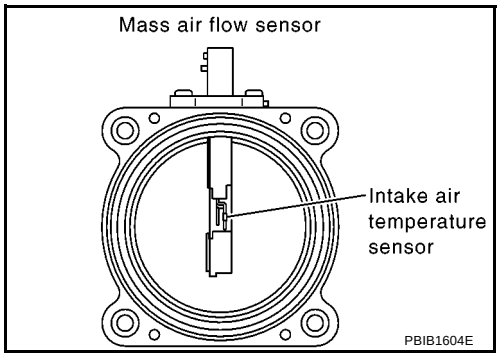
EBS0154Q

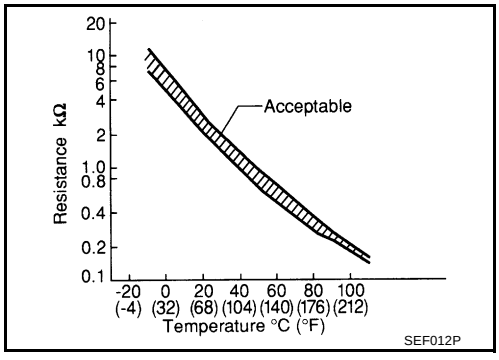
INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor terminals 1 and 2 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

EBS0154R

MASS AIR FLOW SENSOR

Refer to EM-15, "AIR CLEANER AND AIR DUCT" .

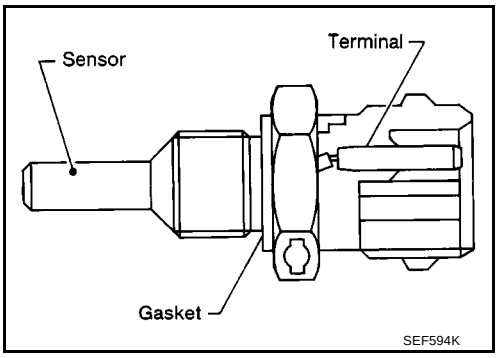
DTC P0117, P0118 ECT SENSOR

PFP:22630

Description

EBS0154S

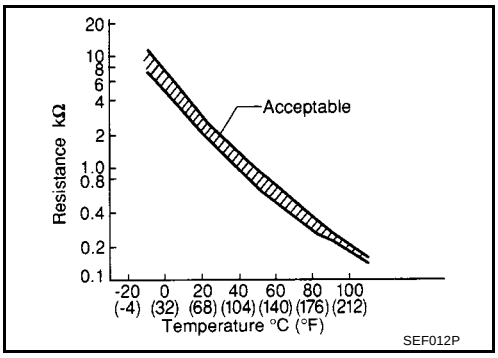
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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



<Reference data>

Engine coolant temperature °C (°F)	Voltage* (V)	Resistance (kΩ)
–10 (14)	4.7	7.0 - 11.4
20 (68)	3.8	2.1 - 2.9
50 (122)	2.6	0.68 - 1.00
90 (194)	1.3	0.236 - 0.260

*: This data is reference values and is measured between ECM terminal 51 (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

EBS0154T

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor
P0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

EBS0154U

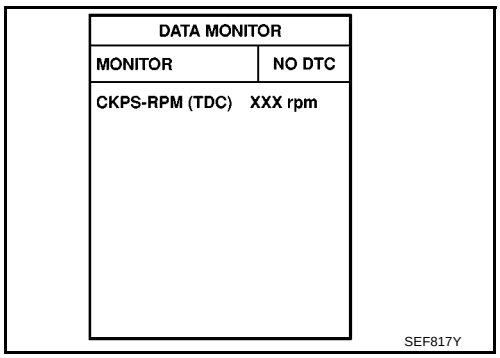
NOTE:

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.

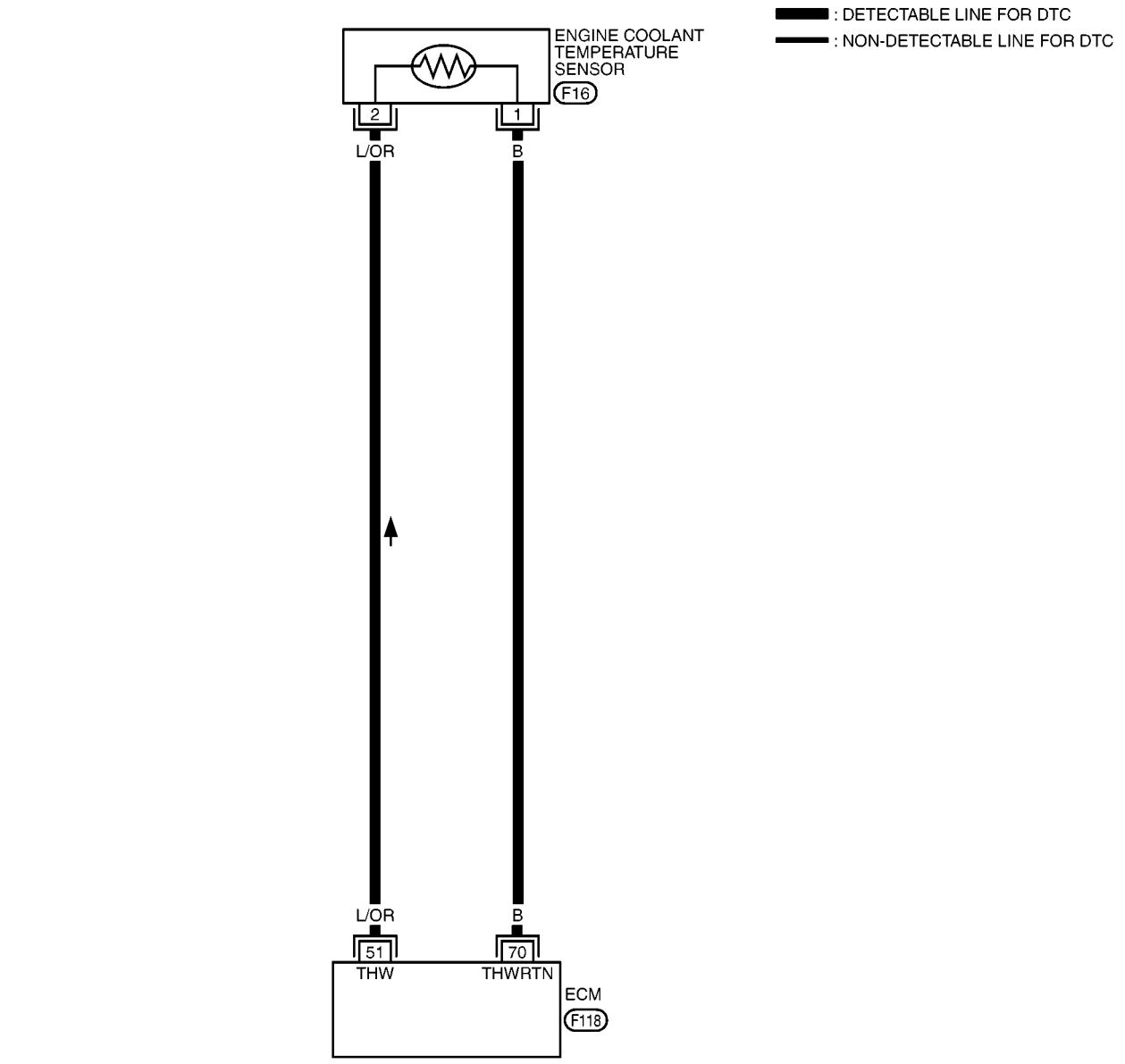
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-440, "Diagnostic Procedure" .

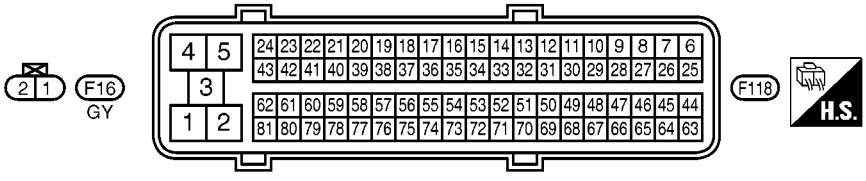


Wiring Diagram

EBS0154V

EC-ECTS-01





MBWA0373E

Diagnostic Procedure

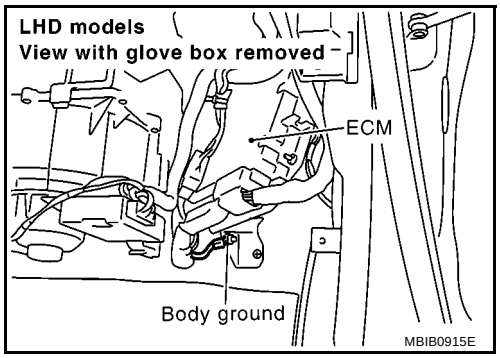
EBS0154W

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

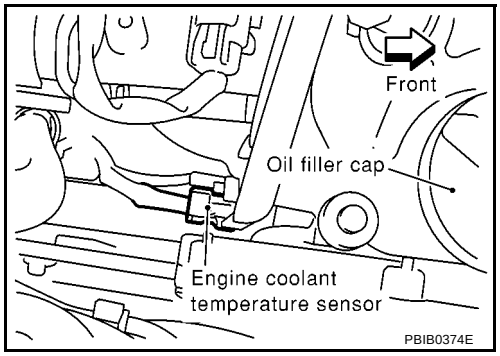
OK or NG

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



2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature sensor harness connector.
2. Turn ignition switch ON.

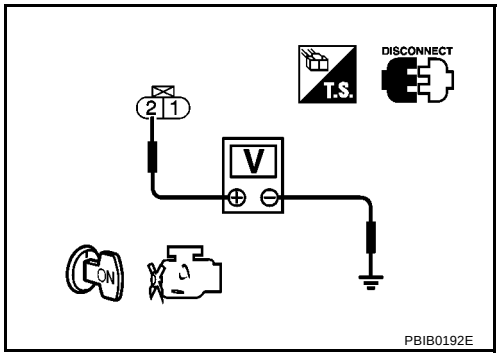


3. Check voltage between ECT sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connectors.



3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECT sensor terminal 1 and ECM terminal 70. 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 ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-441, "Component Inspection" .

OK or NG

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

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

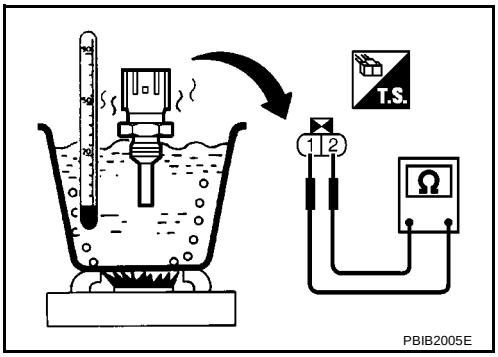
>> **INSPECTION END**

Component Inspection

EBS0154X

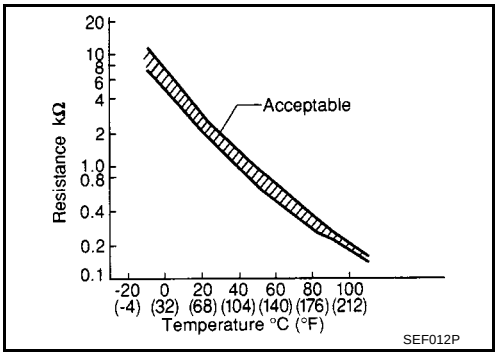
ENGINE COOLANT TEMPERATURE SENSOR

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



<Reference data>

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



2. If NG, replace engine coolant temperature sensor.

Removal and Installation

EBS0154Y

ENGINE COOLANT TEMPERATURE SENSOR

Refer to EM-78, "CYLINDER HEAD" .

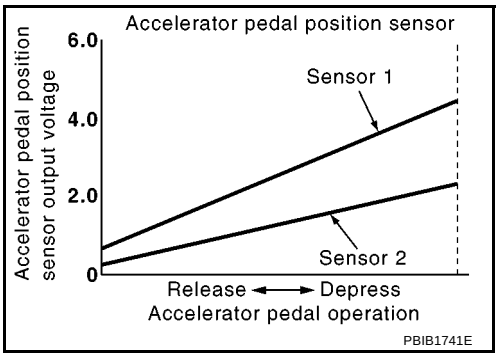
DTC P0122, P0123 APP SENSOR

PFP:18002

Description

EBS0154Z

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS01550

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS01551

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS01552

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122	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)
P0123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

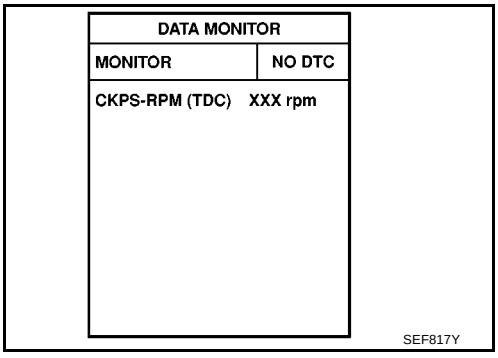
DTC Confirmation Procedure

EBS01553

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

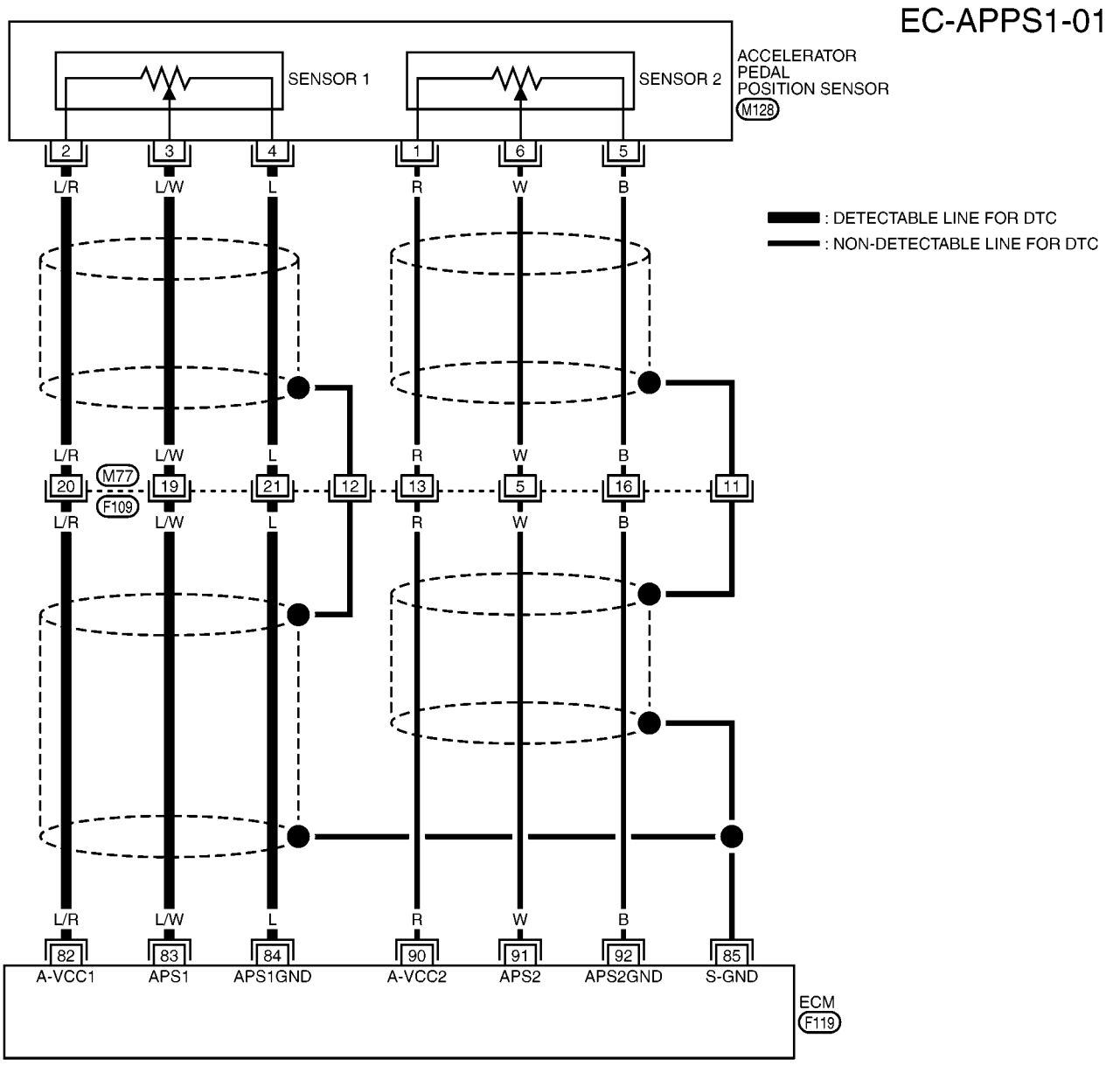
WITH CONSULT-II

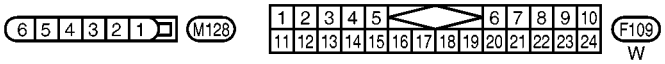
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-445, "Diagnostic Procedure" .

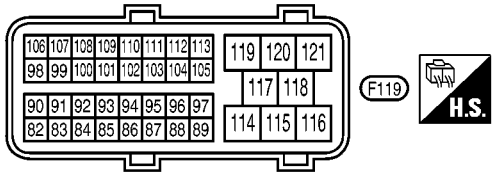


Wiring Diagram

EBS01554







MBWA0374E

Diagnostic Procedure

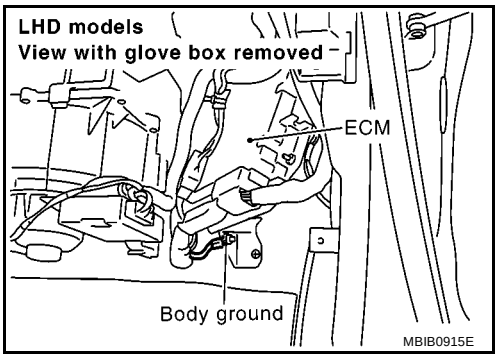
EBS01555

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

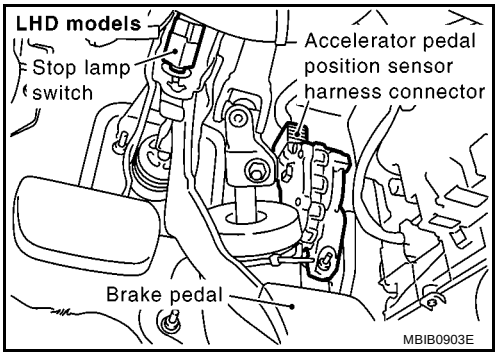
OK or NG

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



2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

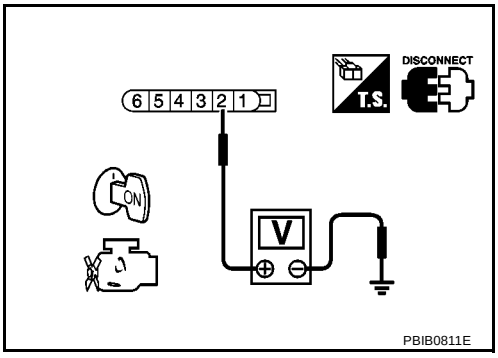


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F109, M77
- Harness for open or short between ECM and APP 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. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 4 and ECM terminal 84.
   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 F109, M77
- Harness for open or short between ECM and APP 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. Check harness continuity between ECM terminal 83 and APP sensor terminal 3.
   Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F109, M77
- Harness for open or short between ECM and APP sensor

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

8. CHECK APP SENSOR

Refer to EC-446, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

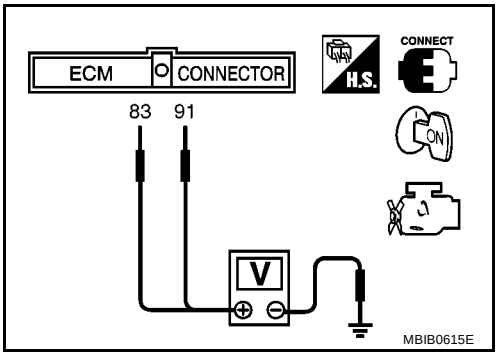
EBS01556

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and body ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.2V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V



4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS01557

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

PFP:16700

Description

EBS01558

Fuel pump temperature sensor is built in the fuel pump. The sensor detects the fuel temperature in the fuel pump and calibrates the fuel injection amount change by fuel temperature.

CONSULT-II Reference Value in Data Monitor Mode

EBS01559

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL TEMP SEN	● Engine: After warming up	More than 40°C (104°F)

ECM Terminals and Reference Value

EBS0155A

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)
50	PU	Fuel pump temperature sensor	**[Engine is running]** ● **Warm-up condition**	Approximately 0.3 - 5.3V Output voltage varies with fuel pump temperature
69	B	Fuel pump temperature sensor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS0155B

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182	Fuel pump temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Fuel pump temperature sensor
P0183	Fuel pump temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

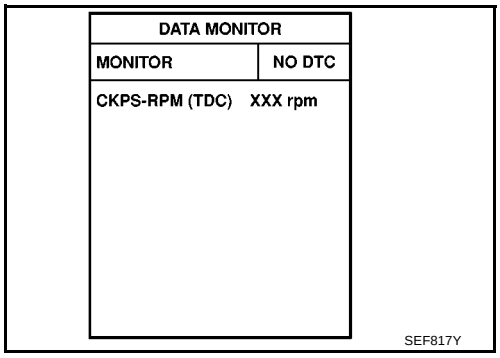
EBS0155C

NOTE:

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

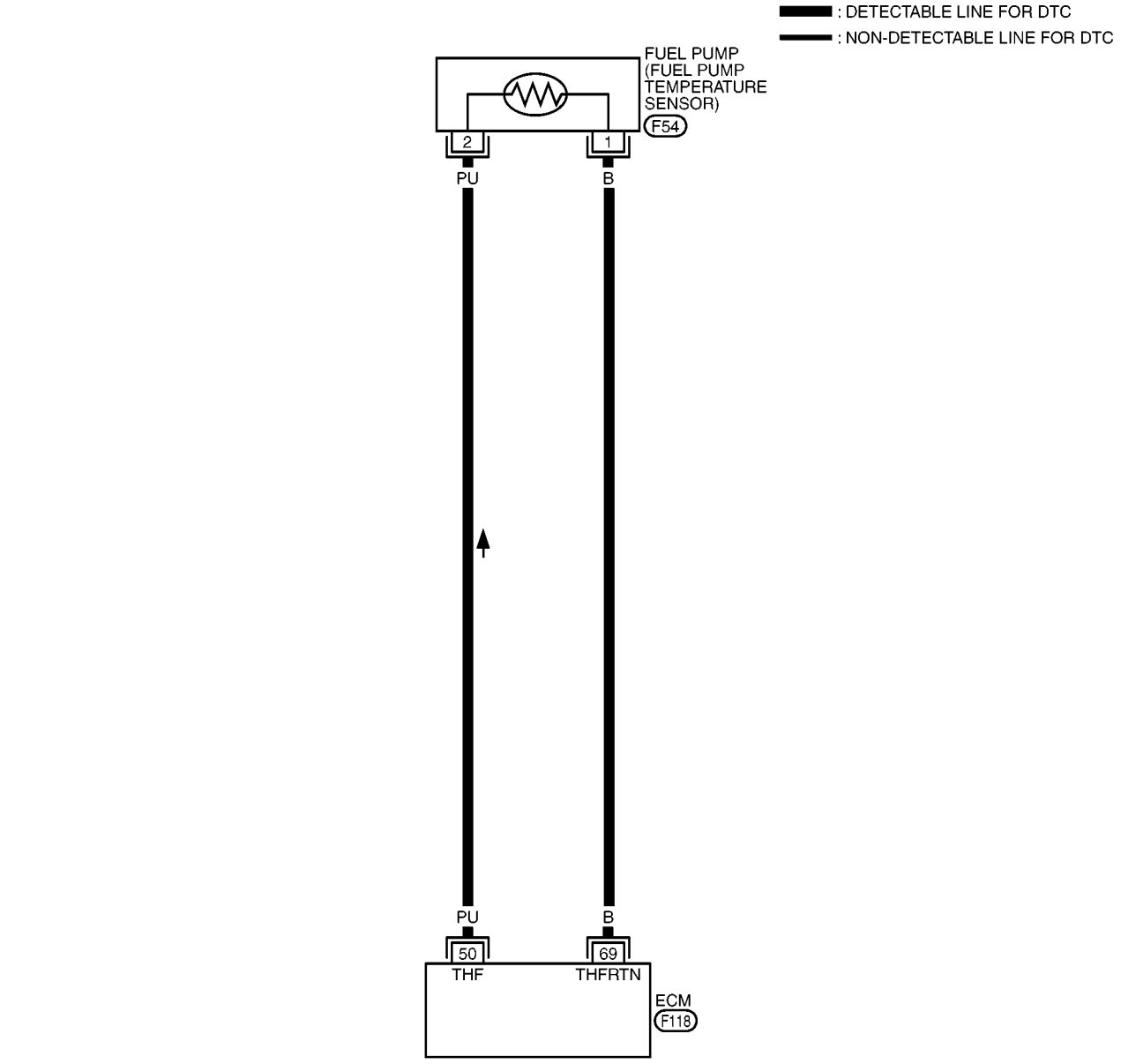
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-450, "Diagnostic Procedure" .

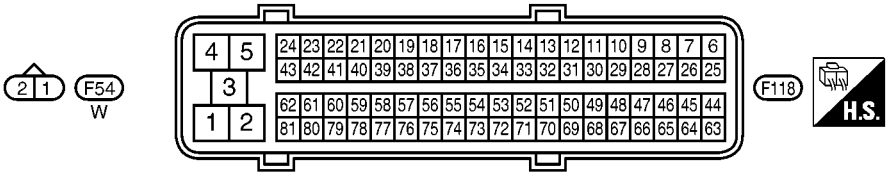


Wiring Diagram

EBS0155D

EC-FTS-01





MBWA0381E

Diagnostic Procedure

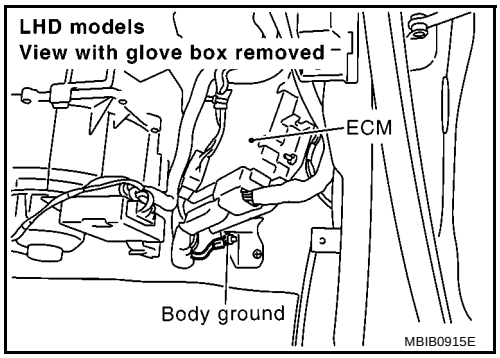
EBS0155E

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

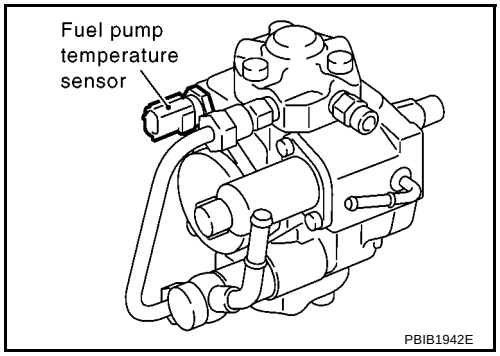
OK or NG

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



2. CHECK FUEL PUMP TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect fuel pump temperature sensor harness connector.
2. Turn ignition switch ON.

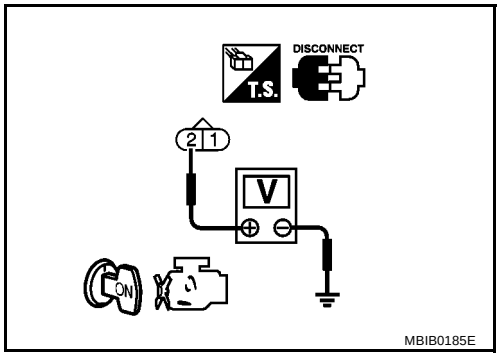


3. Check voltage between fuel pump temperature sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connectors.



3. CHECK FUEL PUMP TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel pump temperature sensor terminal 1 and ECM terminal 69. 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 INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

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

5. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

Removal and Installation

EBS0155F

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P0192, P0193 FRP SENSOR

PFP:16638

Description

EBS0155G

The fuel rail pressure (FRP) sensor is placed to the fuel rail. It measures the fuel pressure in the fuel rail. The sensor sends voltage signal to the ECM. As the pressure increases, the voltage rises.
The ECM controls the fuel pressure in the fuel rail by the inlet throttling device. The ECM uses the signal from fuel rail pressure sensor as a feedback signal.

CONSULT-II Reference Value in Data Monitor Mode

EBS0155H

Specification data are reference values.

MONITOR	CONDITION		SPECIFICATOIN
ACT CR PRESS	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	20 - 30 MPa
		2,000 rpm	45 - 55 MPa

ECM Terminals and Reference Value

EBS0155I

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)
48 49	R R	Fuel rail pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.7 - 2.0V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.0 - 2.3V
63	W	Fuel rail pressure sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
68	B	Fuel rail pressure sensor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS0155J

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0192	Fuel rail pressure sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Fuel rail temperature sensor
P0193	Fuel rail temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

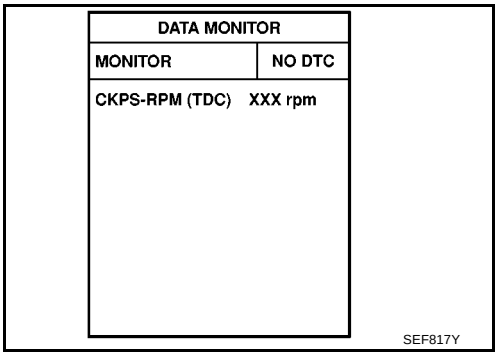
DTC Confirmation Procedure

EBS0155K

NOTE:
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

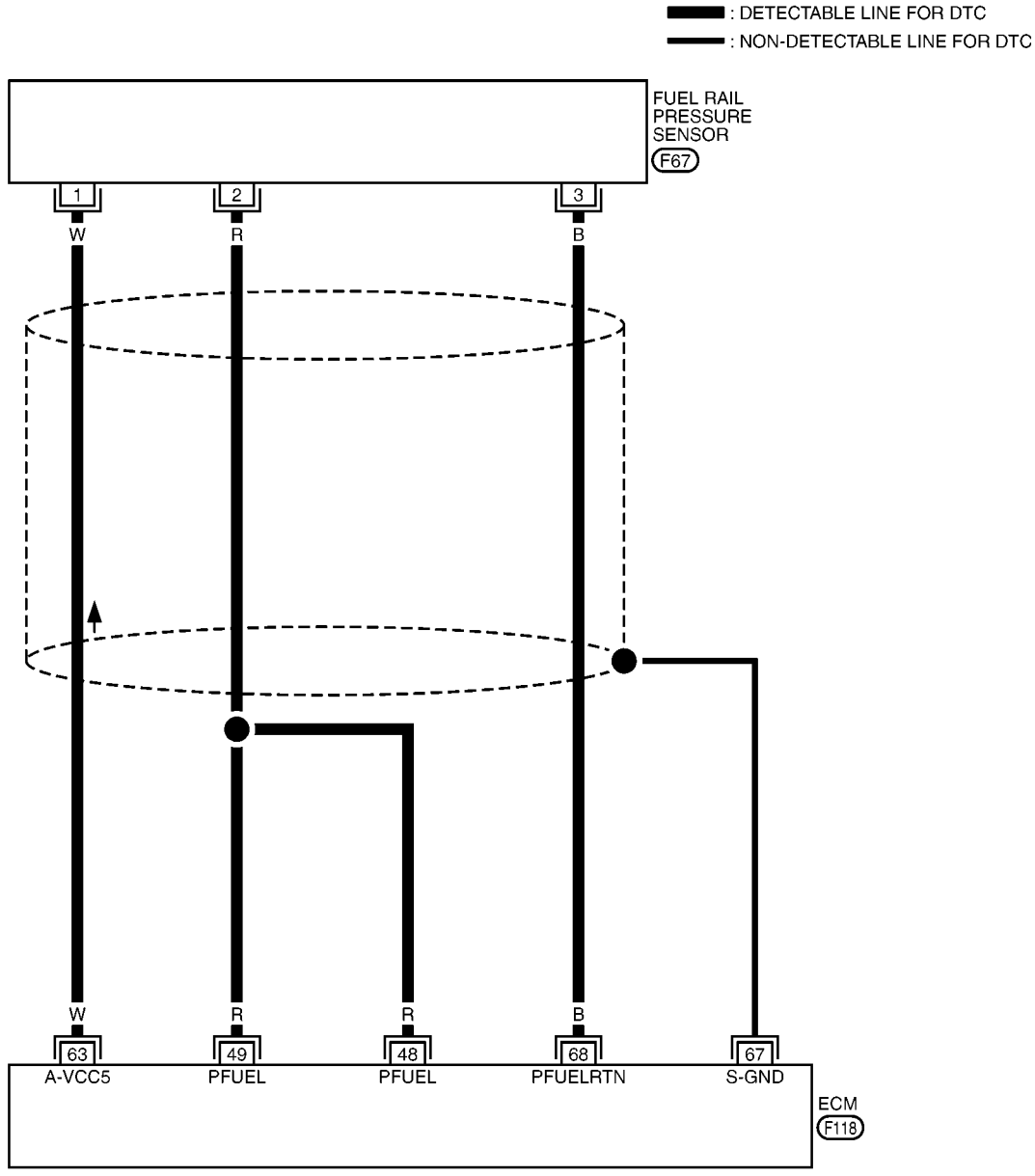
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-455, "Diagnostic Procedure" .

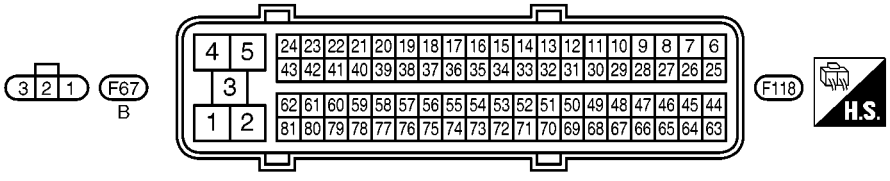


Wiring Diagram

EBS0155L

EC-FRPS-01





MBWA0375E

Diagnostic Procedure

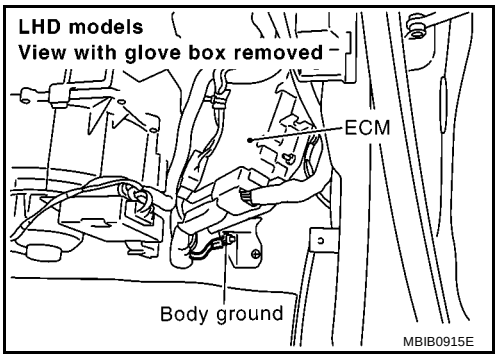
EBS0155M

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

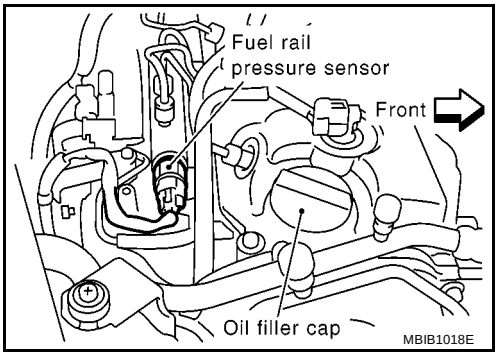
OK or NG

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



2. CHECK FUEL RAIL PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect fuel rail pressure sensor harness connector.
2. Turn ignition switch ON.

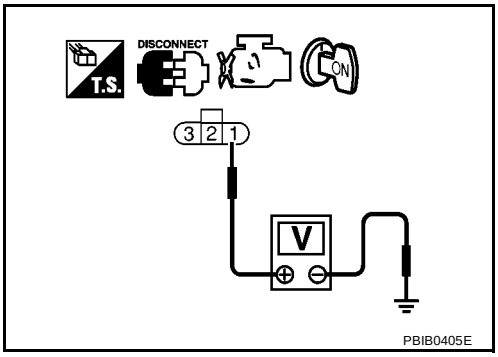


3. Check voltage between fuel rail pressure sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 FUEL RAIL PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel rail pressure sensor terminal 3 and ECM terminal 68. 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 FUEL RAIL PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminals 48, 49 and fuel rail pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-456, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace fuel rail.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

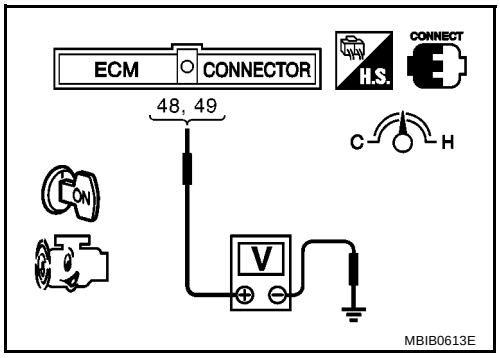
Component Inspection

EBS0155N

FUEL RAIL PRESSURE SENSOR

1. Reconnect harness connector disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminals 48, 49 (Fuel rail pressure sensor signal) and ground under the following conditions.

Condition	Voltage V
Idle	1.7 - 2.0
2,000 rpm	2.0 - 2.3



4. If the voltage is out of specification, disconnect fuel rail pressure sensor harness connector and connect it again. Then repeat above check.
5. If NG, replace fuel rail.

Removal and Installation

EBS0155O

FUEL RAIL

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

DTC P0200 FUEL INJECTOR

PFP:16600

On Board Diagnosis Logic

EBS0155P

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0200	Fuel injector power supply circuit	ECM detects a voltage of power source for the fuel injector is excessively high or low.	● ECM

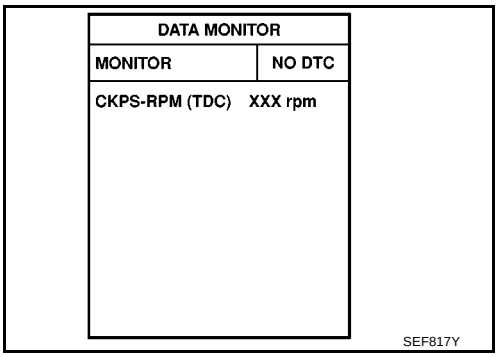
DTC Confirmation Procedure

EBS0155Q

NOTE:
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 DTC is detected, go to EC-457, "Diagnostic Procedure" .



Diagnostic Procedure

EBS0155R

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 EC-457, "DTC Confirmation Procedure" , again.
5. Is DTC P0200 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-371, "NATS (Nissan Anti-theft System)" .
3. Perform Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

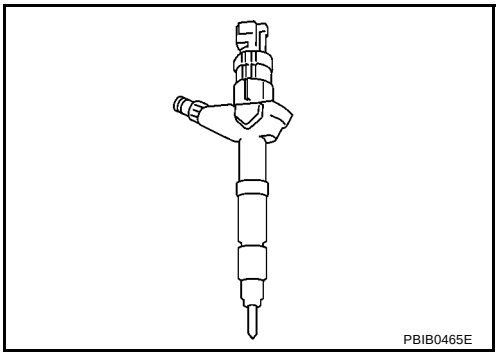
DTC P0201 - P0204 FUEL INJECTOR

PFP:16600

Component Description

EBS0155S

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


PBIB0465E

CONSULT-II Reference Value in Data Monitor Mode

EBS0155T

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec

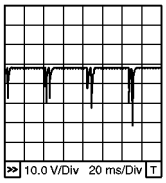
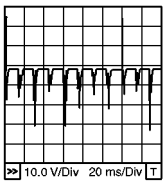
ECM Terminals and Reference Value

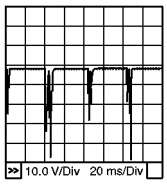
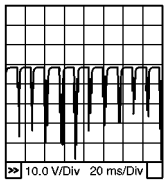
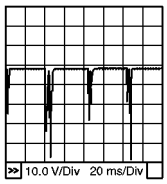
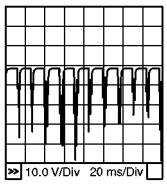
EBS0155U

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
4	O/B	Fuel injector power supply (For cylinder No. 1 and 4)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
5	B	Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

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

On Board Diagnosis Logic

EBS0155V

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0201	No. 1 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 1 cylinder fuel injector.	● Harness or connectors (The fuel injector circuit is open.) ● Fuel injector
P0202	No. 2 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 2 cylinder fuel injector.	
P0203	No. 3 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 3 cylinder fuel injector.	
P0204	No. 4 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 4 cylinder fuel injector.	

DTC Confirmation Procedure

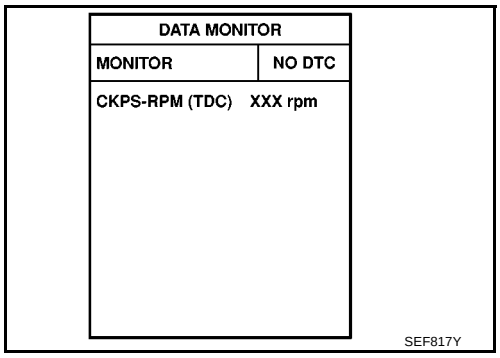
EBS0155W

NOTE:
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 the ambient temperature is more than -20°C (-4°F).

WITH CONSULT-II

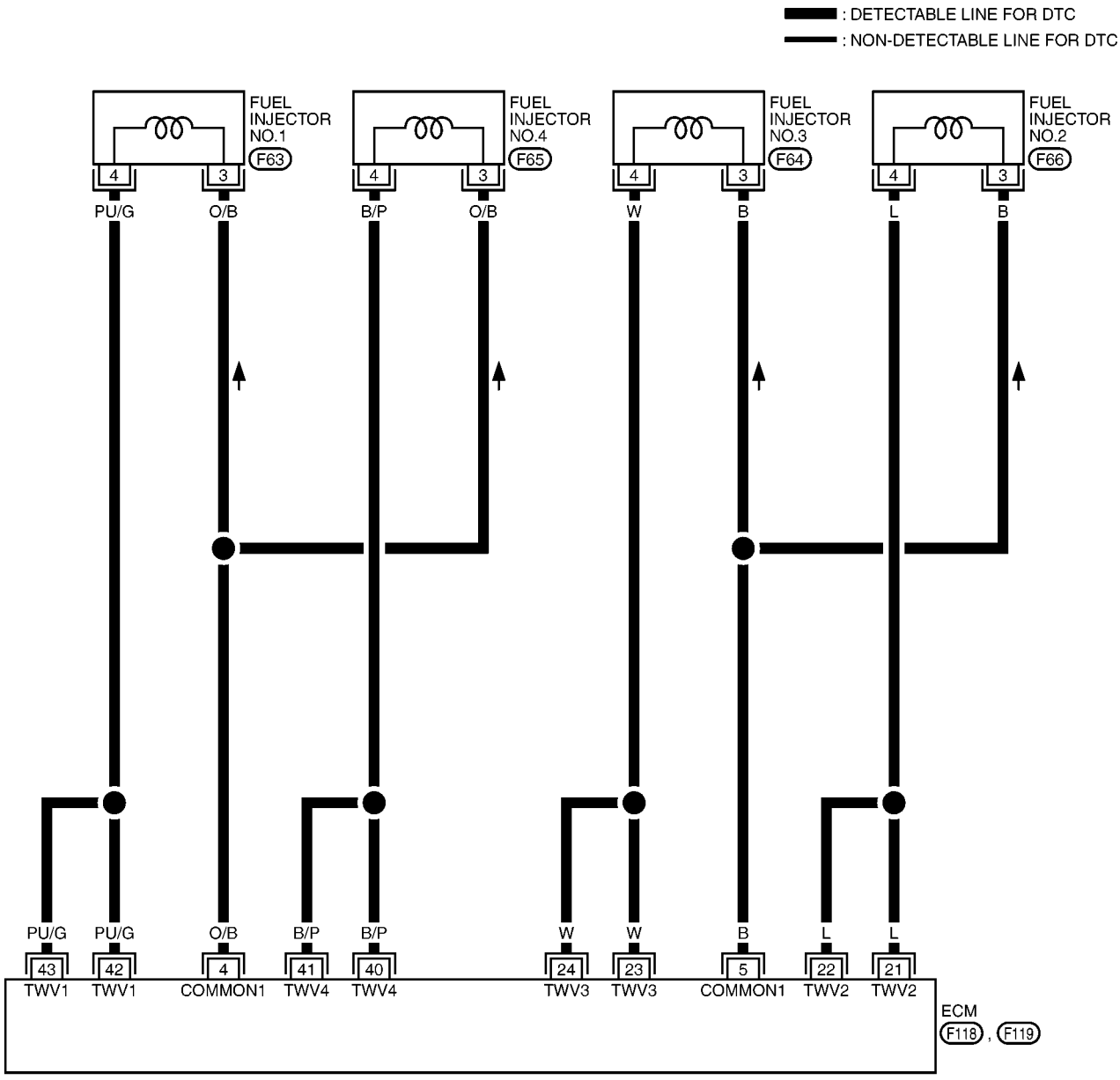
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If DTC is detected, go to EC-462, "Diagnostic Procedure" .



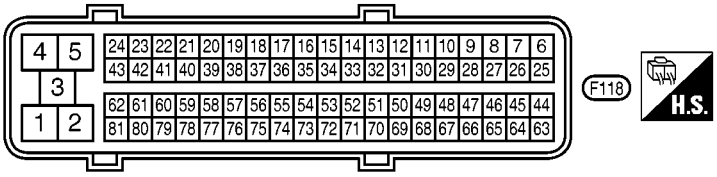
Wiring Diagram

EBS0155X

EC-INJECT-01







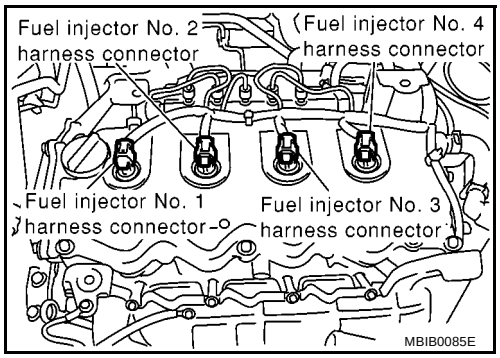
MBWA0634E

Diagnostic Procedure

EBS0155Y

1. CHECK FUEL INJECTOR POWER SUPPLY FOR OPEN AND SHORT CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector harness connector.
4. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.



DTC	Terminal		Cylinder
	ECM	Fuel injector	
P0201	4	3	No.1
P0202	5	3	No.2
P0203	5	3	No.3
P0204	4	3	No.4

Continuity should exist.

5. 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 FUEL INJECOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.

DTC	Terminal		Cylinder
	ECM	Fuel injector	
P0201	42, 43	4	No.1
P0202	21, 22	4	No.2
P0203	23, 24	4	No.3
P0204	40, 41	4	No.4

Continuity should exist.

2. 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 FUEL INJECTOR-I

Refer to EC-463, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel injector.

4. CHECK FUEL INJECTOR-II

With CONSULT-II

1. Remove two fuel injectors of malfunctioning cylinder and another cylinder.
2. Install fuel injectors to different cylinder.
3. Reconnect ECM harness connector and fuel injector harness connector.
4. Turn ignition switch ON.
5. Select “SELF DIAG RESULTS” mode with CONSULT-II.
6. Touch “ERASE”.
7. Perform EC-460, "DTC Confirmation Procedure" .
8. Is another DTC displayed?

Yes or No

Yes >> Replace fuel injector of malfunctioning cylinder.
No >> GO TO 5.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

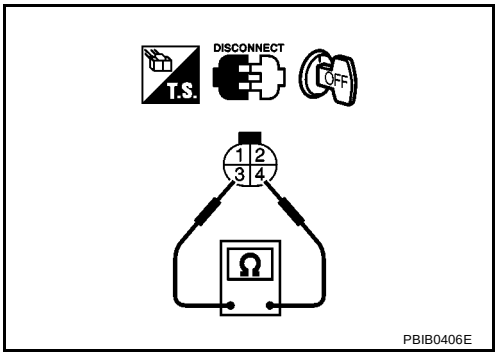
EBS0155Z

FUEL INJECTOR

1. Disconnect fuel injector.
2. Check continuity between terminals as shown in the figure.

Continuity should exist.

3. If NG, replace fuel injector.



Removal and Installation

EBS01560

FUEL INJECTOR

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

DTC P0217 ENGINE OVER TEMPERATURE

PFP:21481

System Description

EBS01561

NOTE:
If DTC P0217 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to **EC-416, "DTC U1000 CAN COMMUNICATION LINE"** **.**

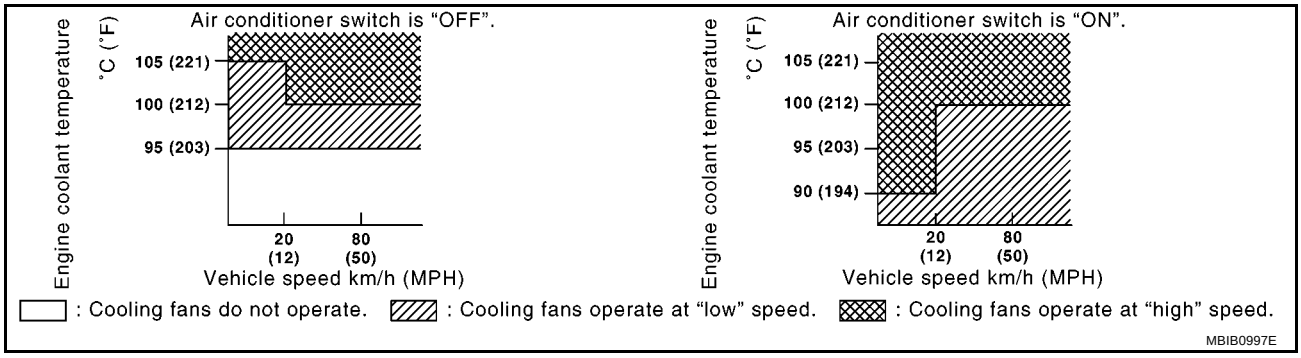
COOLING FAN CONTROL

Sensor	Input signal to ECM	ECM function	Actuator
Vehicle speed sensor*1	Vehicle speed	Cooling fan control	Cooling fan relay*2
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch*1	Air conditioner ON signal		

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

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

OPERATION



CONSULT-II Reference Value in Data Monitor Mode

EBS01562

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
COOLING FAN	● When cooling fan is stopped.	OFF
	● When cooling fans operate at low speed.	LOW
	● When cooling fans operate at high speed.	HI

On Board Diagnosis Logic

EBS01563

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0217	Engine over temperature (Overheat)	● Cooling fan does not operate properly (Overheat). ● Cooling fan system does not operate properly (Overheat). ● Engine coolant was not added to the system using the proper filling method. ● Engine coolant is not within the specified range.	● Harness or connectors (The cooling fan circuit is open or shorted.) ● Cooling fan ● Radiator hose ● Radiator ● Radiator cap ● Water pump ● Thermostat For more information, refer to EC-476, "Main 12 Causes of Overheating" .

Overall Function Check

EBS01564

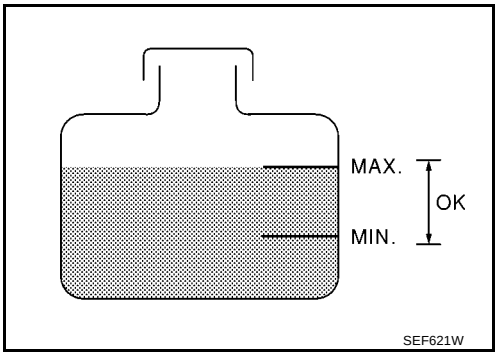
Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

WARNING:

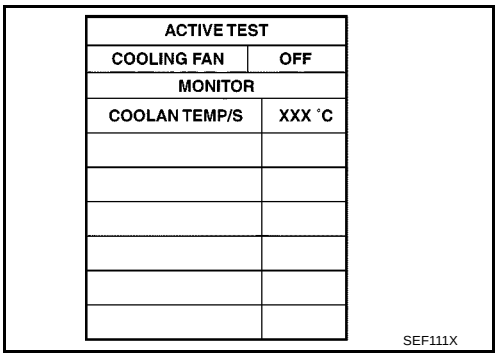
- **Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.**
- **Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.**

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-468, "Diagnostic Procedure" .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-468, "Diagnostic Procedure" .
3. Turn ignition switch ON.

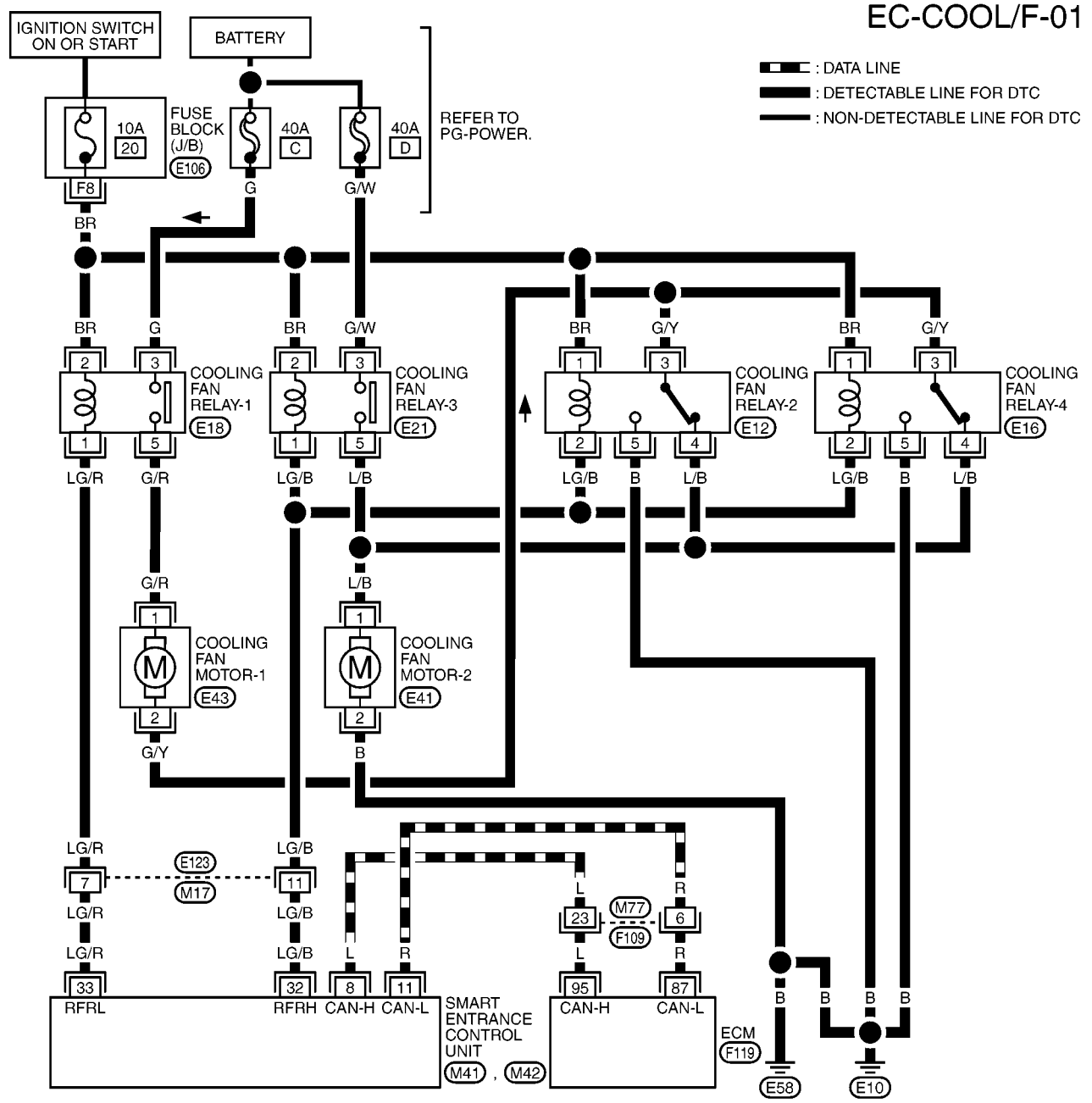


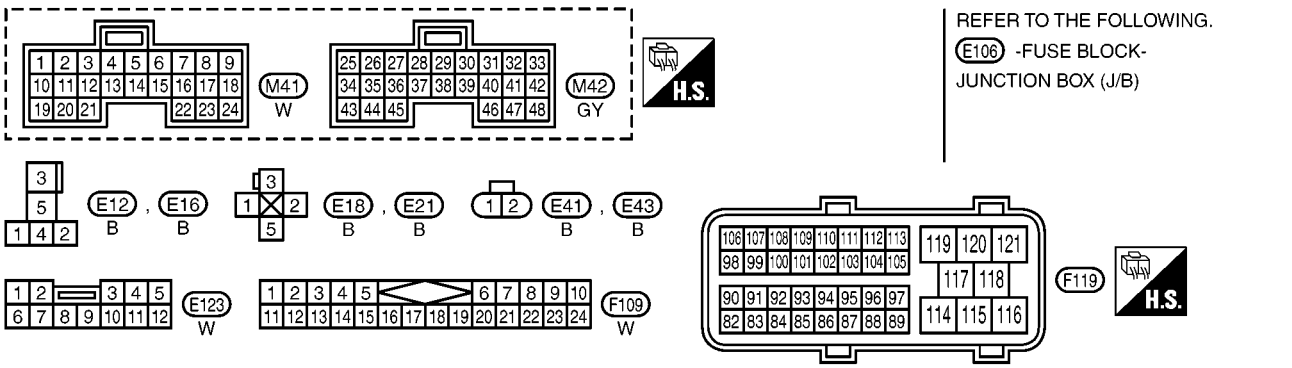
4. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II.
5. If the results are NG, go to EC-468, "Diagnostic Procedure" .



Wiring Diagram
LHD MODELS

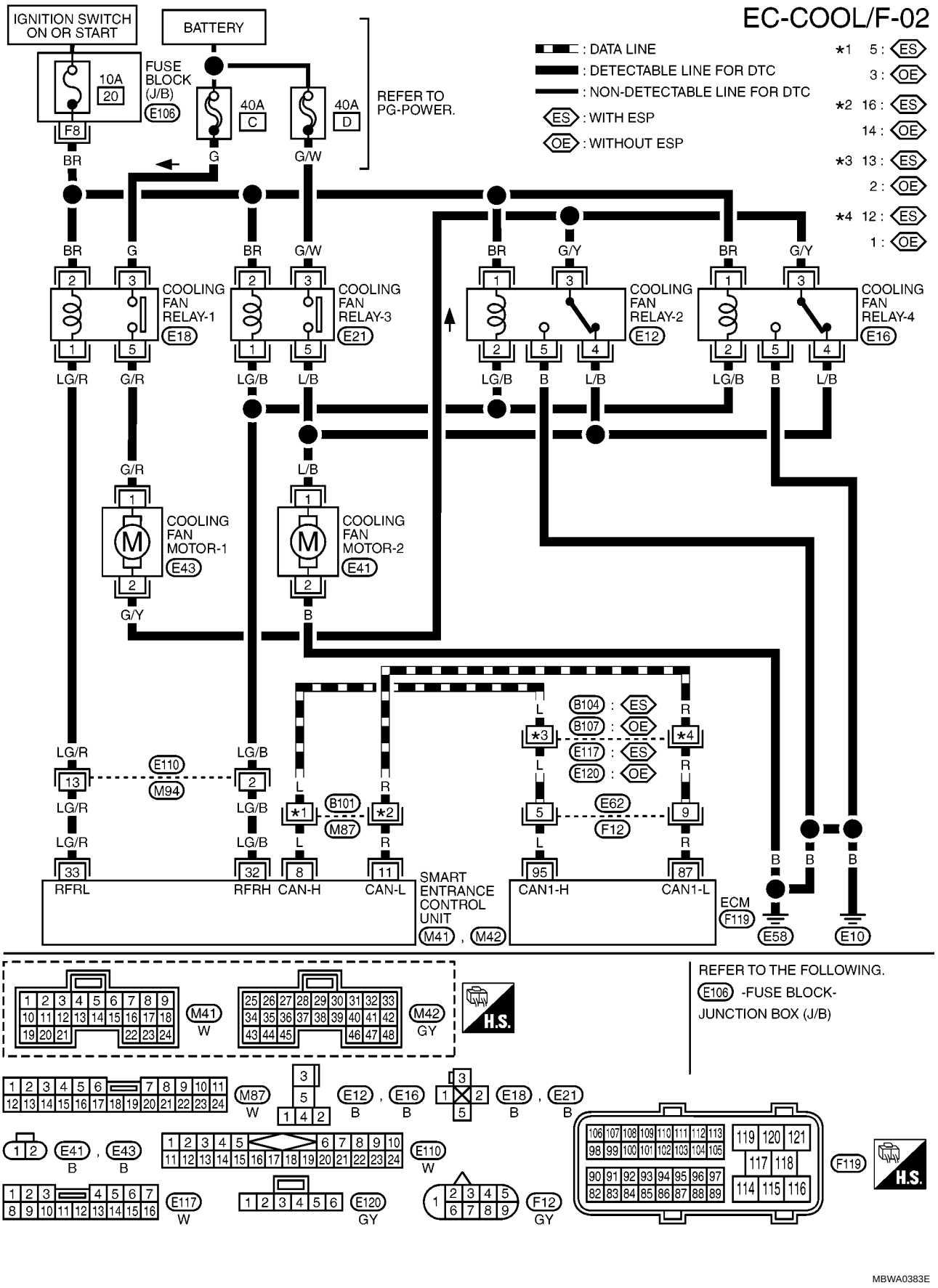
EBS01565





MBWA0382E

RHD MODELS



MBWA0383E

Diagnostic Procedure

EBS01566

1. CHECK COOLING FAN LOW SPEED OPERATION

With CONSULT-II

1. Turn ignition switch ON.
2. Perform “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 2.
NG >> Check cooling fan low speed control circuit. (Go to EC-470, "PROCEDURE A" .)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

2. CHECK COOLING FAN HIGH SPEED OPERATION-I

With CONSULT-II

1. Touch “HIGH”on the CONSULT-II screen.
2. Make sure that cooling fan-1 operates at higher speed than low speed.

OK or NG

OK >> GO TO 3.
NG >> Check cooling fan high speed control circuit-1. (Go to EC-472, "PROCEDURE B" .)

ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

3. CHECK COOLING FAN HIGH SPEED OPERATION-II

With CONSULT-II

Make sure that cooling fan-2 operates at higher speed than low speed.

OK or NG

OK >> GO TO 4.
NG >> Check cooling fan high speed control circuit-2. (Go to EC-474, "PROCEDURE C" .)

4. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

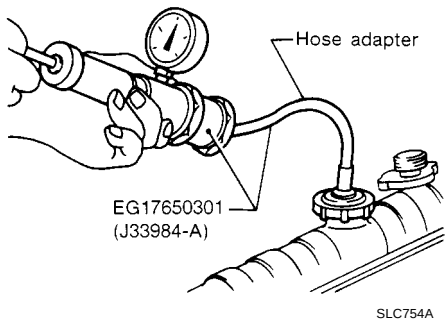
Testing pressure: 157 kPa (1.57 bar, 1.6 kg/cm^2 , 23psi)

CAUTION:
Higher than the specified pressure may cause radiator damage.

Pressure should not drop.

OK or NG

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



SLC754A

5. DETECT MALFUNCTIONING PART

Check the following for leak.

- Hose
- Radiator
- Water pump (Refer to CO-17, "WATER PUMP" .)

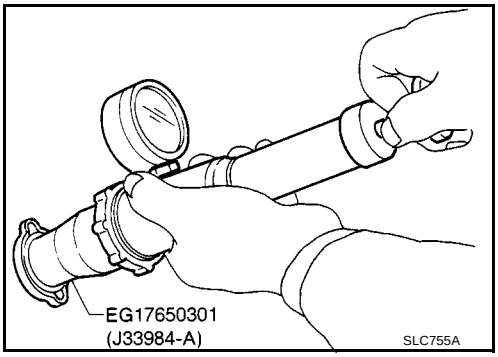
>> Repair or replace.

6. CHECK RADIATOR CAP

Apply pressure to cap with a tester and check radiator cap relief pressure.

Radiator cap relief pressure:

59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi)



OK or NG

OK >> GO TO 7.
NG >> Replace radiator cap.

7. CHECK THERMOSTAT

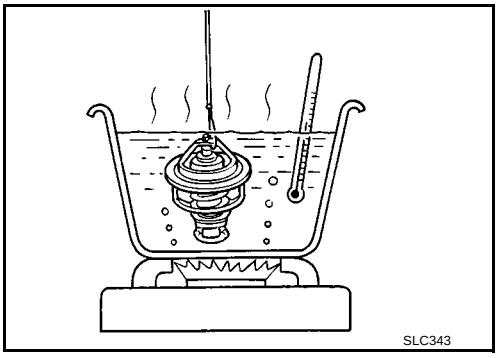
1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.
   It should seat tightly.
3. Check valve opening temperature and valve lift.

Valve opening temperature:

80.5 - 83.5 °C (177 - 182 °F)

Valve lift:

More than 8 mm/95 °C (0.31 in/203 °F)



4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to CO-19, "THERMOSTAT AND WATER PIPING" .

OK or NG

OK >> GO TO 8.
NG >> Replace thermostat.

8. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-441, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace engine coolant temperature sensor.

9. CHECK MAIN 12 CAUSES

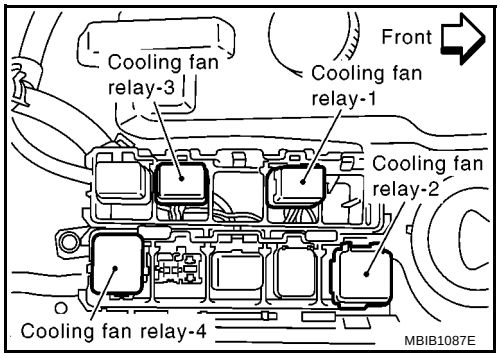
If the cause cannot be isolated, go to EC-476, "Main 12 Causes of Overheating" .

>> **INSPECTION END**

PROCEDURE A

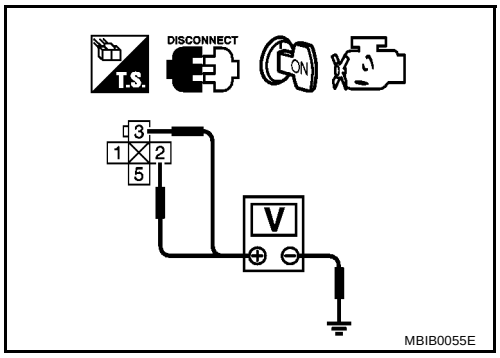
1. CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relay-1.
3. Turn ignition switch ON.



4. Check voltage between cooling fan relay-1 terminals 2, 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

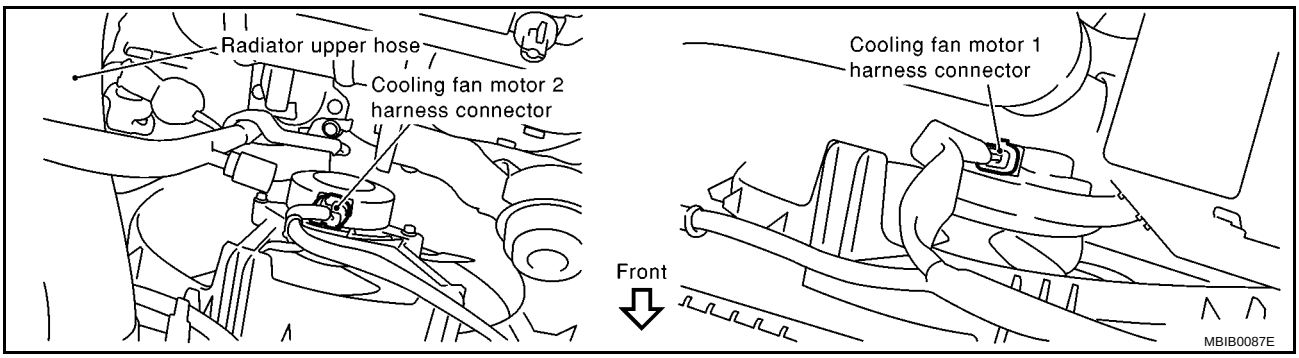
Check the following.

- Fuse block (J/B) connector E106
- 10A fuse
- 40A fusible link
- Harness for open or short between cooling fan relay-1 and fuse
- Harness for open or short between cooling fan relay-1 and battery

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

3. CHECK COOLING FAN MOTORS CONTROL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.



3. Disconnect cooling fan relay-2 and cooling fan relay-4.
4. Check harness continuity between the following.

- Cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1
- Cooling fan motor-1 terminal 2 and cooling fan relay-2 terminal 3
- Cooling fan motor-1 terminal 2 and cooling fan relay-4 terminal 3
- Cooling fan relay-2 terminal 4 and cooling fan motor-2 terminal 1
- Cooling fan relay-4 terminal 4 and cooling fan motor-2 terminal 1
- Cooling fan motor-2 terminal 2 and 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 MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

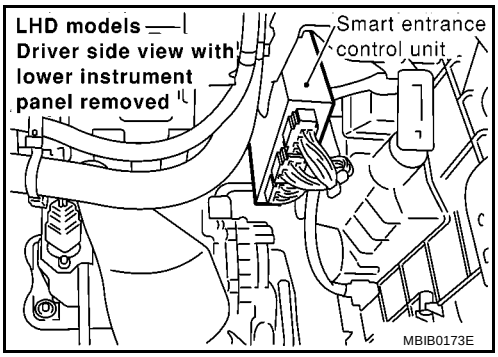
1. Disconnect smart entrance control unit harness connector.
2. Check harness continuity between cooling fan relay-1 terminal 1 and smart entrance control unit terminal 33.
   Refer to Wiring Diagram.

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 E123, M17 (LHD models)
- Harness connectors E110, M94 (RHD models)
- Harness for open or short between cooling fan relay-1 and smart entrance control unit

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

6. CHECK COOLING FAN RELAYS-1, -2 AND 4

Refer to EC-477, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace cooling fan relay.

7. CHECK COOLING FAN MOTORS-1 AND -2

Refer to EC-477, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace cooling fan motors.

8. CHECK SMART ENTRANCE CONTROL UNIT

Refer to BCS-21, "Trouble Diagnoses" .

OK or NG

OK >> GO TO 9.
NG >> Replace smart entrance control unit.

9. CHECK INTERMITTENT INCIDENT

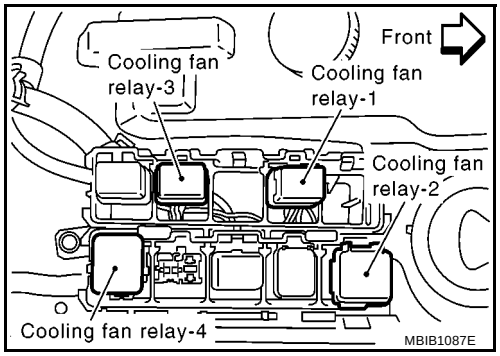
Perform EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

PROCEDURE B

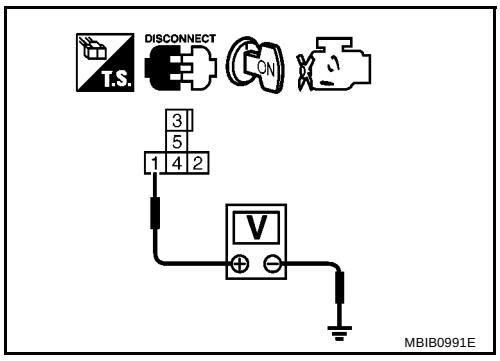
1. CHECK COOLING FAN RELAYS-2 AND -4 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relays-2 and -4.
3. Turn ignition switch ON.



4. Check voltage between cooling fan relays-2, -4 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.

- Fuse block (J/B) connector E106
- Harness for open or short between cooling fan relays-2, -4 and fuse

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

3. CHECK COOLING FAN RELAY GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between cooling fan relay-2 terminal 5 and ground, cooling fan relay-4 terminal 5 and ground.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to power.

OK or NG

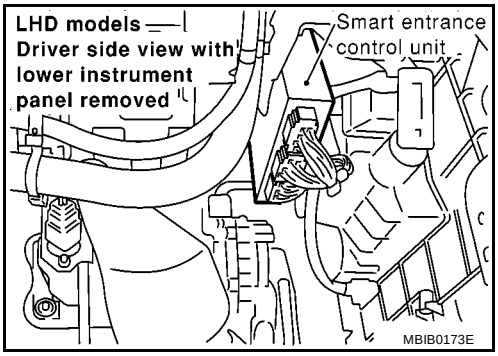
OK >> GO TO 4.
NG >> Repair open circuit or short to power in harness or connectors.

4. CHECK COOLING FAN MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect smart entrance control unit harness connector.
2. Check harness continuity between cooling fan relay-2 terminal 2 and smart entrance control unit terminal 32, cooling fan relay-4 terminal 2 and smart entrance control unit terminal 32.
   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 E123, M17 (LHD models)
- Harness connectors E110, M94 (RHD models)
- Harness for open or short between cooling fan relay-2 and smart entrance control unit
- Harness for open or short between cooling fan relay-4 and smart entrance control unit

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

6. CHECK COOLING FAN RELAYS-2 AND -4

Refer to EC-477, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace cooling fan relays.

7. CHECK SMART ENTRANCE CONTROL UNIT

Refer to BCS-21, "Trouble Diagnoses" .

OK or NG

OK >> GO TO 8.
NG >> Replace smart entrance control unit.

8. CHECK INTERMITTENT INCIDENT

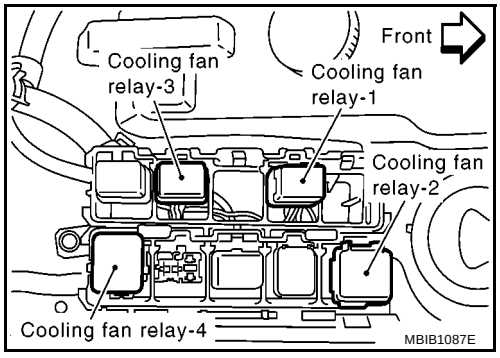
Perform EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

PROCEDURE C

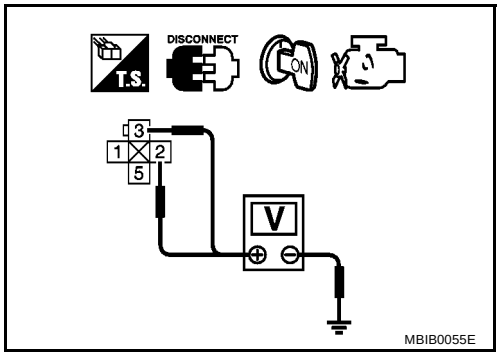
1. CHECK COOLING FAN MOTOR-2 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relay-3.
3. Turn ignition switch ON.



4. Check voltage between cooling fan relay-3 terminals 2, 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

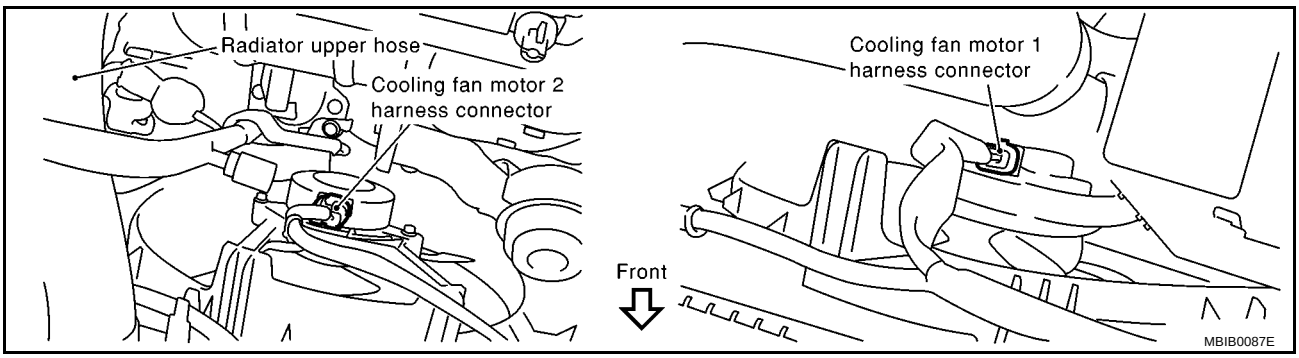
Check the following.

- Fuse block (J/B) connector E106
- 40A fusible link
- Harness for open or short between cooling fan relay-3 and fuse
- Harness for open or short between cooling fan relay-3 and battery

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

3. CHECK COOLING FAN MOTOR CONTROL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-2 harness connector.



3. Check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground short to power in harness or connectors.

4. CHECK COOLING FAN MOTOR CONTROL CIRCUIT FOR SHORT TO GROUND

Check harness continuity between cooling fan relay-3 terminal 5 or cooling fan motor-2 terminal 1 and ground. Refer to Wiring Diagram.

Continuity should not exist.

OK or NG

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

5. DETECT MALFUNCTIONING PART

Check the following.

- Cooling fan relays-2 and -4 (Refer to EC-477, "Component Inspection")
- Harness for short to ground between cooling fan relay-2 and cooling fan motor-2
- Harness for short to ground between cooling fan relay-3 and cooling fan motor-2
- Harness for short to ground between cooling fan relay-4 and cooling fan motor-2

>> Repair or replace.

6. CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

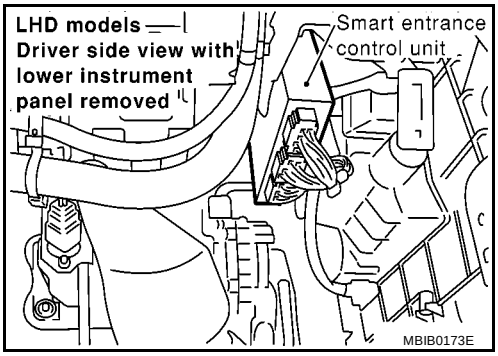
1. Disconnect smart entrance control unit harness connector.
2. Check harness continuity between cooling fan relay-3 terminal 1 and smart entrance control unit terminal 32. Refer to Wiring Diagram.

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 E123, M17 (LHD models)
- Harness connectors E110, M94 (RHD models)
- Harness for open or short between cooling fan relay-3 and smart entrance control unit

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

8. CHECK COOLING FAN RELAY-3

Refer toEC-477, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace cooling fan relay.

9. CHECK SMART ENTRANCE CONTROL UNIT

Refer to BCS-21, "Trouble Diagnoses" .

OK or NG

OK >> GO TO 10.
NG >> Replace smart entrance control unit.

10. CHECK INTERMITTENT INCIDENT

Perform EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Main 12 Causes of Overheating

EBS01567

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper	● Visual	No blocking	—
	2	● Coolant mixture	● Coolant tester	50 - 50% coolant mixture	See MA-16, "Engine Coolant Mixture Ratio" .
	3	● Coolant level	● Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See CO-8, "LEVEL CHECK" .
	4	● Radiator cap	● Pressure tester	59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi) (Limit)	See MA-19, "CHECKING RADIATOR CAP" .
ON*2	5	● Coolant leaks	● Visual	No leaks	See CO-8, "LEAK CHECK" .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See CO-19, "THERMOSTAT AND WATER PIPING" , and CO-13, "RADIATOR (ALUMINUM TYPE)" .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P0217 (EC-464).
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See MA-17, "Changing Engine Coolant" .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See CO-8, "LEVEL CHECK" .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	SeeEM-78, "CYLINDER HEAD" .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See EM-93, "CYLINDER BLOCK" .

*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-5, "OVERHEATING CAUSE ANALYSIS" .

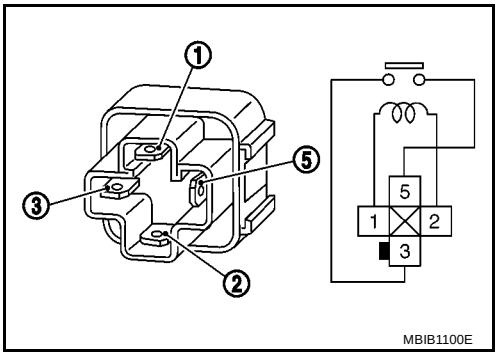
Component Inspection

EBS01568

COOLING FAN RELAYS-1 AND -3

Check continuity between terminals 3 and 5 under the following conditions.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

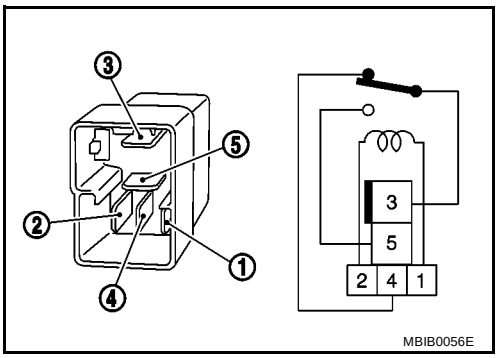


MBIB1100E

COOLING FAN RELAYS-2 AND -4

Check continuity between terminals 3 and 4, 3 and 5 under the following conditions.

Conditions	Terminals	Continuity
12V direct current supply between terminals 1 and 2	3 and 4	No
	3 and 5	Yes
No current supply	3 and 4	Yes
	3 and 5	No

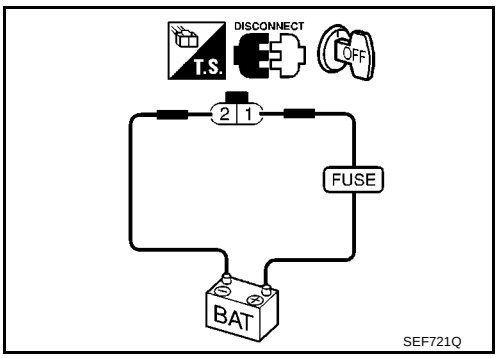


MBIB0056E

COOLING FAN MOTORS-1 AND -2

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Terminals	
	(+)	(-)
Cooling fan motor	1	2



SEF721Q

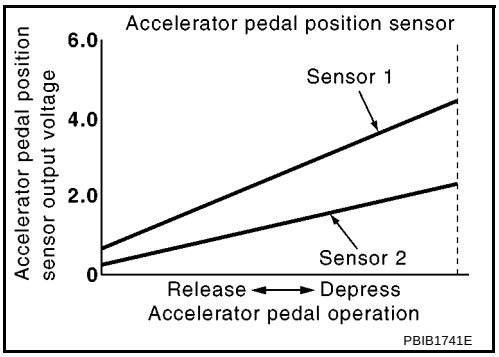
DTC P0222, P0223 APP SENSOR

PFP:18002

Description

EBS01569

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS0156A

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS0156B

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS0156C

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222	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)
P0223	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

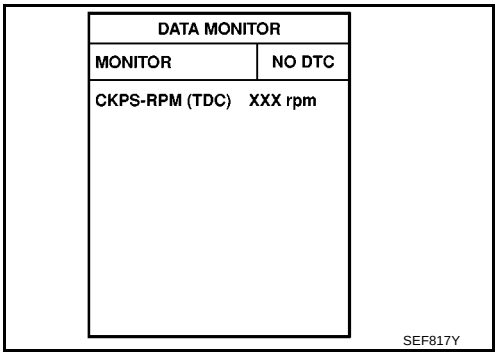
DTC Confirmation Procedure

EBS0156D

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

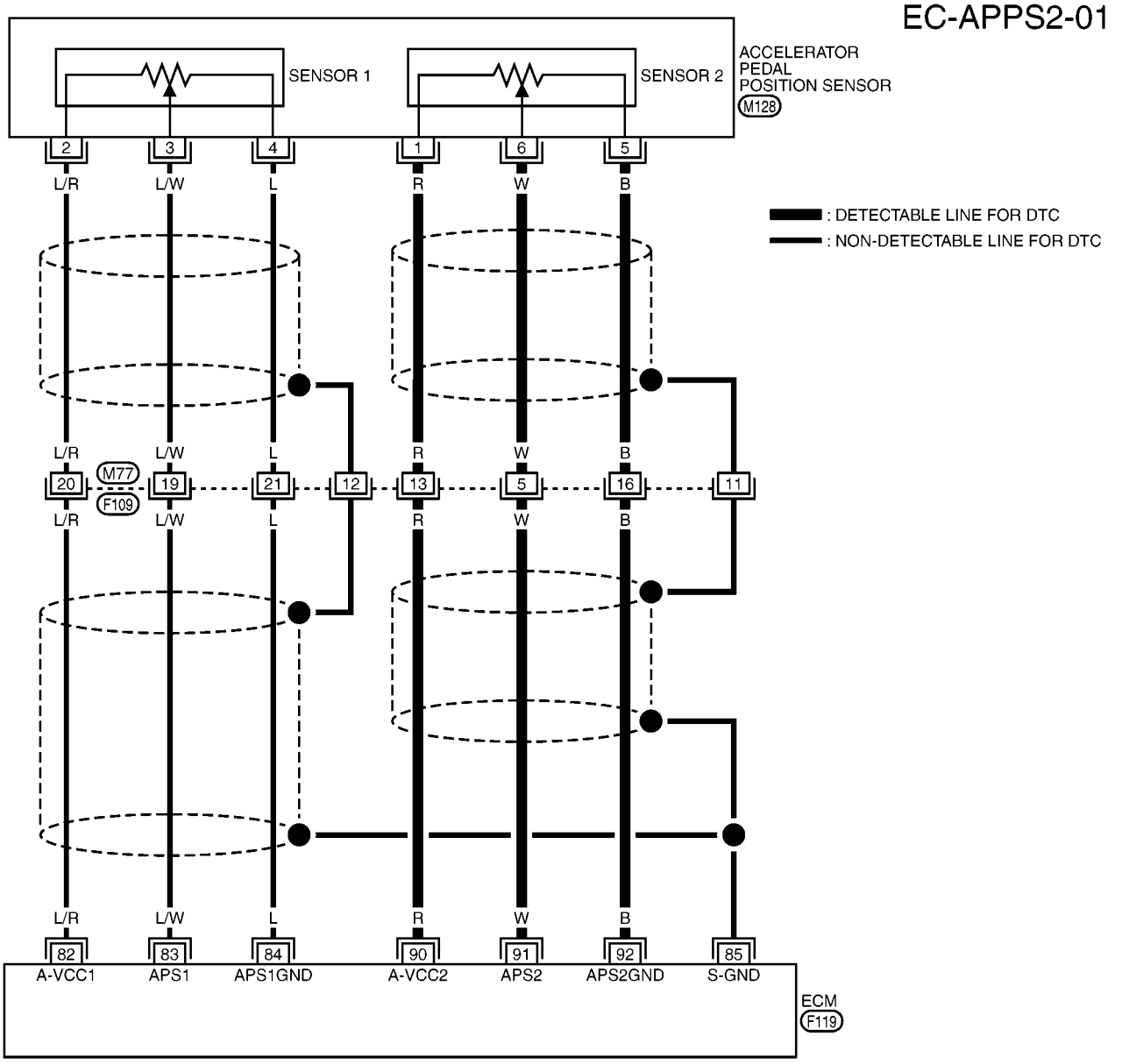
WITH CONSULT-II

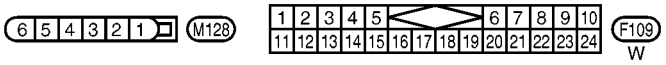
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-481, "Diagnostic Procedure" .

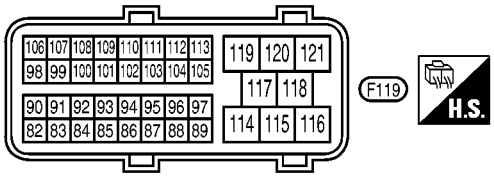


Wiring Diagram

EBS0156E







MBWA0432E

Diagnostic Procedure

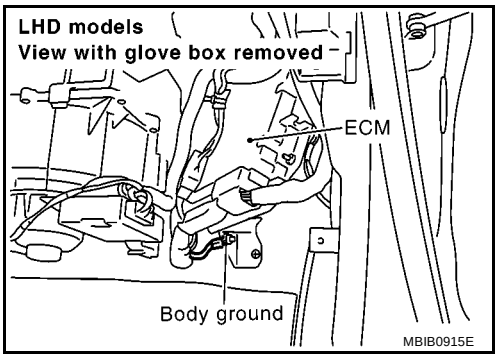
EBS0156F

1. CHCEK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

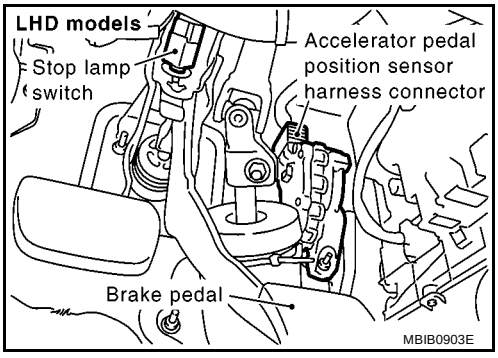
OK or NG

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



2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

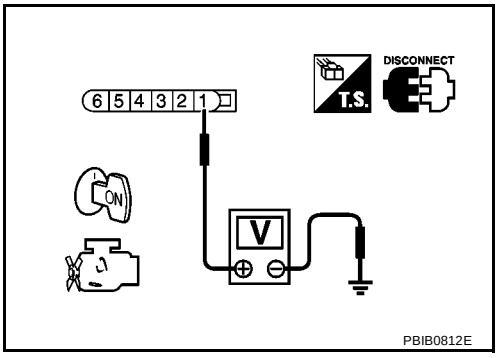


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F109, M77
- Harness for open or short between ECM and APP 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. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 92.
   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 F109, M77
- Harness for open or short between ECM and APP 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. Check harness continuity between ECM terminal 91 and APP sensor terminal 6.
   Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F109, M77
- Harness for open or short between ECM and APP sensor

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

8. CHECK APP SENSOR

Refer to EC-482, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

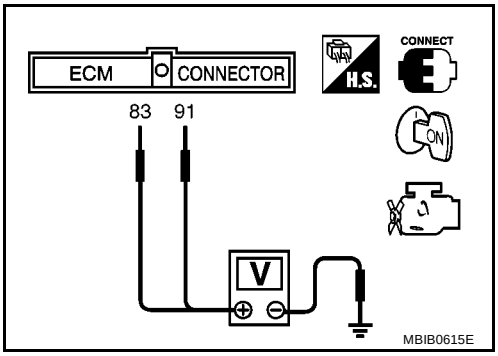
EBS0156G

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and body ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.3V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V



4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS0156H

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

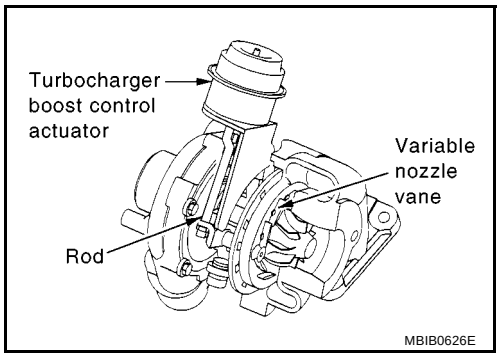
DTC P0234 TC SYSTEM

PFP:14411

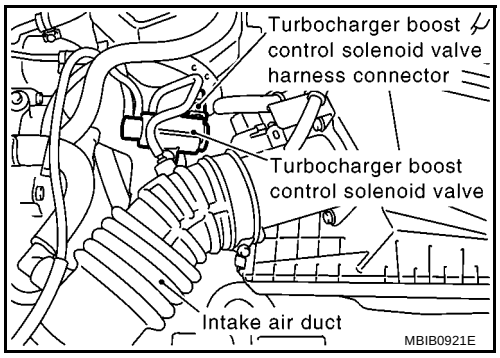
Description

EBS0156I

The load from the turbocharger boost control solenoid valve controls the actuator. By changing the variable nozzle vane opening through the rods, the intake air volume is adjusted.



The turbocharger boost control solenoid valve is moved by ON/OFF pulse from the ECM. The longer the ON pulse, the charge air pressure rises.



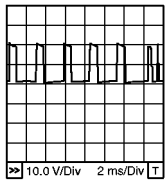
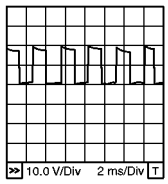
ECM Terminals and Reference Value

EBS0156J

Specification data are reference valves, and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
6	L	Turbocharger boost control solenoid valve	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0889E
			[Ignition switch ON] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0890E

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

On Board Diagnosis Logic

EBS0156K

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

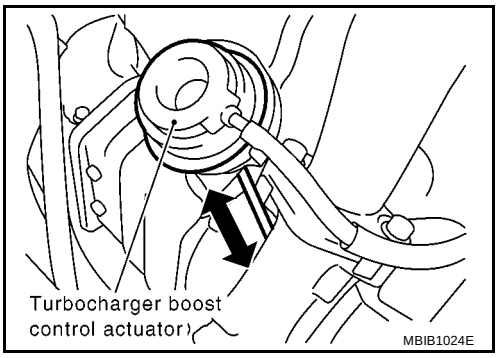
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0234	Turbocharger overboost condition	ECM detects turbocharger boost pressure is excessively high.	● Turbocharger ● Vacuum pump ● Turbocharger boost sensor ● Turbocharger boost control solenoid valve

Overall Function Check

EBS0156L

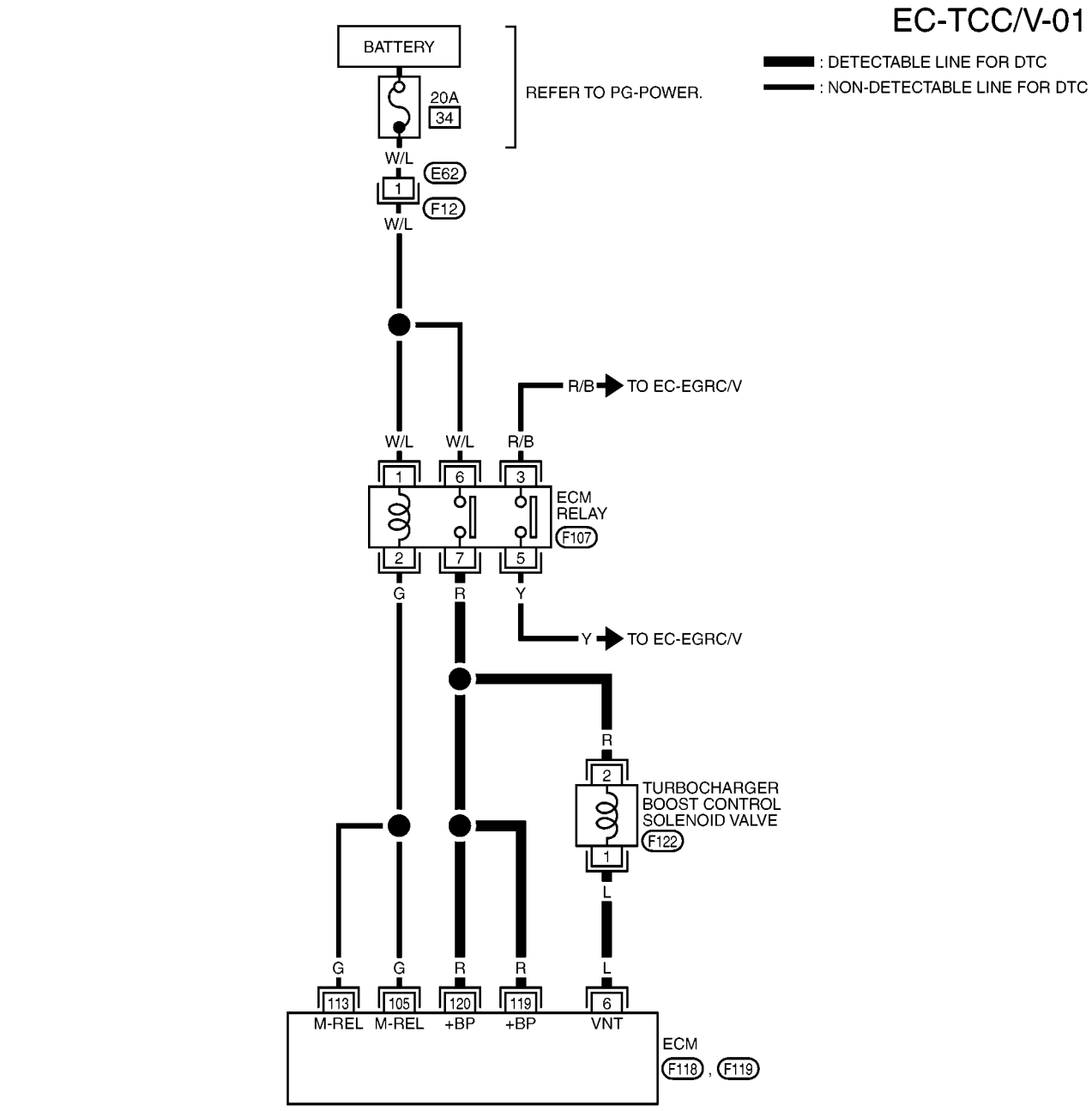
Use this procedure to check the overall function of the turbocharger. During this check, a DTC might not be confirmed.

1. Start engine and let it idle.
2. Make sure that turbocharger control actuator rod moves slightly when engine is started.
3. If NG, go to EC-487, "Diagnostic Procedure" .



Wiring Diagram

EBS0156M



MBWA0617E

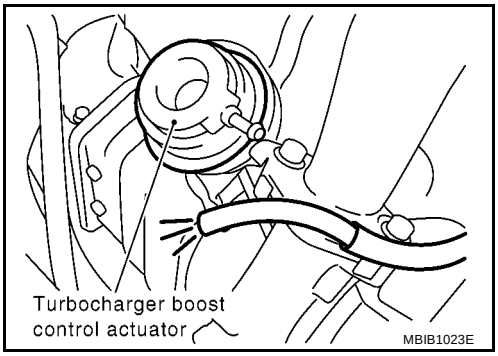
Diagnostic Procedure

EBS0156N

1. CHECK VACUUM SOURCE

1. Turn ignition switch OFF.
2. Disconnect vacuum hose connected to turbocharger control actuator.
3. Start engine and let it idle.
4. Check vacuum hose for vacuum existence.

Vacuum should exist.

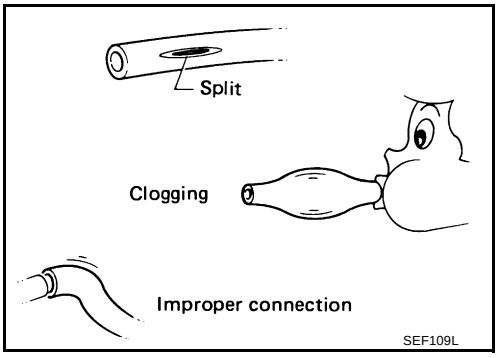


OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

2. CHECK VACUUM HOSES AND VACUUM GALLERY

1. Turn ignition switch OFF.
2. Check vacuum hoses and vacuum gallery for clogging, cracks or improper connection. Refer to EC-361, "Vacuum Hose Drawing" .

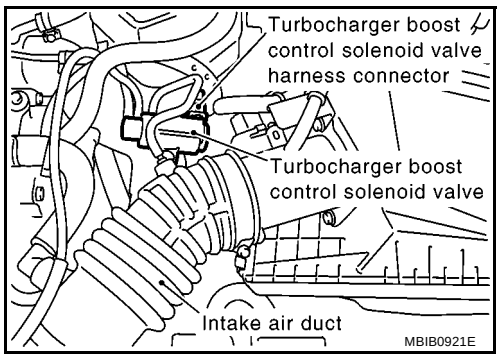


OK or NG

OK >> GO TO 3.
NG >> Repair or replace vacuum hoses and vacuum gallery.

3. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect turbocharger boost control solenoid valve harness connector.
2. Turn ignition switch ON.

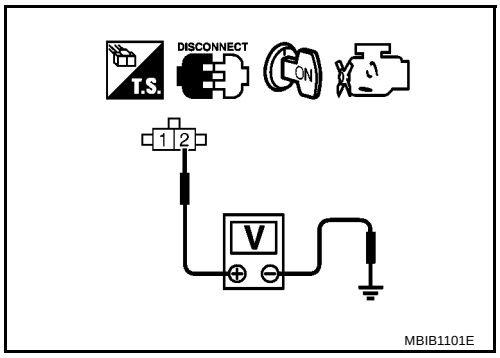


3. Check voltage between turbocharger boost control solenoid valve terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage

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 TURBOCHARGER BOOST 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 terminals 6 and turbocharger boost 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 >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK TURBOCHARGE BOOST CONTROL SOLENOID VALVE

Refer to EC-489, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace turbocharger boost control solenoid valve.

6. CHECK VACUUM PUMP

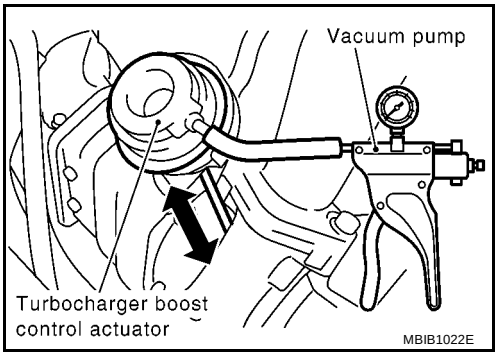
Refer to EM-35, "VACUUM PUMP" .

OK or NG

OK >> GO TO 7.
NG >> Replace vacuum pump assembly.

7. CHECK TURBOCHARGER BOOST CONTROL ACTUATOR

1. Turn ignition switch OFF.
2. Install a vacuum pump to turbocharger boost control actuator.
3. Make sure that the turbocharger boost control actuator rod moves smoothly when applying vacuum of -53.3kPa (-533mbar, -400mmHg, -15.75inHg) and releasing it.



OK or NG

OK >> GO TO 8.
NG >> Replace turbocharger assembly.

8. CHECK TURBOCHARGER BOOST SENSOR

Refer to EC-494, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace turbocharger boost sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

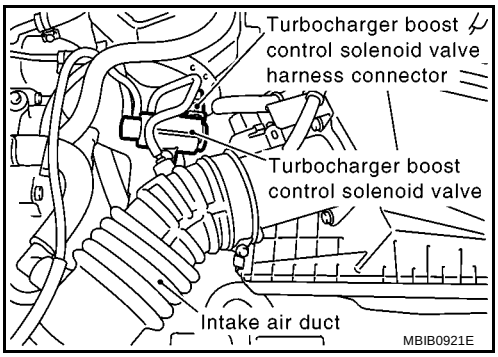
>> **INSPECTION END**

Component Inspection

EBS0156O

TURBOCHARGER BOOST CONTROL SOLENOID VALVE

1. Disconnect turbocharger boost control solenoid valve harness connector.

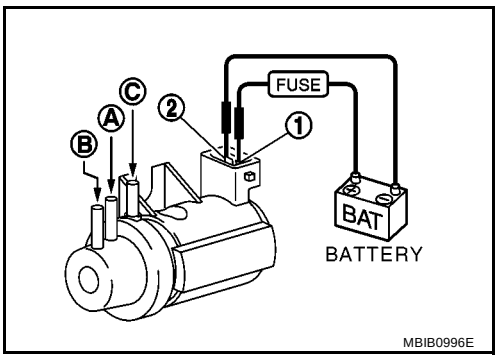


2. Apply 12V direct current between turbocharger boost control solenoid valve terminals.
3. Check air passage continuity of turbocharger boost control solenoid valve under the following conditions.

CONDITIONS	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.

If NG, replace turbocharger boost control solenoid valve.



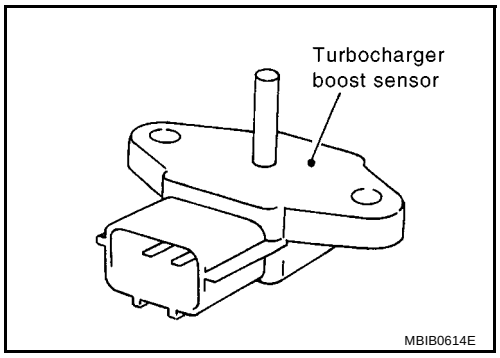
DTC P0237, P0238 TC BOOST SENSOR

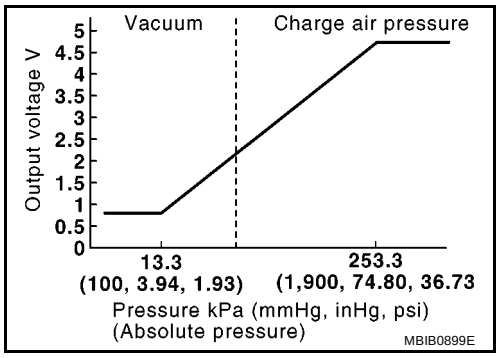
PFP:22365

Component Description

EBS0156P

The turbocharger boost sensor detects pressure in the exit side of the charge air cooler. The sensor output voltage to the ECM increases as pressure increases.





CONSULT-II Reference Value in Data Monitor Mode

EBS0156Q

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/M PRES SE [kPa]	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	Approx. 100 kPa
		2,800 rpm	Approx. 126 kPa
		4,000 rpm	Approx. 106 kPa

ECM Terminals and Reference Value

EBS0156R

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 damage the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
52	Y	Turbocharger boost sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	2.3 - 2.6V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	2.5 - 2.8V
64	W	Turbocharger boost sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
71	B	Turbocharger boost sensor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS0156S

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0237	Turbocharger boost sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Turbocharger boost sensor
P0238	Turbocharger boost sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

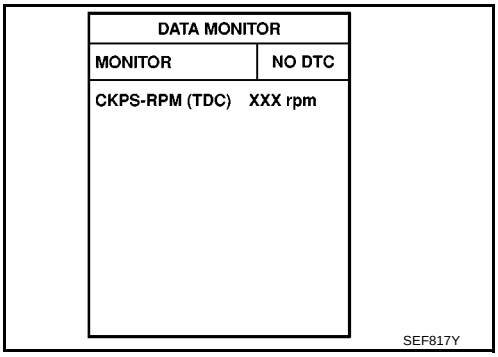
DTC Confirmation Procedure

EBS0156T

NOTE:
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-493, "Diagnostic Procedure" .

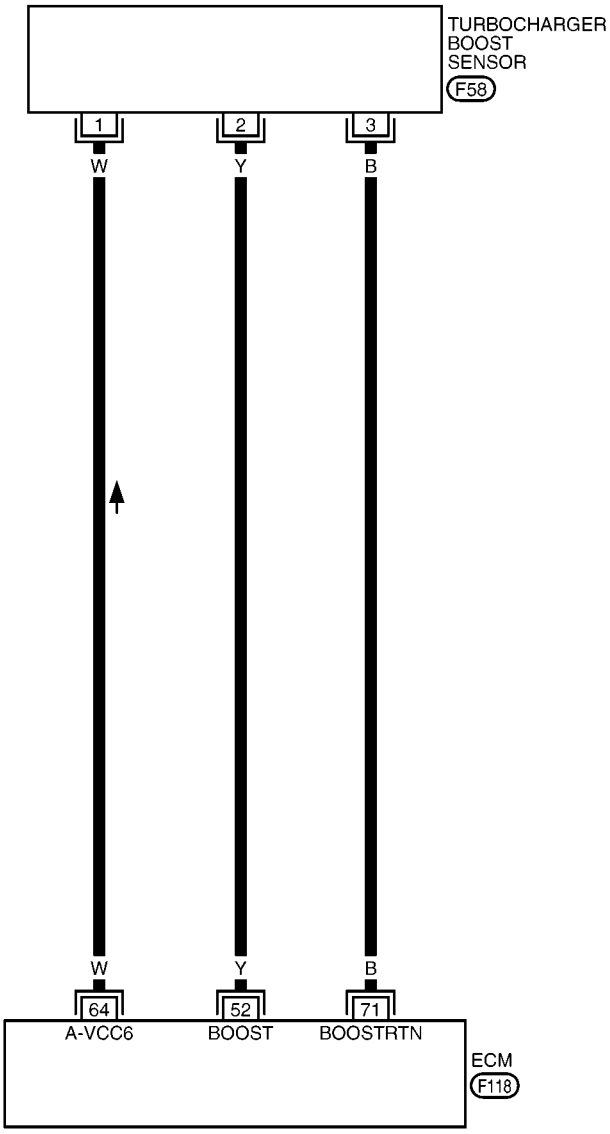


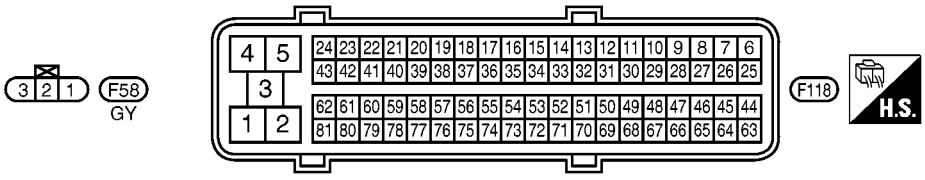
Wiring Diagram

EBS0156U

EC-BOOST-01

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





MBWA0378E

Diagnostic Procedure

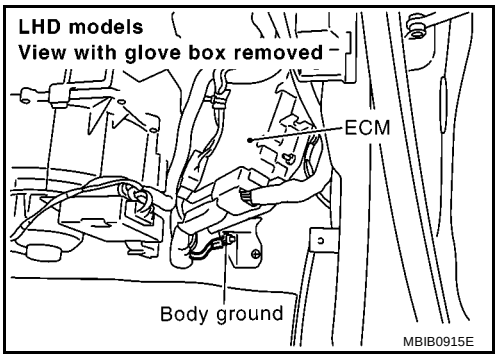
EBS0156V

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

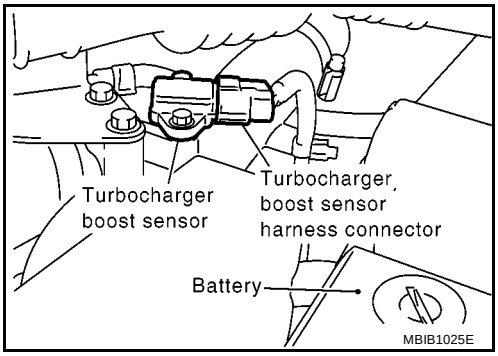
OK or NG

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



2. CHECK TURBOCHARGER BOOST SENSOR POWER SUPPLY CIRCUIT

1. Disconnect turbocharge boost sensor harness connector.
2. Turn ignition switch ON.

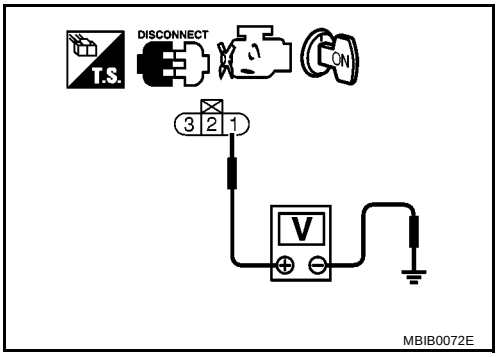


3. Check voltage between turbocharge boost sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 TURBOCHAGER BOOST SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between turbocharger boost sensor terminal 3 and ECM terminal 71. 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 TURBOCHAGER BOOST SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 52 and turbocharger boost sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. CHECK TURBOCHARGER BOOST SENSOR

Refer to EC-494, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace turbocharger boost sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

EBS0156W

CHECK TURBOCHARGER BOOST SENSOR

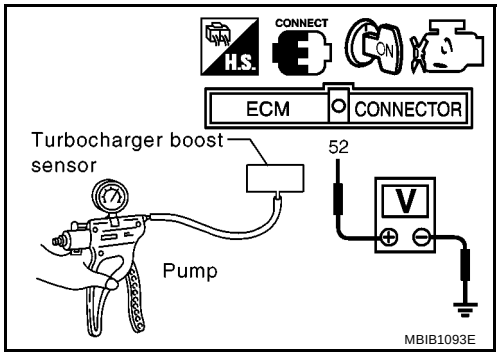
1. Remove turbocharger boost sensor with its harness connected.
2. Turn ignition switch ON.
3. Use pump to apply pressure sensor as shown in the figure.

CAUTION:

- **Always calibrate the pressure pump gauge when using it.**
- **Inspection should be done at room temperature [10-30°C (50-86°F)].**

4. Check the output voltage between turbocharger boost sensor terminal 2 and body ground.

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mbar, 0 mmHg, 0 inHg)	Approximately 2.3V
+40 kPa (400 mbar, 300mmHg, 11.81 inHg)	Approximately 2.9V



Removal and Installation

EBS0156X

TURBOCHARGER BOOST SENSOR

Refer to
EM-17, "CHARGE AIR COOLER".

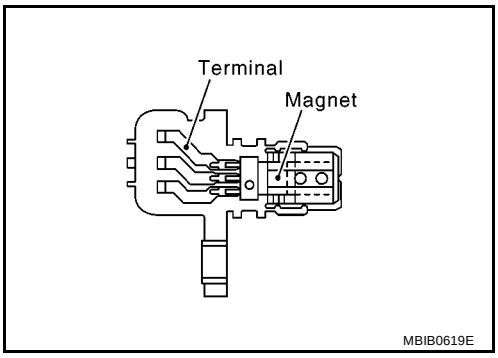
DTC P0335 CKP SENSOR

PFP:23731

Description

EBS0156Y

The crankshaft position sensor monitors engine speed by means of signals from the sensing plate (with 56 protrusions) installed to the fly wheel. The datum signal output is detected 6° signal and sent to the ECM. The sensor signal is used for fuel injection control and fuel injection timing control.



MBIB0619E

CONSULT-II Reference Value in Data Monitor Mode

EBS0156Z

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
CKPS-RPM (TDC)	● Run engine and compare CONSULT-II value with the tachometer indication.	Almost the same speed as the tachometer indication

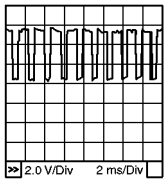
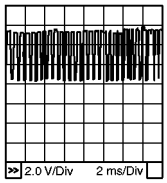
ECM Terminals and Reference Value

EBS01570

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
44	L	Crankshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
46	L/W	Crankshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0879E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0880E
65	L/R	Crankshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V

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

On Board Diagnosis Logic

EBS01571

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335	Crankshaft position sensor circuit	Crankshaft position sensor signal is not detect by the ECM when engine is running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Crankshaft position sensor

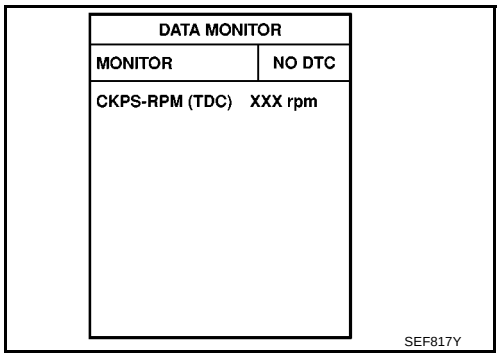
DTC Confirmation Procedure

EBS01572

NOTE:
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

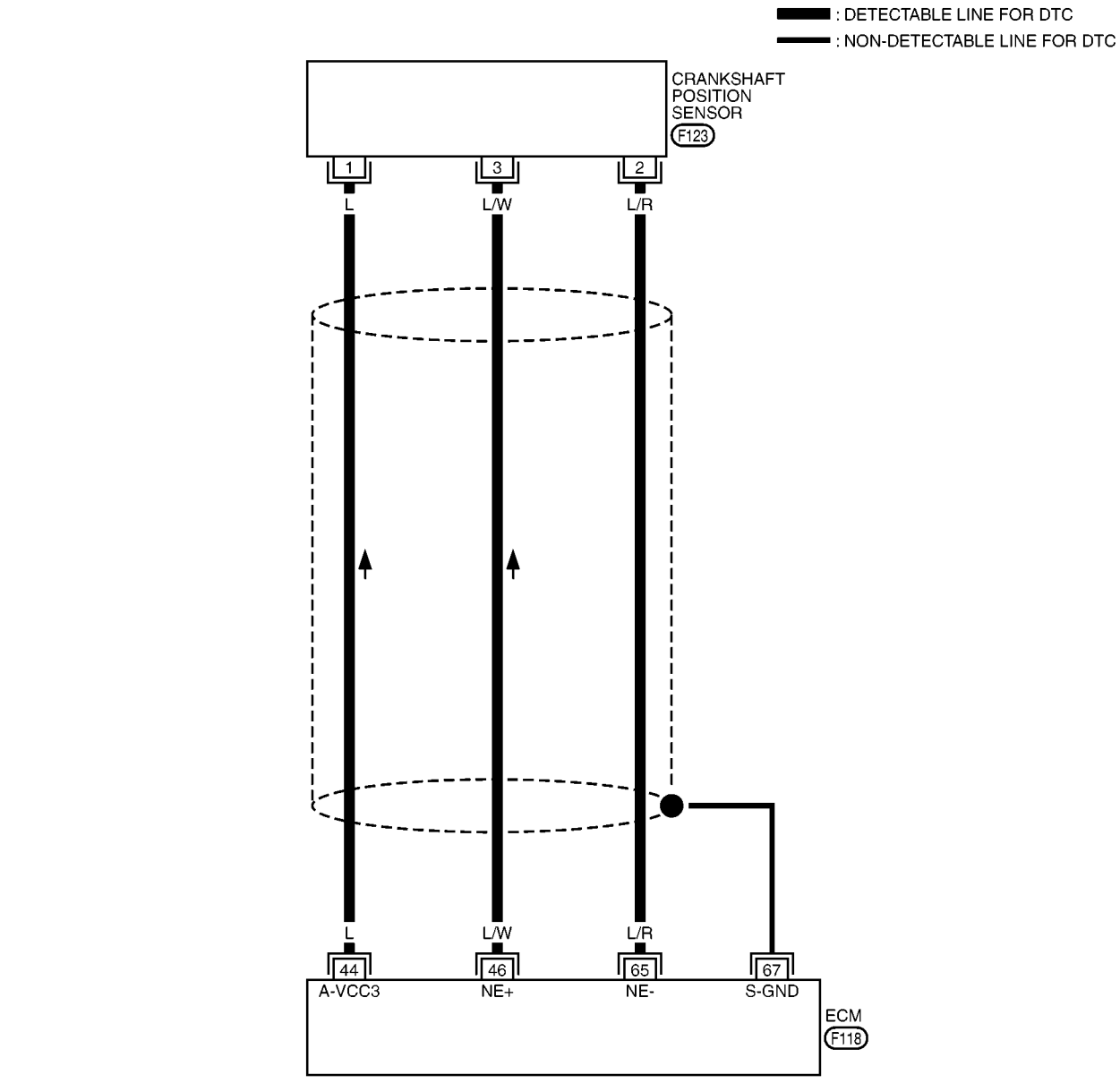
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
   If engine could not start, keep ignition switch at START position for 5 seconds.
4. If DTC is detected, go to EC-498, "Diagnostic Procedure" .

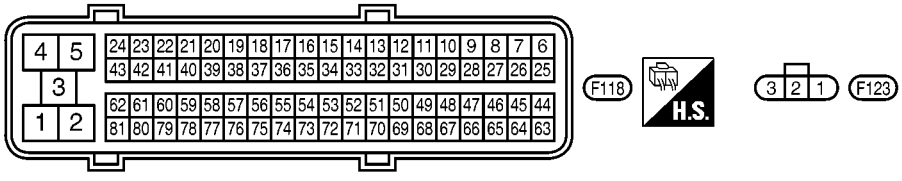


Wiring Diagram

EBS01573

EC-CKPS-01





MBWA0379E

Diagnostic Procedure

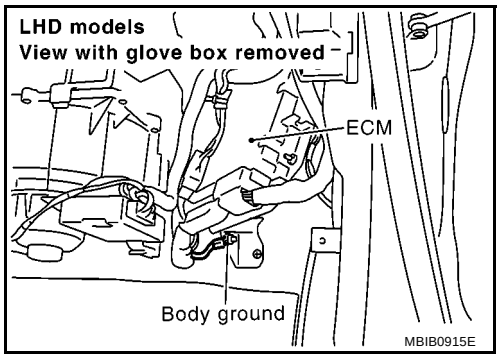
EBS01574

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

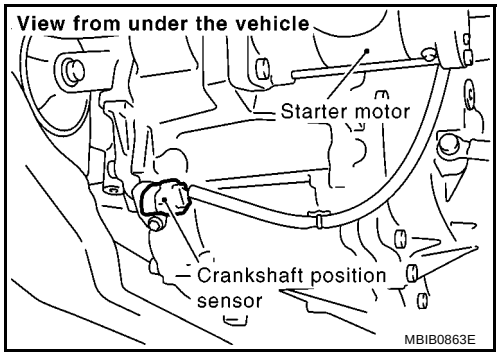
OK or NG

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



2. CHECK CKP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position sensor harness connector.
2. Turn ignition switch ON.

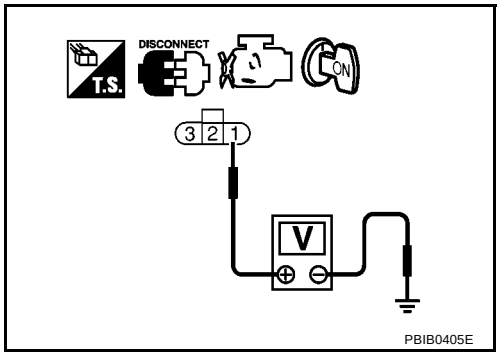


3. Check voltage between CKP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 CKP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 65 and CKP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for and 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 CKP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 46 and CKP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

5. CHECK CRANKSHAFT POSITION SENSOR

Refer to EC-499, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace crankshaft position sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

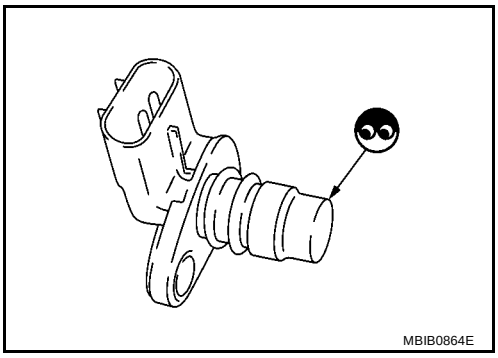
>> **INSPECTION END**

Component Inspection

EBS01575

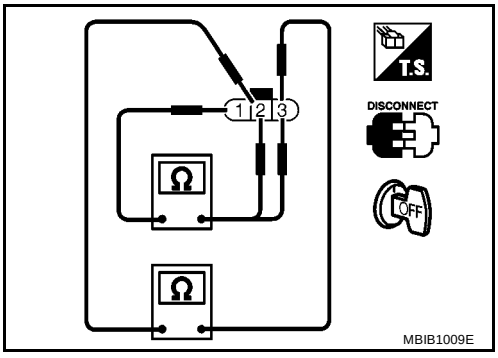
CRANKSHAFT POSITION SENSOR

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.


MBIB0864E

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0
1 (+) - 3 (-)	Except 0 or ∞
2 (+) - 3 (-)	Except 0



MBIB1009E

6. If NG, replace crankshaft position sensor.

Removal and Installation

EBS01576

CRANKSHAFT POSITION SENSOR

Refer to EM-29, "OIL PAN AND OIL STRAINER" .

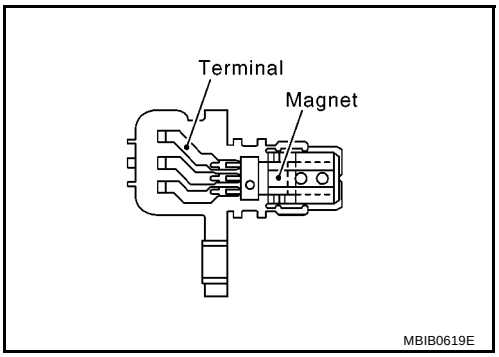
DTC P0336 CKP SENSOR

PFP:23731

Description

EBS01577

The crankshaft position sensor monitors engine speed by means of signals from the sensing plate (with 56 protrusions) installed to the fly wheel. The datum signal output is detected 6° signal and sent to the ECM. The sensor signal is used for fuel injection control and fuel injection timing control.



CONSULT-II Reference Value in Data Monitor Mode

EBS01578

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
CKPS·RPM (TDC)	● Tachometer: Connect ● Run engine and compare CONSULT-II value with the tachometer indication.	Almost the same speed as the tachometer indication.

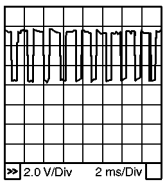
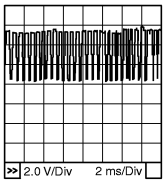
ECM Terminals and Reference Value

EBS01579

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
44	L	Crankshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
46	L/W	Crankshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0879E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0880E
65	L/R	Crankshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V

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

On Board Diagnosis Logic

EBS0157A

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0336	Crankshaft position sensor circuit range/performance	Crankshaft position sensor signal is not in the normal pattern when engine is running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Crankshaft position sensor ● Signal plate

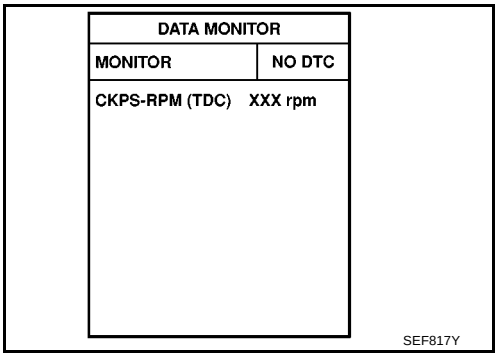
DTC Confirmation Procedure

EBS0157B

NOTE:
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

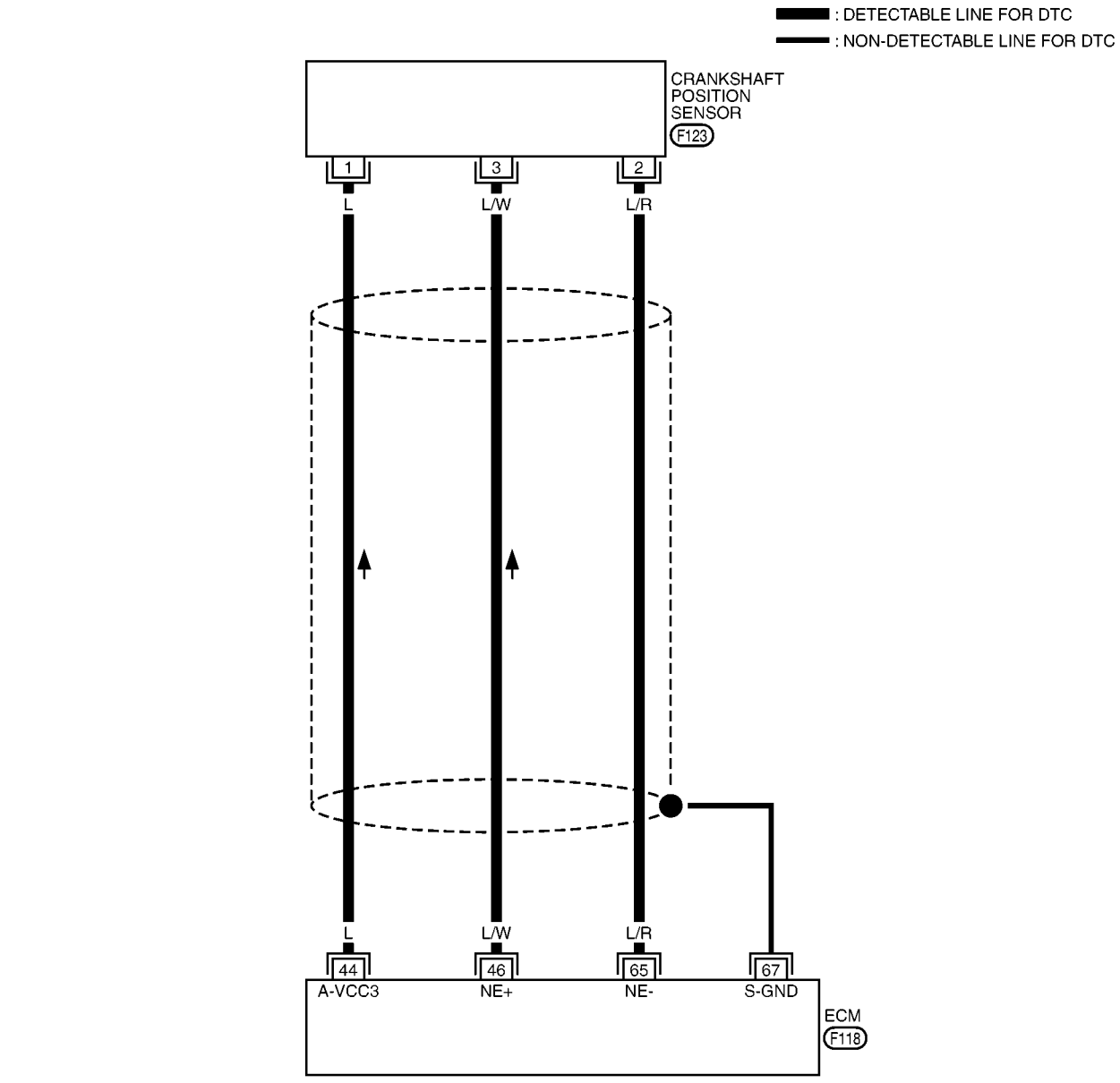
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
   If engine could not start, keep ignition switch at START position for 5 seconds.
4. If DTC is detected, go to EC-503, "Diagnostic Procedure" .

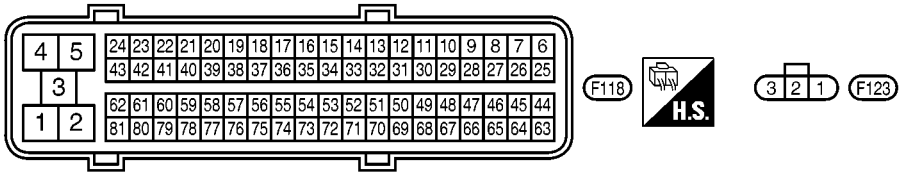


Wiring Diagram

EBS0157C

EC-CKPS-01





MBWA0379E

Diagnostic Procedure

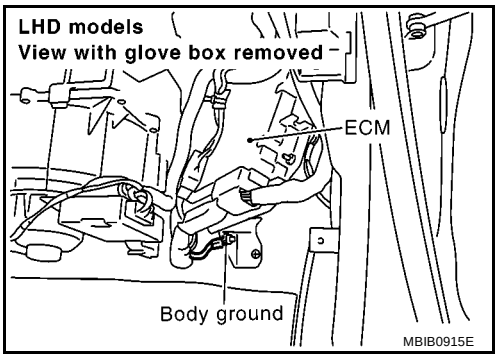
EBS0157D

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

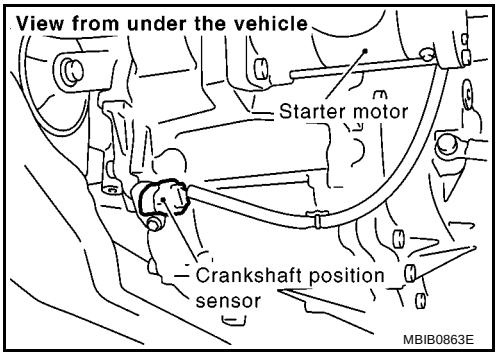
OK or NG

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



2. CHECK CKP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position sensor harness connector.
2. Turn ignition switch ON.



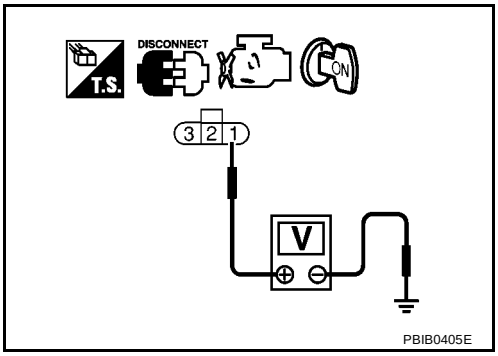
3. Check voltage between CKP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 CKP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 65 and CKP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for and 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 CKP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 46 and CKP sensor terminal 3.
   Refer to Wiring Diagram.

   Continuity should exist.

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

OK or NG

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

5. CHECK CRANKSHAFT POSITION SENSOR

Refer to EC-504, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace crankshaft position sensor.

6. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 7.
NG >> Replace the signal plate.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

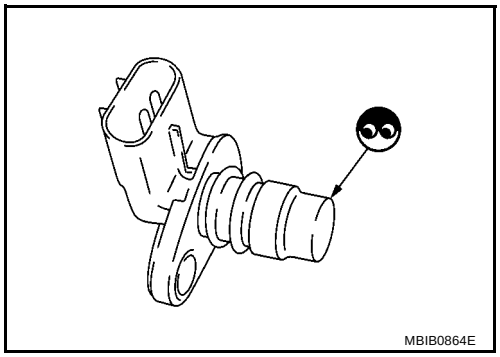
>> **INSPECTION END**

Component Inspection

EBS0157E

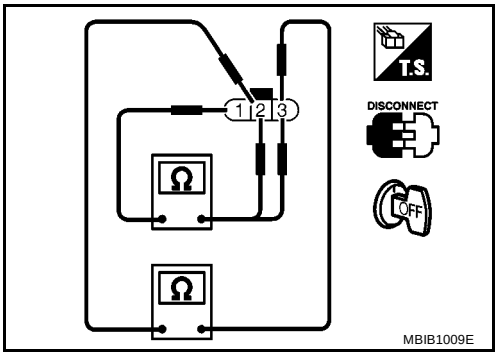
CRANKSHAFT POSITION SENSOR

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.


MBIB0864E

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0
1 (+) - 3 (-)	Except 0 or ∞
2 (+) - 3 (-)	Except 0



EBS0157F

6. If NG, replace crankshaft position sensor.

Removal and Installation

CRANKSHAFT POSITION SENSOR

Refer to EM-29, "OIL PAN AND OIL STRAINER" .

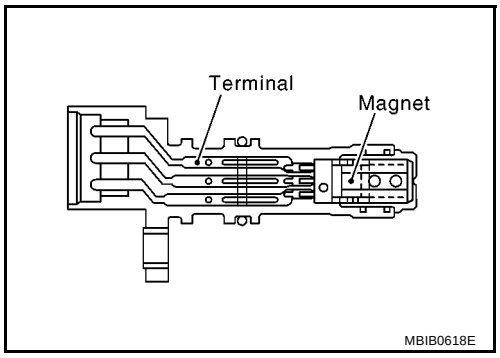
DTC P0340 CMP SENSOR

PFP:23731

Description

EBS0157G

The camshaft position sensor identifies a particular cylinder by means of signals from the sensing plate (with five protrusions) installed to the camshaft. The datum signal output is detected 90° signal and sent to the ECM.

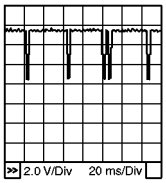
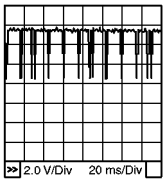


ECM Terminals and Reference Value

EBS0157H

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

CAUTION:
Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
45	R	Camshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
47	B	Camshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0877E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0878E
66	W	Camshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V

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

On Board Diagnosis Logic

EBS0157I

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sensor circuit	Camshaft position sensor signal is not detect by the ECM when engine is running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Camshaft position sensor

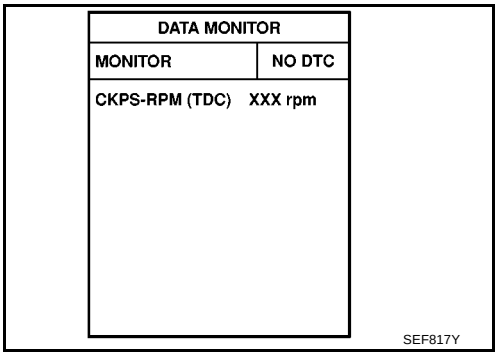
DTC Confirmation Procedure

EBS0157J

NOTE:
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

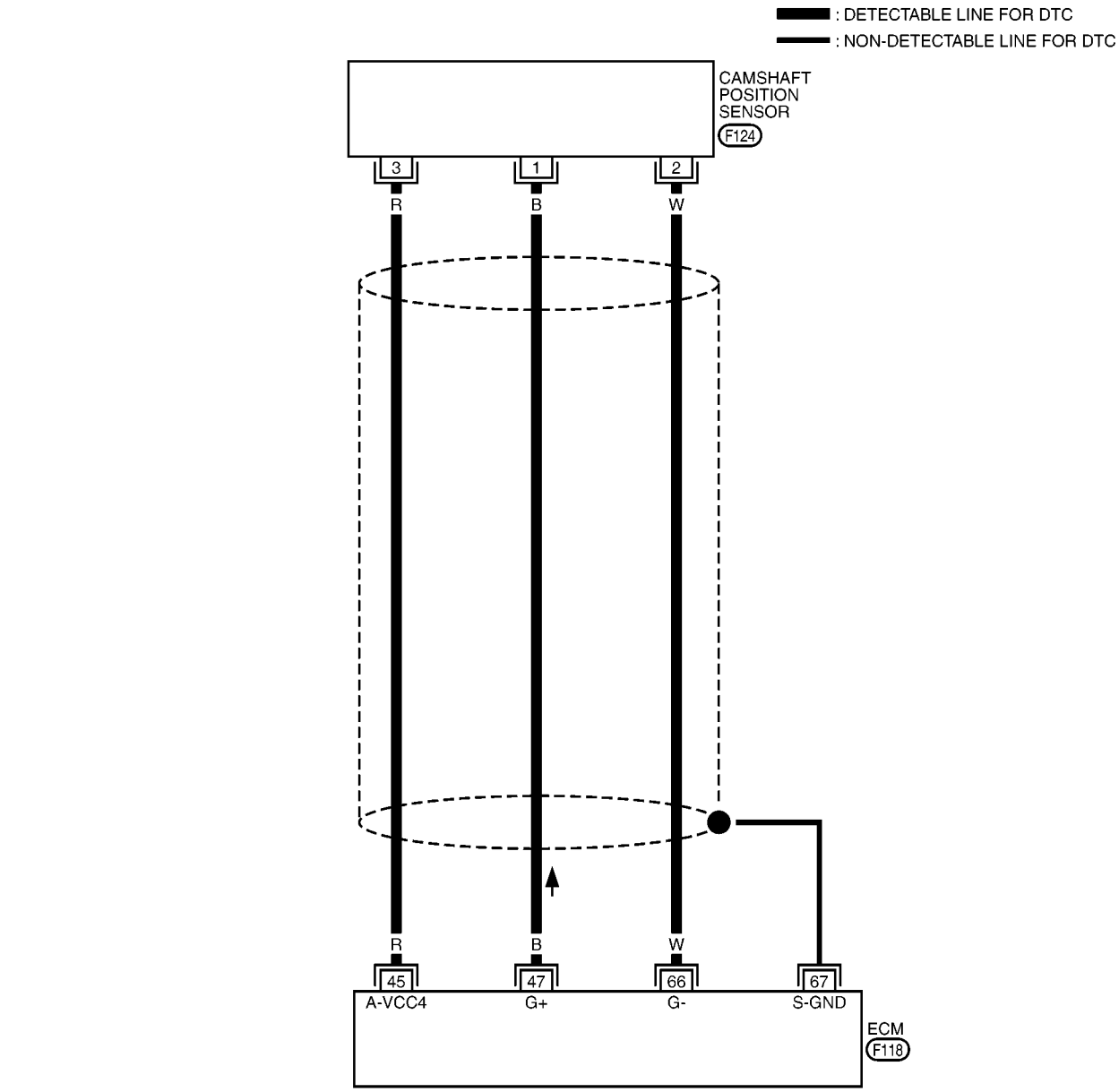
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
   If engine could not start, keep ignition switch at START position for 5 seconds.
4. If DTC is detected, go to EC-509, "Diagnostic Procedure" .

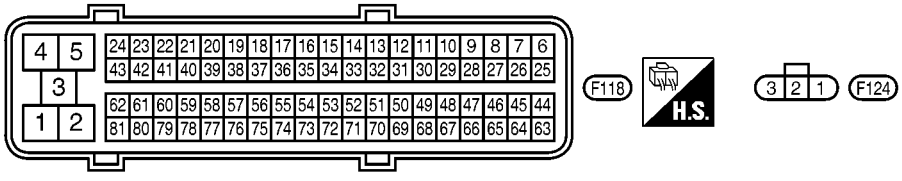


Wiring Diagram

EBS0157K

EC-CMPS-01





MBWA0380E

Diagnostic Procedure

EBS0157L

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

Yes or No

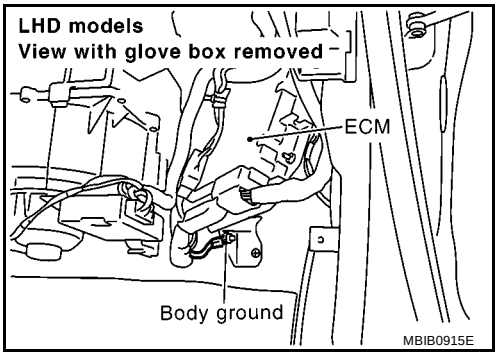
Yes >> GO TO 2.
No >> Check starting system. (Refer to SC-20, "STARTING SYSTEM" .)

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

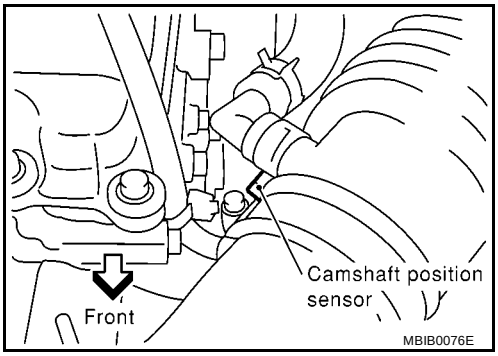
OK or NG

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



3. CHECK CMP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor harness connector.
2. Turn ignition switch ON.

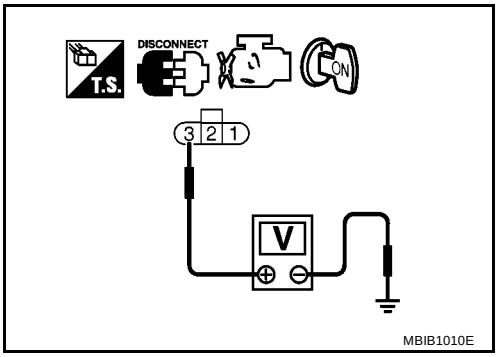


3. Check voltage between CMP sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK CMP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and CMP sensor terminal 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.

5. CHECK CMP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 47 and CMP sensor terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

6. CHECK CAMSHAFT POSITION SENSOR

Refer to EC-510, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace camshaft position sensor.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

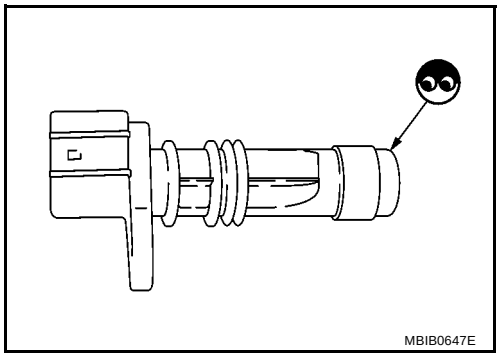
>> **INSPECTION END**

Component Inspection

EBS0157M

CAMSHAFT POSITION SENSOR

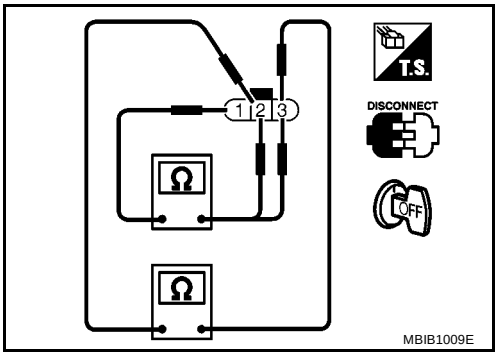
1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0
1 (+) - 3 (-)	
2 (+) - 3 (-)	Except 0 or ∞

6. If NG, replace camshaft position sensor.



EBS0157N

Removal and Installation

CAMSHAFT POSITION SENSOR

Refer to EM-35, "VACUUM PUMP"

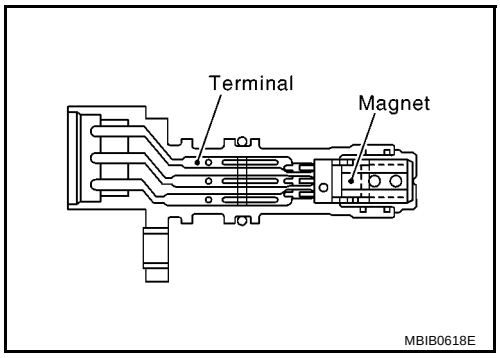
DTC P0341 CMP SENSOR

PFP:23731

Description

EBS0157O

The camshaft position sensor identifies a particular cylinder by means of signals from the sensing plate (with five protrusions) installed to the camshaft. The datum signal output is detected 90° signal and sent to the ECM.

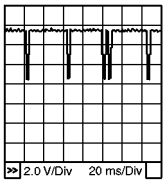
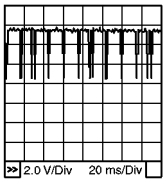


ECM Terminals and Reference Value

EBS0157P

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

CAUTION:
Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
45	R	Camshaft position sensor power supply	**[Ignition switch ON]**	Approximately 5.3V
47	B	Camshaft position sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 6V ★  MBIB0877E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 6V ★  MBIB0878E
66	W	Camshaft position sensor ground	**[Ignition switch ON]**	Approximately 0.3V
67	—	Sensor ground (Sensors shield circuit)	**[Ignition switch ON]**	Approximately 0.3V

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

On Board Diagnosis Logic

EBS0157Q

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0341	Camshaft position sensor circuit range/performance	Camshaft position sensor signal is not in the normal pattern when engine is running.	● Harness connectors (The sensor circuit is opener shorted.) ● Camshaft position sensor ● Signal plate

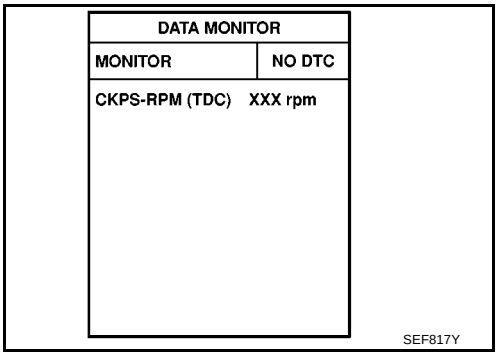
DTC Confirmation Procedure

EBS0157R

NOTE:
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

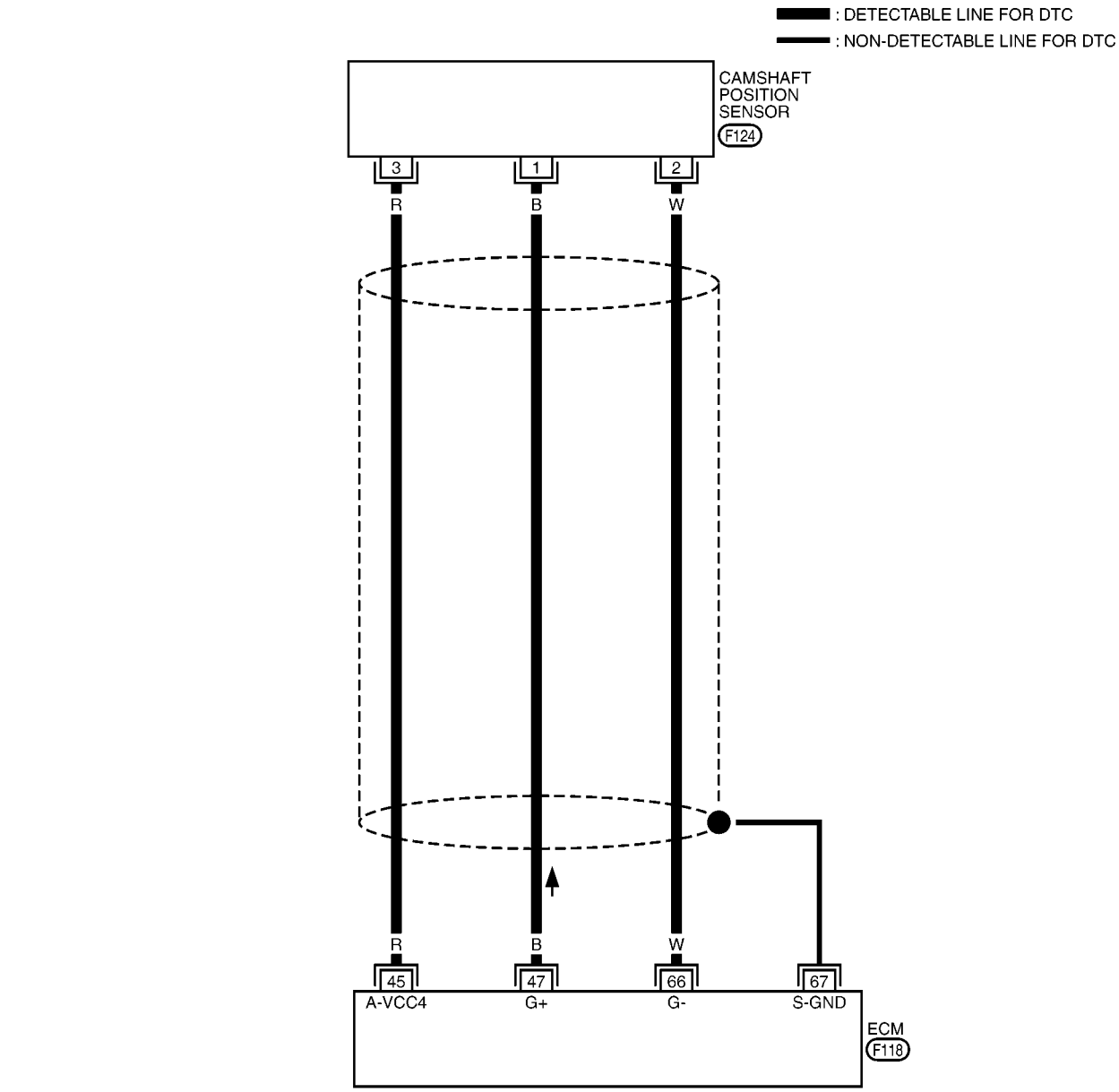
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
   If engine could not start, keep ignition switch at START position for 5 seconds.
4. If DTC is detected, go to EC-515, "Diagnostic Procedure" .

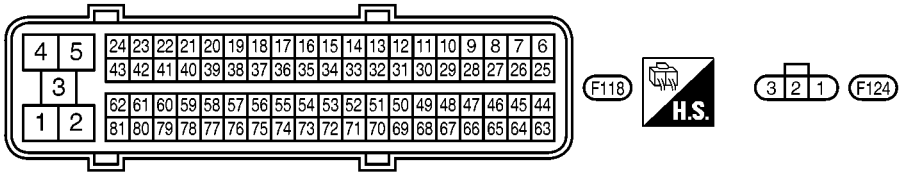


Wiring Diagram

EBS0157S

EC-CMPS-01





MBWA0380E

Diagnostic Procedure

EBS0157T

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

Yes or No

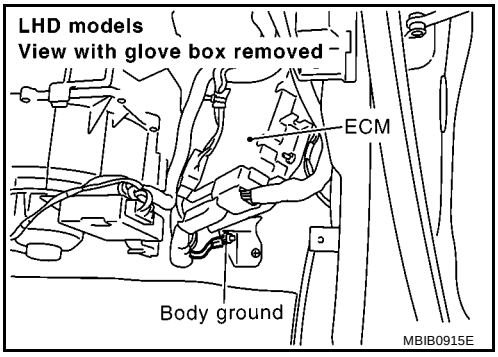
Yes >> GO TO 2.
No >> Check starting system. (Refer to SC-20, "STARTING SYSTEM" .)

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

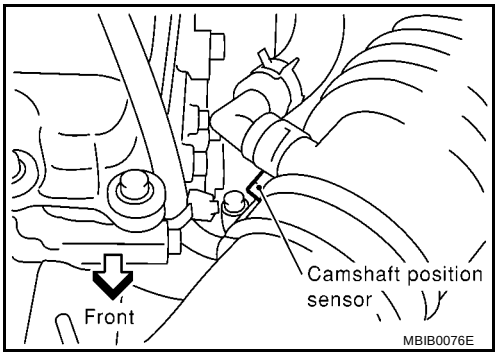
OK or NG

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



3. CHECK CMP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor harness connector.
2. Turn ignition switch ON.

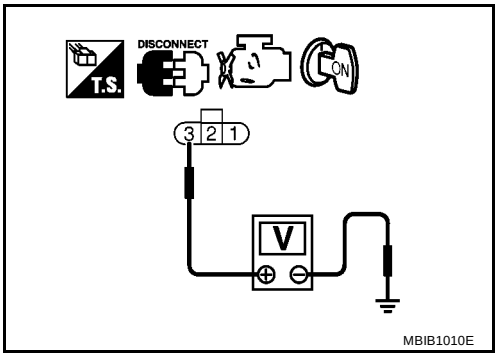


3. Check voltage between CMP sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK CMP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and CMP sensor terminal 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.

5. CHECK CMP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 47 and CMP sensor terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

6. CHECK CAMSHAFT POSITION SENSOR

Refer to EC-517, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace camshaft position sensor.

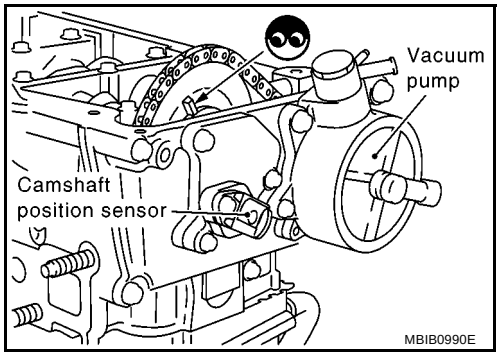
7. CHECK CAMSHAFT (EXHAUST)

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 8.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



8. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

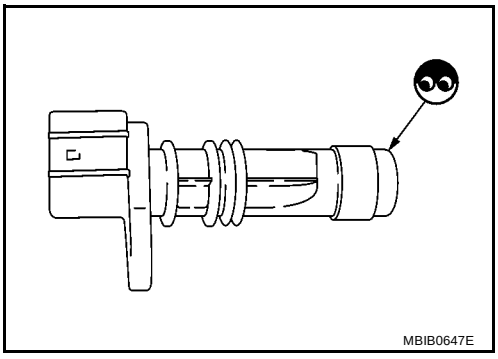
>> **INSPECTION END**

Component Inspection

EBS0157U

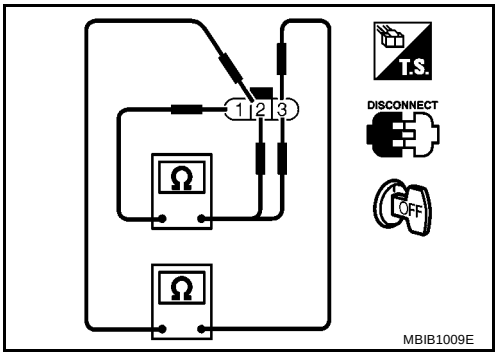
CAMSHAFT POSITION SENSOR

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0
1 (+) - 3 (-)	
2 (+) - 3 (-)	Except 0 or ∞



6. If NG, replace camshaft position sensor.

Removal and Installation

EBS0157V

CAMSHAFT POSITION SENSOR

Refer to EM-35, "VACUUM PUMP" .

DTC P0501 ASCD VEHICLE SPEED SENSOR

PFP:24810

Component Description

EBS0157W

The ECM receives vehicle speed sensor signal via CAN communication line. It is sent from combination meter. The ECM uses this signal for ASCD control. Refer to EC-653, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for ASCD functions.

On Board Diagnosis Logic

EBS0157X

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

NOTE:

- **If DTC P0501 is displayed with DTC U1000 first perform the trouble diagnosis for DTC U1000. Refer to EC-416, "DTC U1000 CAN COMMUNICATION LINE" .**

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0501	Vehicle speed sensor range/performance	A change of vehicle speed signal is excessively large during specified time.	● Harness or connectors (The CAN communication line is open or shorted.) ● Combination meter ● ABS actuator and electric unit (control unit) (models without ESP) ● ESP/TCS/ABS control unit (models with ESP) ● Wheel sensor ● ECM

DTC Confirmation Procedure

EBS0157Y

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

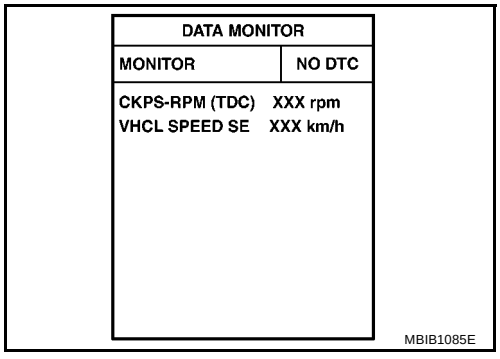
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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 (ESP switch OFF).
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Drive the vehicle at more than 10 km/h (6 MPH) for at least 5 seconds.
4. If DTC is detected, go to EC-518, "Diagnostic Procedure" .



Diagnostic Procedure

EBS0157Z

1. CHECK DTC WITH ESP/TCS/ABS CONTROL UNIT (MODELS WITH ESP) OR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (MODELS WITHOUT ESP)

Refer to BRC-47, "TROUBLE DIAGNOSIS" or BRC-8, "TROUBLE DIAGNOSIS" .

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 (LHD MODELS)" or DI-27, "COMBINATION METERS (RHD MODELS)" .

>> **INSPECTION END**

DTC P0502 ASCD VEHICLE SPEED SENSOR

PFP:24810

Component Description

EBS01580

The ECM receives vehicle speed sensor signal via CAN communication line. It is sent from combination meter. The ECM uses this signal for ASCD control. Refer to EC-653, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for ASCD functions.

On Board Diagnosis Logic

EBS01581

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

NOTE:

- **If DTC P0502 is displayed with DTC U1000 first perform the trouble diagnosis for DTC U1000. Refer to EC-416, "DTC U1000 CAN COMMUNICATION LINE" .**

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0502	Vehicle speed sensor circuit low input	Vehicle speed signal is excessively low compared with the driving condition.	● Harness or connectors (The CAN communication line is open or shorted.) ● Combination meter ● ABS actuator and electric unit (control unit) (models without ESP) ● ESP/TCS/ABS control unit (models with ESP) ● Wheel sensor ● ECM

DTC Confirmation Procedure

EBS01582

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:

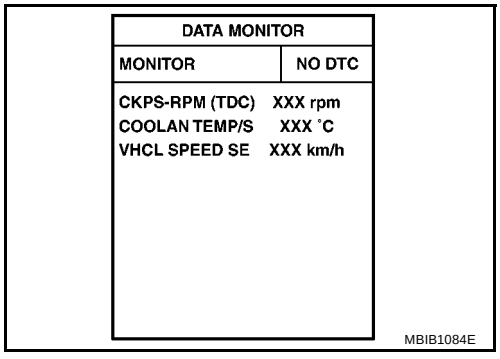
Step 3 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature (ESP switch OFF).
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Maintain the following condition for at least 5 seconds.

CKPS·RPM (TDC)	More than 2,800 rpm
COOLAN TEMP/S	More than 60°C (140 °F)
Clutch pedal	Released
Shift lever	1st position

4. If DTC is detected, go to EC-520, "Diagnostic Procedure" .



Diagnostic Procedure

EBS01583

1. CHECK DTC WITH ESP/TCS/ABS CONTROL UNIT (MODELS WITH ESP) OR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (MODELS WITHOUT ESP)

Refer to BRC-47, "TROUBLE DIAGNOSIS" or BRC-8, "TROUBLE DIAGNOSIS" .

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 (LHD MODELS)" or DI-27, "COMBINATION METERS (RHD MODELS)" .

>> **INSPECTION END**

DTC P0503 ASCD VEHICLE SPEED SENSOR

PFP:24810

Component Description

EBS01584

The ECM receives vehicle speed sensor signal via CAN communication line. It is sent from combination meter. The ECM uses this signal for ASCD control. Refer to EC-653, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for ASCD functions.

On Board Diagnosis Logic

EBS01585

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

NOTE:

- **If DTC P0503 is displayed with DTC U1000 first perform the trouble diagnosis for DTC U1000. Refer to EC-416, "DTC U1000 CAN COMMUNICATION LINE" .**

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0503	Vehicle speed sensor circuit high input	Vehicle speed signal is excessively high compared with the driving condition.	● Harness or connectors (The CAN communication line is open or shorted.) ● Combination meter ● ABS actuator and electric unit (control unit) (models without ESP) ● ESP/TCS/ABS control unit (models with ESP) ● Wheel sensor ● ECM

DTC Confirmation Procedure

EBS01586

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

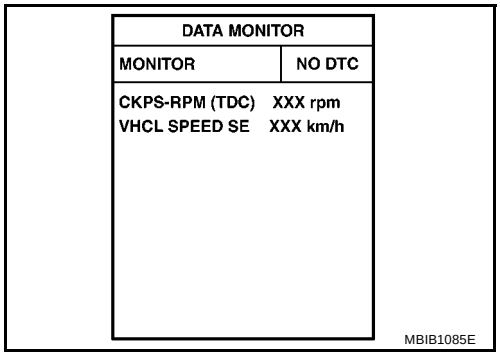
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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 (ESP switch OFF).
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Drive the vehicle at more than 10 km/h (6 MPH) for at least 5 seconds.
4. If DTC is detected, go to EC-522, "Diagnostic Procedure" .



Diagnostic Procedure

EBS01587

1. CHECK DTC WITH ESP/TCS/ABS CONTROL UNIT (MODELS WITH ESP) OR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (MODELS WITHOUT ESP)

Refer to BRC-47, "TROUBLE DIAGNOSIS" or BRC-8, "TROUBLE DIAGNOSIS" .

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 (LHD MODELS)" or DI-27, "COMBINATION METERS (RHD MODELS)" .

>> **INSPECTION END**

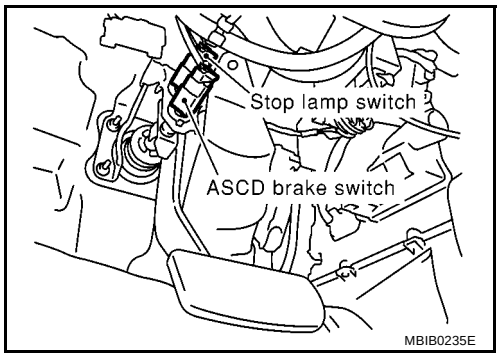
DTC P0504 ASCD BRAKE SWITCH

PFP:25320

Component Description

EBS01588

When the brake pedal is depressed, ASCD brake switch and stop lamp switch are turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-653, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

EBS01589

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW (Stop lamp switch)	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
BRAKE SW2 (ASCD brake switch)	● Ignition switch: ON	Brake pedal and clutch pedal: Fully released	OFF
		Brake pedal and/or clutch pedal: Slightly depressed	ON

ECM Terminals and Reference Value

EBS0158A

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)
100	R/G	Stop lamp switch	**[Ignition switch ON]** ● Brake pedal fully released	Approximately 0V
			[Ignition switch ON] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
101	L/Y	ASCD brake switch	**[Ignition switch ON]** ● Brake pedal and clutch pedal fully released	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON] ● Brake pedal and/or clutch pedal depressed	Approximately 0V

On Board Diagnosis Logic

EBS0158B

The MI will not light up for this diagnosis.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0504	ASCD brake switch	● When the vehicle speed is above 5 km/h (3 MPH), ON signal from the stop lamp switch and OFF signal from the ASCD brake switch are sent to the ECM at the same time.	● 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

EBS0158C

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.

WITH CONSULT-II

1. Start engine (ESP switch OFF).
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Drive the vehicle for at least 5 consecutive seconds under the following condition.

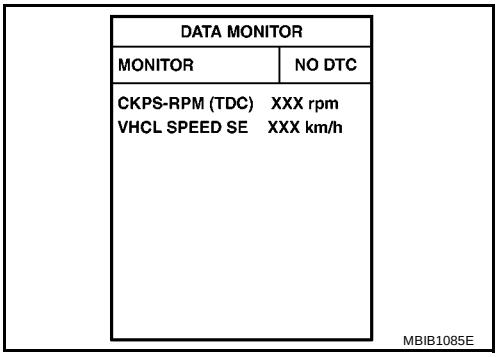
VHCL SPEED SE	More than 5 km/h (3 MPH)
Selector lever	Suitable position

If DTC is detected, go to EC-527, "Diagnostic Procedure" .
If DTC is not detected, go to the following step.

4. Drive the vehicle for at least 5 consecutive seconds under the following condition.

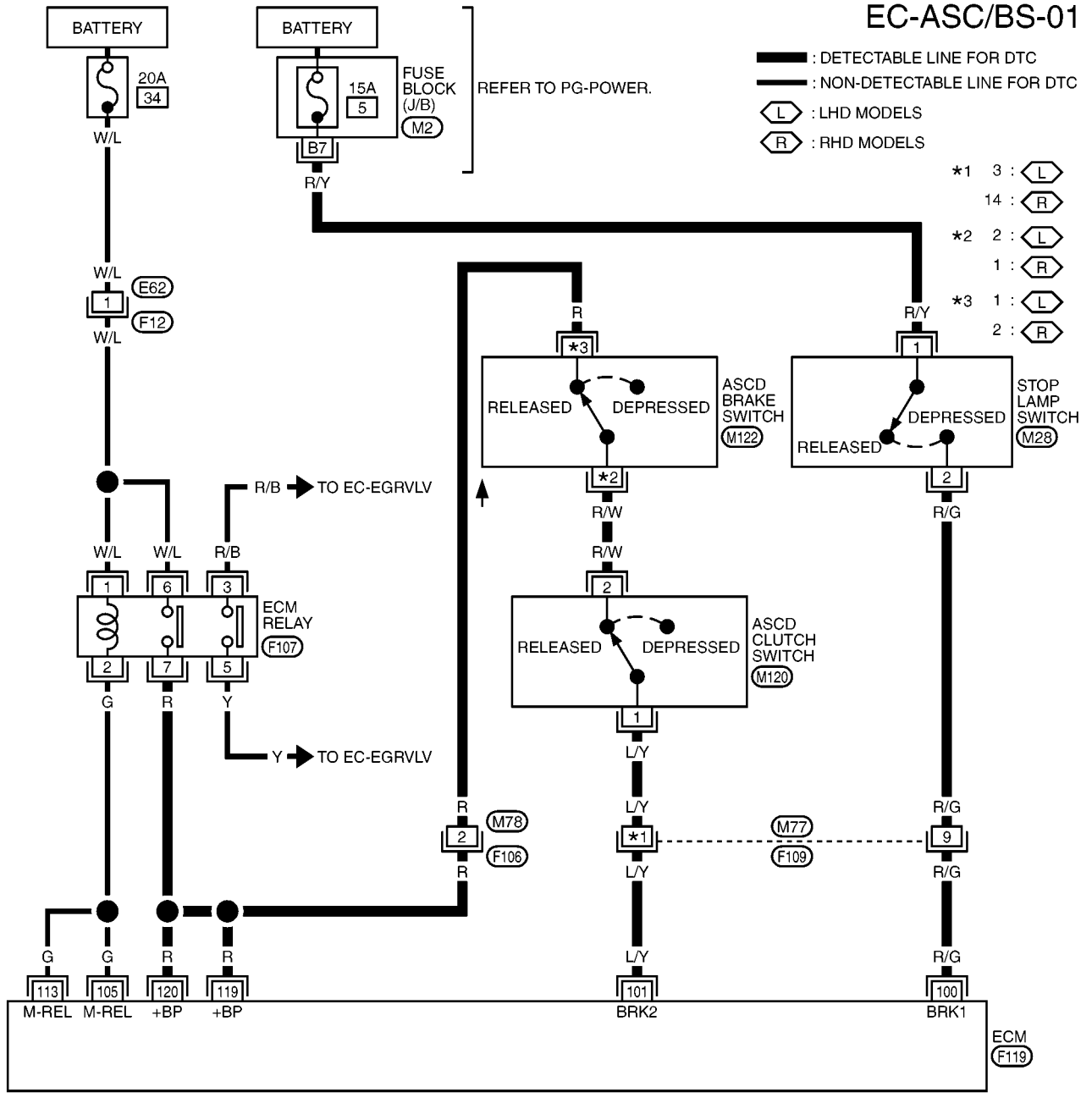
VHCL SPEED SE	More than 5 km/h (3 MPH)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned condition.

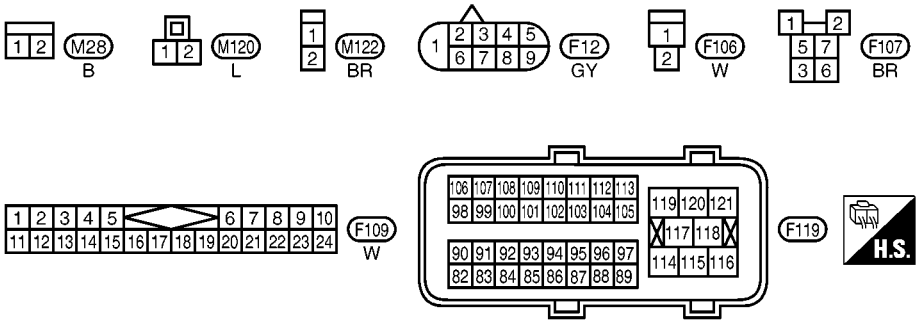
5. If DTC is detected, go to EC-527, "Diagnostic Procedure" .



Wiring Diagram

EBS0158D





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

MBWA0647E

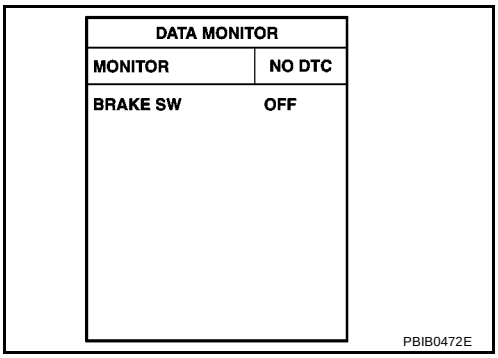
Diagnostic Procedure

EBS0158E

1. CHECK OVERALL FUNCTION-I

1. Turn ignition switch ON.
2. Select “BRAKE SW” in “DATA MONITOR” mode with CONSULT-II.
3. Check “BRAKE SW” indication under the following conditions.

CONDITION	INDICATION
When brake pedal is depressed	ON
When brake pedal is released	OFF



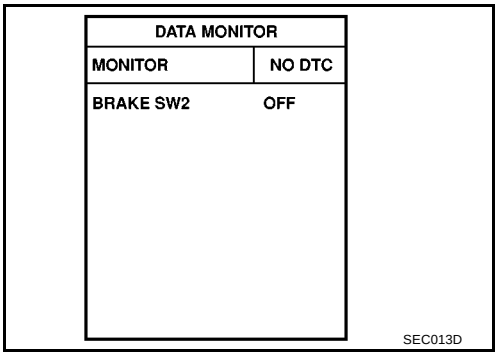
OK or NG

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

2. CHECK OVERALL FUNCTION-II

Check “BRAKE SW2” indication in “DATA MONITOR” mode.

CONDITION	INDICATION
When brake pedal or clutch pedal is depressed	ON
When brake pedal and clutch pedal are released	OFF

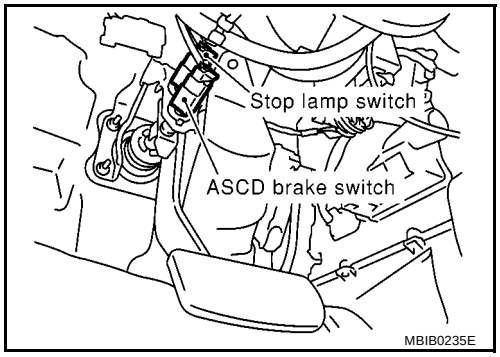


OK or NG

OK >> GO TO 16.
NG >> GO TO 8.

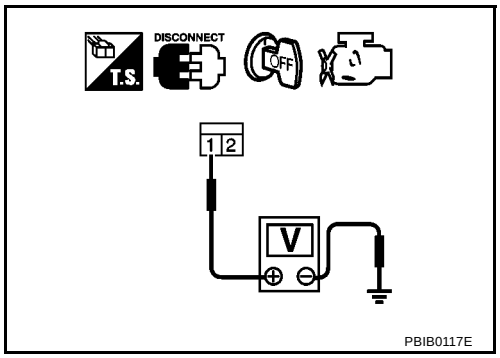
3. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

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 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 15A 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.

5. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 100 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 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- 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.

7. CHECK STOP LAMP SWITCH

Refer to EC-531, "Component Inspection" .

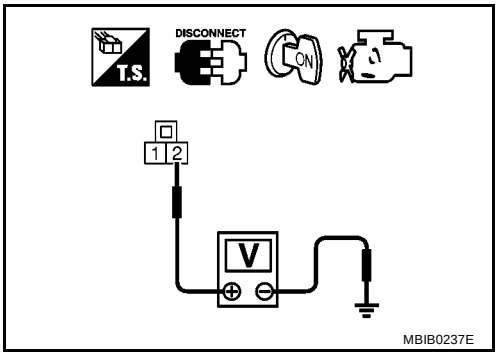
OK or NG

OK >> GO TO 16.
NG >> Replace stop lamp switch.

8. CHECK ASCD BRAKE SWITCH 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 2 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

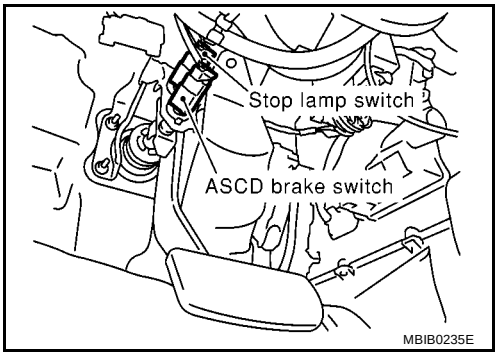


OK or NG

OK >> GO TO 13.
NG >> GO TO 9.

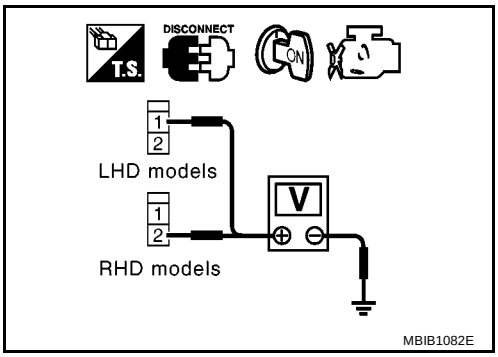
9. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

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 (LHD models) or 2 (RHD models) and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F106, M78
- Harness for open or short between ASCD brake switch and ECM relay
- Harness for open or short between ASCD brake switch and ECM

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

11. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 2 (LHD models) or 1 (RHD models) and ASCD brake clutch switch terminal 2.
   Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ASCD BRAKE SWITCH

Refer to EC-531, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace ASCD brake switch.

13. CHECK ASCD CLUTCH 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 101 and ASCD clutch switch terminal 1.
   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 15.
NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and ASCD clutch switch

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

15. CHECK ASCD CLUTCH SWITCH

Refer to EC-531, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace ASCD clutch switch.

16. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

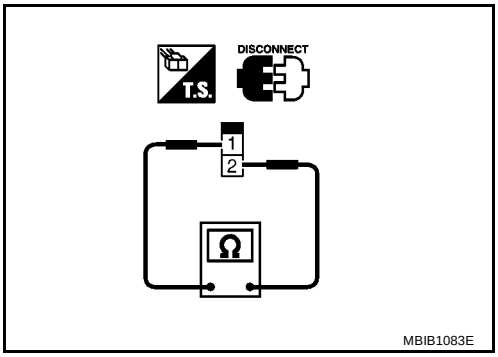
EBS0158F

ASCD BRAKE SWITCH

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.



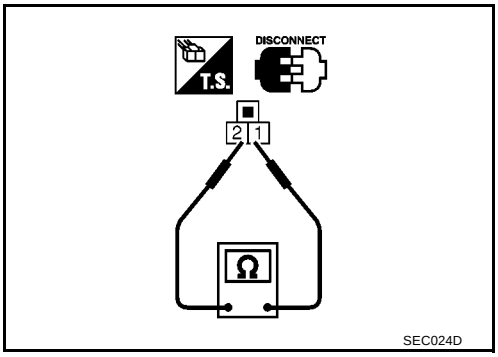
MBIB1083E

ASCD CLUTCH SWITCH

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.



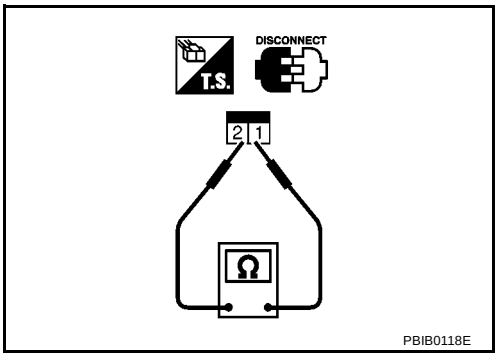
SEC024D

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.



PBIB0118E

DTC P0563 BATTERY VOLTAGE

PFP:24410

On Board Diagnosis Logic

EBS0158G

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0563	Battery voltage high	An excessively high voltage from the battery is sent to ECM.	● Battery ● Battery terminal ● Alternator

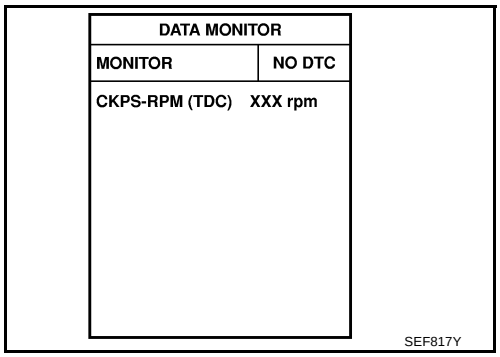
DTC Confirmation Procedure

EBS0158H

NOTE:
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 35 seconds.
4. If DTC is detected, go to EC-532, "Diagnostic Procedure" .



Diagnostic Procedure

EBS0158I

1. INSPECTION START

Are jumper cables connected for the jump starting?

Yes or No

Yes >> GO TO 3.
No >> GO TO 2.

2. CHECK BATTERY AND ALTERNATOR

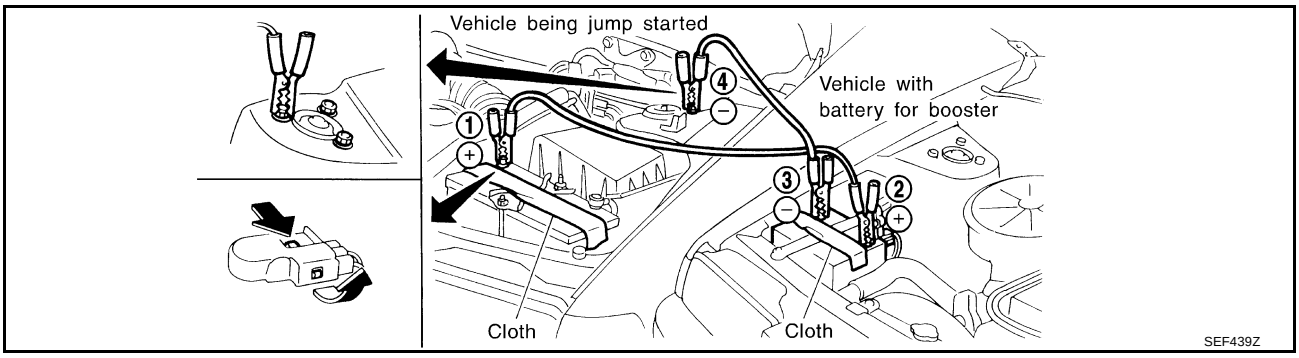
Check that the proper type of battery and alternator is installed.
Refer to , SC-3, "BATTERY" and SC-12, "CHARGING SYSTEM" .

OK or NG

OK >> GO TO 5.
NG >> Replace with a proper one.

3. CHECK JUMPER CABLES INSTALLATION

Check that the jumper cables are connected in the correct sequence.



OK or NG

OK >> GO TO 4.
NG >> Reconnect jumper cables properly.

4. CHECK BATTERY FOR BOOSTER

Check that the battery for the booster is a 12V battery.

OK or NG

OK >> GO TO 5.
NG >> Change the vehicle for booster.

5. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

Perform EC-532, "DTC Confirmation Procedure" , again.

OK or NG

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

6. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EC-371, "NATS (Nissan Anti-theft System)" .
3. Perform Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

7. CHECK ELECTRICAL PARTS DAMAGE

Check the following for damage.

- Wiring harness and harness connectors for burn
- Fuses for short

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace malfunctioning part.

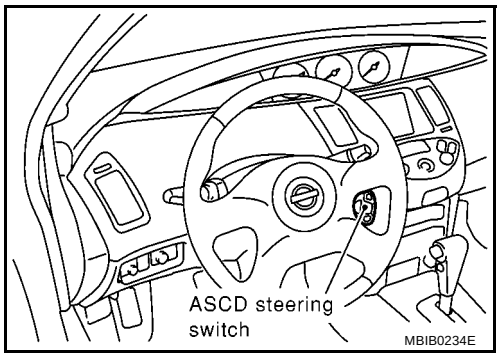
DTC P0580, P0581 ASCD STEERING SWITCH

PFP:25551

Component Description

EBS0158J

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-653, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

EBS0158K

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SET SW	● Ignition switch: ON	SET/COAST switch: Released	OFF
		SET/COAST switch: Pressed	ON
RESUME/ACC SW	● Ignition switch: ON	RESUME/ACCEL switch: Released	OFF
		RESUME/ACCEL switch: Pressed	ON
CANCEL SW	● Ignition switch: ON	CANCEL switch: Released	OFF
		CANCEL switch: Pressed	ON
MAIN SW	● Ignition switch: ON	ON/OFF switch: Released	OFF
		ON/OFF switch: Pressed	ON

ECM Terminals and Reference Value

EBS0158L

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)
102	PU	ASCD steering switch	**[Ignition switch ON]** ● ASCD steering switch is OFF.	Approximately 4.3V
			[Ignition switch ON] ● ON/OFF switch is ON.	Approximately 0.3V
			[Ignition switch ON] ● CANCEL switch is ON.	Approximately 1.3V
			[Ignition switch ON] ● SET/COAST switch is ON.	Approximately 2.3V
			[Ignition switch ON] ● RESUME/ACCEL switch is ON.	Approximately 3.3V
103	B	ASCD steering switch ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS0158M

The MI will not light up for this diagnosis.

NOTE:
If DTC P0580 or P0581 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-539, "DTC P0605 ECM".

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0580	ASCD steering switch circuit low	● ECM detects that the ASCD steering switch is stuck ON.	● Harness or connectors (The switch circuit is open or shorted.) ● ASCD steering switch ● ECM
P0581	ASCD steering switch circuit high	● An excessively high voltage signal from the ASCD steering switch is sent to ECM.	

DTC Confirmation Procedure

EBS0158N

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

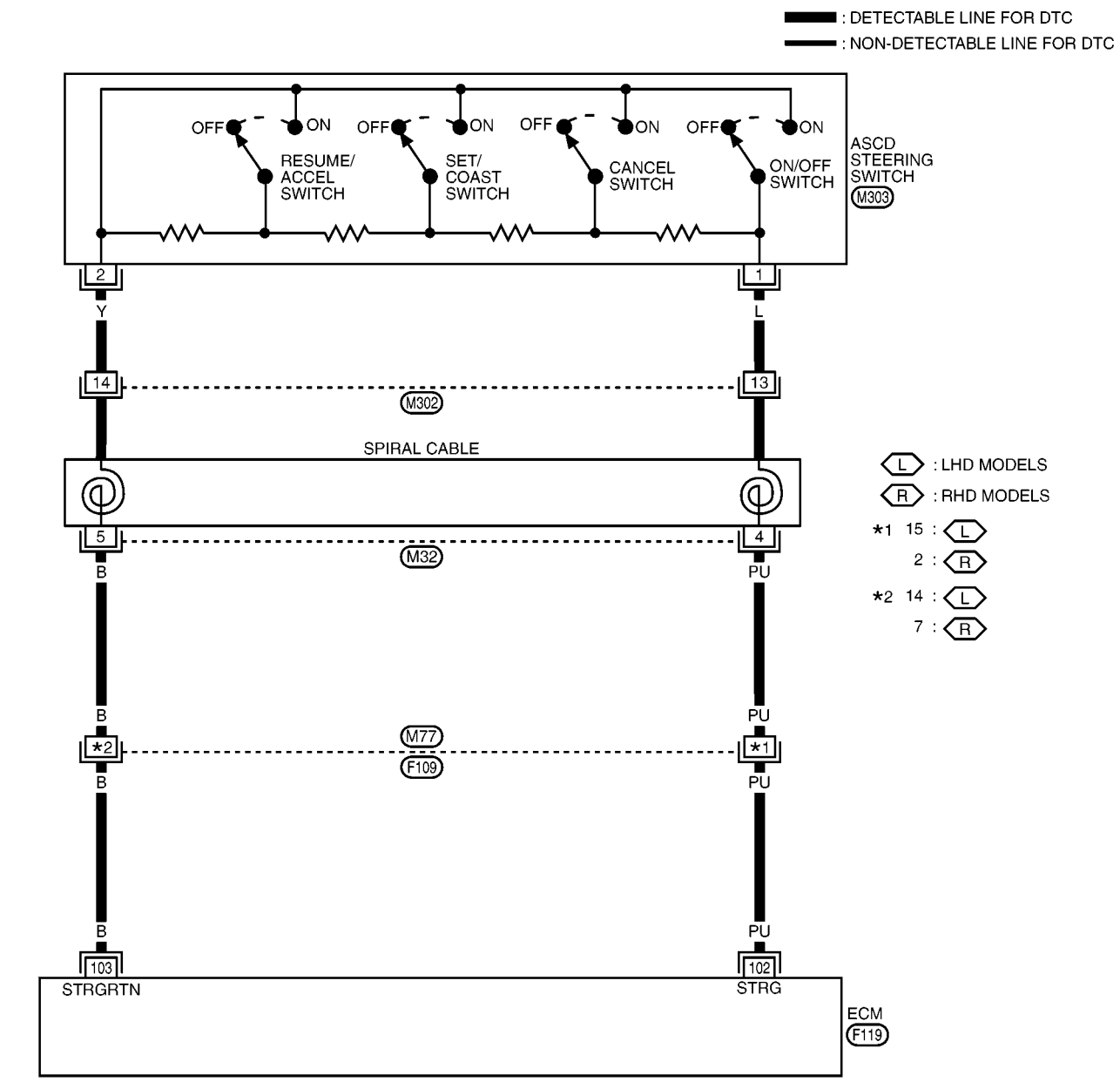
WITH CONSULT-II

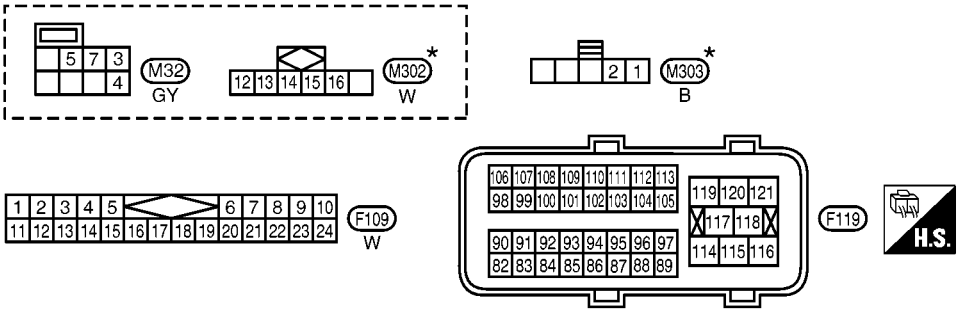
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 10 seconds.
4. Press ON/OFF switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If DTC is detected, go to EC-537, "Diagnostic Procedure" .

Wiring Diagram

EBS0158O

EC-ASC/SW-01





MBWA0608E

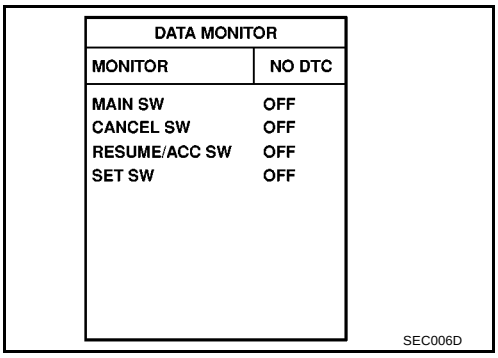
Diagnostic Procedure

EBS0158P

1. CHECK ASCD STEERING SWITCH CIRCUIT

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
ON/OFF	MAIN SW	Pressed	ON
		Released	OFF
SET/COAST	SET SW	Pressed	ON
		Released	OFF
RESUME/ACCEL	RESUME/ACC SW	Pressed	ON
		Released	OFF
CANCEL	CANCEL SW	Pressed	ON
		Released	OFF



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

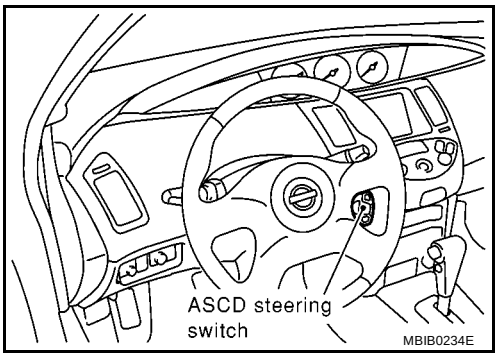
1. Turn ignition switch OFF.
2. Disconnect ASCD steering harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between switch terminal 2 and ECM terminal 103. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Spiral cable
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to ground 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 102 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 M77, F109
- 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-538, "Component Inspection"

OK or NG

OK >> GO TO 7.
NG >> Replace ASCD steering switch.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

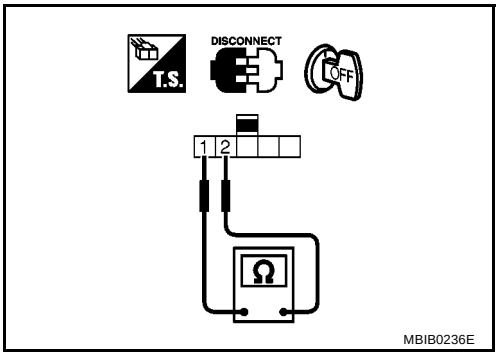
>> **INSPECTION END**

Component Inspection

EBS0158Q

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]
ON/OFF	Pressed	Approx. 0
	Released	Approx. 4,000
SET/COAST	Pressed	Approx. 660
	Released	Approx. 4,000
RESUME/ACCEL	Pressed	Approx. 1,480
	Released	Approx. 4,000
CANCEL	Pressed	Approx. 250
	Released	Approx. 4,000

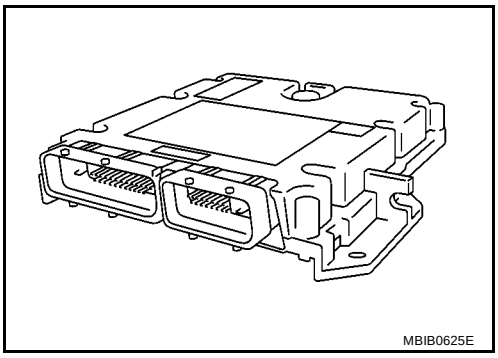
DTC P0605 ECM

PFP:23710

Description

EBS0158R

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.


MBIB0625E

On Board Diagnosis Logic

EBS0158S

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0605	Engine control module (ROM)	ECM ROM is malfunctioning.	● ECM

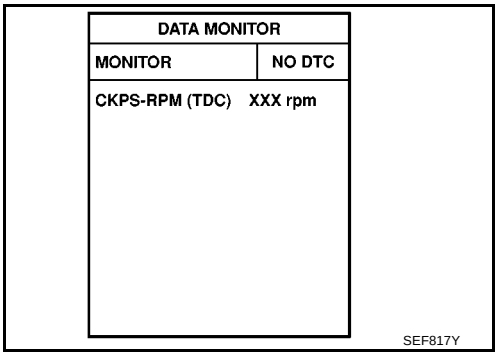
DTC Confirmation Procedure

EBS0158T

NOTE:
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-539, "Diagnostic Procedure" .



SEF817Y

Diagnostic Procedure

EBS0158U

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 EC-539, "DTC Confirmation Procedure" , again.
5. Is 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-371, "NATS (Nissan Anti-theft System)" .
3. Perform Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

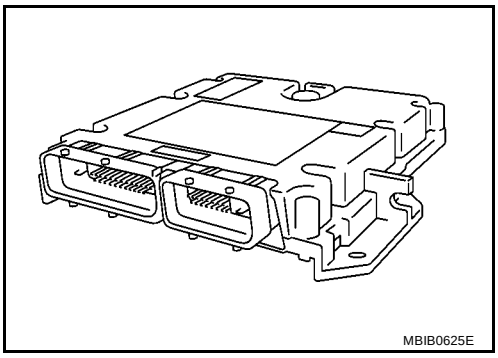
DTC P0606 ECM

PFP:23710

Description

EBS0158V

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.


MBIB0625E

On Board Diagnosis Logic

EBS0158W

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0606	Engine control module (Processor)	ECM calculation function is malfunctioning.	● ECM

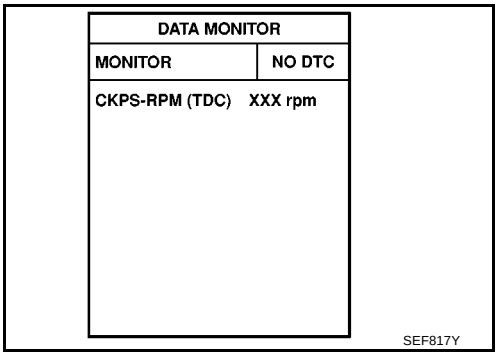
DTC Confirmation Procedure

EBS0158X

NOTE:
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-541, "Diagnostic Procedure" .



SEF817Y

Diagnostic Procedure

EBS0158Y

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 EC-541, "DTC Confirmation Procedure" , again.
5. Is DTC P0606 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-371, "NATS (Nissan Anti-theft System)" .
3. Perform “Fuel Pump Learning Value Clearing”. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

DTC P0628, P0629 FUEL PUMP

PFP:16700

Description

EBS0158Z

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel increases, the fuel pump raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to the fuel pump to raise the injection pressure.

CONSULT-II Reference Value in Data Monitor Mode

EBS01590

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

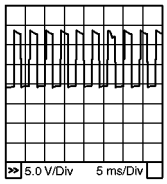
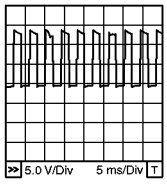
ECM Terminals and Reference Value

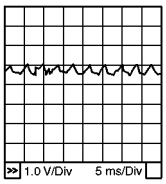
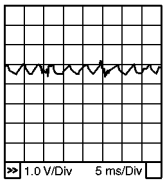
EBS01591

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS01592

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0628	Fuel pump control circuit low input	ECM detects a control circuit for the fuel pump is open or short to ground.	● Harness or connectors (The fuel pump circuit is open or shorted.) ● Fuel pump
P0629	Fuel pump control circuit high output	ECM detects a control circuit for the fuel pump is short to power.	

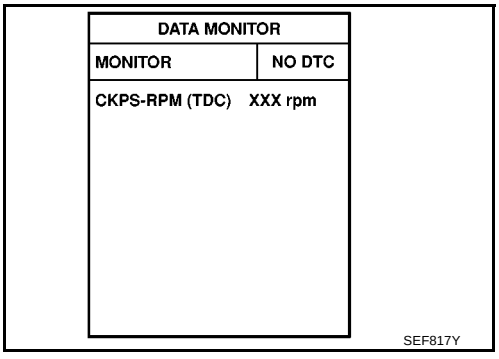
DTC Confirmation Procedure

EBS01593

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Let engine idle for at least 5 seconds.
4. If DTC is detected, go to EC-546, "Diagnostic Procedure" .



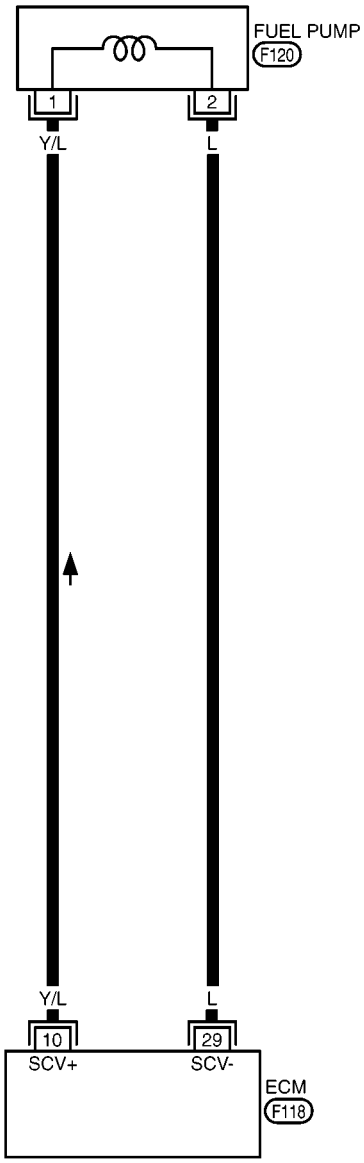
SEF817Y

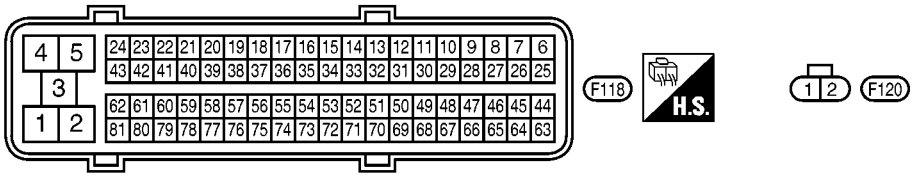
Wiring Diagram

EBS01594

EC-F/PUMP-01

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





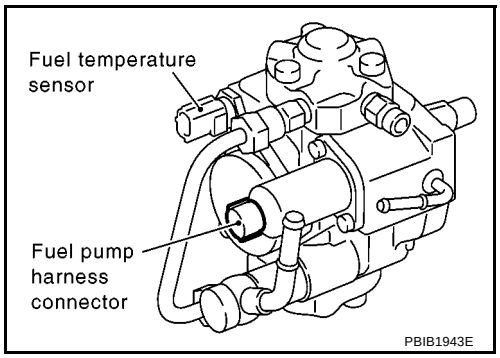
MBWA0396E

Diagnostic Procedure

EBS01595

1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connector.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 2.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

3. CHECK FUEL PUMP

Refer toEC-547, "Component Inspection" .

OK or NG

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

4. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

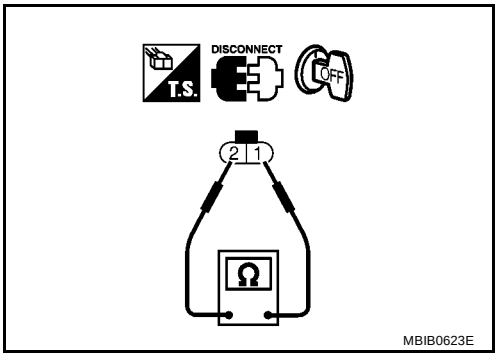
EBS01596

FUEL PUMP

1. Check continuity between fuel supply pump terminals 1 and 2.

Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS01597

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

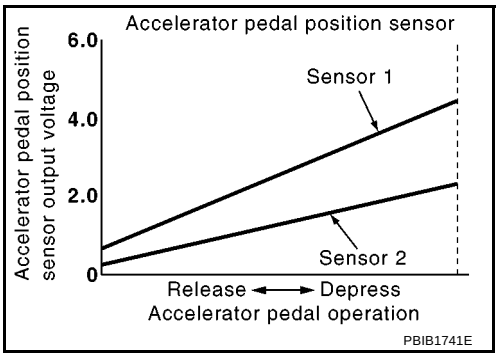
DTC P0642, P0643 SENSOR POWER SUPPLY

PFP:18002

Description

EBS01598

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS01599

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS0159A

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS0159B

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0642	Accelerator pedal position sensor 1 power supply circuit low	ECM detects a voltage of power source for the APP sensor 1 is excessively low.	● Harness or connectors (The APP sensor 1 power supply circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P0643	Accelerator pedal position sensor 1 power supply circuit high	ECM detects a voltage of power source for the APP sensor 1 is excessively high.	

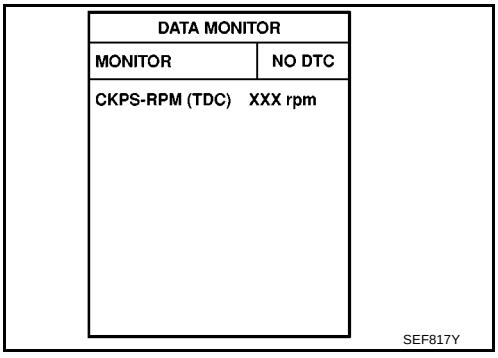
DTC Confirmation Procedure

EBS0159C

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

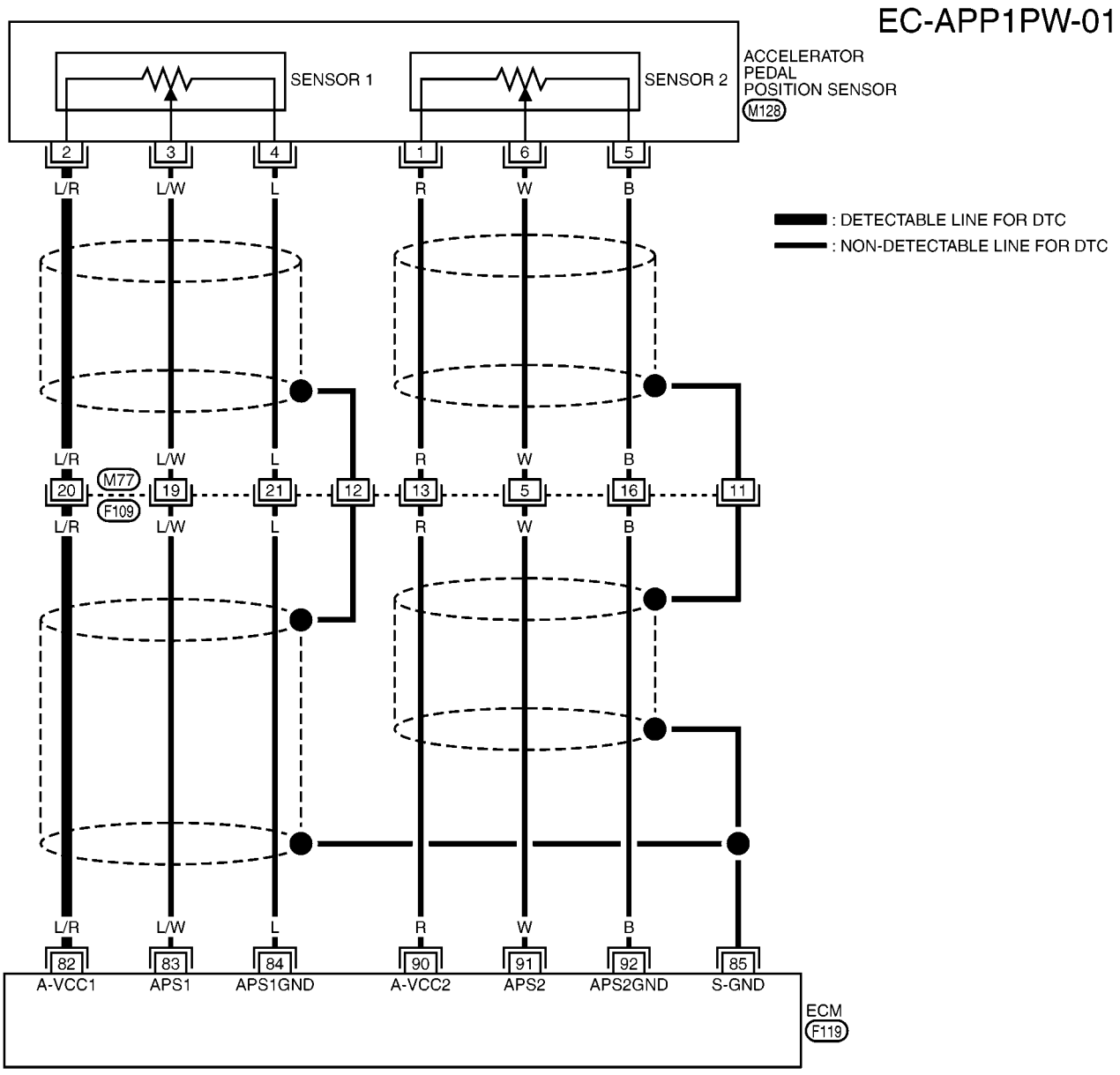
WITH CONSULT-II

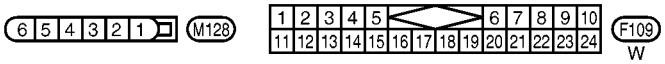
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-551, "Diagnostic Procedure" .

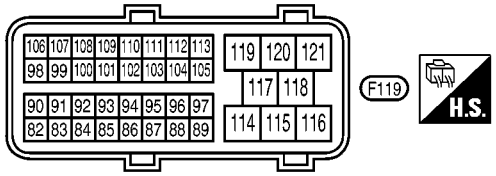


Wiring Diagram

EBS0159D







MBWA0434E

Diagnostic Procedure

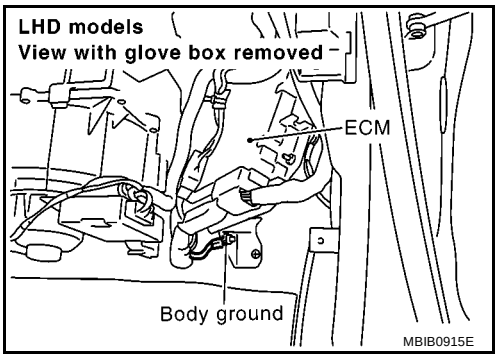
EBS0159E

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

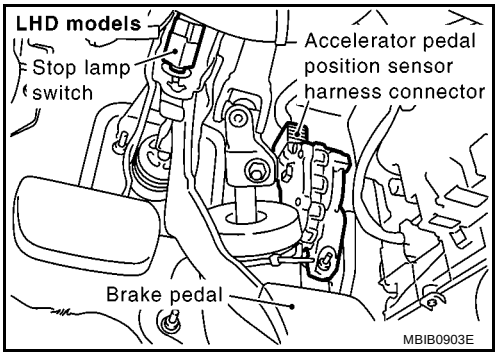
OK or NG

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



2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

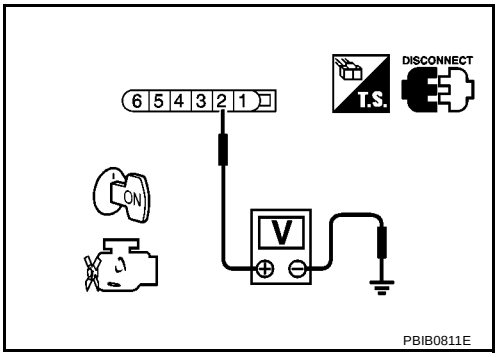


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and APP sensor

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

4. CHECK APP SENSOR

Refer to EC-552, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace accelerator pedal assembly.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

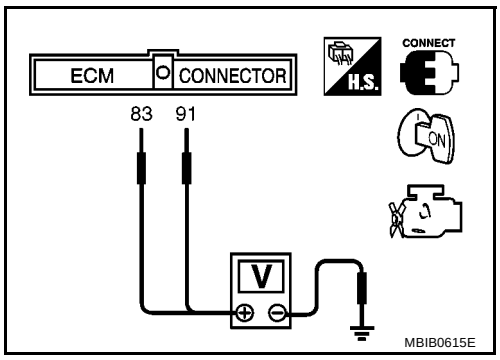
Component Inspection

EBS0159F

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and body ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.2V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V



4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS0159G

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

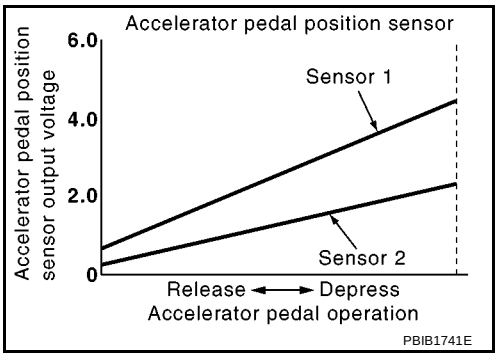
DTC P0652, P0653 SENSOR POWER SUPPLY

PFP:18002

Description

EBS0159H

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS0159I

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS0159J

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS0159K

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0652	Accelerator pedal position sensor 2 power supply circuit low	ECM detects a voltage of power source for the APP sensor 2 is excessively low.	● Harness or connectors (The APP sensor 2 power supply circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2)
P0653	Accelerator pedal position sensor 2 power supply circuit high	ECM detects a voltage of power source for the APP sensor 2 is excessively high.	

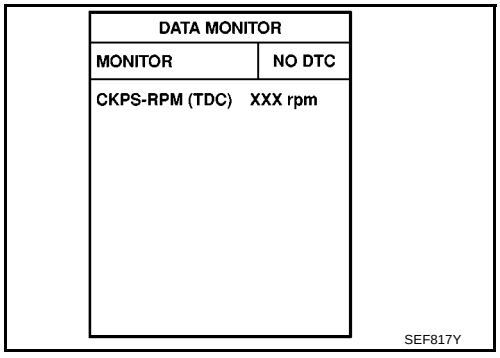
DTC Confirmation Procedure

EBS0159L

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

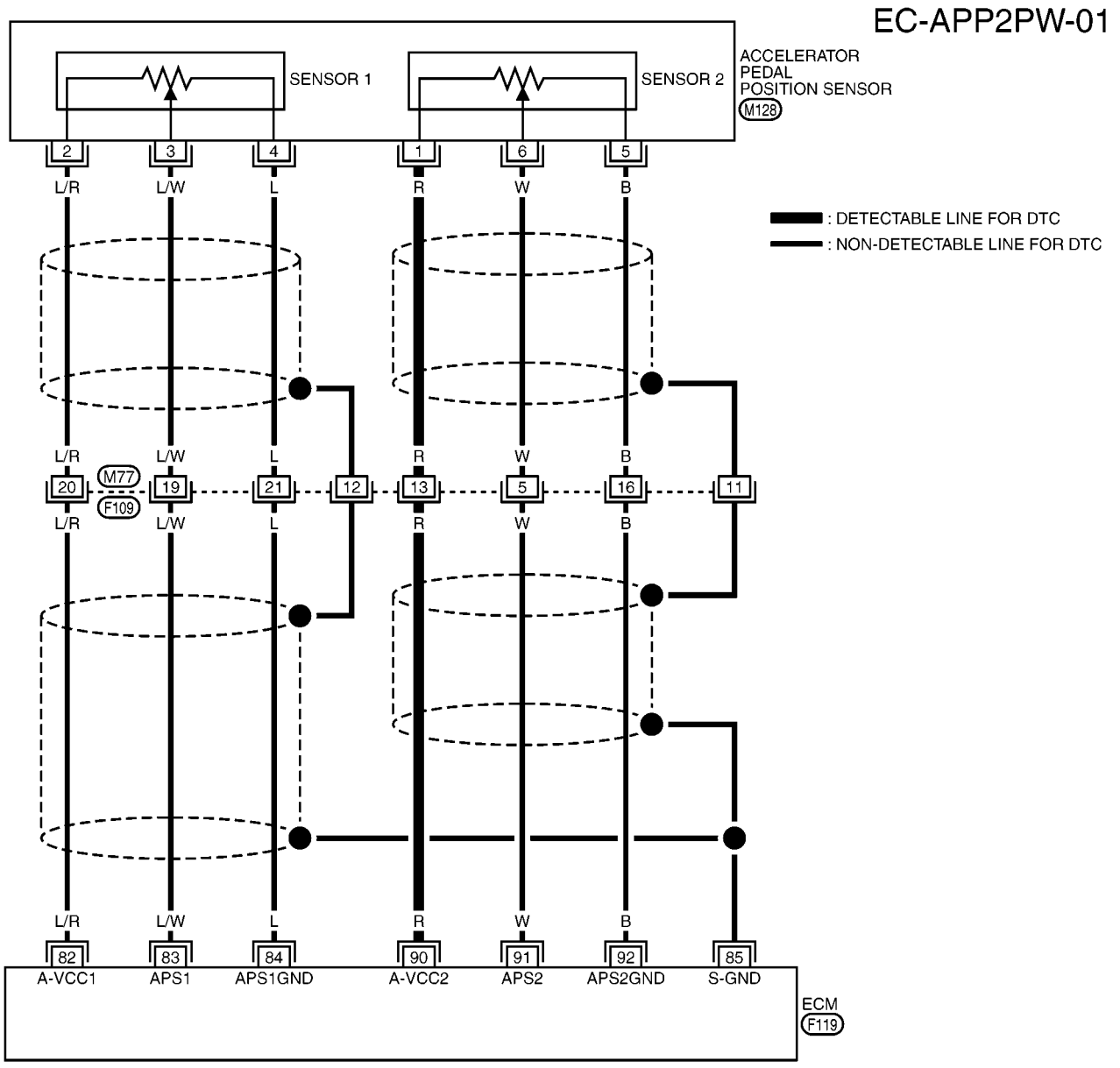
WITH CONSULT-II

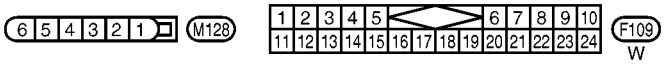
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-556, "Diagnostic Procedure" .

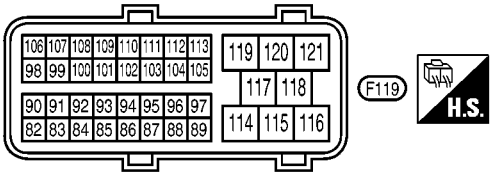


Wiring Diagram

EBS0159M







MBWA0435E

Diagnostic Procedure

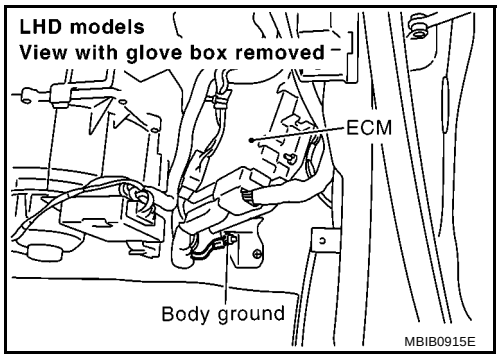
EBS0159N

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

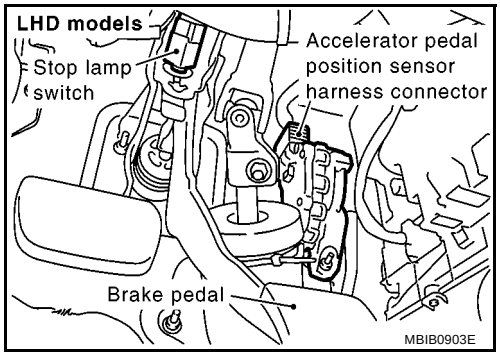
OK or NG

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



2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

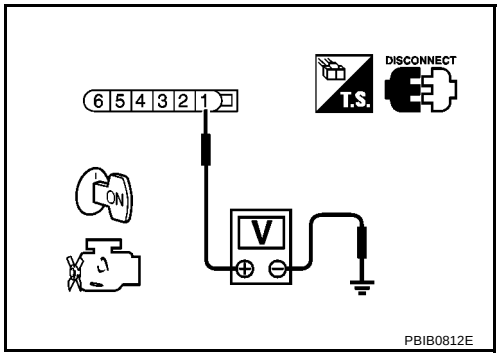


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and APP sensor

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

4. CHECK APP SENSOR

Refer to EC-557, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace accelerator pedal assembly.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

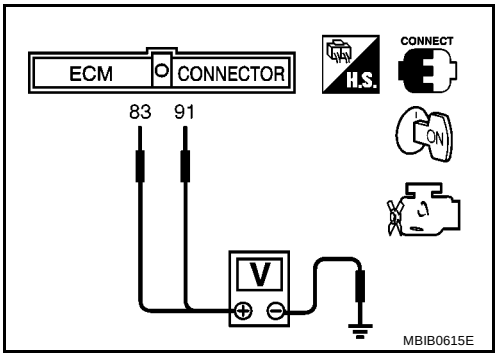
Component Inspection

EBS0159O

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and engine body under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.2V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V



4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS0159P

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

DTC P0686 ECM RELAY

PFP:25230

ECM Terminals and Reference valve

EBS0159Q

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)
105	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
113	G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	R R	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)

On Board Diagnosis Logic

EBS0159R

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0686	ECM relay circuit	ECM detects ECM relay is stuck closed even if ignition switch OFF.	● Harness or connectors (The ECM relay circuit is shorted.) ● ECM relay

DTC Confirmation Procedure

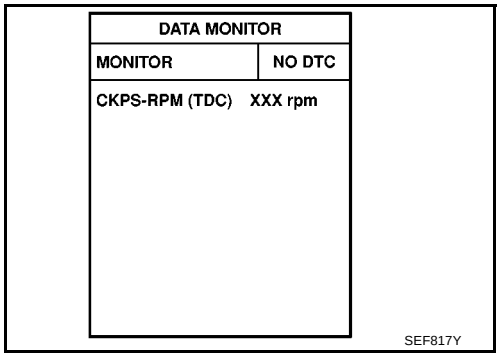
EBS0159S

NOTE:

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

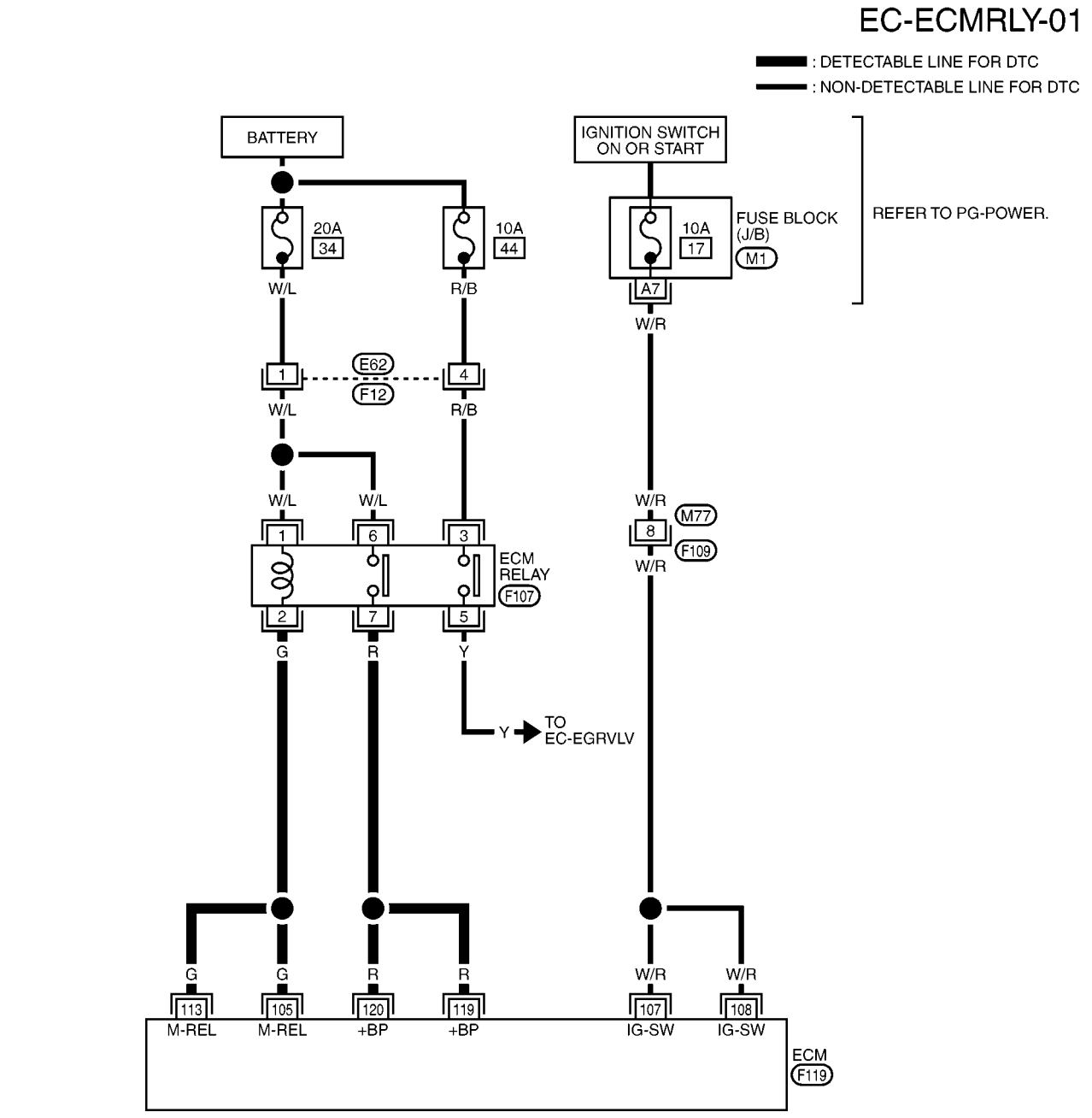
1. Turn ignition switch ON and then turn OFF.
2. Wait at least 30 seconds.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. If DTC is detected, go to EC-560, "Diagnostic Procedure" .

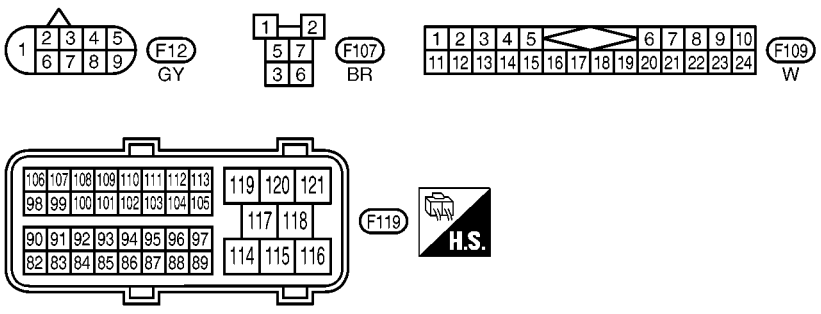


Wiring Diagram

EBS0159T

EC-ECMRLY-01





REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-
JUNCTION BOX (J/B)

MBWA0649E

Diagnostic Procedure

EBS0159U

1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR SHORT TO GROUND

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 105, 113 and ground. Refer to Wiring Diagram.

Continuity should not exist.

OK or NG

OK >> GO TO 2.
NG >> Repair short to ground in harness or connectors.

2. CHECK ECM INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

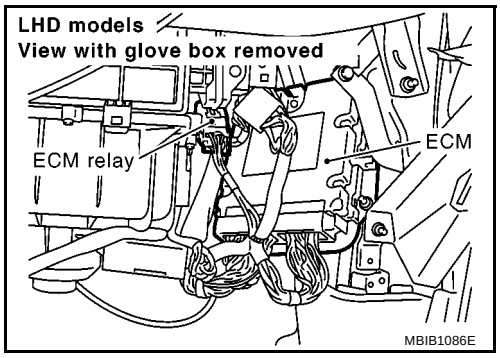
1. Disconnect ECM relay.
2. Check harness continuity between ECM terminals 119, 120 and ECM relay terminal 7. Refer to Wiring Diagram.

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 ECM RELAY

Refer to EC-560, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace ECM relay.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

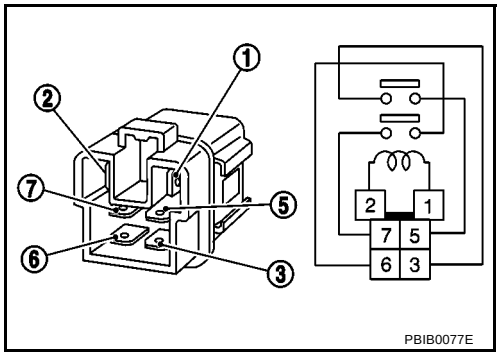
EBS0159V

ECM RELAY

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

3. If NG, replace ECM relay.



DTC P1211 TCS CONTROL UNIT

PFP:47850

Description

EBS0159W

The malfunction information related to TCS is transferred through the CAN communication line from ESP/TCS/ABS control unit to ECM.

Be sure to erase the malfunction information such as DTC not only for ESP/TCS/ABS control unit but also for ECM after TCS related repair.

On Board Diagnosis Logic

EBS0159X

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211	TCS control unit	ECM receives a malfunction information from ESP/TCS/ABS control unit.	● ESP/TCS/ABS control unit ● TCS related parts

DTC Confirmation Procedure

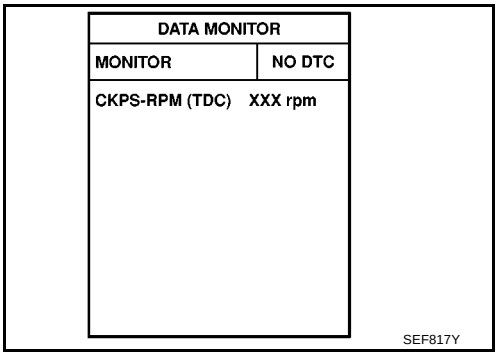
EBS0159Y

NOTE:

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-561, "Diagnostic Procedure" .



Diagnostic Procedure

EBS0159Z

Go to BRC-47, "TROUBLE DIAGNOSIS" (models with ESP system) or BRC-8, "TROUBLE DIAGNOSIS" (models without ESP system).

DTC P1212 TCS COMMUNICATION LINE

PFP:47850

Description

EBS015A0

NOTE:
If DTC P1212 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to EC-416, "DTC U1000 CAN COMMUNICATION LINE" .
This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and ESP/TCS/ABS control unit.
Be sure to erase the malfunction information such as DTC not only for ESP/TCS/ABS control unit but also for ECM after TCS related repair.

On Board Diagnosis Logic

EBS015A1

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212	TCS communication line	ECM can not receive the information from ESP/ TCS/ABS control unit continuously.	● Harness or connectors (The CAN communication line is open or shorted.) ● ESP/TCS/ABS control unit ● Dead (Weak) battery

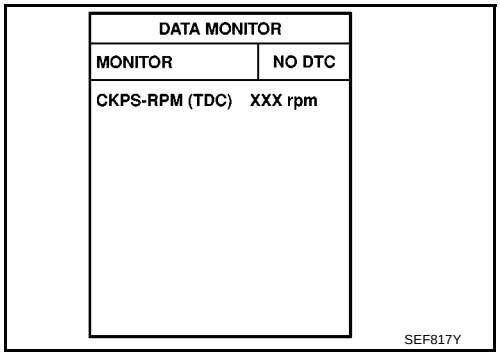
DTC Confirmation Procedure

EBS015A2

NOTE:
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-562, "Diagnostic Procedure" .



Diagnostic Procedure

EBS015A3

1. CHECK ESP/TCS/ABS CONTROL UNIT FUNCTION

Refer to BRC-47, "TROUBLE DIAGNOSIS" (models with ESP system) or BRC-8, "TROUBLE DIAGNOSIS" (models without ESP system).

>> **INSPECTION END**

DTC P1260 - P1267 FUEL INJECTOR ADJUSTMENT RESISTOR

PFP:16600

Description

EBS015A4

The fuel injector adjustment resistor is built into the fuel injector. The resistance is constant and individual. ECM uses the individual resistance to determine the fuel injection pulse.

ECM Terminals and Reference Value

EBS015A5

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)
59	L/G	Fuel injector adjustment resistor No. 1	**[Ignition switch ON]**	0.5 - 5.1V (There are individual differences between fuel injector adjustment resistors.)
60	L/R	Fuel injector adjustment resistor No. 3		
61	R/Y	Fuel injector adjustment resistor No. 4		
62	LG/W	Fuel injector adjustment resistor No. 2		
78	R	Fuel injector adjustment resistor ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS015A6

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1260	No. 1 cylinder fuel injector adjustment resistor low input	An excessively low voltage from the No. 1 cylinder fuel injector adjustment resistor is sent to ECM.	● Harness or connectors (The fuel injector adjustment resistor circuit is open or shorted.) ● Fuel injector adjustment resistor
P1261	No. 1 cylinder fuel injector adjustment resistor high input	An excessively high voltage from the No. 1 cylinder fuel injector adjustment resistor is sent to ECM.	
P1262	No. 2 cylinder fuel injector adjustment resistor low input	An excessively low voltage from the No. 2 cylinder fuel injector adjustment resistor is sent to ECM.	
P1263	No. 2 cylinder fuel injector adjustment resistor high input	An excessively high voltage from the No. 2 cylinder fuel injector adjustment resistor is sent to ECM.	
P1264	No. 3 cylinder fuel injector adjustment resistor low input	An excessively low voltage from the No. 3 cylinder fuel injector adjustment resistor is sent to ECM.	
P1265	No. 3 cylinder fuel injector adjustment resistor high input	An excessively high voltage from the No. 3 cylinder fuel injector adjustment resistor is sent to ECM.	
P1266	No. 4 cylinder fuel injector adjustment resistor low input	An excessively low voltage from the No. 4 cylinder fuel injector adjustment resistor is sent to ECM.	
P1267	No. 4 cylinder fuel injector adjustment resistor high input	An excessively high voltage from the No. 4 cylinder fuel injector adjustment resistor is sent to ECM.	

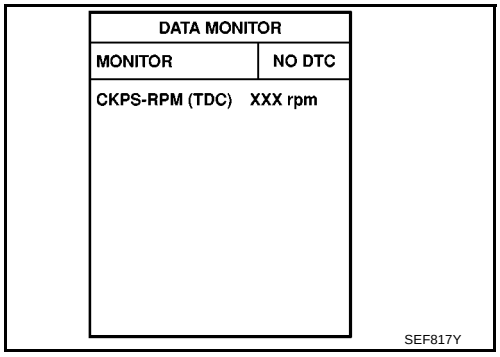
DTC Confirmation Procedure

EBS015A7

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

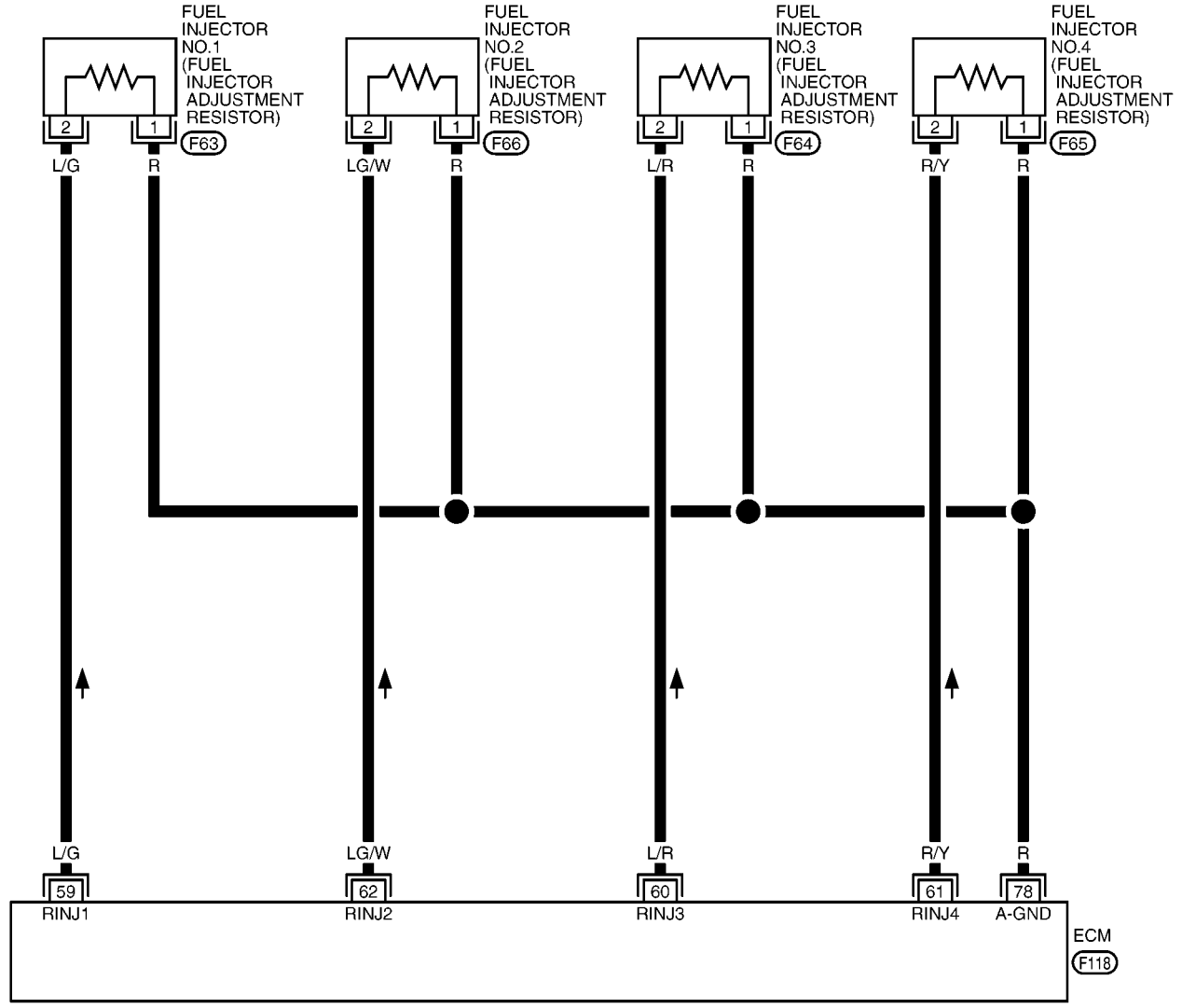
WITH CONSULT-II

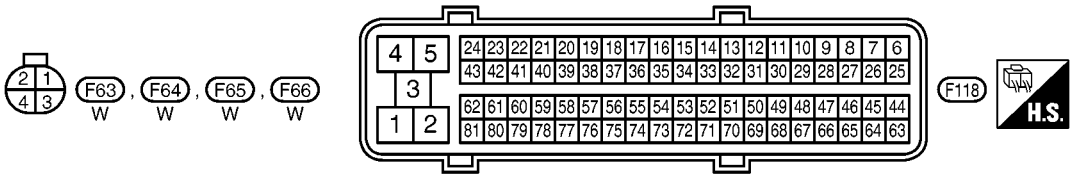
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-566, "Diagnostic Procedure" .



Wiring Diagram

EBS015A8





MBWA0635E

Diagnostic Procedure

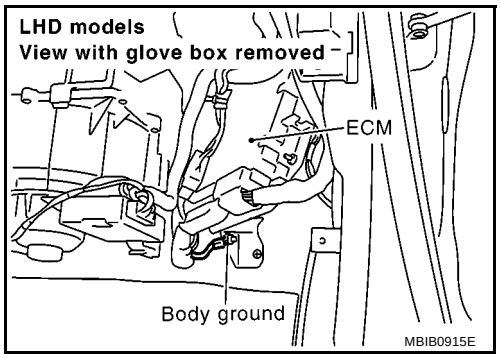
EBS015A9

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

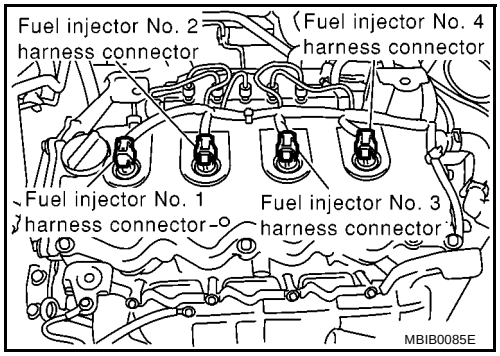
OK or NG

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



2. CHECK FUEL INJECTOR ADJUSTMENT RESISTOR POWER SUPPLY CIRCUIT

1. Disconnect fuel injector harness connector of malfunctioning cylinder.
2. Turn ignition switch ON.

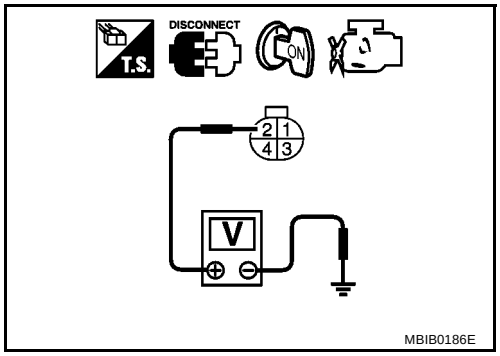


3. Check voltage between fuel injector terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

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 FUEL INJECTOR ADJUSTMENT RESISTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel injector terminal 1 and ECM terminal 78.

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 FUEL INJECTOR ADJUSTMENT RESISTOR

Refer to EC-567, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace fuel injector.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

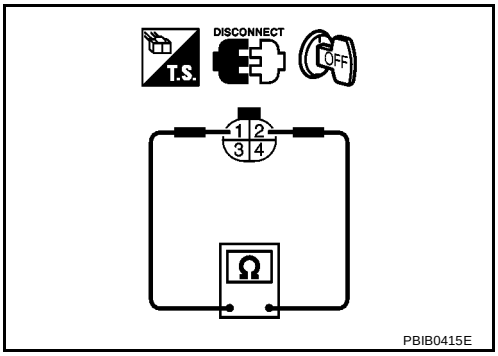
EBS015AA

FUEL INJECTOR ADJUSTMENT RESISTOR

1. Disconnect fuel injector harness connector.
2. Check continuity between terminals as shown in the figure.

Continuity should exist.

If NG, replace fuel injector.



Removal and Installation

EBS015AB

FUEL INJECTOR

Refer to
EM-39, "INJECTION TUBE AND FUEL INJECTOR".

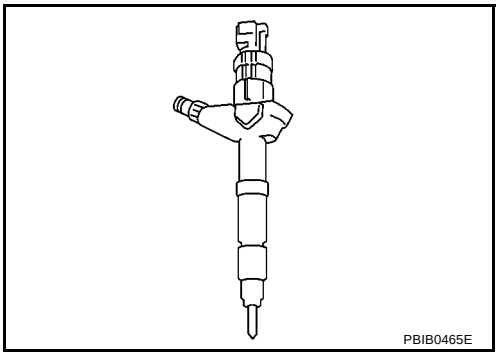
DTC P1268 - P1271 FUEL INJECTOR

PFP:16600

Component Description

EBS015AC

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


PBIB0465E

CONSULT-II Reference Value in Data Monitor Mode

EBS015AD

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

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec

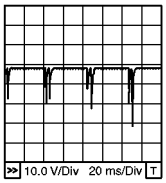
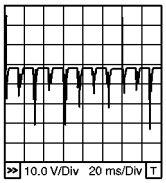
ECM Terminals and Reference Value

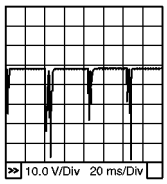
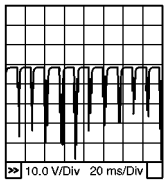
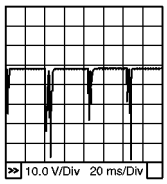
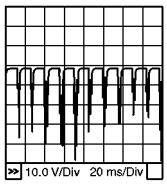
EBS015AE

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
4	O/B	Fuel injector power supply (For cylinder No. 1 and 4)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
5	B	Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

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

On Board Diagnosis Logic

EBS015AF

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1268	No. 1 cylinder fuel injector	The valve built into No. 1 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	● Fuel injector
P1269	No. 2 cylinder fuel injector	The valve built into No. 2 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	
P1270	No. 3 cylinder fuel injector	The valve built into No. 3 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	
P1271	No. 4 cylinder fuel injector	The valve built into No. 4 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	

DTC Confirmation Procedure

EBS015AG

CAUTION:

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

NOTE:

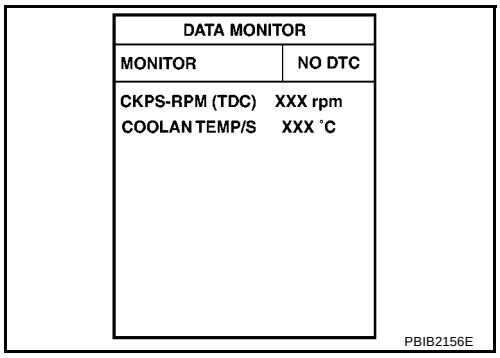
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON, and select “DATA MONITOR” mode with CONSULT-II.
2. Restart engine and let it idle for about 15 minutes.
3. If DTC is detected, go to EC-572, "Diagnostic Procedure" .
   If DTC is not detected, go to next step.
4. Drive vehicle and maintain the following conditions for at least 60 seconds.

CKPS·RPM	700 - 2000 rpm (A constant rotation is maintained)
COOLAN TEMP/S	Less than 75°C (167°F)
Shift lever	Suitable position
Accelerator pedal	Hold the accelerator pedal as steady as possible.

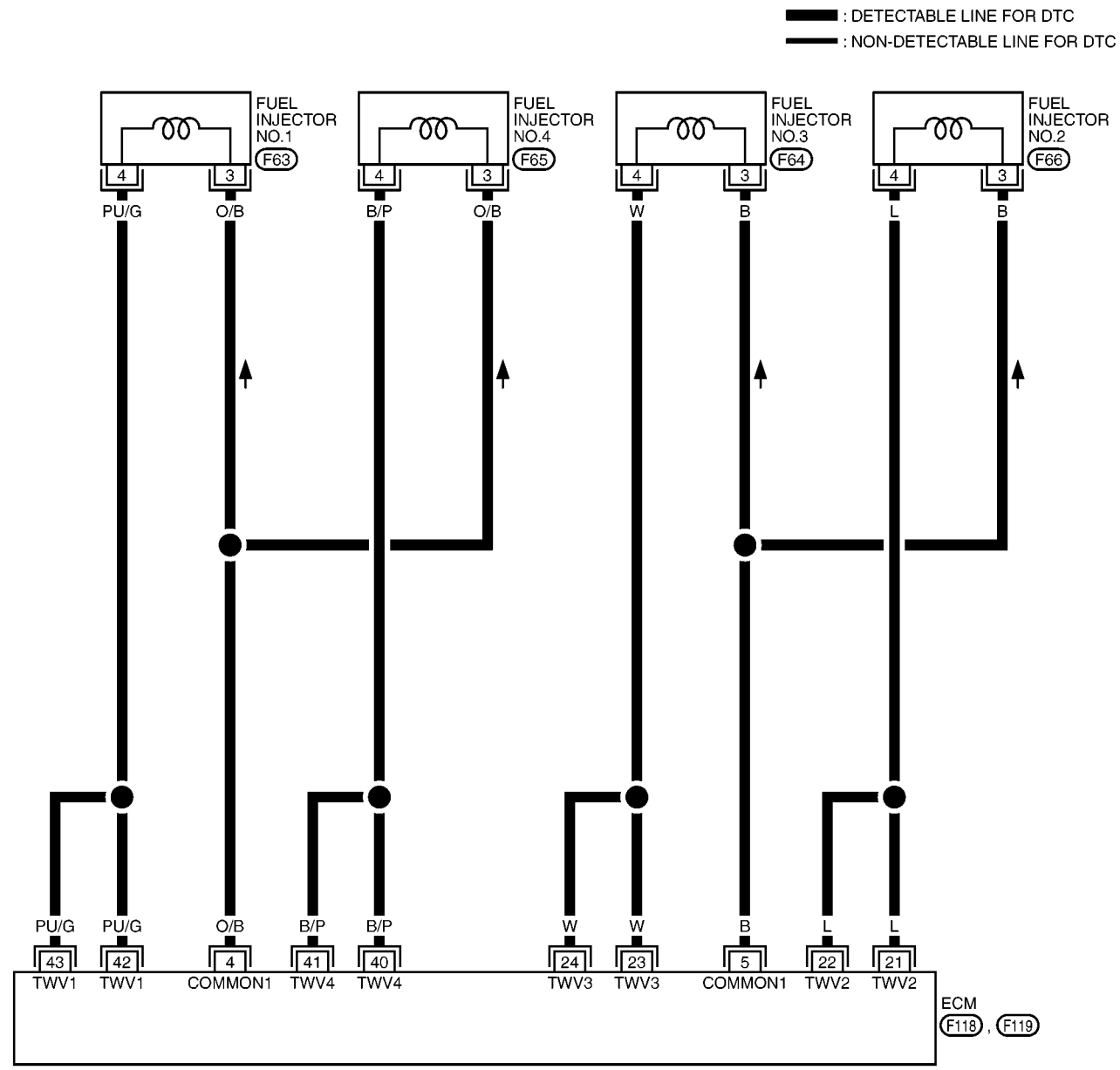
5. If DTC is detected, go to EC-572, "Diagnostic Procedure" .



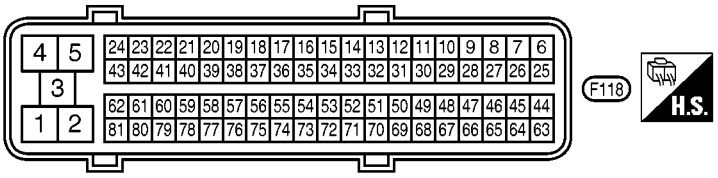
Wiring Diagram

EBS015AH

EC-INJECT-01







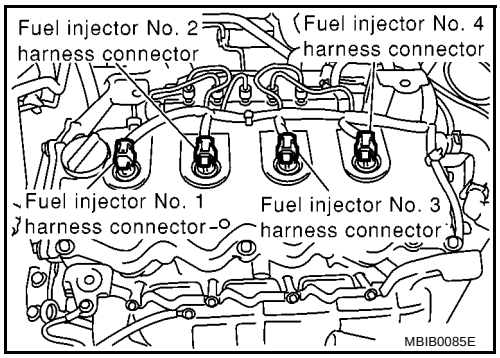
MBWA0634E

Diagnostic Procedure

EBS015AI

1. CHECK FUEL INJECOR POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector harness connector.
4. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.



DTC	Terminal		Cylinder
	ECM	Fuel injector	
P1268	4	3	No.1
P1269	5	3	No.2
P1270	5	3	No.3
P1271	4	3	No.4

Continuity should exist.

5. 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 ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.

DTC	Terminal		Cylinder
	ECM	Fuel injector	
P1268	42, 43	4	No.1
P1269	21, 22	4	No.2
P1270	23, 24	4	No.3
P1271	40, 41	4	No.4

Continuity should exist.

2. 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 FUEL INJECTOR-I

Refer to EC-573, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel injector.

4. CHECK FUEL INJECTOR-II

With CONSULT-II

1. Remove two fuel injectors of malfunctioning cylinder and another cylinder.
2. Install fuel injectors to different cylinder.
3. Reconnect ECM harness connector and fuel injector harness connector.
4. Turn ignition switch ON.
5. Select “SELF DIAG RESULTS” mode with CONSULT-II.
6. Touch “ERASE”.
7. Perform EC-570, "DTC Confirmation Procedure" .
8. Is another DTC displayed?

Yes or No

Yes >> Replace fuel injector of malfunctioning cylinder.
No >> GO TO 5.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

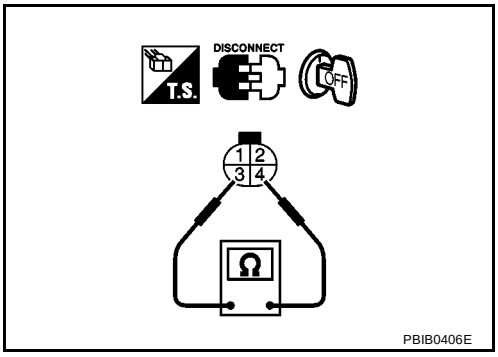
EBS015AJ

FUEL INJECTOR

1. Disconnect fuel injector.
2. Check continuity between terminals as shown in the figure.

Continuity should exist.

3. If NG, replace fuel injector.



Removal and Installation

EBS015AK

FUEL INJECTOR

Refer to
EM-39, "INJECTION TUBE AND FUEL INJECTOR".

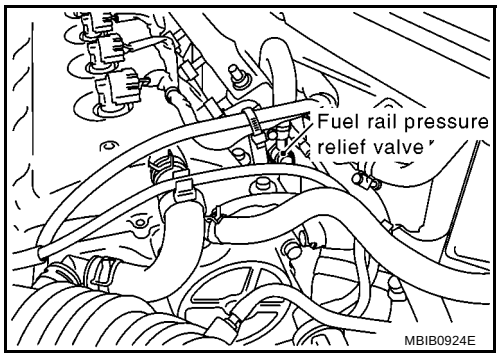
DTC P1272 FUEL PUMP

PFP:16700

Description

EBS015AL

When the fuel pressure in fuel rail increases to excessively high, fuel pressure relief valve opens to carry excess fuel to the return hose.



CONSULT-II Reference Value in Data Monitor Mode

EBS015AM

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

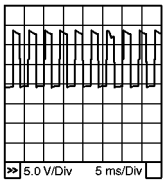
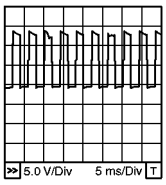
ECM Terminals and Reference Value

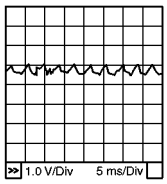
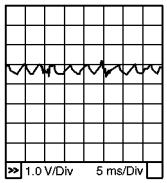
EBS015AN

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS015AO

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1272	Fuel rail pressure relief valve open	Fuel rail pressure relief valve is open because of fuel pressure control system malfunction.	● Harness or connectors (Fuel pump circuit is open or shorted.) ● Fuel pump ● Fuel rail pressure sensor ● Air mixed with fuel ● Lack of fuel

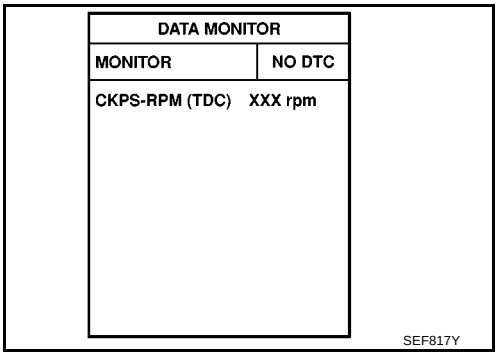
DTC Confirmation Procedure

EBS015AP

NOTE:
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 keep engine speed more than 4,000 rpm for at least 5 seconds, then release the accelerator pedal.
4. If DTC is detected, go to EC-577, "Diagnostic Procedure" .



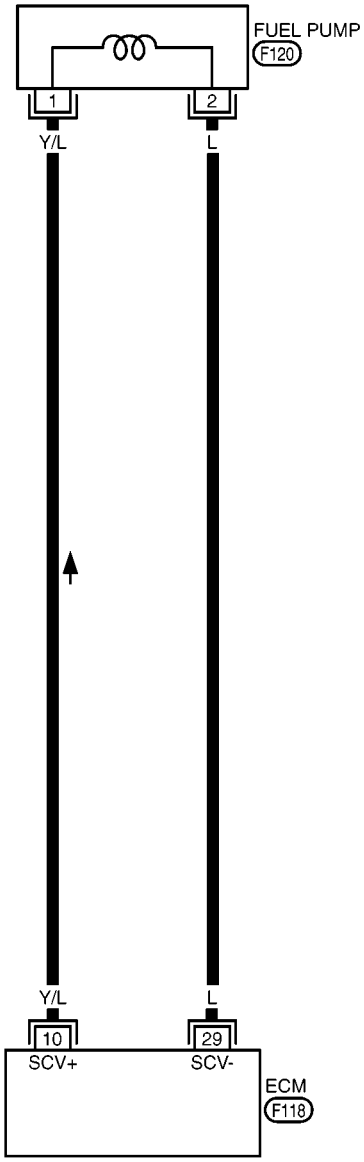
SEF817Y

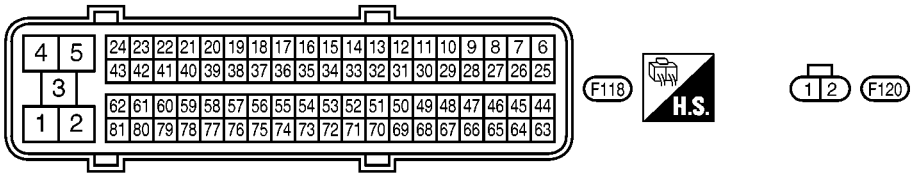
Wiring Diagram

EBS015AQ

EC-F/PUMP-01

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





MBWA0396E

Diagnostic Procedure

EBS015AR

1. PERFORM FUEL PUMP LEARNING VALUE CLEARING

NOTE:
If the DTC is detected because of air mixed with fuel (i.e.: caused by lack of fuel), it may become normal by performing following procedure.

With CONSULT-II

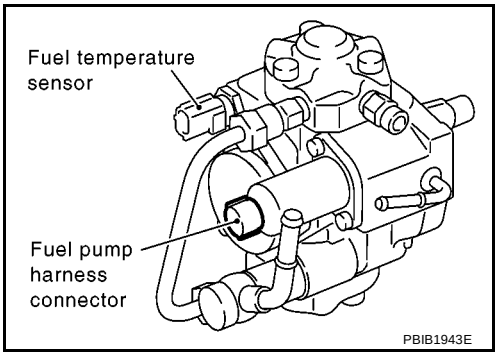
1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select “SELF-DIAG RESULT” mode with CONSULT-II.
5. Touch “ERASE”.
6. Perform EC-575, "DTC Confirmation Procedure" , again.
7. Is DTC detected again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connectors.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PUMP

Refer to EC-578, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> GO TO 7.

5. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-456, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace fuel rail.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace.

7. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

Component Inspection

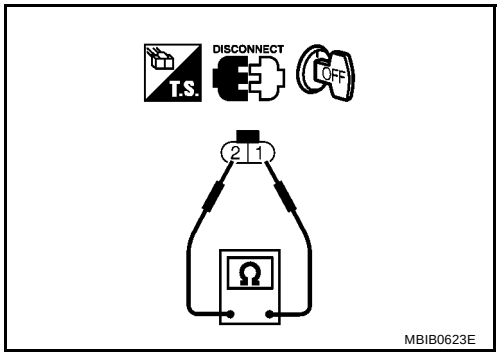
EBS015AS

FUEL PUMP

1. Check continuity between fuel supply pump terminals 1 and 2.

Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS015AT

FUEL RAIL

Refer to
EM-39, "INJECTION TUBE AND FUEL INJECTOR".

FUEL PUMP

Refer to
EM-42, "FUEL PUMP".

DTC P1273 FUEL PUMP

PFP:16700

Description

EBS015AU

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel pump increases, the fuel raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to the fuel pump to raise the injection pressure.

CONSULT-II Reference Value in Data Monitor Mode

EBS015AV

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

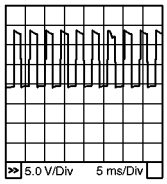
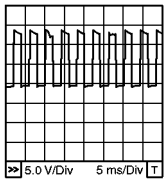
ECM Terminals and Reference Value

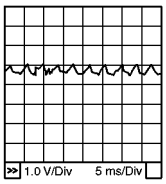
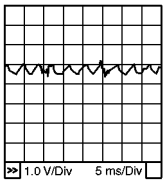
EBS015AW

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS015AX

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1273	Fuel pump insufficient flow	ECM detects the abnormal pulse of fuel pressure.	● Fuel pump ● Air mixed with fuel ● Lack of fuel ● Fuel rail pressure sensor

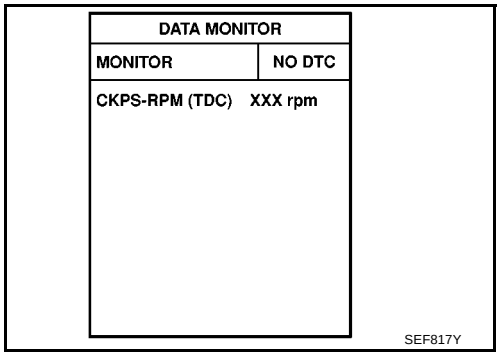
DTC Confirmation Procedure

EBS015AY

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Keep engine speed more than 2,000 rpm for at least 10 seconds.
4. If DTC is detected, go to EC-582, "Diagnostic Procedure" .



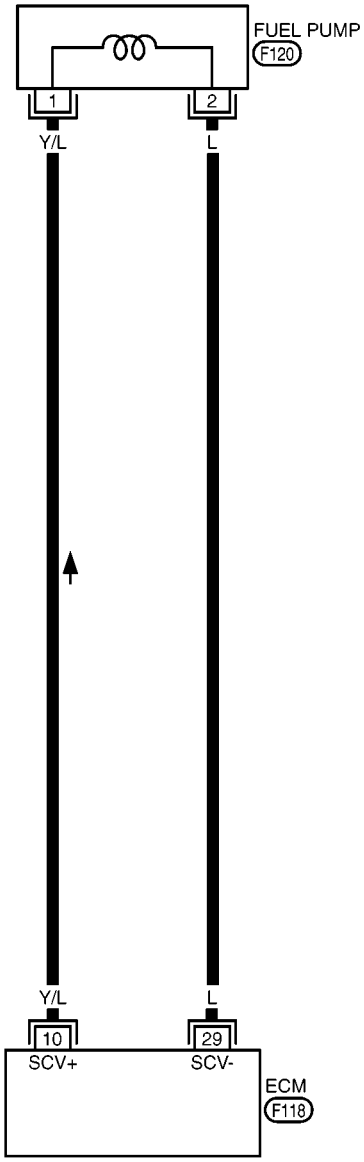
SEF817Y

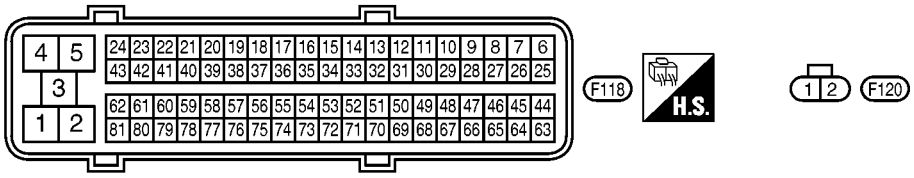
Wiring Diagram

EBS015AZ

EC-F/PUMP-01

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





MBWA0396E

Diagnostic Procedure

EBS015B0

1. PERFORM FUEL PUMP LEARNING VALUE CLEARING

NOTE:
If the DTC is detected because of air mixed with fuel (i.e.: caused by lack of fuel), it may become normal by performing following procedure.

With CONSULT-II

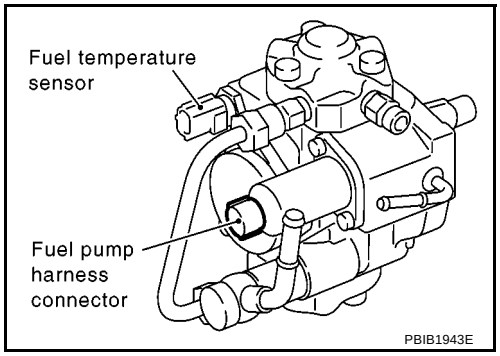
1. Turn ignition switch ON.
2. Perform Fuel Pump Learning value clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .
3. Start engine and let it idle for at least 60 seconds.
4. Select “SELF-DIAG RESULT” mode with CONSULT-II.
5. Touch “ERASE”.
6. Perform EC-580, "DTC Confirmation Procedure" , again.
7. Is DTC detected again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connectors.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-456, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace fuel rail.

5. CHECK FUEL PUMP

Refer to EC-583, "Component Inspection" .

OK or NG

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

6. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Valve Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

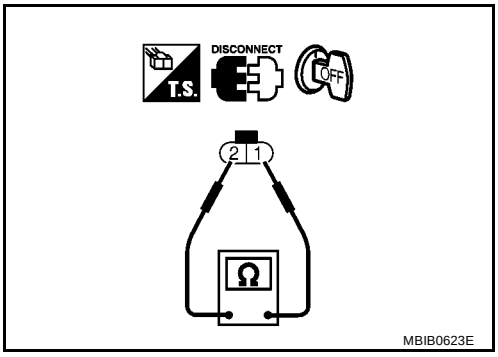
EBS015B1

FUEL PUMP

1. Check continuity between fuel supply pump terminals 1 and 2.

Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS015B2

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P1274 FUEL PUMP

PFP:16700

Description

EBS015B3

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel increases, the fuel pump raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to the fuel pump to raise the injection pressure.

CONSULT-II Reference Value in Data Monitor Mode

EBS015B4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

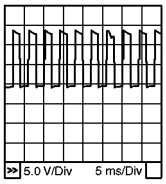
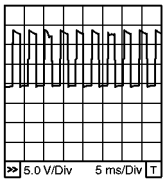
ECM Terminals and Reference Value

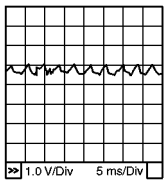
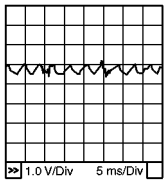
EBS015B5

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS015B6

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1274	Fuel pump protection	Fuel pressure is too much higher than the target value.	● Harness or connectors (The fuel pump circuit is open or shorted.) ● Fuel pump ● Fuel rail pressure sensor

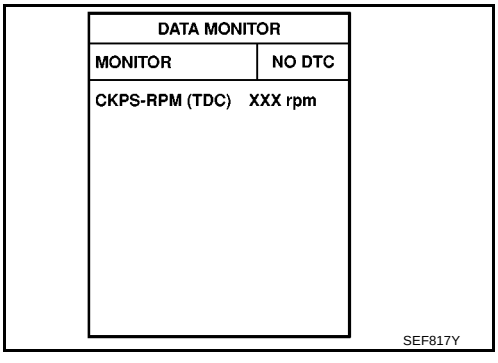
DTC Confirmation Procedure

EBS015B7

NOTE:
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. Tuning ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let idle for at least 5 seconds.
4. If DTC is detected, go to EC-587, "Diagnostic Procedure" .



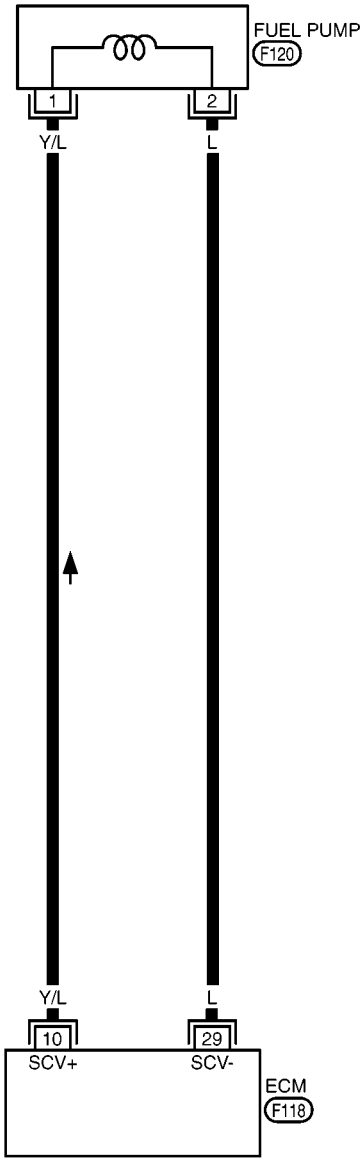
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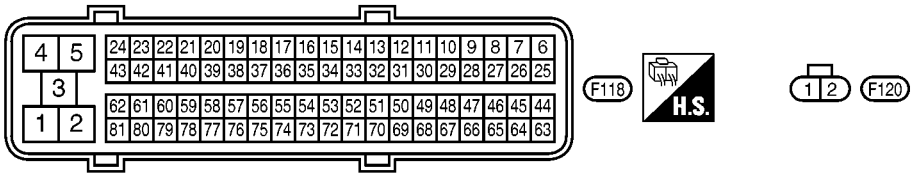
Wiring Diagram

EBS015B8

EC-F/PUMP-01

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





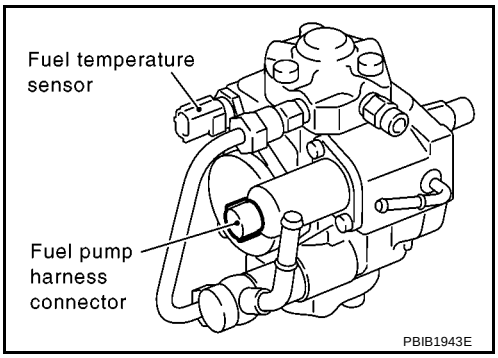
MBWA0396E

Diagnostic Procedure

EBS015B9

1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connectors.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 2.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

3. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-456, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel rail.

4. CHECK FUEL PUMP

Refer to EC-588, "Component Inspection" .

OK or NG

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

5. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Valve Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

6. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

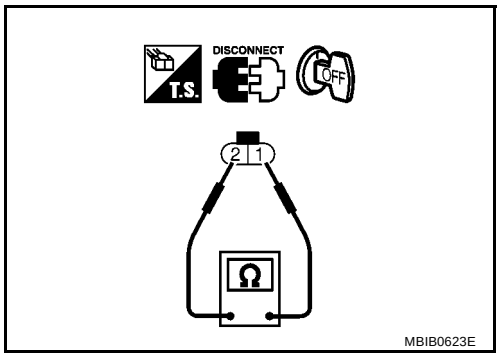
EBS015BA

FUEL PUMP

1. Check continuity between fuel pump terminals 1 and 2.

   Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS015BB

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

DTC P1275 FUEL PUMP

PFP:16700

Description

EBS015BC

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel increases, the fuel pump raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to fuel pump to raise the injection pressure.

CONSULT-II Reference Value in Data Monitor Mode

EBS015BD

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	Idle	1,700 - 1,900 mA
		2,000 rpm	1,600 - 1,800 mA

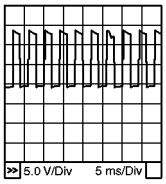
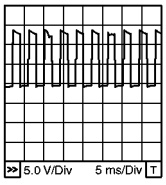
ECM Terminals and Reference Value

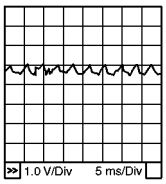
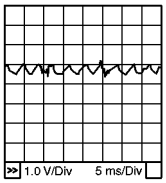
EBS015BE

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
10	Y/L	Fuel pump power supply	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0885E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0886E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	L	Fuel pump	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0.5 - 1.0V ★  MBIB0888E

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

On Board Diagnosis Logic

EBS015BF

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1275	Fuel pump exchange	Fuel pressure is too much higher than the target value.	● Harness or connectors (The fuel pump circuit is open or shorted.) ● Fuel pump ● Fuel rail pressure sensor

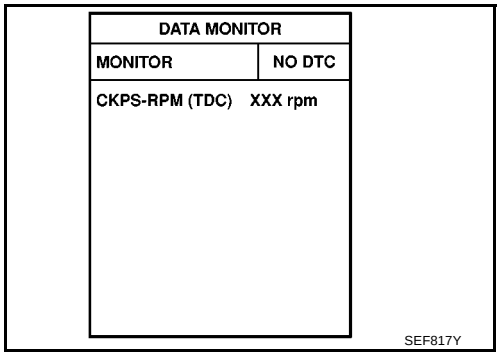
DTC Confirmation Procedure

EBS015BG

NOTE:
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. Select “DATA MONITOR” mode with CONSULT-II.
3. Keep engine speed more than 2,000 rpm for at least 60 seconds.
4. If DTC is detected, go to EC-592, "Diagnostic Procedure" .



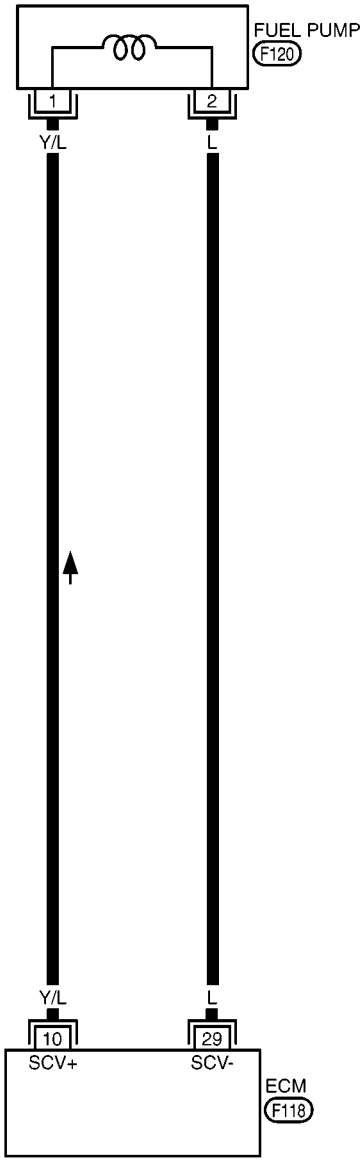
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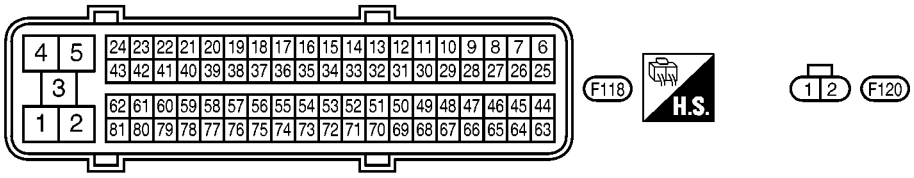
Wiring Diagram

EBS015BH

EC-F/PUMP-01

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





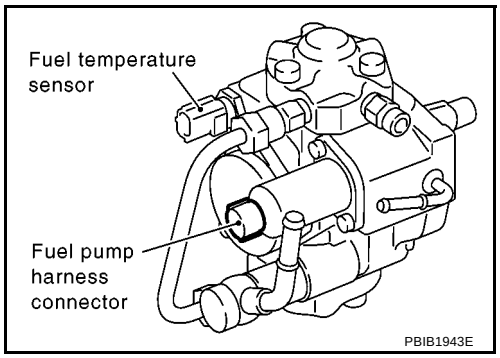
MBWA0396E

Diagnostic Procedure

EBS015BI

1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump harness connectors.



3. Check harness continuity between ECM terminal 10 and fuel pump 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 2.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

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

3. CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-456, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel rail.

4. CHECK FUEL PUMP

Refer to EC-593, "Component Inspection" .

OK or NG

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

5. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Valve Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

6. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

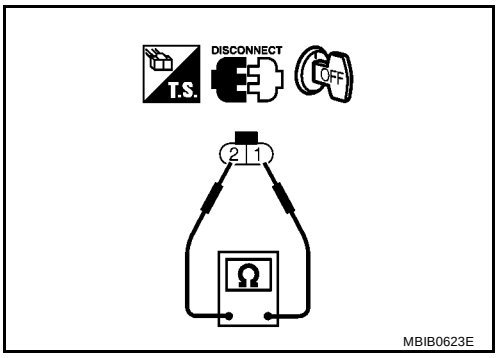
EBS015BJ

FUEL PUMP

1. Check continuity between fuel pump terminals 1 and 2.

Continuity should exist.

2. If NG, replace fuel pump.



Removal and Installation

EBS015BK

FUEL PUMP

Refer to EM-42, "FUEL PUMP" .

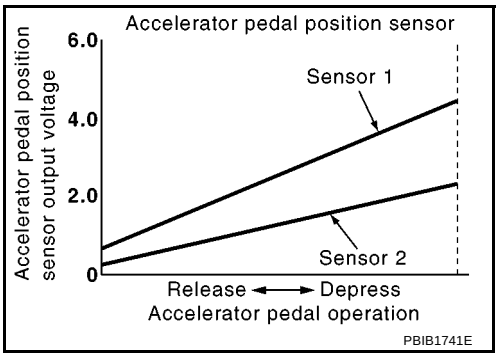
DTC P2135 APP SENSOR

PFP:18002

Description

EBS015BL

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and sends a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.



CONSULT-II Reference Value in Data Monitor Mode

EBS015BM

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.2 - 0.7V
		Accelerator pedal: fully depressed	3.9 - 4.9V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: fully released	0.1 - 0.4V
		Accelerator pedal: fully depressed	1.9 - 2.4V

*: This signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

ECM Terminals and Reference Value

EBS015BN

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)
82	L/R	Accelerator pedal position sensor 1 power supply	**[Ignition switch ON]**	Approximately 5.3V
83	L/W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.5 - 1.0V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	4.2 - 5.2V
84	L	Accelerator pedal position sensor 1 ground	**[Ignition switch ON]**	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	**[Ignition switch ON]**	Approximately 0.3V
90	R	Accelerator pedal position sensor 2 power supply	**[Ignition switch ON]**	Approximately 5.3V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	W	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● Engine stopped ● Accelerator pedal fully released	0.4 - 0.7V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal fully depressed	2.2 - 2.7V
92	B	Accelerator pedal position sensor 2 ground	**[Ignition switch ON]**	Approximately 0.3V

On Board Diagnosis Logic

EBS015BO

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135	Accelerator pedal position sensor 1, 2 signal correlation	The correlation between APP sensor 1 signal and APP sensor 2 signal is out of the normal range.	● Harness or connectors (The APP sensor circuit is open or shorted.) ● Accelerator pedal position sensor

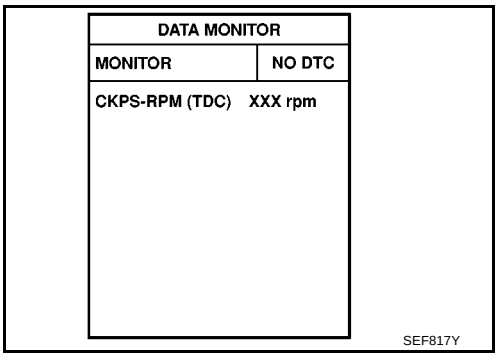
DTC Confirmation Procedure

EBS015BP

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

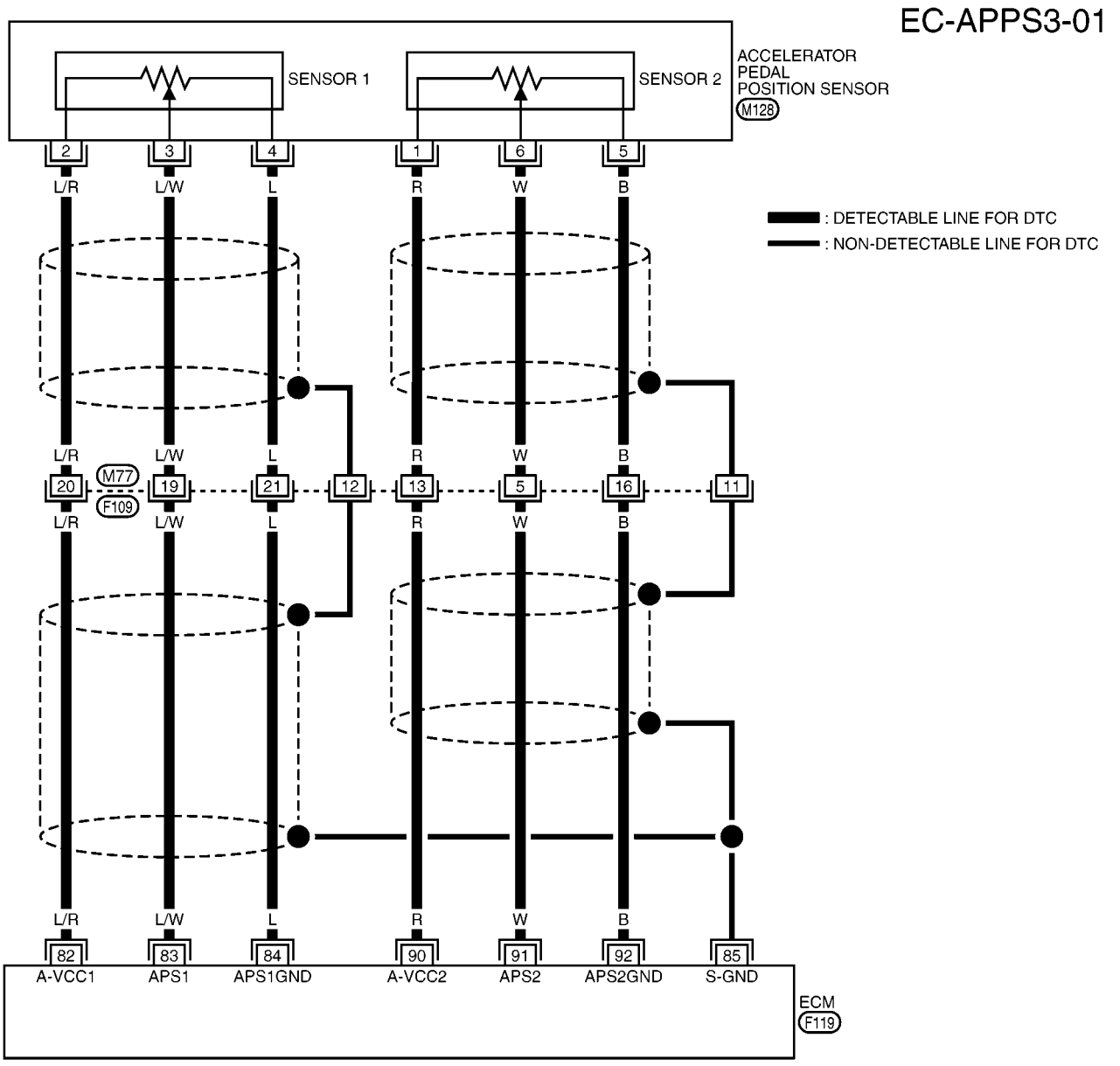
WITH CONSULT-II

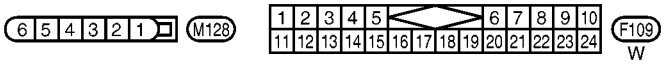
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. Depress accelerator pedal slowly spending 5 seconds, and then release it slowly spending 5 seconds.
5. If DTC is detected, go to EC-597, "Diagnostic Procedure" .

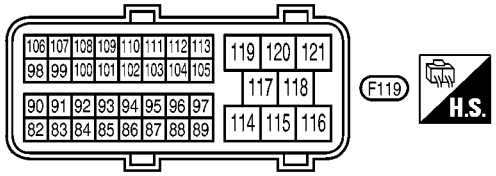


Wiring Diagram

EBS015BQ







MBWA0433E

Diagnostic Procedure

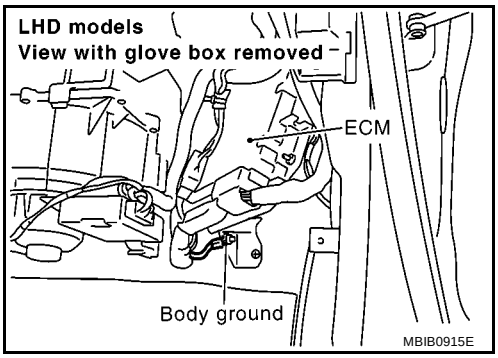
EBS015BR

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

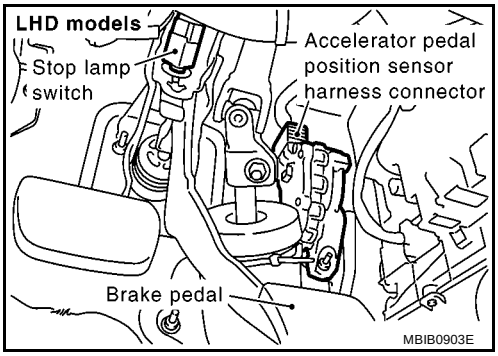
OK or NG

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



2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

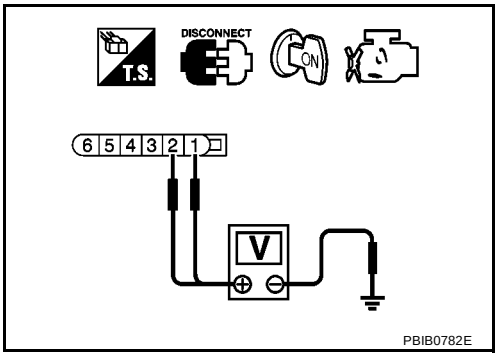


3. Check voltage between APP sensor terminals 1, 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5.3V

OK or NG

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



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and APP 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. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 4 and ECM terminal 84, APP sensor terminal 5 and ECM terminal 92.
   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 M77, F109
- Harness for open or short between ECM and APP 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. Check harness continuity between ECM terminal 83 and APP sensor terminal 3, ECM terminal 91 and APP sensor terminal 6.
   Refer to Wiring Diagram.

   Continuity should exist.

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

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and APP sensor

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

8. CHECK APP SENSOR

Refer to EC-599, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace accelerator pedal assembly.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

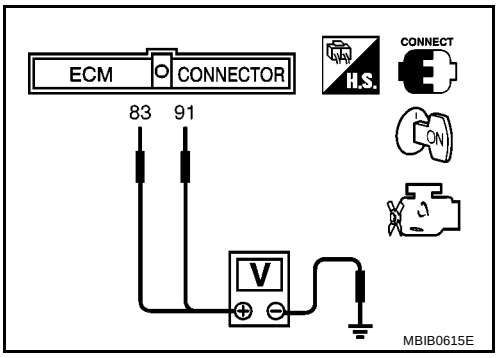
Component Inspection

EBS015BS

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 83 (APP sensor 1 signal), 91 (APP sensor 2 signal) and body ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	4.2 - 5.2V
91 (Accelerator pedal position sensor 2)	Fully released	0.4 - 0.7V
	Fully depressed	2.2 - 2.7V



4. If NG, replace accelerator pedal assembly.

Removal and Installation

EBS015BT

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

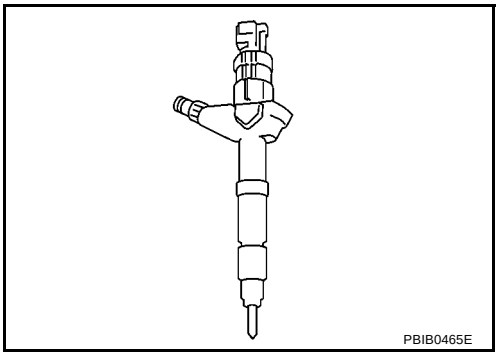
DTC P2146, P2149 FUEL INJECTOR POWER SUPPLY

PFP:16600

Component Description

EBS015BU

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


PBIB0465E

CONSULT-II Reference Value in Data Monitor Mode

EBS015BV

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec

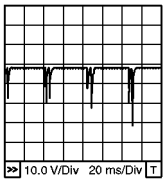
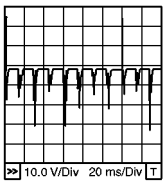
ECM Terminals and Reference Value

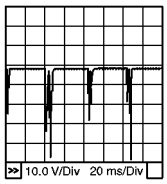
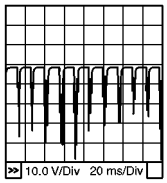
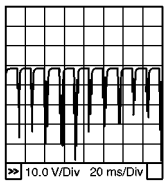
EBS015BW

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

CAUTION:

Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
4	O/B	Fuel injector power supply (For cylinder No. 1 and 4)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
5	B	Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★ G/R
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

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

On Board Diagnosis Logic

EBS015BX

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2146	No. 1 and 4 cylinder fuel injector power supply circuit open	An improper voltage signal is sent to ECM through No. 1 and 4 cylinder fuel injector.	● Harness or connectors (The fuel injector circuit is open.)
P2149	No. 2 and 3 cylinder fuel injector power supply circuit open	An improper voltage signal is sent to ECM through No. 2 and 3 cylinder fuel injector.	

DTC Confirmation Procedure

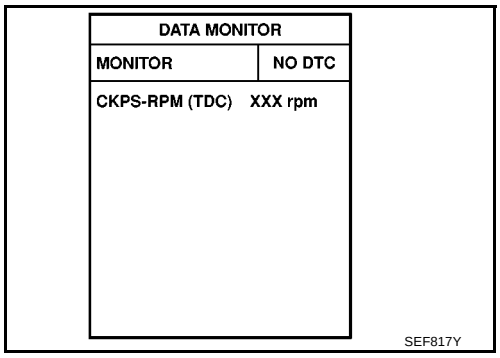
EBS015BY

NOTE:
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 the ambient temperature is more than -20°C (-4°F).

WITH CONSULT-II

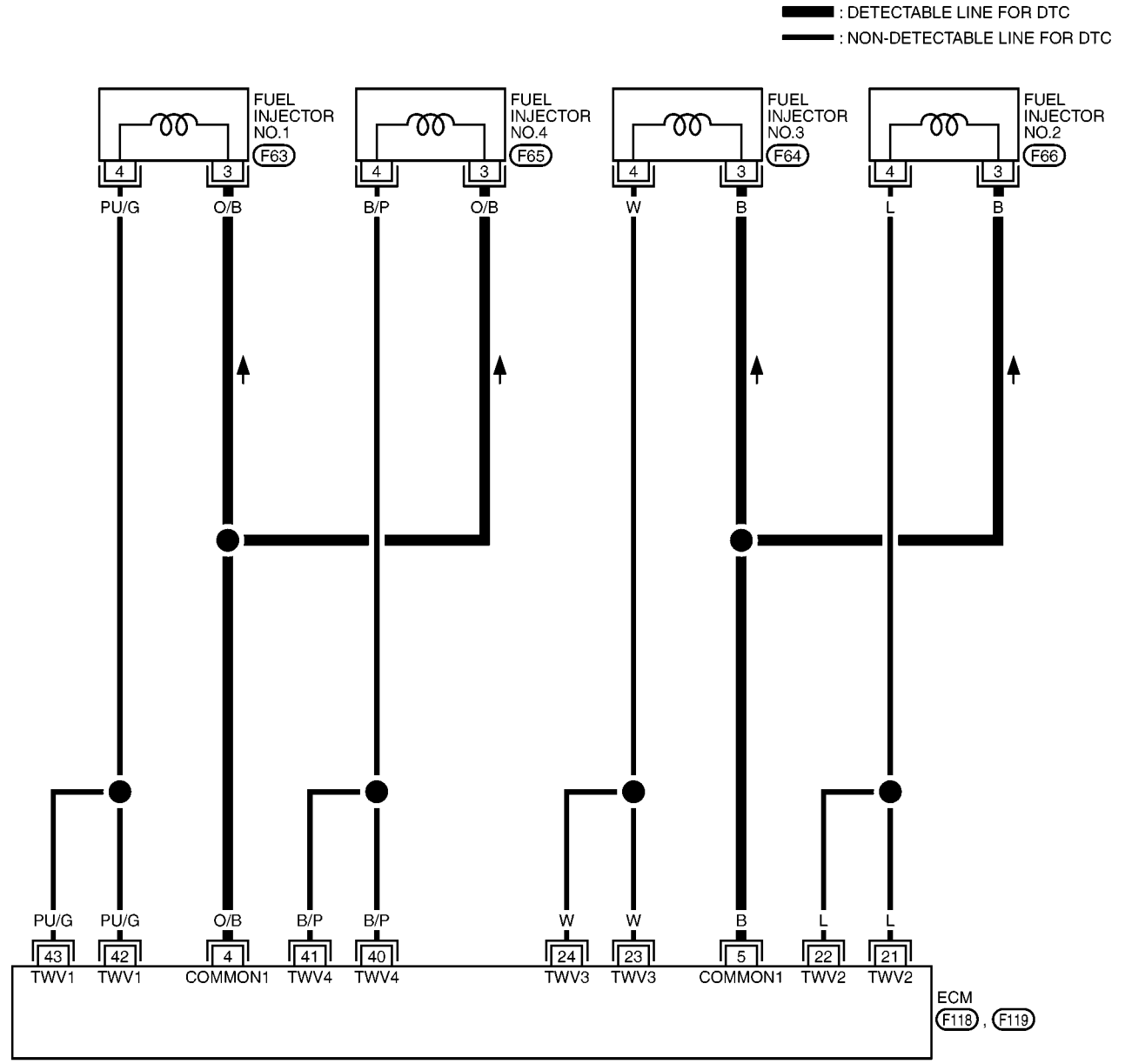
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If DTC is detected, go to EC-604, "Diagnostic Procedure" .



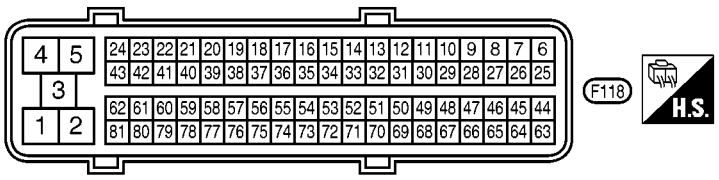
Wiring Diagram

EBS015BZ

EC-INJ/PW-01







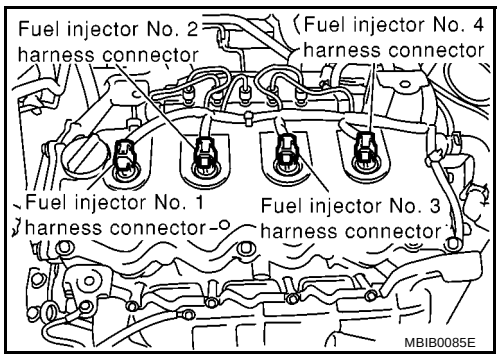
MBWA0636E

Diagnostic Procedure

EBS015C0

1. CHECK FUEL INJECOR POWER CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector harness connector.
4. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder.
   Refer to Wiring Diagram.



Terminal		Cylinder
ECM	Fuel injector	
4	3	No.1
5	3	No.2
5	3	No.3
4	3	No.4

Continuity should exist.

5. 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 INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

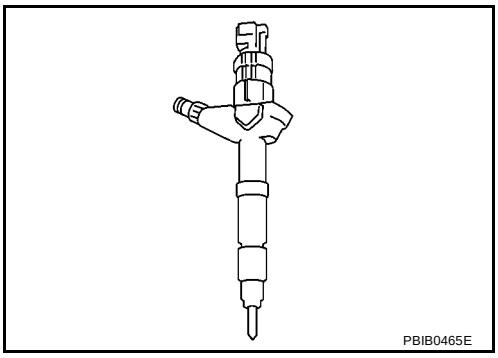
DTC P2147, P2148 FUEL INJECTOR CIRCUIT

PFP:16600

Component Description

EBS015C1

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


PBIB0465E

CONSULT-II Reference Value in Data Monitor Mode

EBS015C2

Specification data are reference values.

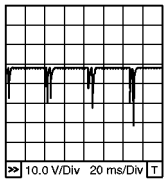
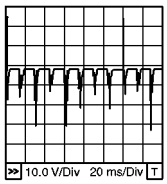
MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	● Engine: After warming up ● Shift lever: Neutral position ● Idle speed	No-load	0.68 - 0.78 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.78 - 0.88 msec

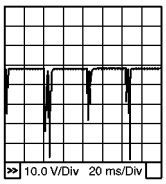
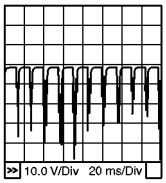
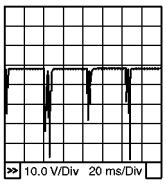
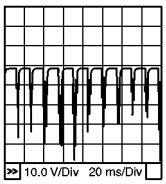
ECM Terminals and Reference Value

EBS015C3

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

CAUTION:
Do not use ECM ground terminals when measuring input/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 and Pulse Signal)
4	O/B	Fuel injector power supply (For cylinder No. 1 and 4)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	5 - 10V ★  MBIB0883E
5	B	Fuel injector power supply (For cylinder No. 2 and 3)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm	5 - 10V ★  MBIB0884E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	L L W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E
40 41 42 43	B/P B/P PU/G PU/G	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 9V ★  MBIB0881E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 9V ★  MBIB0882E

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

On Board Diagnosis Logic

EBS015C4

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2147	Fuel injector circuit low input	ECM detects the fuel injector circuit is shorted to ground.	● Harness or connectors (The fuel injector circuit is shorted.)
P2148	Fuel injector circuit high input	ECM detects the fuel injector circuit is shorted to power.	

DTC Confirmation Procedure

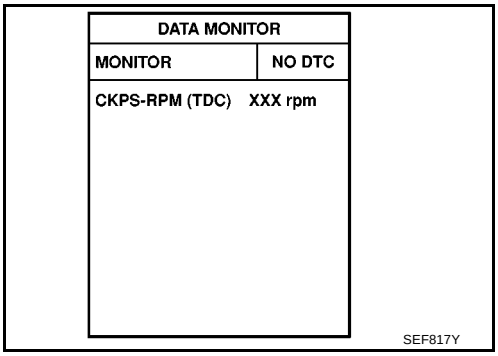
EBS015C5

NOTE:
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.

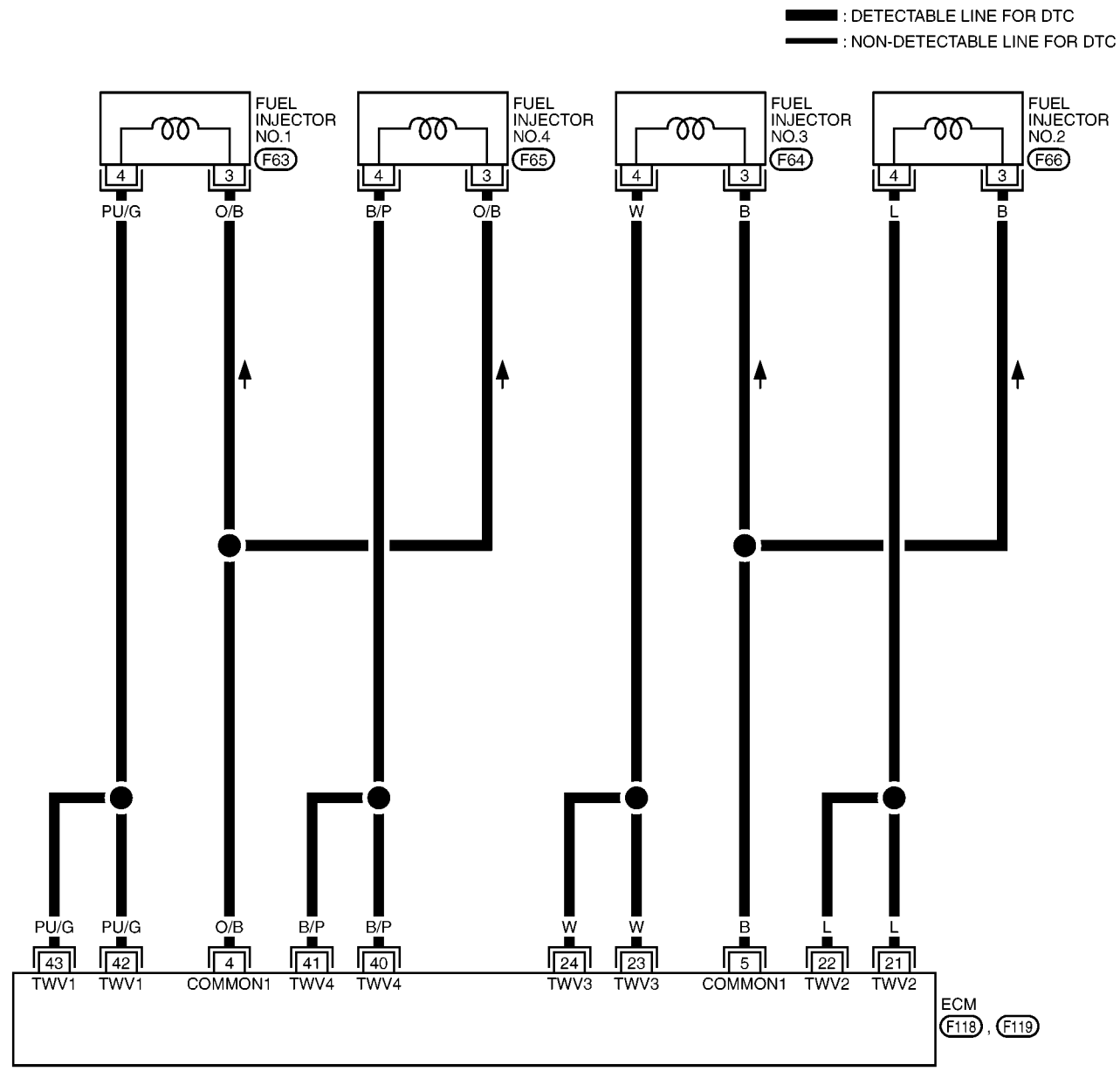
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If DTC is detected, go to EC-609, "Diagnostic Procedure" .

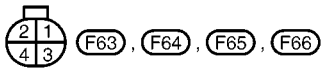


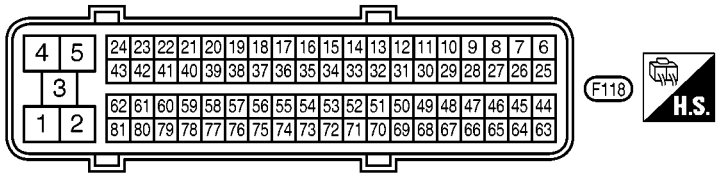
Wiring Diagram

EBS015C6

EC-INJECT-01







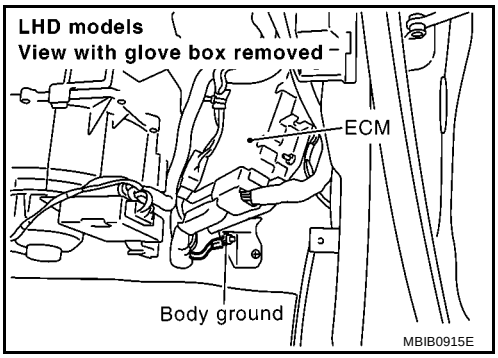
MBWA0634E

Diagnostic Procedure

EBS015C7

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws. Refer to EC-415, "Ground Inspection" .

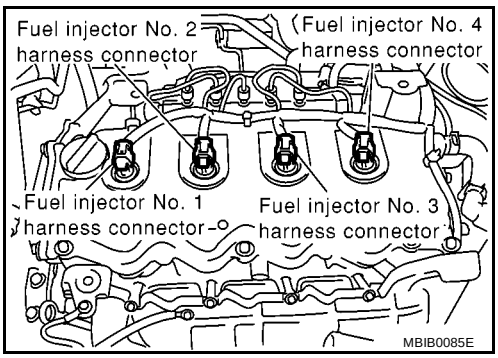


OK or NG

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

2. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Disconnect fuel injector harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals corresponding to the malfunctioning cylinder.
   Refer to Wiring Diagram.



Cylinder	Terminal		Continuity
	Fuel injector	ECM	
No.1	3	42, 43	Should not exist
		4	Should exist
	4	42,43	Should exist
		4	Should not exist
No.2	3	21, 22	Should not exist
		5	Should exist
	4	21, 22	Should exist
		5	Should not exist
No.3	3	23, 24	Should not exist
		5	Should exist
	4	23, 24	Should exist
		5	Should not exist
No.4	3	40, 41	Should not exist
		4	Should exist
	4	40, 41	Should exist
		4	Should not exist

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

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK FUEL INJECTOR

Refer to EC-610, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace fuel injector.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

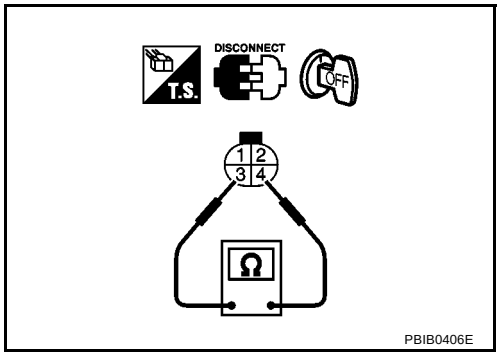
EBS015C8

FUEL INJECTOR

1. Disconnect fuel injector.
2. Check continuity between terminals as shown in the figure.

   Continuity should exist.

3. If NG, replace fuel injector.



Removal and Installation

EBS015C9

FUEL INJECTOR

Refer to EM-39, "INJECTION TUBE AND FUEL INJECTOR" .

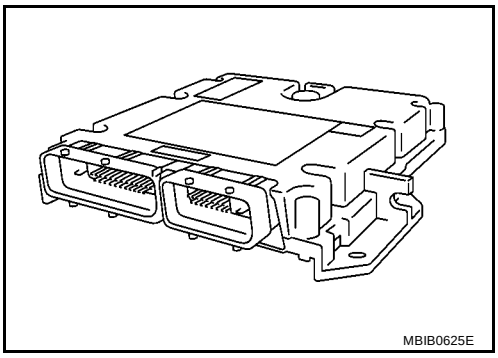
DTC P2228, P2229 BARO SENSOR

PFP:23731

Description

EBS015CA

The barometric pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the microcomputer.


MBIB0625E

On Board Diagnosis Logic

EBS015CB

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2228	Barometric pressure sensor circuit low input	An excessively low voltage from the barometric pressure sensor (built-into ECM) is sent to ECM.	● ECM
P2229	Barometric pressure sensor circuit high input	An excessively high voltage from the barometric pressure sensor (built-into ECM) is sent to ECM.	

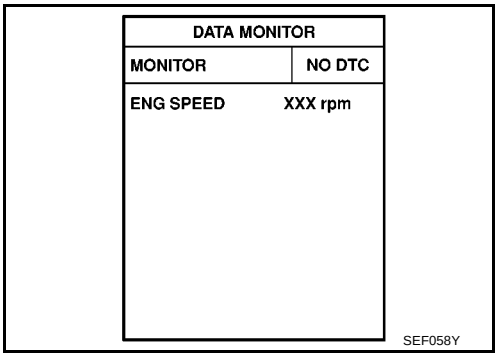
DTC Confirmation Procedure

EBS015CC

NOTE:
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-611, "Diagnostic Procedure" .



SEF058Y

Diagnostic Procedure

EBS015CD

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 EC-611, "DTC Confirmation Procedure" , again.
5. Is DTC P2228 or P2229 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-371, "NATS (Nissan Anti-theft System)" .
3. Perform Fuel Pump Learning Valve Clearing. Refer to EC-368, "Fuel Pump Learning Value Clearing" .

>> **INSPECTION END**

GLOW CONTROL SYSTEM

PFP:25230

Description

EBS015CE

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor	Engine speed	Glow control	Glow lamp Glow relay Glow plugs
Engine coolant temperature sensor	Engine coolant temperature		

When engine coolant temperature is more than approximately 80°C (176°F), the glow relay turns off.
When coolant temperature is lower than approximately 80°C (176°F):

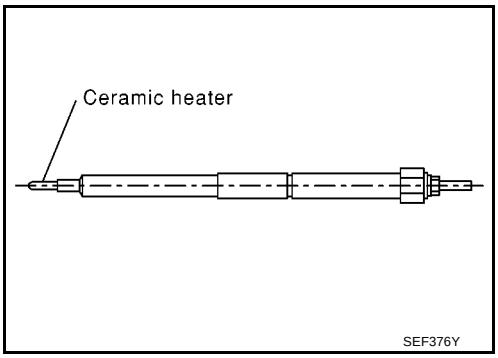
- Ignition switch ON
  After ignition switch has turned to ON, the glow relay turns ON for a certain period of time in relation to engine coolant temperature, allowing current to flow through glow plug.
- Cranking
  The glow relay turns ON, allowing current to flow through glow plug.
- Starting
  After engine has started, current continues to flow through glow plug (after-glow mode) for a certain period in relation to engine coolant temperature.

The glow indicator lamp turns ON for a certain period of time in relation to engine coolant temperature at the time glow relay is turned ON.

COMPONENT DESCRIPTION

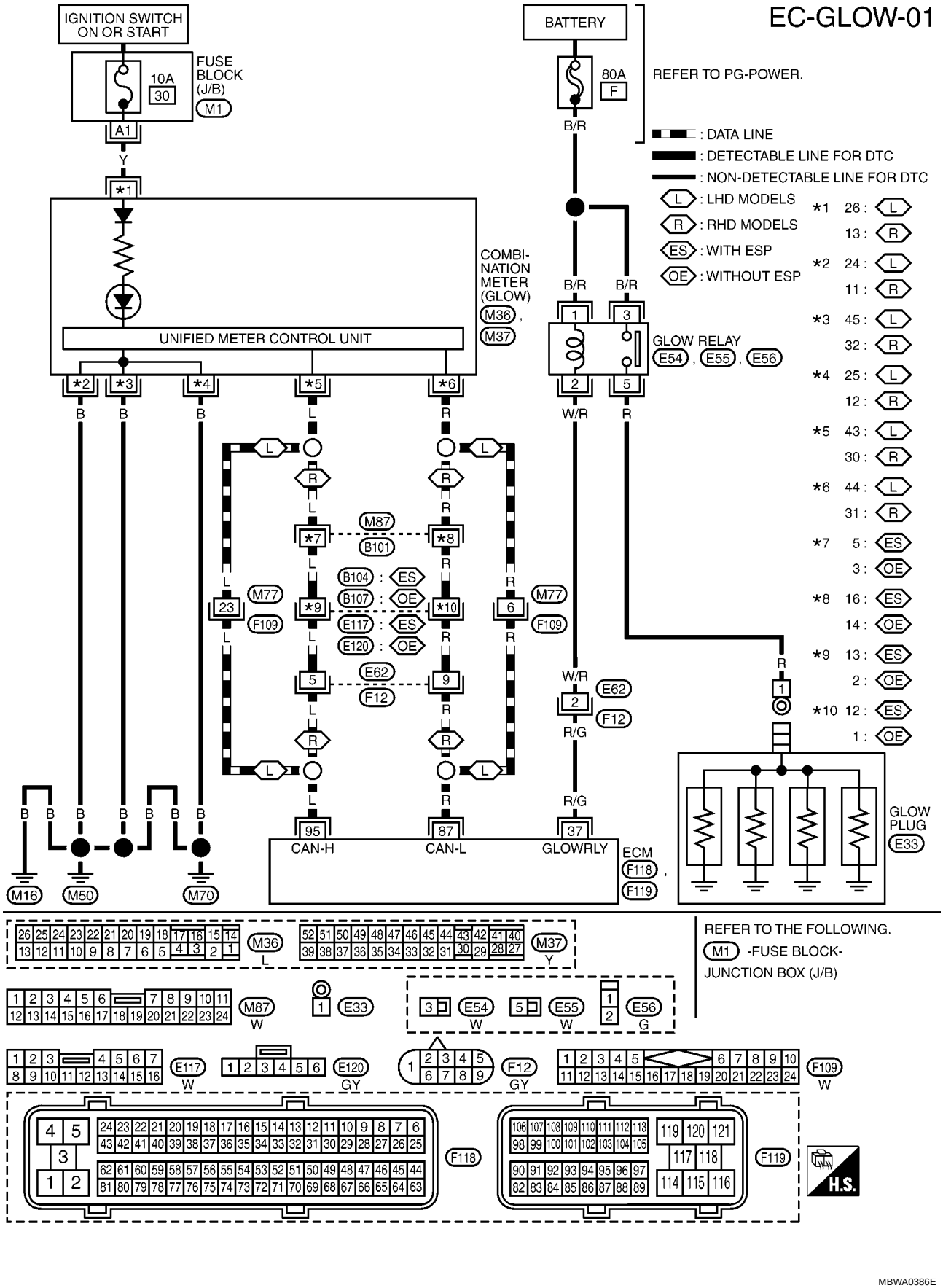
Glow Plug

The glow plug is provided with a ceramic heating element to obtain a high-temperature resistance. It glows in response to a signal sent from the ECM, allowing current to flow through the glow plug via the glow relay.



Wiring Diagram

EBS015CF



MBWA0386E

Diagnostic Procedure

EBS015CG

1. INSPECTION START

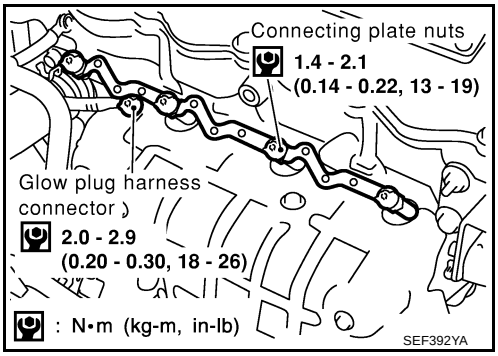
Check fuel level, fuel supplying system, starter motor, etc.

OK or NG

OK >> GO TO 2.
NG >> Correct.

2. CHECK INSTALLATION

Check that glow plug nut and all glow plug connecting plate nuts are installed properly.



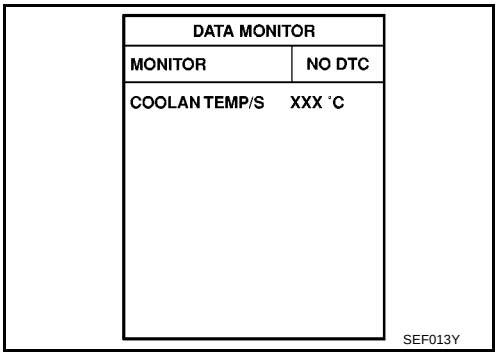
OK or NG

OK >> GO TO 3.
NG >> Install properly.

3. CHECK GLOW INDICATOR LAMP OPERATION

With CONSULT-II

1. Turn ignition switch ON.
2. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
3. Confirm that “COOLAN TEMP/S” indicates below 80°C (176°F). If it indicates above 80°C (176°F), cool down engine.
4. Turn ignition switch OFF, wait at least 5 seconds and then turn ON.
5. Make sure that glow indicator lamp is turned ON for 1.5 seconds or more after turning ignition switch ON, and then glow indicator lamp turned OFF.



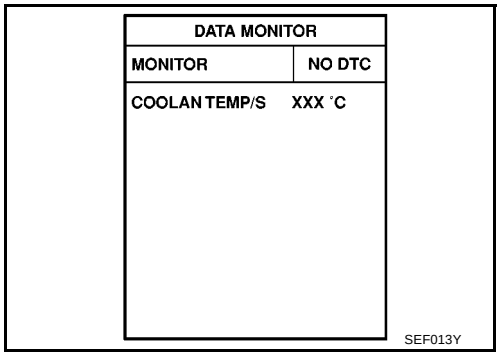
OK or NG

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

4. CHECK GLOW CONTROL SYSTEM OVERALL FUNCTION

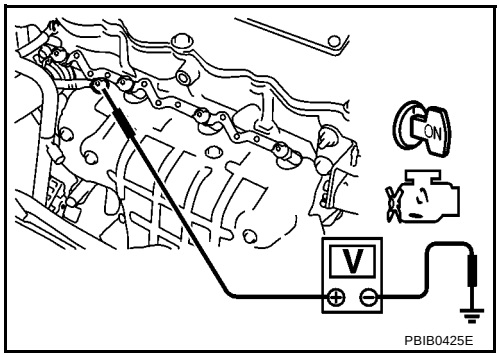
With CONSULT-II

1. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
2. Confirm that “COOLAN TEMP/S” indicates approximately 25°C (77°F). If NG, cool down engine.
3. Turn ignition switch OFF.
4. Set voltmeter probe between glow plug and engine body.
5. Turn ignition switch ON.



6. Check the voltage between glow plug and engine body under the following conditions.

Conditions	Voltage
For 20 seconds after turning ignition switch ON	Battery voltage
More than 20 seconds after turning ignition switch ON	Approx. 0V



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

5. CHECK DTC

Check that DTC U1000 is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC U1000, refer to EC-416, "DTC U1000 CAN COMMUNICATION LINE" .
No >> GO TO 6.

6. CHECK COMBINATON METER OPERATION

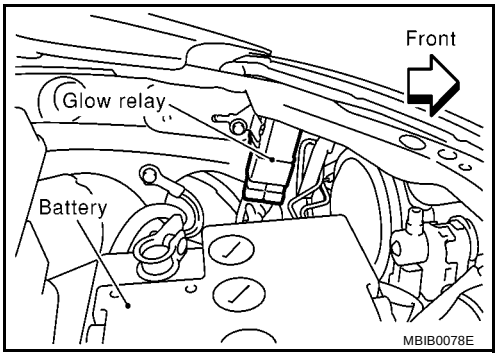
Does combination meter operate normally?

Yes or No

Yes >> GO TO 14.
No >> Check combination meter circuit. Refer to DI-4, "COMBINATION METERS (LHD MODELS)" or DI-27, "COMBINATION METERS (RHD MODELS)" .

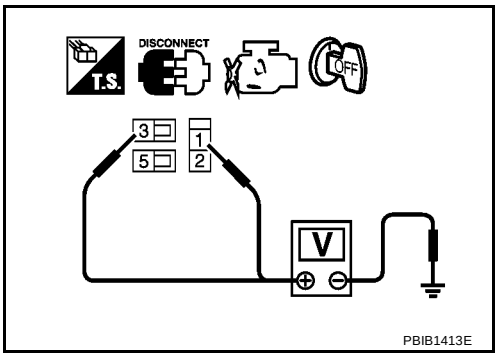
7. CHECK GLOW RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect glow relay.



3. Check voltage between glow relay terminals 1, 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- 80A fusible link
- Harness for open or short between glow relay and battery

>> Repair harness or connectors.

9. CHECK GLOW RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 37 and glow relay 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 11.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E62, F12
- Harness for open or short between glow relay and ECM

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

11. CHECK HARNESS CONTINUITY BETWEEN GLOW RELAY AND GLOW PLUG FOR OPEN AND SHORT

1. Disconnect glow plug harness connector.
2. Check harness continuity between glow relay terminal 5 and glow plug harness connector. 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 GLOW RELAY

Refer to EC-619, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Replace glow relay.

13. CHECK GLOW PLUG

Refer to EC-619, "Component Inspection" .

OK or NG

OK >> GO TO 14.
NG >> Replace glow plug.

14. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

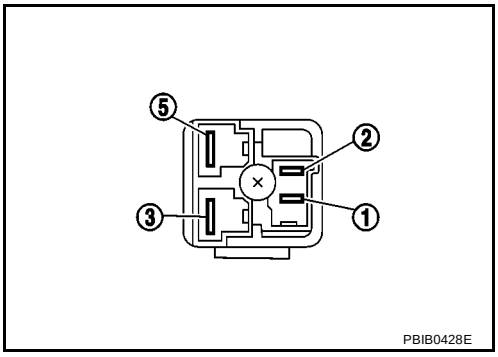
EBS015CH

GLOW RELAY

Check continuity between glow relay terminals 3 and 5 under the following conditions.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

Operation takes less than 1 second.



PBIB0428E

GLOW PLUG

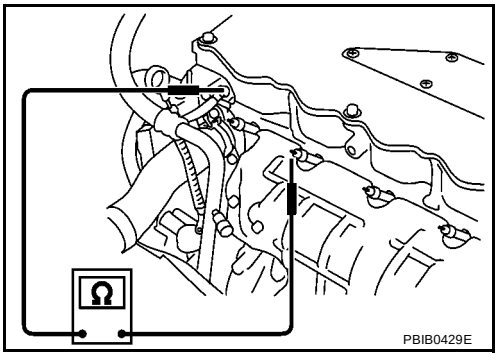
1. Remove glow plug connecting plate.
2. Check glow plug resistance.

Resistance: Approximately 0.8 Ω [at 25°C (77°F)]

NOTE:

- **Do not bump glow plug heating element. If it is bumped, replace glow plug with a new one.**
- **If glow plug is dropped from a height of 10 cm (3.94 in) or higher, replace with a new one.**
- **If glow plug installation hole is contaminated with carbon, remove it with a reamer or suitable tool.**
- **Hand-tighten glow plug by turning it two or three times, then tighten using a tool to specified torque.**

: 20.1 N-m (2.1 kg-m, 15 ft-lb)



PBIB0429E

Removal and Installation

EBS015CI

GLOW PLUG

Refer to EM-34, "GLOW PLUG" .

EGR VOLUME CONTROL SYSTEM

PFP:14710

Description

EBS015CJ

SYSTEM DESCRIPTION

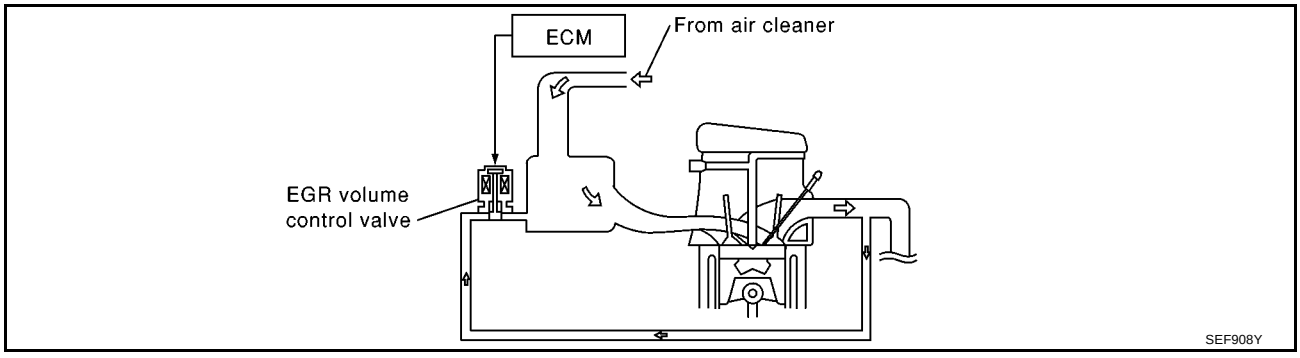
Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor	Engine speed	EGR volume control	EGR volume control valve
Vehicle speed sensor*	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Accelerator pedal position sensor	Accelerator pedal position		
Mass air flow sensor	Amount of intake air		
Air conditioner switch*	Air conditioner operation		

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

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions.

The EGR volume control valve remains close under the following conditions.

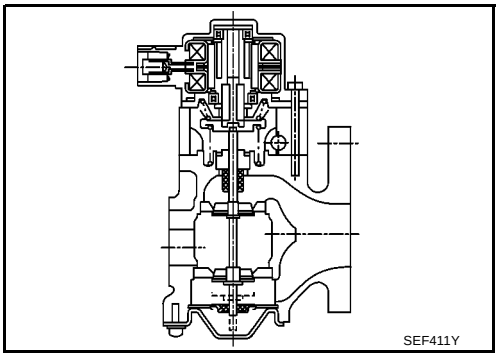
- Engine stopped
- Engine starting
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle



COMPONENT DESCRIPTION

EGR Volume Control Valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.



CONSULT-II Reference Value in Data Monitor Mode

EBS015CK

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: Neutral position ● No-load	After one minute at idle	More than 10 steps
		Revving engine from idle to 3,600 rpm	0 step

ECM Terminals and Reference Value

EBS015CL

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

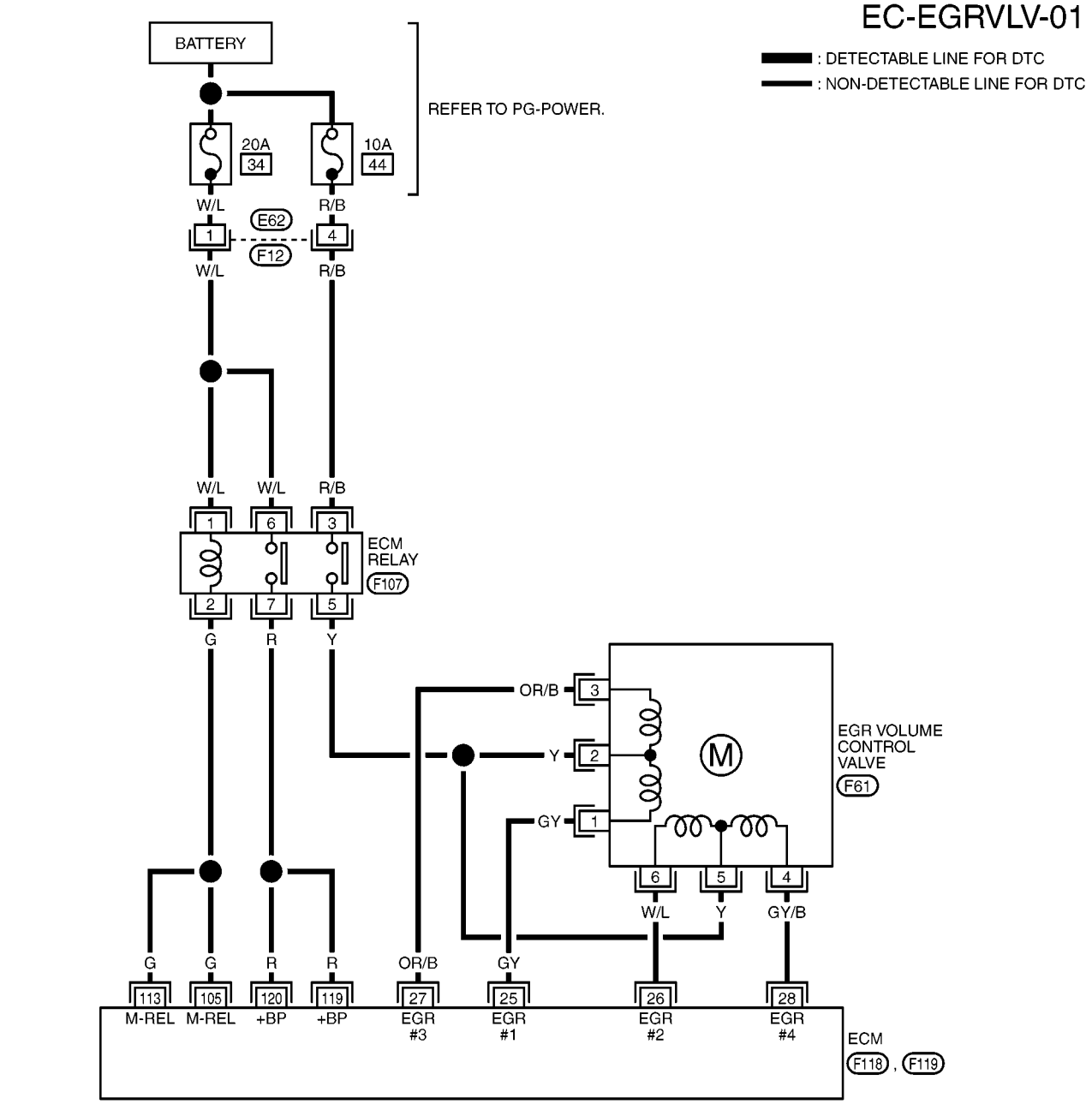
CAUTION:

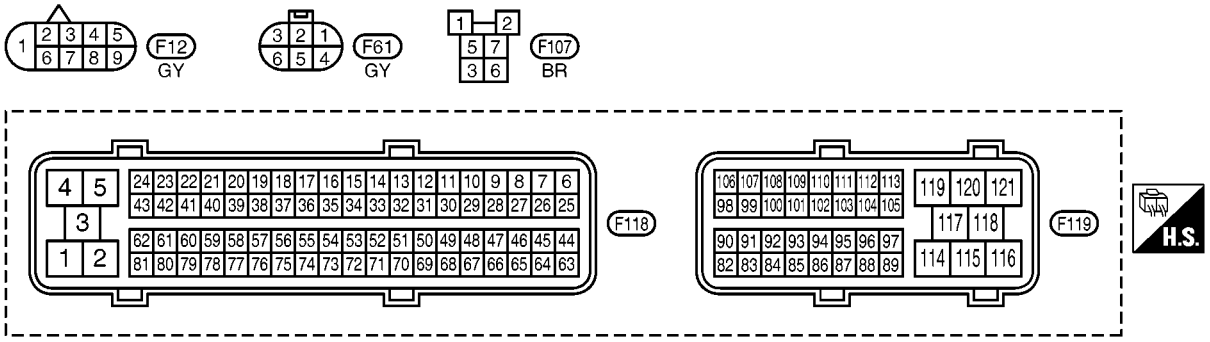
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25 26 27 28	GY W/L OR/B GY/B	EGR volume control valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.1 - 14V (Voltage signals of each ECM terminals differ according to the control position of EGR volume control valve.)
105 113	G G	ECM relay (self-shutoff)	**[Ignition switch ON]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	Approximately 1.2V
			[Ignition switch OFF] ● A few seconds passed after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	R R	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)

Wiring Diagram

EBS015CM





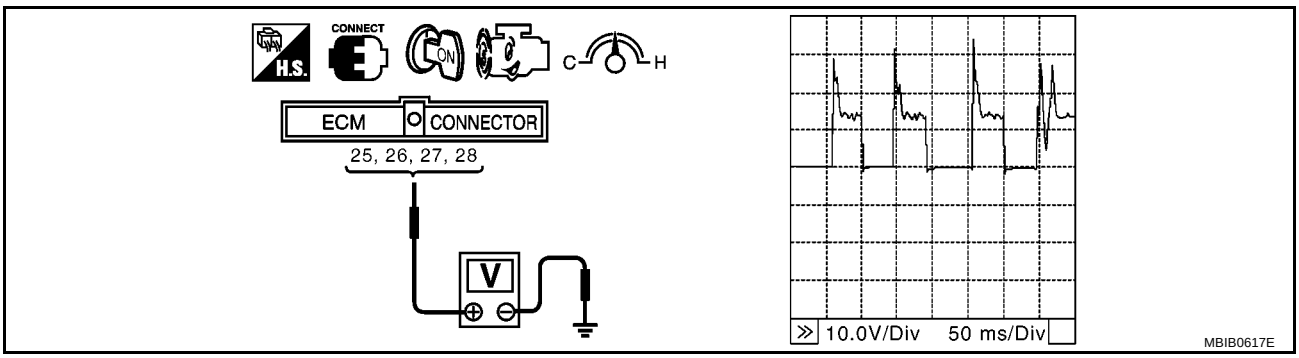
MBWA0618E

Diagnostic Procedure

EBS015CN

1. CHECK EGR VOLUME CONTROL SYSTEM OVERALL FUNCTION

1. Turn ignition switch OFF.
2. Set the oscilloscope probe between ECM terminals 25, 26, 27, 28 and ground.
3. Start engine and let it idle.
4. Check the oscilloscope screen when revving engine up to 3,200 rpm and return to idle.



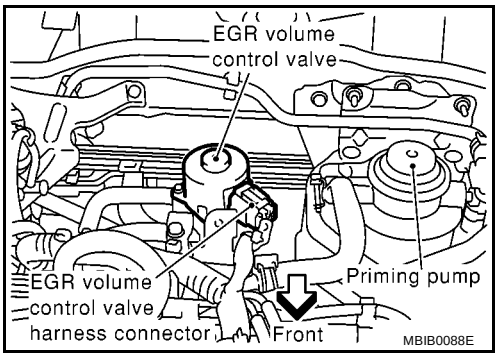
The pulse signal as shown in the figure should appear.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

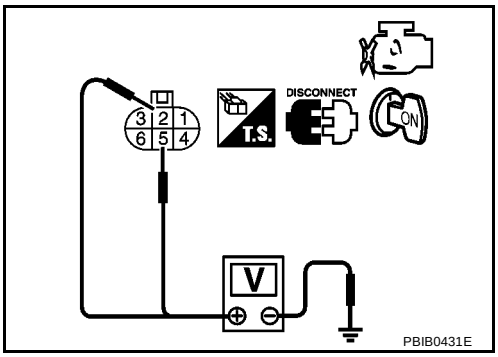
2. CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect EGR volume control valve harness connector.
3. Turn ignition switch ON.



4. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 7.
NG >> GO TO 3.

3. CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT-II

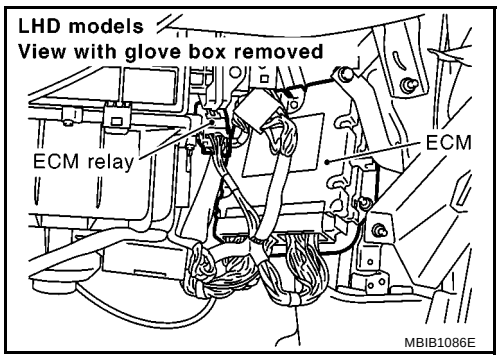
1. Turn ignition switch OFF.
2. Disconnect ECM relay.
3. Check harness continuity between ECM relay terminal 5 and EGR volume control valve terminals 2, 5. Refer to Wiring Diagram.

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.



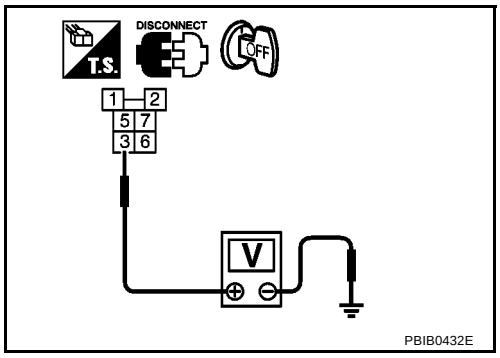
4. CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT-III

Check voltage between ECM relay terminal 3 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.

- Harness connectors E62, F12
- 10A fuse
- Harness for open or short between ECM relay and fuse

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

6. CHECK ECM RELAY

Refer to EC-560, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace ECM relay.

7. CHECK EGR VOLUME 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 terminals and EGR volume control valve terminals as follows. Refer to Wiring Diagram.

ECM terminal	EGR volume control valve terminal
25	1
26	6
27	3
28	4

Continuity should exist.

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

OK or NG

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

8. CHECK EGR VOLUME CONTROL VALVE

Refer to EC-625, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace EGR volume control valve.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

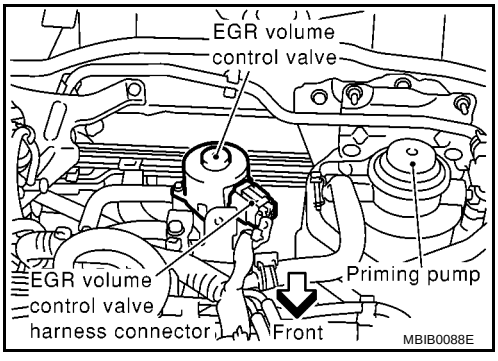
Component Inspection

EBS015CO

EGR VOLUME CONTROL VALVE

With CONSULT-II

1. Disconnect EGR volume control valve harness connector.

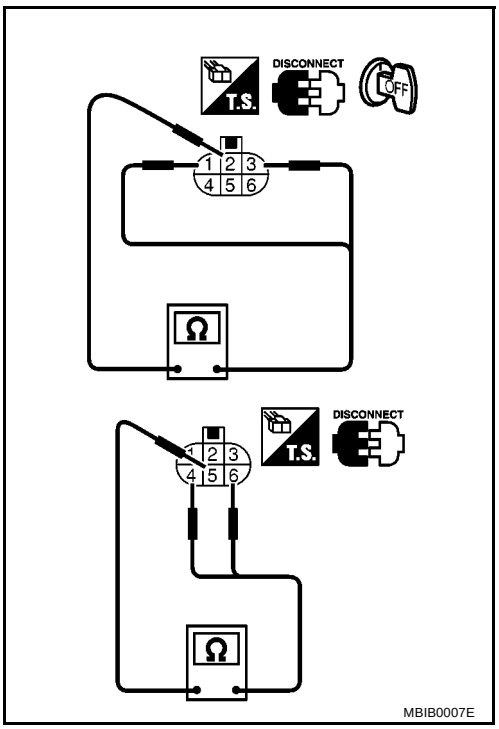


2. Check resistance between the following terminals.
   - terminal 2 and terminals 1, 3
   - terminal 5 and terminals 4, 6

Temperature °C (°F)	Resistance Ω
20 (68)	13 - 17

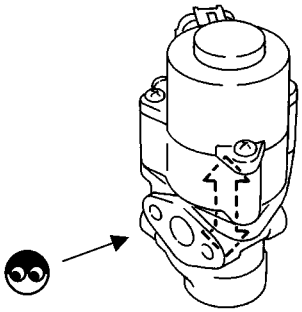
If NG, replace EGR volume control valve.
If OK, go to next step.

3. Remove EGR volume control valve from cylinder head.
   (The EGR volume control valve harness connector should remain connected.)
4. Reconnect EGR volume control valve harness connector.
5. Turn ignition switch ON.



6. Perform “EGR VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening.

ACTIVE TEST	
EGR VOL CONT/V	20 step
MONITOR	
CKPS-RPM (TDC)	XXX rpm



If NG, replace the EGR volume control valve.

NOTE:
When installing the EGR volume control valve, make sure that the shaft is in the same position before checking.

Removal and Installation

EBS015CP

EGR VOLUME CONTROL VALVE

Refer to EM-23, "EXHAUST MANIFOLD AND TURBOCHARGER" .

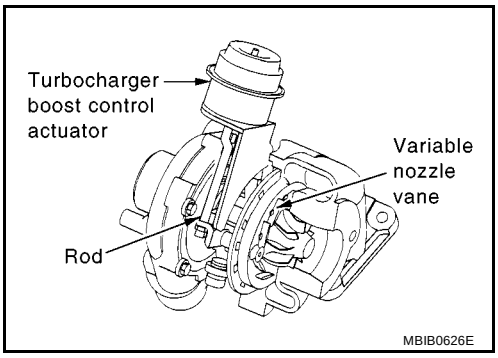
TC BOOST CONTROL SOLENOID VALVE

PFP:14956

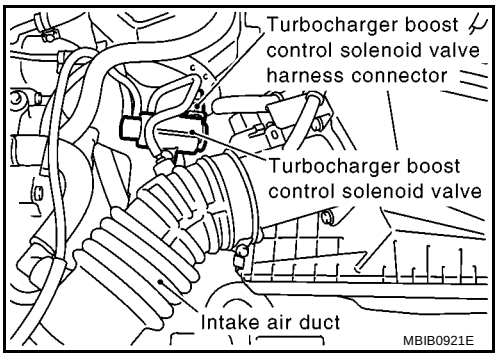
Description

EBS015CQ

The load from the turbocharger boost control solenoid valve controls the actuator. By changing the variable nozzle vane opening through the rods, the intake air volume is adjusted.



The turbocharger boost control solenoid valve is moved by ON/OFF pulse from the ECM. The longer the ON pulse, the charge air pressure rises.



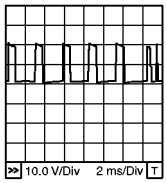
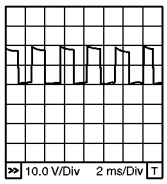
ECM Terminals and Reference Value

EBS015CR

Specification data are reference valves, and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

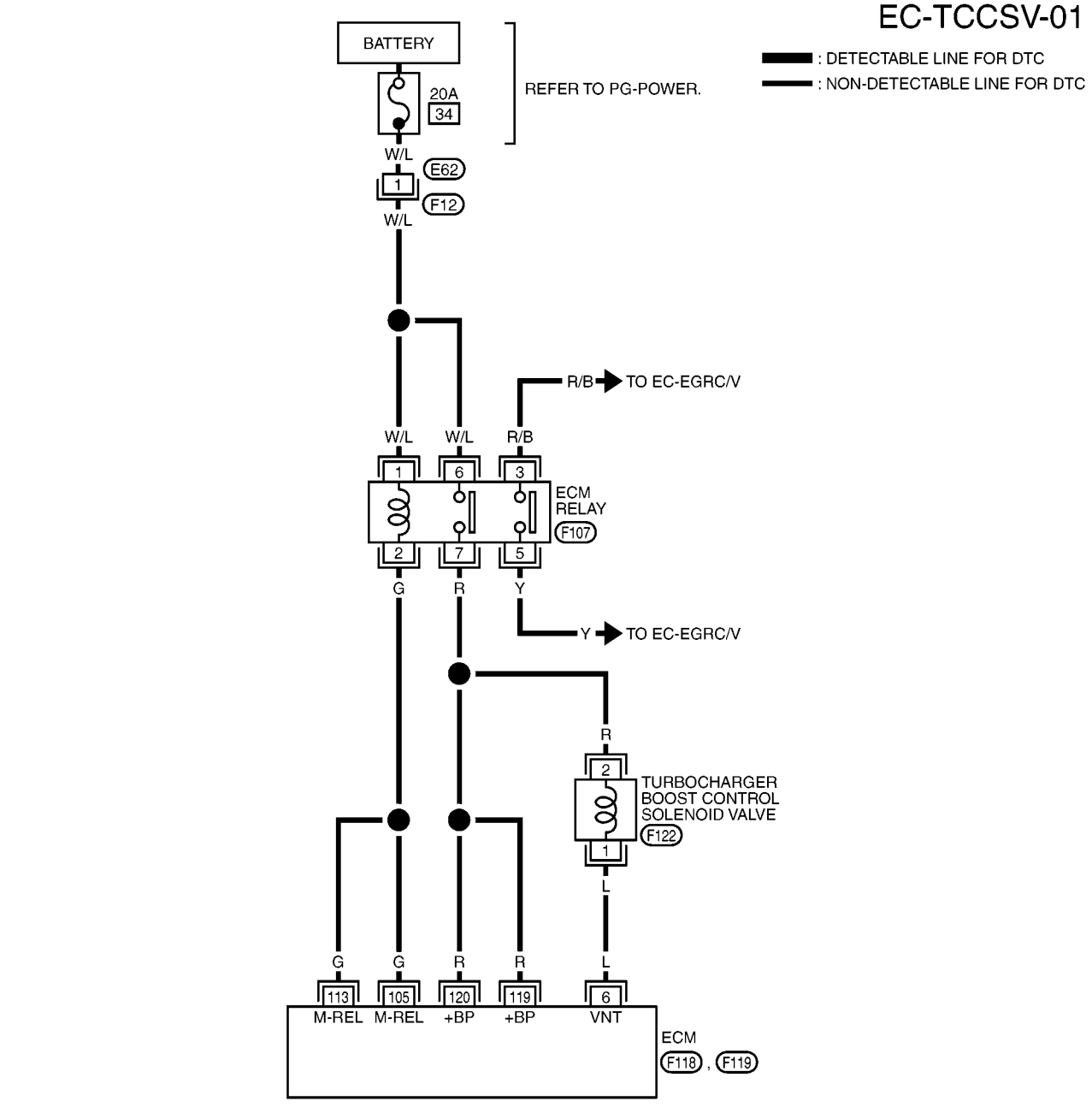
CAUTION:

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

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
6	L	Turbocharger boost control solenoid valve	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	0 - 12.5V ★  MBIB0889E
			[Ignition switch ON] ● **Warm-up condition** ● Engine speed is 2,000 rpm	0 - 12.5V ★  MBIB0890E

Wiring Diagram

EBS015CS



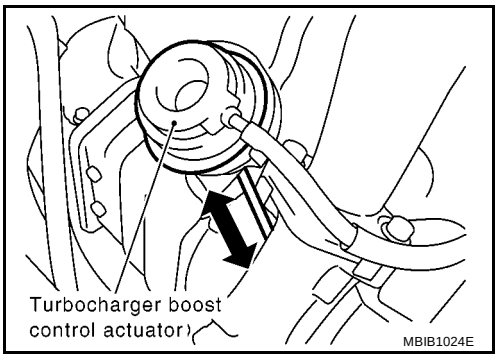
MBWA0616E

Diagnostic Procedure

EBS015CT

1. CHECK OVERALL FUNCTION

1. Start engine and let it idle.
2. Make sure that turbocharger control actuator rod moves slightly when engine is started.

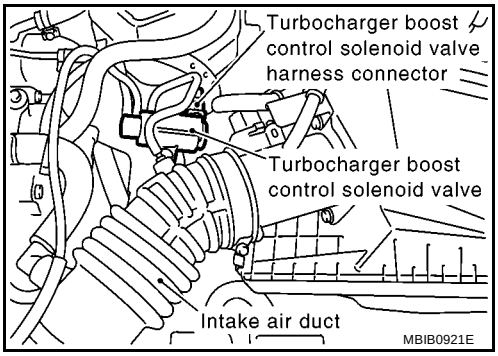


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

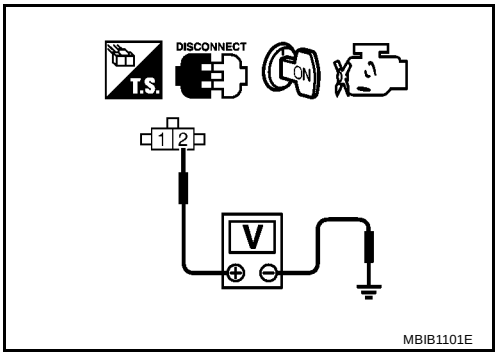
2. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect turbocharger boost control solenoid valve harness connector.
2. Turn ignition switch ON.



3. Check voltage between turbocharger boost control solenoid valve terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage



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 TURBOCHARGER BOOST 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 6 and turbocharger boost 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 TURBOCHARGER BOOST CONTROL SOLENOID VALVE

Refer to EC-630, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace turbocharger boost control solenoid valve.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

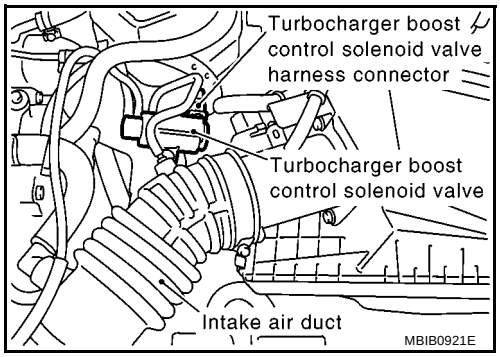
>> **INSPECTION END**

Component Inspection

EBS015CU

TURBOCHARGER BOOST CONTROL SOLENOID VALVE

1. Disconnect turbocharger boost control solenoid valve harness connector.

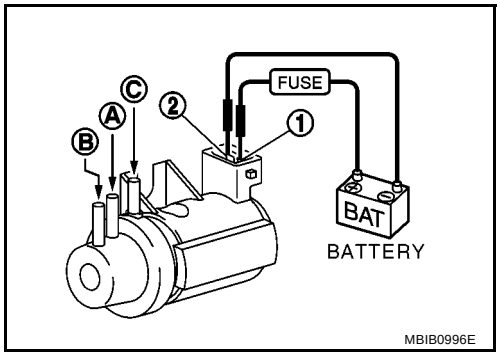


2. Apply 12V direct current between turbocharger boost control solenoid valve terminals.
3. Check air passage continuity of turbocharger boost control solenoid valve under the following conditions.

CONDITIONS	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.

If NG, replace turbocharger boost control solenoid valve.



Removal and Installation

EBS015CV

TURBOCHARGER BOOST CONTROL SOLENOID VALVE

Refer to EM-23, "Removal and Installation" .

BRAKE SWITCH

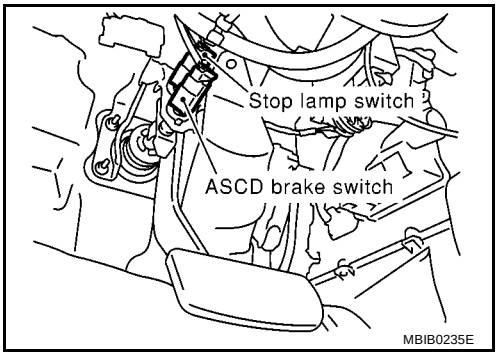
PFP:25230

Description

EBS016LL

STOP LAMP SWITCH

The stop lamp switch is installed to brake pedal bracket. The switch senses brake pedal position and sends an ON-OFF signal to the ECM. The ECM uses the signal to control the fuel injection control system.



ASCD BRAKE SWITCH (MODELS WITH ASCD)

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-653, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.

CONSULT-II Reference Value in Data Monitor Mode

EBS016LM

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW (Stop lamp switch)	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
BRAKE SW2 (ASCD brake switch)	● Ignition switch: ON	Brake pedal and clutch pedal: Fully released	OFF
		Brake pedal and/or clutch pedal: Slightly depressed	ON

ECM Terminals and Reference Value

EBS016LN

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

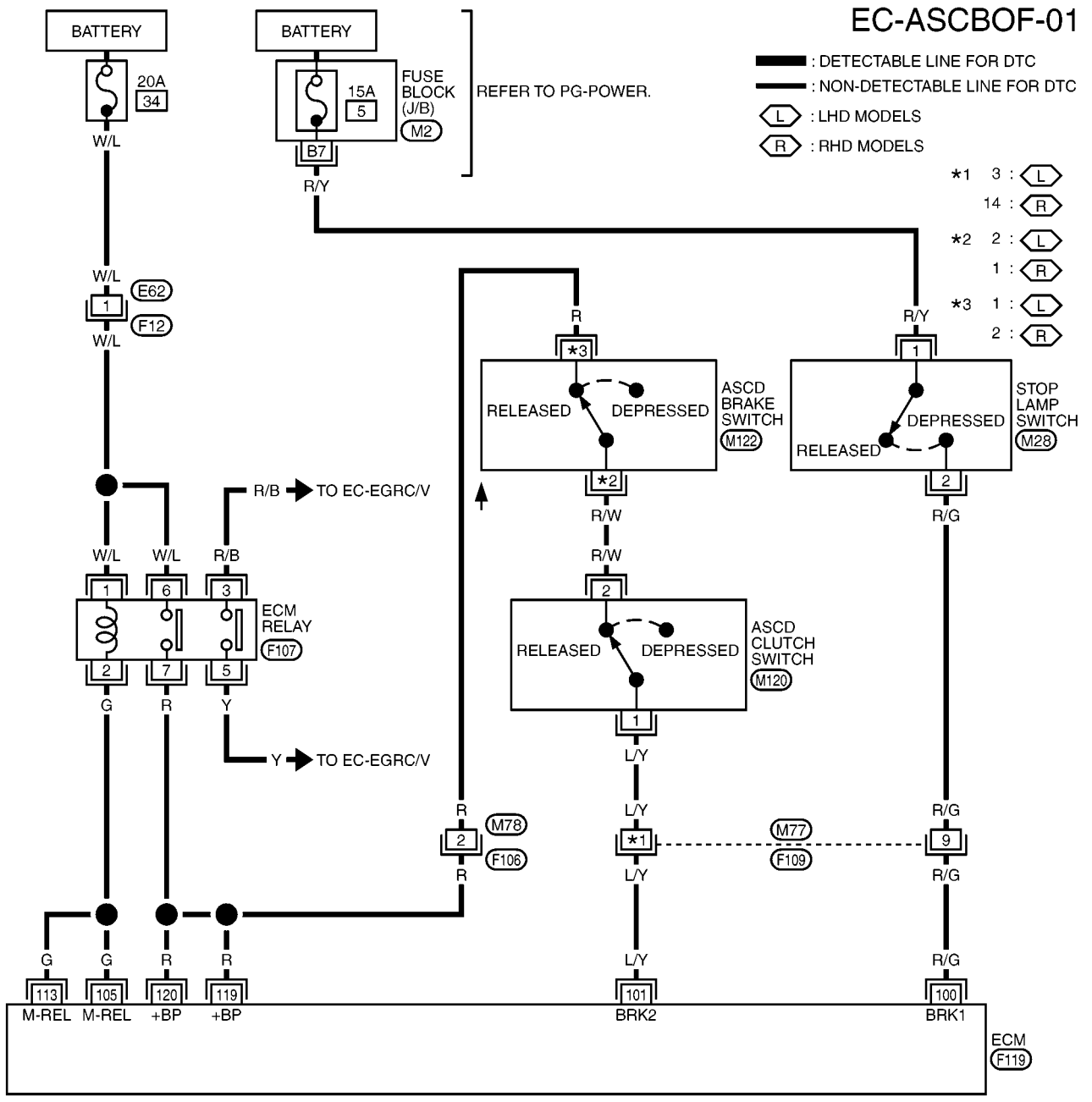
CAUTION:

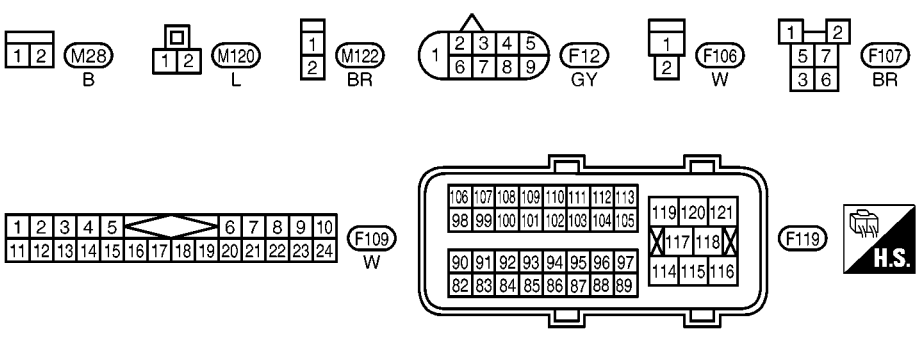
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
100	R/G	Stop lamp switch	**[Ignition switch ON]** ● Brake pedal fully released	Approximately 0V
			[Ignition switch ON] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
101	L/Y	ASCD brake switch	**[Ignition switch ON]** ● Brake pedal and clutch pedal fully released	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON] ● Brake pedal and/or clutch pedal depressed	Approximately 0V

Wiring Diagram

EBS015CZ





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

MBWA0610E

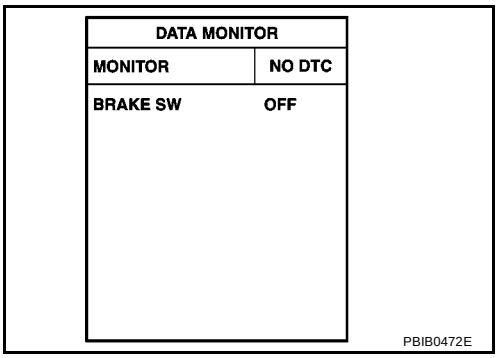
Diagnostic Procedure

EBS016LO

1. CHECK OVERALL FUNCTION-I

1. Turn ignition switch ON.
2. Select “BRAKE SW” in “DATA MONITOR” mode with CONSULT-II.
3. Check “BRAKE SW” indication under the following conditions.

CONDITION	INDICATION
When brake pedal is depressed	ON
When brake pedal is released	OFF



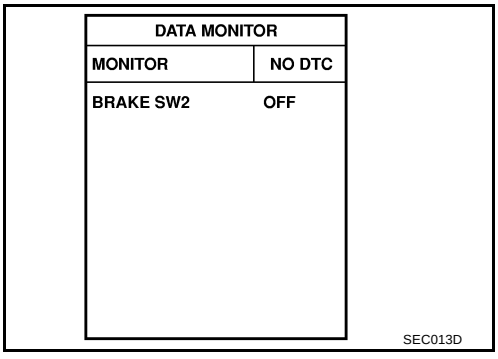
OK or NG

OK (Models with ASCD)>>GO TO 2.
OK (Models without ASCD)>>**INSPECTION END**
NG >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

Check “BRAKE SW2” indication in “DATA MONITOR” mode.

CONDITION	INDICATION
When brake pedal or clutch pedal is depressed	ON
When brake pedal and clutch pedal are released	OFF

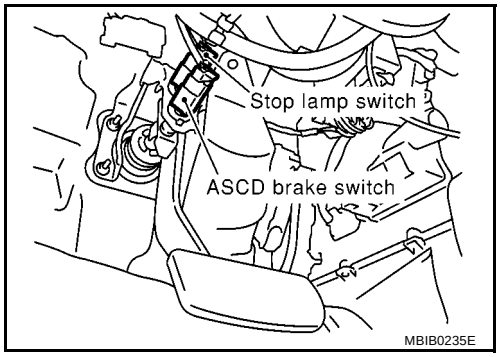


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

3. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

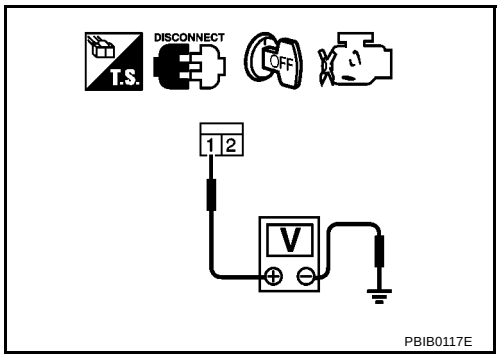


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.

Voltage: Battery voltage

OK or NG

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



4. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 15A 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.

5. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 100 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 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- 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.

7. CHECK STOP LAMP SWITCH

Refer to EC-637, "Component Inspection" .

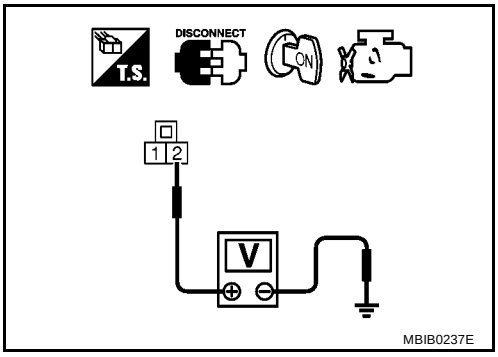
OK or NG

OK >> GO TO 16.
NG >> Replace stop lamp switch.

8. CHECK ASCD BRAKE SWITCH 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 2 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

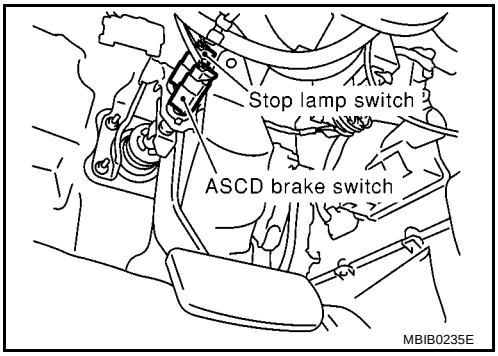


OK or NG

OK >> GO TO 13.
NG >> GO TO 9.

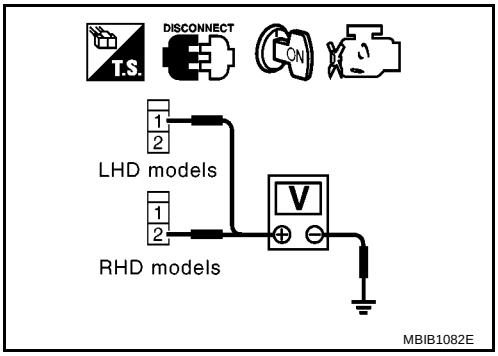
9. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

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 (LHD models) or 2 (RHD models) and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F106, M78
- Harness for open or short between ASCD brake switch and ECM relay
- Harness for open or short between ASCD brake switch and ECM

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

11. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 2 (LHD models) or 1 (RHD models) and ASCD brake clutch switch terminal 2.
   Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ASCD BRAKE SWITCH

Refer to EC-637, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace ASCD brake switch.

13. CHECK ASCD CLUTCH 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 101 and ASCD clutch switch terminal 1.
   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 15.
NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, F109
- Harness for open or short between ECM and ASCD clutch switch

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

15. CHECK ASCD CLUTCH SWITCH

Refer to EC-637, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace ASCD clutch switch.

16. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

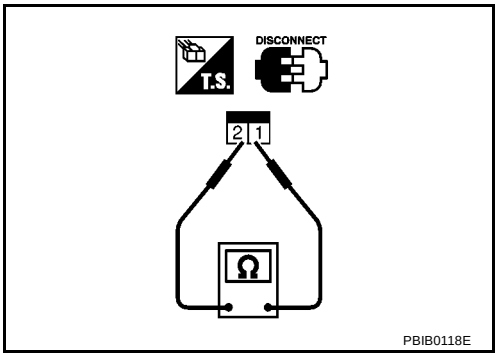
EBS016LP

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.

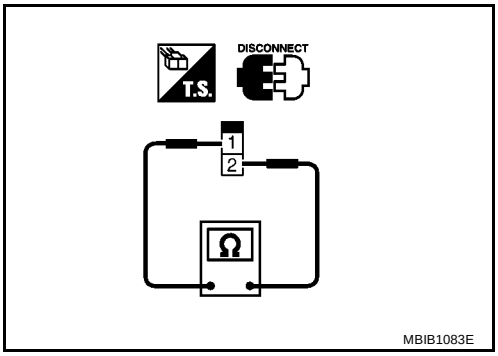


ASCD BRAKE SWITCH

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.

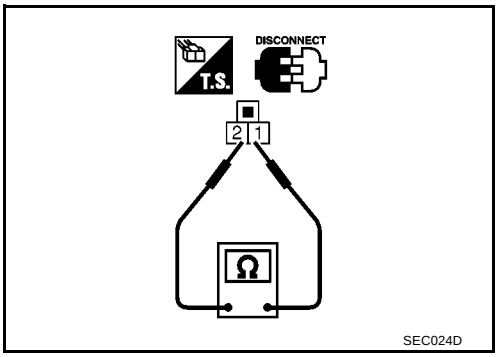


ASCD CLUTCH SWITCH

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.



PNP SWITCH

PFP:32006

Description

EBS015D2

When the gear position is in Neutral, park/neutral position is ON. ECM detects the position because the continuity of the line (the “ON” signal) exists.

CONSULT-II Reference Value in Data Monitor Mode

EBS015D3

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: Neutral position	ON
		Except above	OFF

ECM Terminals and Reference Value

EBS015D4

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

CAUTION:

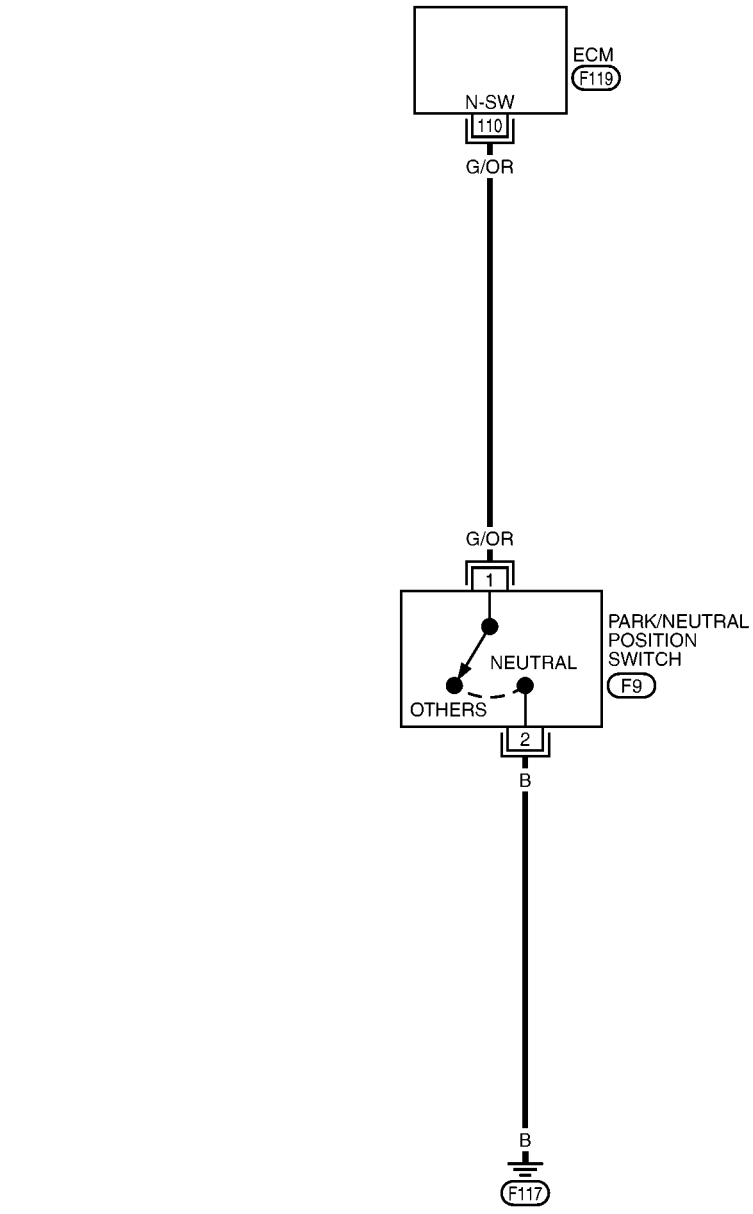
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

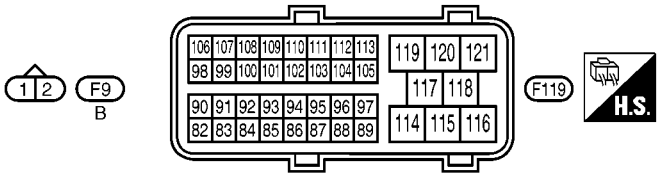
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
110	G/OR	Park/Neutral position switch	**[Ignition switch ON]** ● Gear position is Neutral	Approximately 0V
			[Ignition switch ON] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)

Wiring Diagram

EBS015D5

EC-PNP/SW-01





MBWA0389E

Diagnostic Procedure

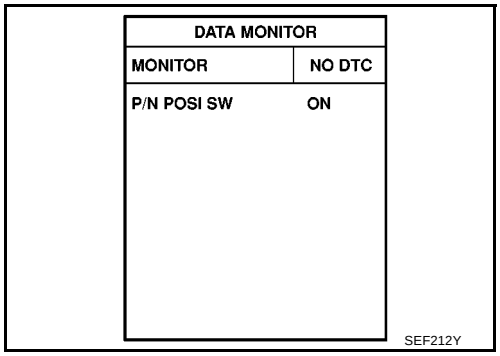
EBS015D6

1. CHECK OVERALL FUNCTION

With CONSULT-II

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II.
3. Check “P/N POSI SW” signal under the following conditions.

Shift lever position	P/N POSI SW
Neutral position	ON
Except the above position	OFF



OK or NG

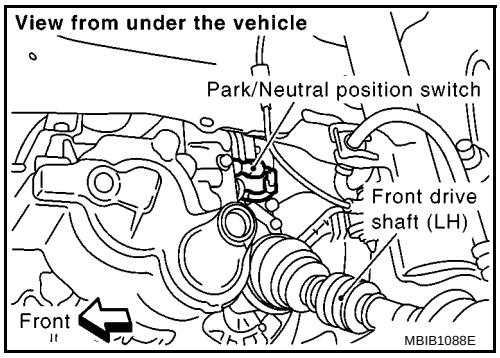
OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK PNP SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect park/neutral position (PNP) switch harness connector.
3. Check harness continuity between PNP 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 3.
NG >> Repair open circuit or short to power in harness or connectors.

3. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 110 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 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK PARK/NEUTRAL POSITION SWITCH

Refer to MT-12, "POSITION SWITCH" .

OK or NG

OK >> GO TO 5.
NG >> Replace park/neutral position switch.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

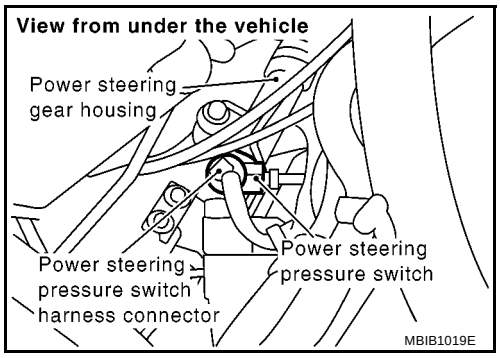
PSP SWITCH

PFP:49761

Component Description

EBS015D7

The power steering pressure switch is attached to the power steering high-pressure tube and detects a power steering load.
When a power steering load is detected, it signals the ECM. The ECM adjusts the fuel injector pulse width to increase the idle speed and adjust for the increased load.



CONSULT-II Reference Value in Data Monitor Mode

EBS015D8

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON

ECM Terminals and Reference Value

EBS015D9

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

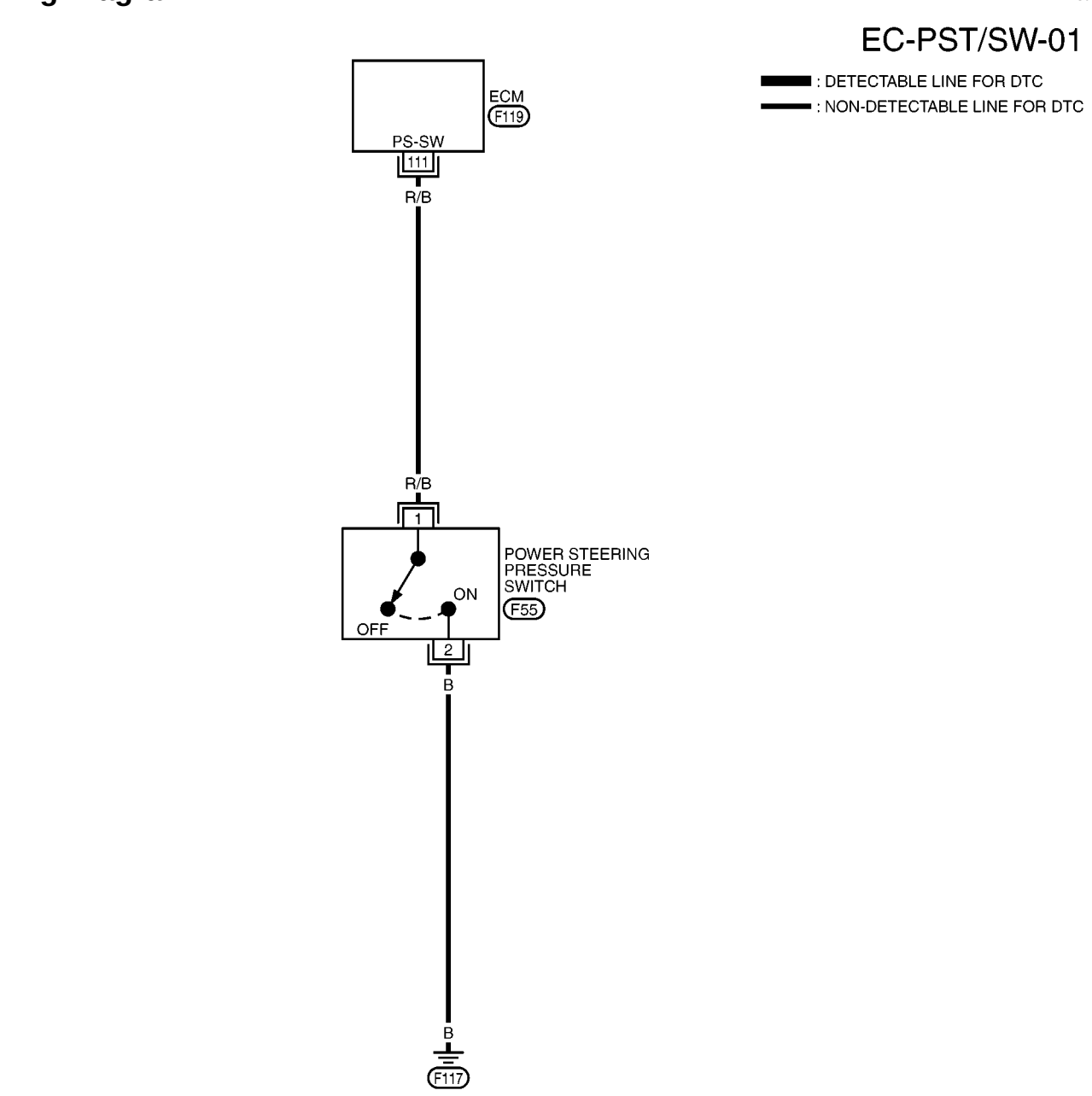
CAUTION:

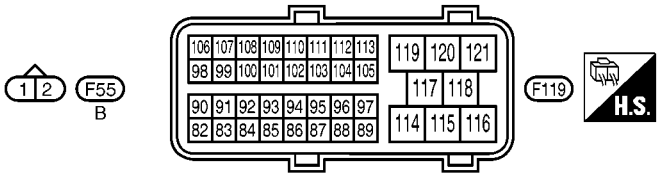
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	R/B	Power steering 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)

Wiring Diagram

EBS015DA





MBWA0391E

Diagnostic Procedure

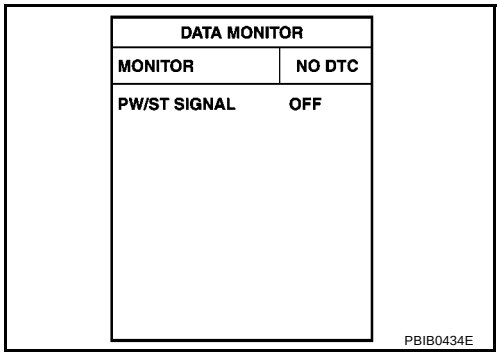
EBS015DB

1. 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.

Conditions	PW/ST SIGNAL
Steering wheel is in neutral position	OFF
Steering wheel is turned	ON



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK POWER STEERING PRESSURE SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

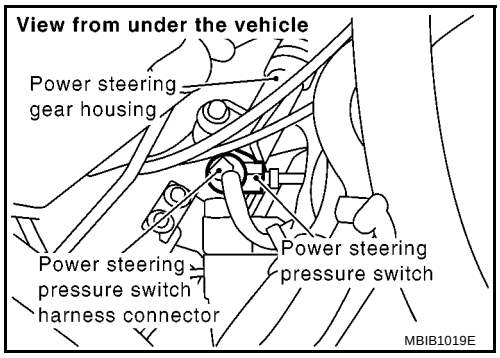
1. Turn ignition switch OFF.
2. Disconnect power steering pressure switch harness connector.
3. Check harness continuity between power steering pressure switch terminal 2 and ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

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



3. CHECK POWER STEERING PRESSURE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 111 and power steering pressure 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 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK POWER STEERING PRESSURE SWITCH

Refer to EC-645, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace power steering pressure switch.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

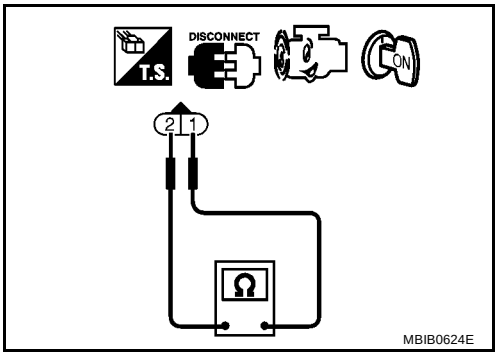
Component Inspection

EBS015DC

POWER STEERING PRESSURE SWITCH

1. Disconnect power steering pressure switch harness connector and then start engine.
2. Check continuity between power steering pressure switch terminal 1 and 2 under the following conditions.

Conditions	Continuity
Steering wheel is being fully turned.	Yes
Steering wheel is not being turned.	No



Removal and Installation

EBS015DD

Refer to PS section in P12 ESM (SM2E00-1P12E0E).

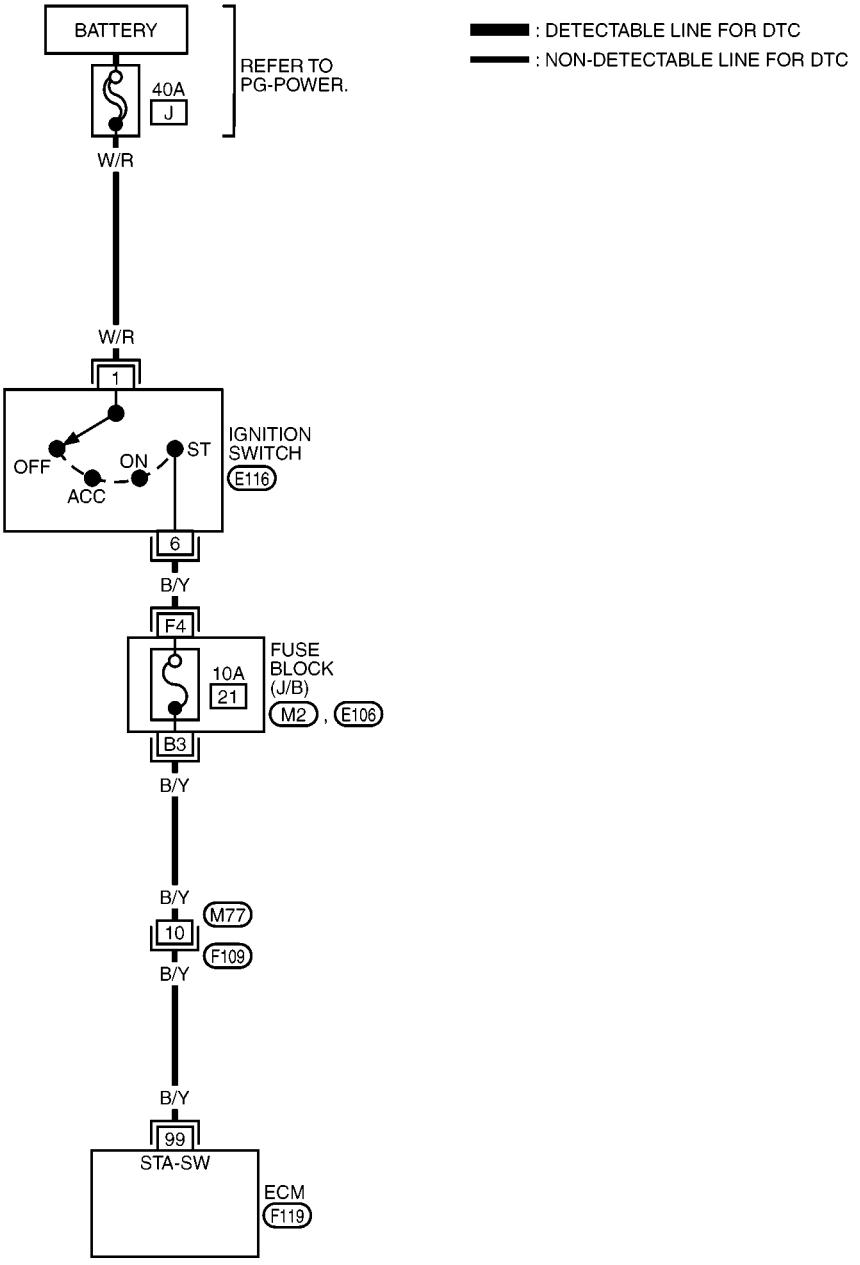
START SIGNAL

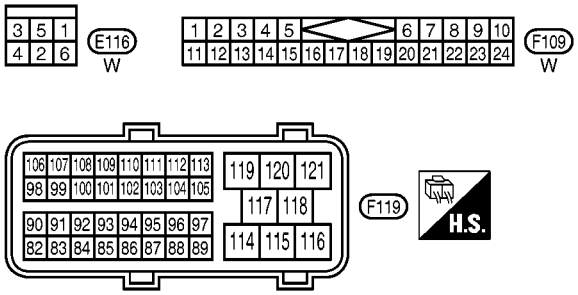
PFP:48750

Wiring Diagram

EBS015DE

EC-S/SIG-01





REFER TO THE FOLLOWING.
M2 , E106 -FUSE BLOCK-JUNCTION BOX (J/B)

MBWA0390E

Diagnostic Procedure

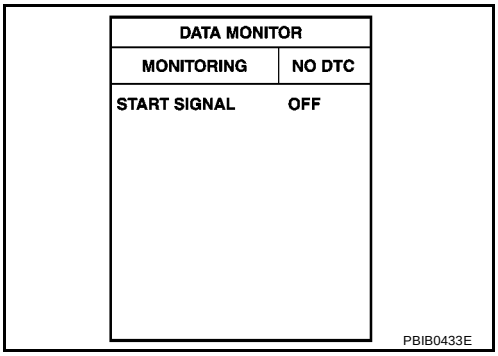
EBS015DF

1. CHECK START SIGNAL OVERALL FUNCTION

With CONSULT-II

1. Turn ignition switch ON.
2. 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



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK START SIGNAL INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and ignition switch harness connector.
3. Check harness continuity between ECM terminal 99 and ignition switch terminal 6. 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.

- 10A fuse
- Harness connectors M77, F109
- Fuse block (J/B) connectors M2, E106
- Harness for open or short between ECM and ignition switch

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

4. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

ASCD INDICATOR

PFP:24814

Component Description

EBS015DL

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.
CRUISE indicator illuminates when ON/OFF switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.
SET indicator illuminates when following conditions are met.

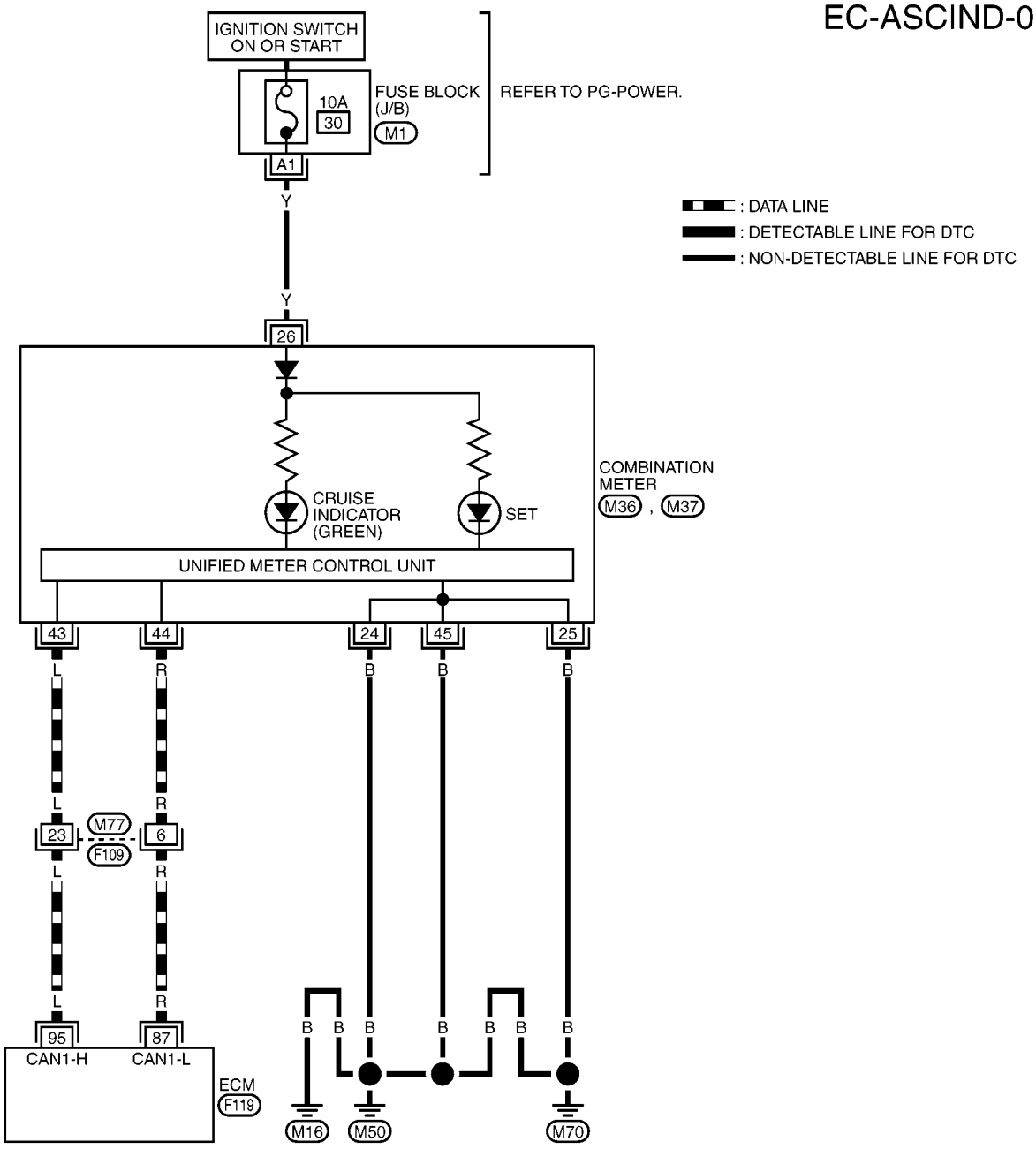
- CRUISE indicator is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

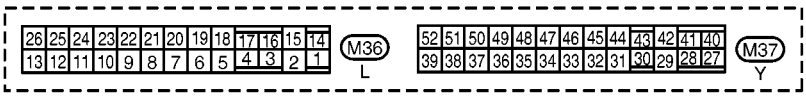
SET indicator remains lit during ASCD control.
Refer to EC-653, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.

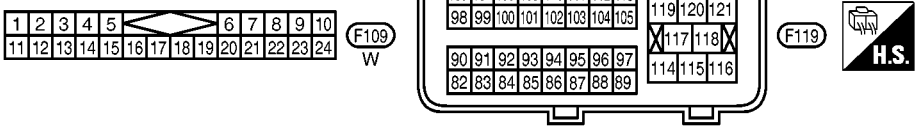
Wiring Diagram—LHD Models

EBS015DM

EC-ASCIND-01





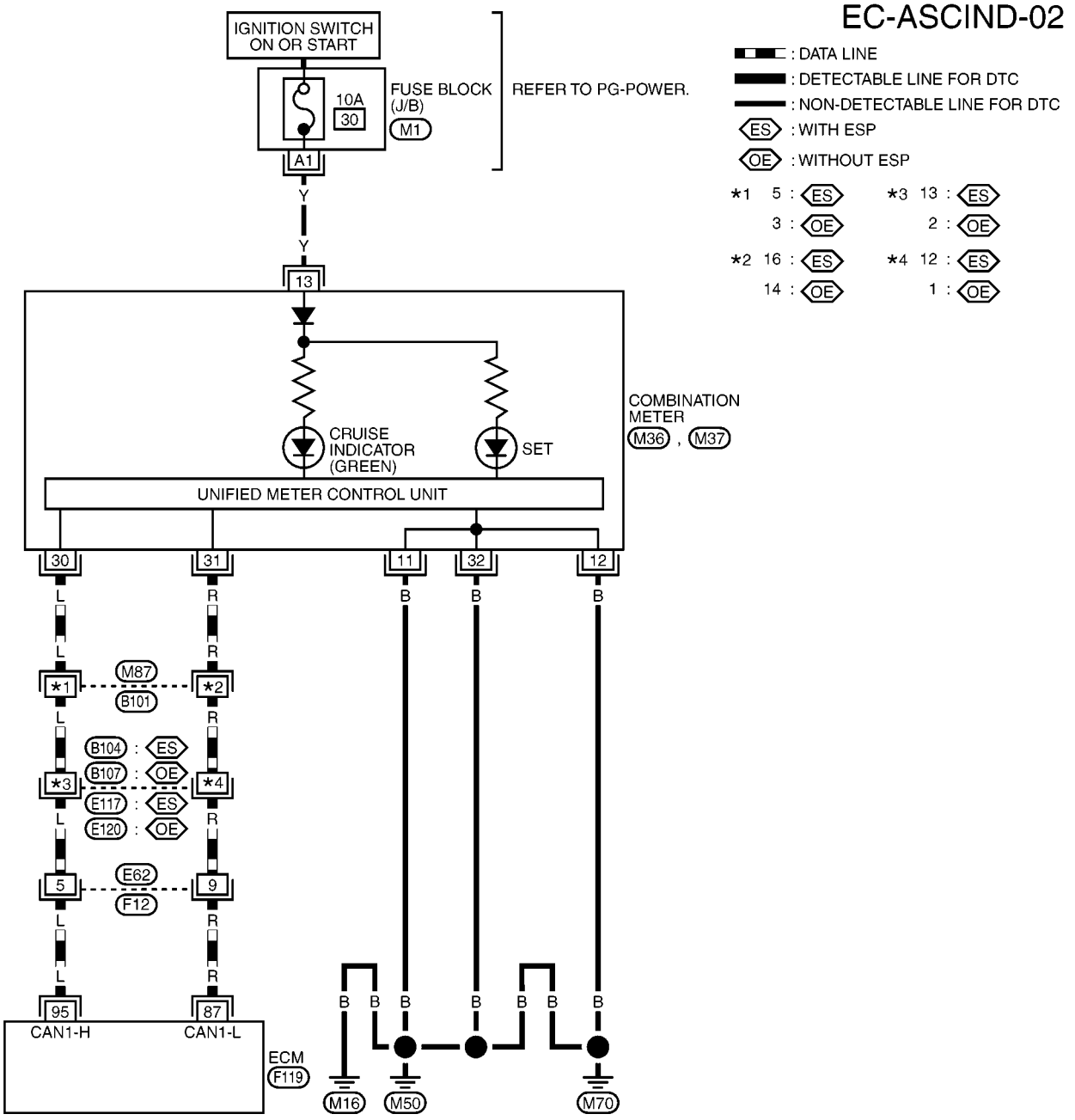


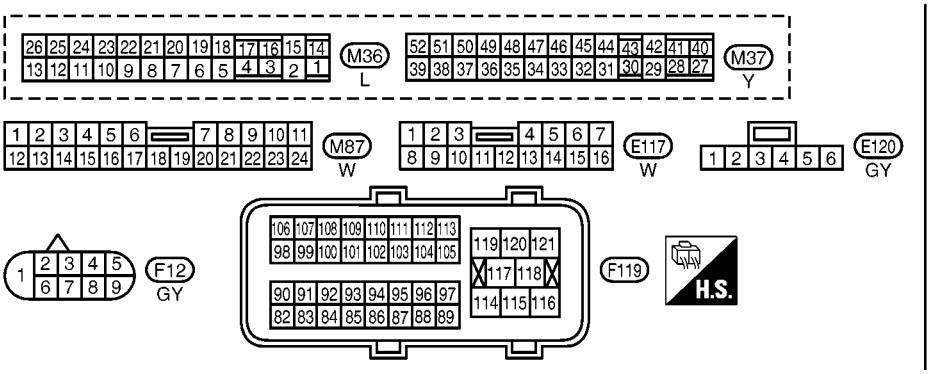
REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-
JUNCTION BOX (J/B)

MBWA0611E

Wiring Diagram—RHD Models

EBS015DN





REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-
JUNCTION BOX (J/B)

MBWA0612E

Diagnostic Procedure

EBS015DO

1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	● ON/OFF switch: Pressed at the first time→at the 2nd time	ON→OFF
SET LAMP	● ON/OFF switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 185 km/h (115 MPH)	● COAST/SET switch pressed	ON
		● COAST/SET switch released	OFF

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK DTC

Check that DTC U1000 is not displayed.

OK or NG

OK >> Perform trouble diagnoses for DTC U1000. Refer to EC-416, "DTC U1000 CAN COMMUNICATION LINE" .
NG >> 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 (LHD MODELS)" or DI-4, "COMBINATION METERS (LHD MODELS)" .

4. CHECK INTERMITTENT INCIDENT

Refer to EC-408, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

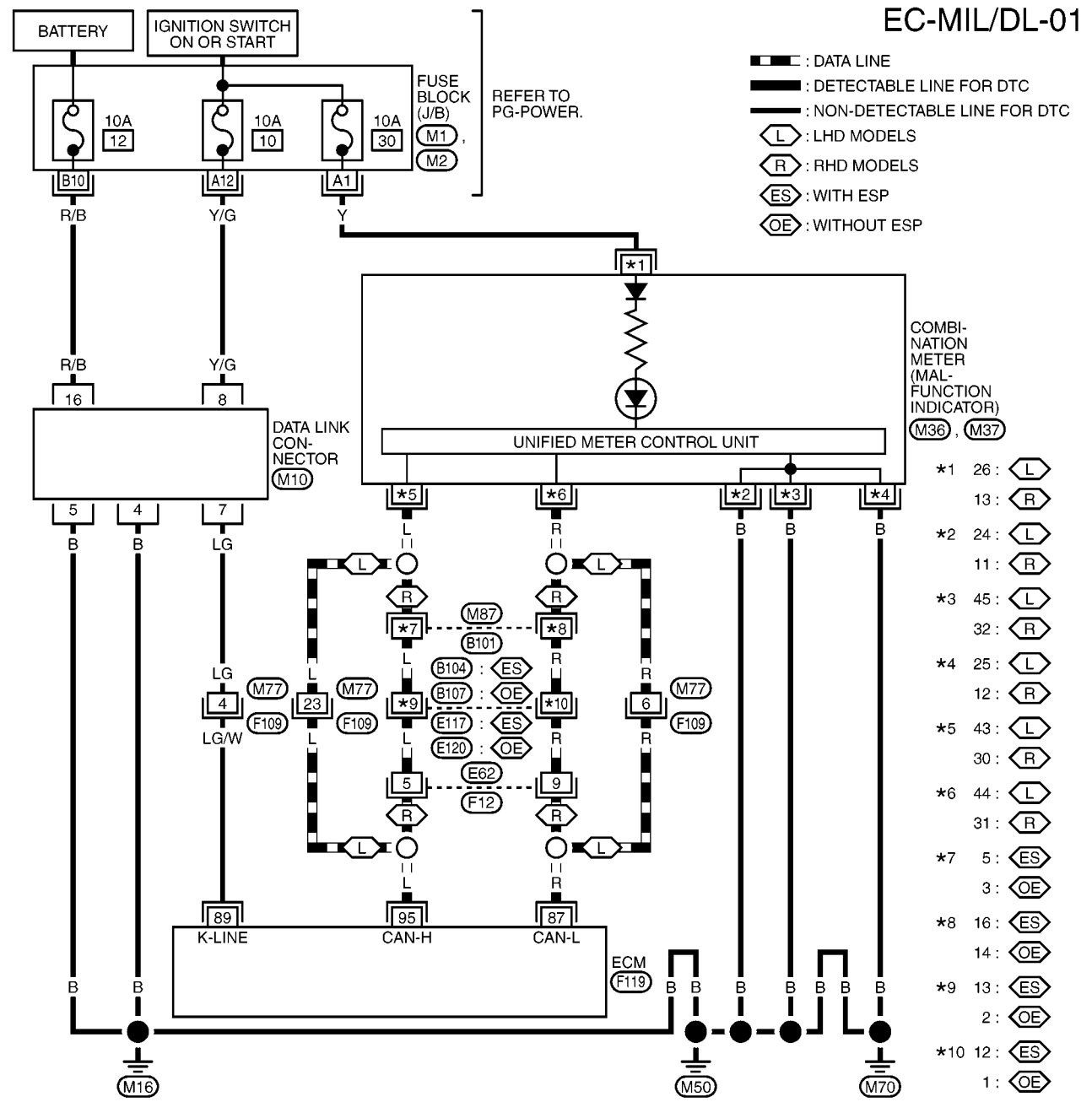
>> **INSPECTION END**

MI & DATA LINK CONNECTORS

PFP:24814

Wiring Diagram

EBS015DP



MBWA0392E

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PFP:18930

System Description

EBS015DQ

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Fuel injector and Fuel pump
Stop lamp switch	Brake pedal operation		
ASCD clutch switch	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Combination meter	Vehicle speed		

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 185 km/h (115 MPH).
ECM controls fuel injection value 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 ON/OFF 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 185 km/h (115 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
- More than 2 switches at ASCD steering switch are depressed at the same time (Set speed will be cleared.).
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to the neutral position
- Vehicle speed increased to 13 km/h higher than the set speed
- Vehicle speed decreased to 13 km/h lower than the set speed
- ESP/TCS system is operated

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

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

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

COAST OPERATION

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 ON/OFF 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
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 185 km/h (115 MPH)

Component Description

EBS015DR

ASCD STEERING SWITCH

Refer to EC-534 .

ASCD BRAKE SWITCH

Refer to EC-524 and EC-631 .

ASCD CLUTCH SWITCH

Refer to EC-524 and EC-631 .

STOP LAMP SWITCH

Refer to EC-524 and EC-631 .

ASCD INDICATOR

Refer to EC-648 .

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00100

General Specifications

EBS015DS

Engine	YD22DDTi
Idle speed	725 ± 25 rpm
Maximum engine speed	4,900 rpm

Mass Air Flow Sensor

EBS015DT

Supply voltage	Battery voltage (11 - 14V)
Ignition switch ON (Engine stopped.)	Approx. 0.4V
Idle (Engine is warmed up to normal operating temperature.)	1.5 - 2.0V
2,000 rpm (Engine is warmed up to normal operating temperature.)	2.2 - 2.7V

Engine Coolant Temperature Sensor

EBS015DU

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

Fuel Rail Pressure Sensor

EBS015DV

Supply voltage	Approximately 5V
Idle (Engine is warmed up to normal operating temperature.)	1.7 - 2.0V
2,000 rpm (Engine is warmed up to normal operating temperature.)	2.0 - 2.3V

Glow Plug

EBS015DW

Resistance [at 25°C (77°F)] Ω	Approximately 0.8

EGR Volume Control Valve

EBS015DX

Resistance [at 25°C (77°F)] Ω	13 - 17

Crankshaft Position Sensor

EBS015DY

Refer to EC-499, "Component Inspection" .

Camshaft Position Sensor

EBS015DZ

Refer to EC-510, "Component Inspection" .