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# SECTION EC

## ENGINE CONTROL SYSTEM

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# INDEX FOR DTC

## INDEX FOR DTC

PFP:00024

### DTC No. Index

EBS01KC3

**NOTE:**

If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to [EC-79, "DTC U1000 CAN COMMUNICATION LINE"](#).

X: Applicable —: Not applicable

DTC		Items (CONSULT-II screen item)	MI lighting up	Reference page
CONSULT-II*1	ECM*2			
U1000	1000*3	CAN COMM CIRCUIT	—	<a href="#">EC-79</a>
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P0503	0503	VEHICLE SPEED	—	<a href="#">EC-187</a>

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P1616	1616	ECM	—	<a href="#">EC-269</a>	
P1622	1622	INJ ADJ VAL UNRGST	—	<a href="#">EC-271</a>	K
P1623	1623	INJ ADJ VAL ERROR	—	<a href="#">EC-273</a>	
P2135	2135	APP SENSOR	—	<a href="#">EC-275</a>	L
P2146	2146	INJ PWR/CIRC	×	<a href="#">EC-281</a>	
P2147	2147	INJECTOR/CIRC	×	<a href="#">EC-286</a>	M
P2148	2148	INJECTOR/CIRC	×	<a href="#">EC-286</a>	
P2149	2149	INJ PWR/CIRC	×	<a href="#">EC-281</a>	
P2228	2228	BARO SEN/CIRC	—	<a href="#">EC-293</a>	
P2229	2229	BARO SEN/CIRC	—	<a href="#">EC-293</a>	

\*1: This number is prescribed by ISO 15031-6.

\*2: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

\*3: The troubleshooting for this DTC needs CONSULT-II.

# INDEX FOR DTC

## Alphabetical Index

EBS01KC4

### NOTE:

If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to [EC-79, "DTC U1000 CAN COMMUNICATION LINE"](#).

X: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC		MI lighting up	Reference page
	CONSULT-II*1	ECM*2		
APP SEN 1/CIRCUIT	P0122	0122	—	<a href="#">EC-108</a>
APP SEN 1/CIRCUIT	P0123	0123	—	<a href="#">EC-108</a>
APP SEN 2/CIRCUIT	P0222	0222	—	<a href="#">EC-142</a>
APP SEN 2/CIRCUIT	P0223	0223	—	<a href="#">EC-142</a>
APP SENSOR	P2135	2135	—	<a href="#">EC-275</a>
BARO SEN/CIRC	P2228	2228	—	<a href="#">EC-293</a>
BARO SEN/CIRC	P2229	2229	—	<a href="#">EC-293</a>
BATTERY VOLTAGE	P0563	0563	—	<a href="#">EC-203</a>
BRAKE SW/CIRCUIT	P0504	0504	—	<a href="#">EC-189</a>
CAN COMM CIRCUIT	U1000	1000*3	—	<a href="#">EC-79</a>
CKP SEN/CIRCUIT	P0335	0335	×	<a href="#">EC-159</a>
CKP SENSOR	P0336	0336	×	<a href="#">EC-165</a>
CMP SEN/CIRCUIT	P0340	0340	×	<a href="#">EC-171</a>
CMP SENSOR	P0341	0341	×	<a href="#">EC-177</a>
CMP/CKP RELATION	P0016	0016	—	<a href="#">EC-82</a>
CYL1 INJECTOR	P0201	0201	×	<a href="#">EC-125</a>
CYL2 INJECTOR	P0202	0202	×	<a href="#">EC-125</a>
CYL3 INJECTOR	P0203	0203	×	<a href="#">EC-125</a>
CYL4 INJECTOR	P0204	0204	×	<a href="#">EC-125</a>
ECM	P0605	0605	×	<a href="#">EC-213</a>
ECM	P0606	0606	×	<a href="#">EC-215</a>
ECM	P1616	1616	—	<a href="#">EC-269</a>
ECM RELAY	P0686	0686	—	<a href="#">EC-232</a>
ECT SEN/CIRCUIT	P0117	0117	—	<a href="#">EC-103</a>
ECT SEN/CIRCUIT	P0118	0118	—	<a href="#">EC-103</a>
ENG OVER TEMP	P0217	0217	×	<a href="#">EC-132</a>
FRP RELIEF VALVE	P1272	1272	—	<a href="#">EC-245</a>
FRP SEN/CIRC	P0192	0192	—	<a href="#">EC-118</a>
FRP SEN/CIRC	P0193	0193	—	<a href="#">EC-118</a>
FUEL LEAK	P0093	0093	×	<a href="#">EC-88</a>
FUEL PUMP	P0089	0089	—	<a href="#">EC-86</a>
FUEL PUMP	P1273	1273	—	<a href="#">EC-251</a>
FUEL PUMP	P1274	1274	×	<a href="#">EC-258</a>
FUEL PUMP	P1275	1275	×	<a href="#">EC-263</a>
FUEL PUMP/CIRC	P0628	0628	×	<a href="#">EC-217</a>
FUEL PUMP/CIRC	P0629	0629	×	<a href="#">EC-217</a>
FUEL TEMP SEN/CIRC	P0182	0182	—	<a href="#">EC-113</a>
FUEL TEMP SEN/CIRC	P0183	0183	—	<a href="#">EC-113</a>
HIGH FUEL PRESS	P0088	0088	×	<a href="#">EC-84</a>

# INDEX FOR DTC

Items (CONSULT-II screen terms)	DTC		MI lighting up	Reference page	
	CONSULT-II*1	ECM*2			
IAT SEN/CIRCUIT	P0112	0112	—	<a href="#">EC-98</a>	A
IAT SEN/CIRCUIT	P0113	0113	—	<a href="#">EC-98</a>	EC
INJ ADJ VAL ERROR	P1623	1623	—	<a href="#">EC-273</a>	
INJ ADJ VAL UNRGST	P1622	1622	—	<a href="#">EC-271</a>	
INJ PWR/CIRC	P2146	2146	×	<a href="#">EC-281</a>	C
INJ PWR/CIRC	P2149	2149	×	<a href="#">EC-281</a>	
INJECTOR	P0200	0200	×	<a href="#">EC-123</a>	D
INJECTOR/CIRC	P2147	2147	×	<a href="#">EC-286</a>	
INJECTOR/CIRC	P2148	2148	×	<a href="#">EC-286</a>	
INJECTOR 1	P1268	1268	—	<a href="#">EC-237</a>	E
INJECTOR 2	P1269	1269	—	<a href="#">EC-237</a>	
INJECTOR 3	P1270	1270	—	<a href="#">EC-237</a>	F
INJECTOR 4	P1271	1271	—	<a href="#">EC-237</a>	
MAF SEN/CIRCUIT	P0102	0102	—	<a href="#">EC-92</a>	G
MAF SEN/CIRCUIT	P0103	0103	—	<a href="#">EC-92</a>	
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	—	<a href="#">BL-176</a>	
<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	<b>P0000</b>	<b>0000</b>	—	—	H
SENSOR PWR/CIRC1	P0642	0642	—	<a href="#">EC-222</a>	I
SENSOR PWR/CIRC1	P0643	0643	—	<a href="#">EC-222</a>	
SENSOR PWR/CIRC2	P0652	0652	—	<a href="#">EC-227</a>	J
SENSOR PWR/CIRC2	P0653	0653	—	<a href="#">EC-227</a>	
STRG SW/CIRC	P0580	0580	—	<a href="#">EC-206</a>	
STRG SW/CIRC	P0581	0581	—	<a href="#">EC-206</a>	K
TC BOOST SEN/CIRC	P0237	0237	—	<a href="#">EC-153</a>	
TC BOOST SEN/CIRC	P0238	0238	—	<a href="#">EC-153</a>	
TC SYSTEM	P0234	0234	—	<a href="#">EC-147</a>	L
VEHICLE SPEED	P0501	0501	—	<a href="#">EC-183</a>	
VEHICLE SPEED	P0502	0502	—	<a href="#">EC-185</a>	
VEHICLE SPEED	P0503	0503	—	<a href="#">EC-187</a>	M

\*1: This number is prescribed by ISO 15031-6.

\*2: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

\*3: The troubleshooting for this DTC needs CONSULT-II.

# PRECAUTIONS

## PRECAUTIONS

PFP:00001

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

EBS01KC5

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

EBS01KC6

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.

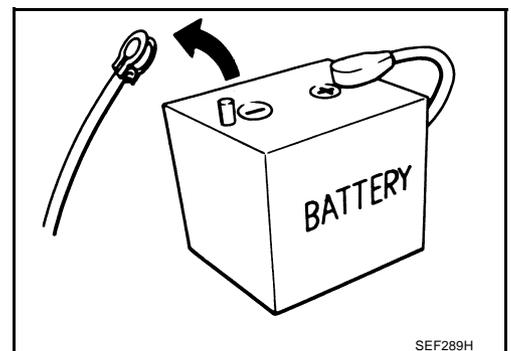
#### **CAUTION:**

- Be sure to turn the ignition switch OFF and disconnect the battery negative 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-75, "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

EBS01KC7

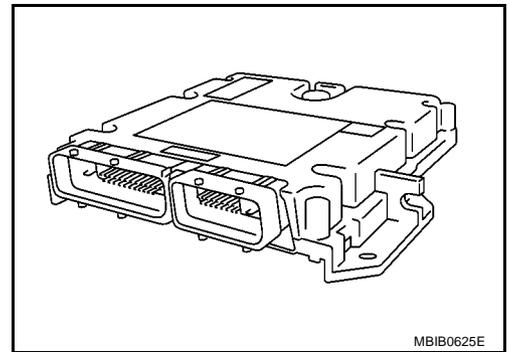
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect battery negative cable. Failure to do so may damage the ECM because battery voltage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



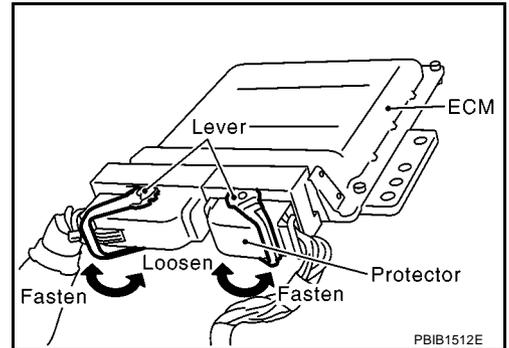
SEF289H

# PRECAUTIONS

- Do not disassemble ECM.



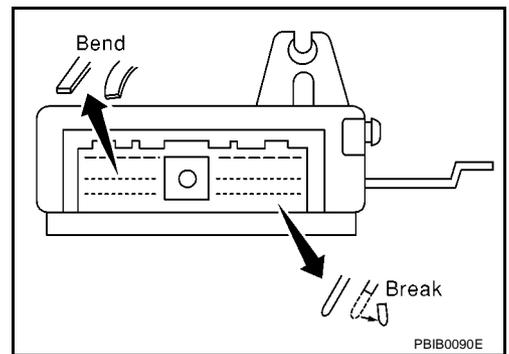
- When connecting ECM harness connector, fasten it securely with levers as far as they will go as shown in the figure.



- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).

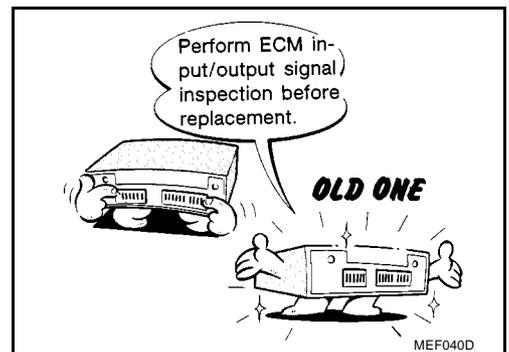
Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.

- 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.



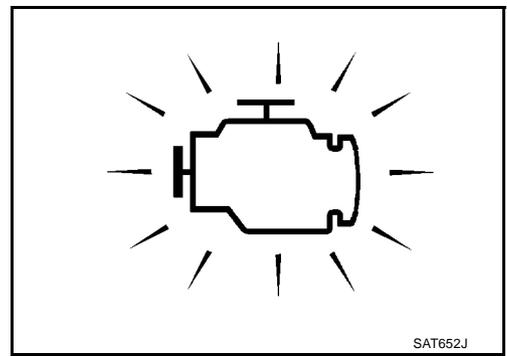
- Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to [EC-52, "ECM Terminals And Reference Value"](#).

- 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.

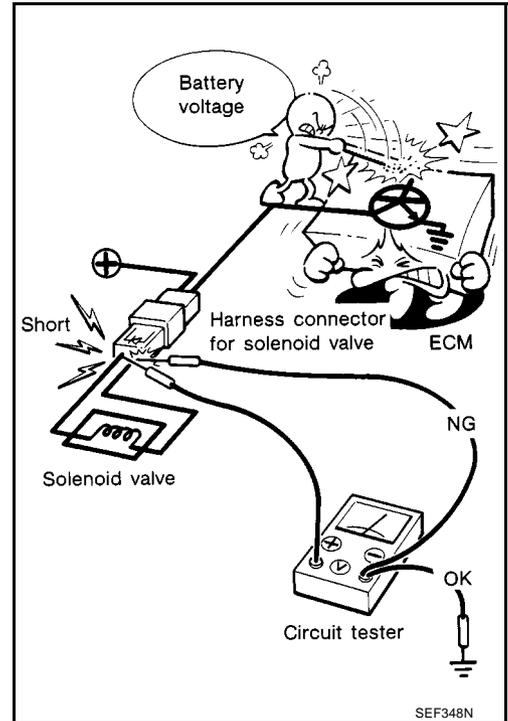


## PRECAUTIONS

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



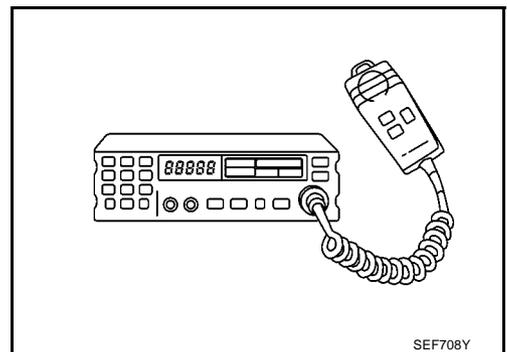
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's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



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



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



# PRECAUTIONS

## Wiring Diagrams and Trouble Diagnosis

EBS01KC8

A

When you read Wiring diagrams, refer to the following:

- [GI-15, "How to Read Wiring Diagrams"](#).
- [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#) for power distribution circuit

EC

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"](#).

C

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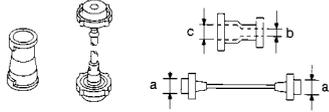
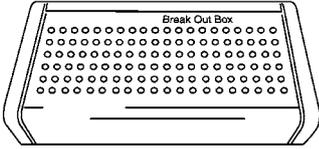
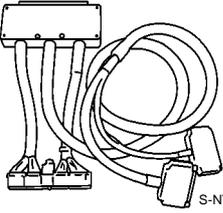
# PREPARATION

## PREPARATION

PFP:00002

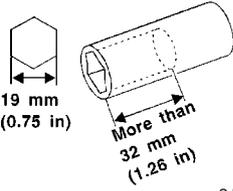
### Special Service Tools

EBS01KC9

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

### Commercial Service Tools

EBS01KCA

Tool name	Description	
Socket wrench	 <p style="text-align: center;">S-NT705</p>	Removing and installing engine coolant temperature sensor

## ENGINE CONTROL SYSTEM

### System Diagram

PFP:23710

EBS01KCB

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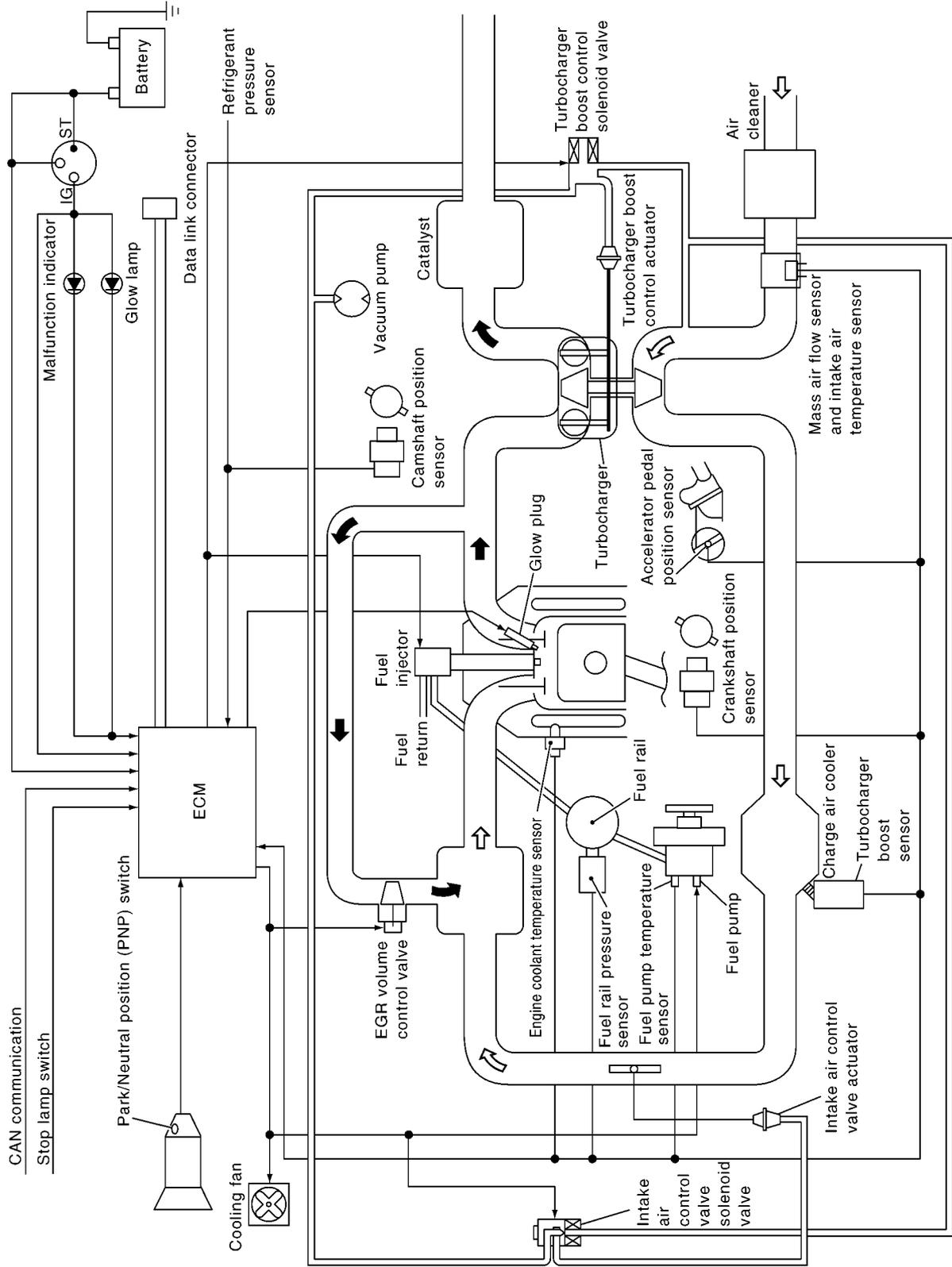
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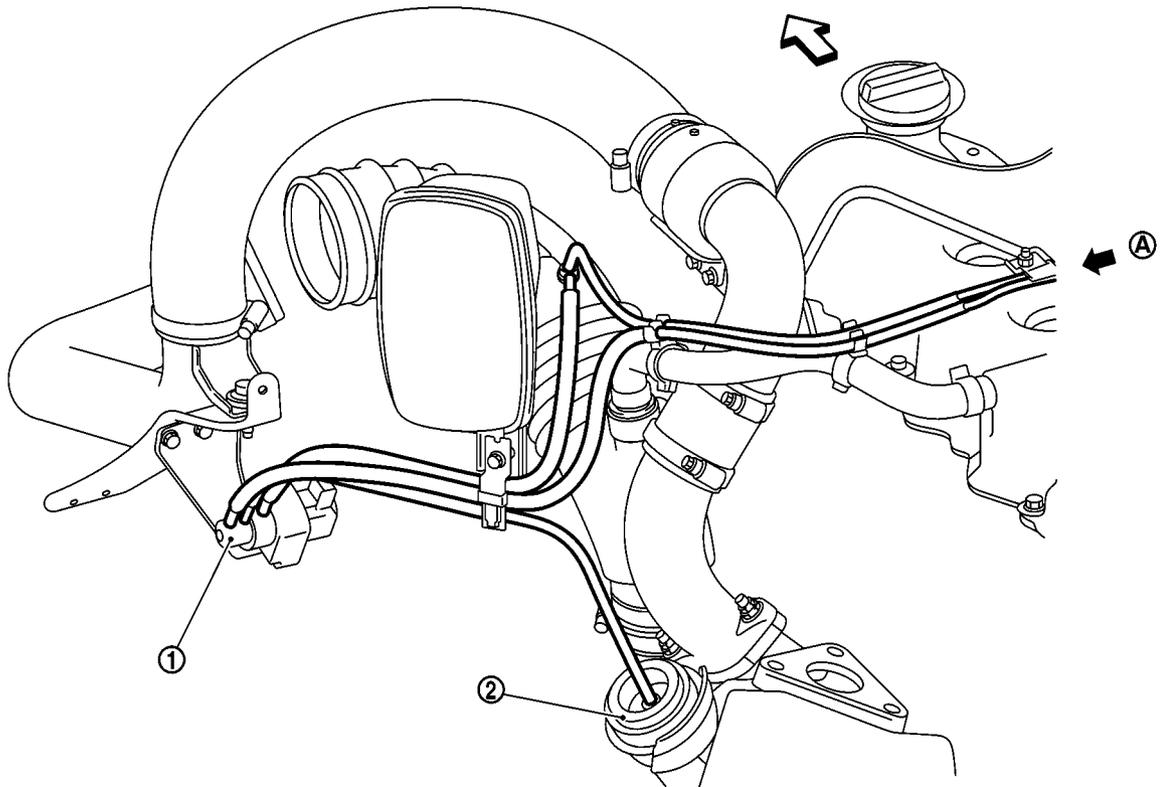


# ENGINE CONTROL SYSTEM

## Vacuum Hose Drawing

EBS01KCC

### LEFT SIDE OF THE ENGINE ROOM



↩ : Vehicle front

1. Turbocharger boost control solenoid valve

2. Turbocharger control actuator

A. From next page

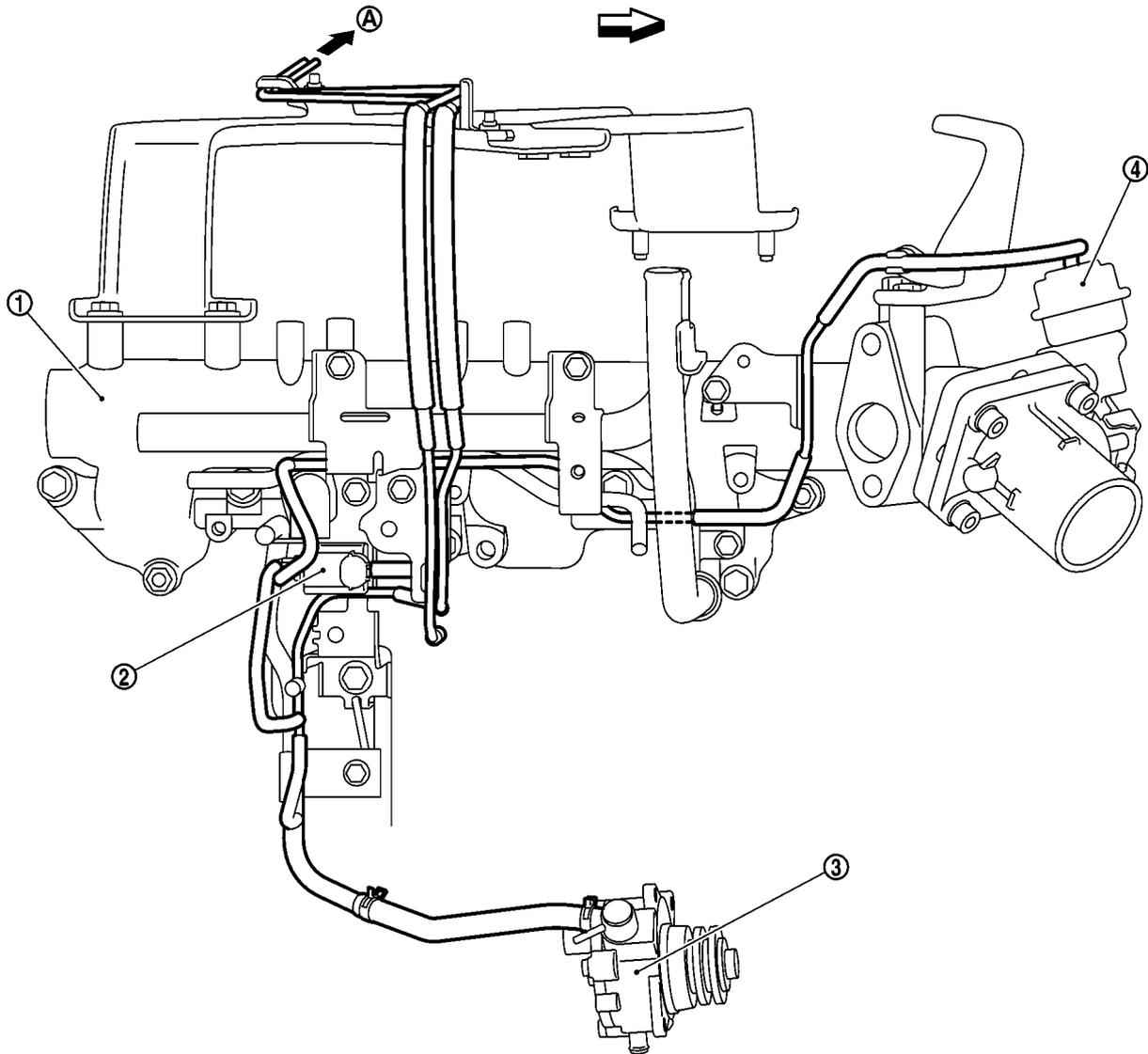
MBIB1387E

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

Refer to [EC-15. "System Diagram"](#) for Vacuum Control System.

# ENGINE CONTROL SYSTEM

## RIGHT SIDE OF THE ENGINE ROOM



A

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MBIB1288E

↔ : Vehicle front

- 1. Fuel rail
- 2. Intake air control valve control solenoid valve
- 3. Vacuum pump
- 4. Intake air control valve actuator
- A. To previous page

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

Refer to [EC-15, "System Diagram"](#) for Vacuum Control System.

# ENGINE CONTROL SYSTEM

## System Chart

EBS01KCD

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

\*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 SYSTEM DESCRIPTION

EBS01KCE

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

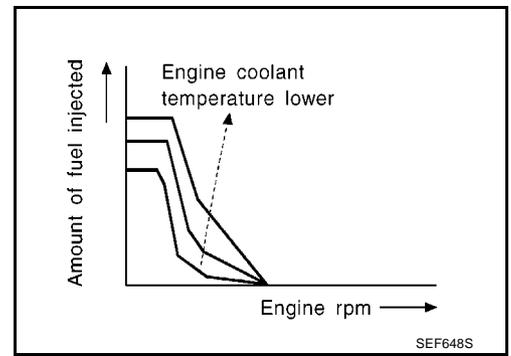
#### Input/Output Signal Chart

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		

# ENGINE CONTROL SYSTEM

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		
Wheel sensor	Vehicle speed*		
Air conditioner switch	Air conditioner ON signal*		
Front air control	PTC heater ON signal*		
Heat up switch	Heat up switch 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.

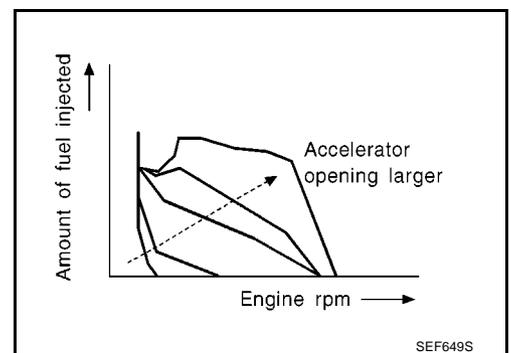
## NORMAL CONTROL

### 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.



# ENGINE CONTROL SYSTEM

## 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

EBS01KCF

### 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

EBS01KCG

### INPUT / OUTPUT SIGNAL CHART

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

\*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)

EBS01KCH

### INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Wheel 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.

# ENGINE CONTROL SYSTEM

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.

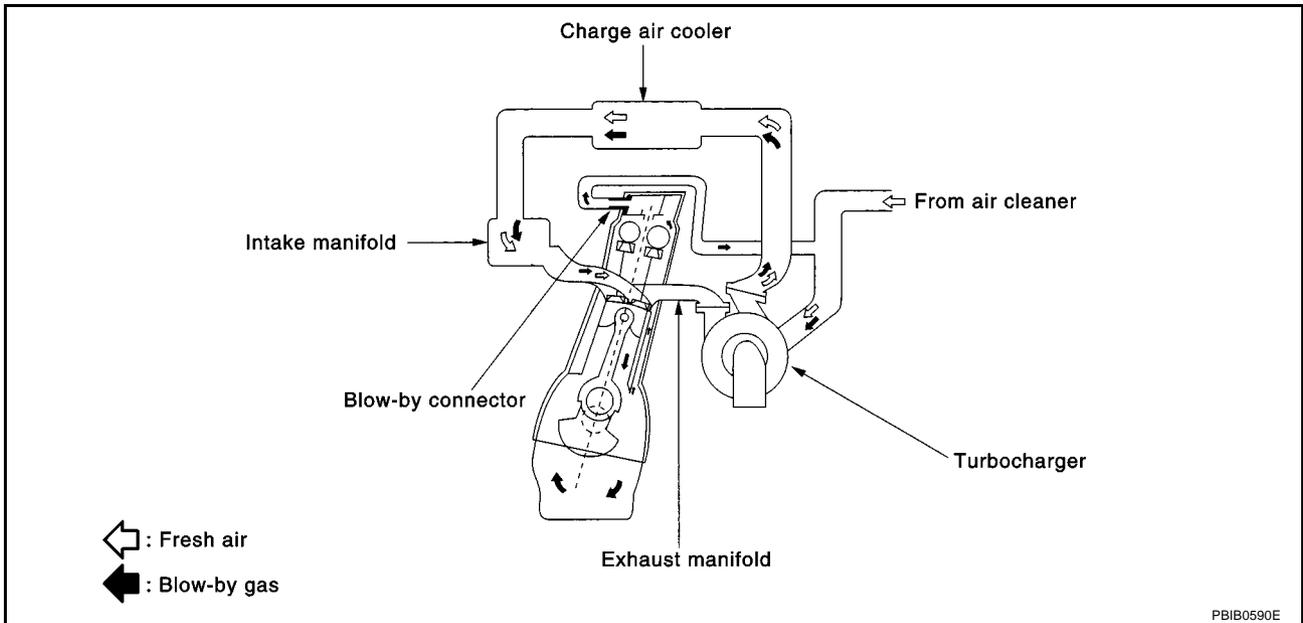
## NOTE:

This function is different from deceleration control listed under [EC-18, "Fuel Injection Control System"](#)

## Crankcase Ventilation System DESCRIPTION

EBS01KCI

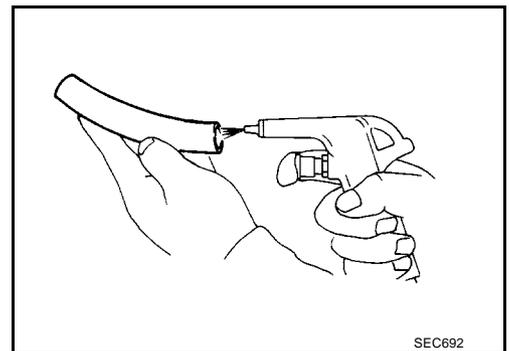
In this system, blow-by gas is sucked into the air duct after oil separation by oil separator in the rocker cover.



## 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 SYSTEM DESCRIPTION**

EBS01KCJ

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to [LAN-30, "CAN Communication Unit"](#) , about CAN communication for detail.

## BASIC SERVICE PROCEDURE

PFP:00018

### Fuel Filter DESCRIPTION

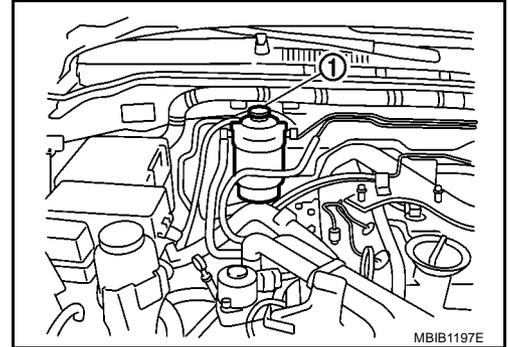
EBS01KCK

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 (1) 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.**

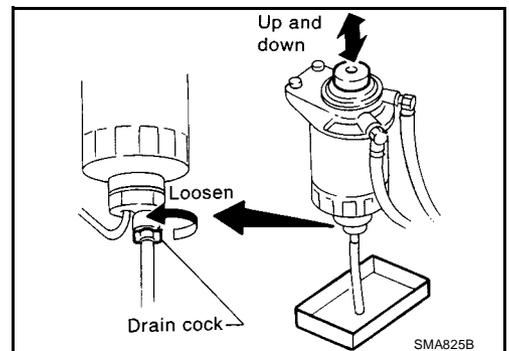
If water does not drain properly, move the priming up and down.

**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-23, "AIR BLEEDING"](#).
4. Start the engine.



# BASIC SERVICE PROCEDURE

EBS01KCL

## Fuel Pump Learning Value Clearing 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 operation to clear the value of the fuel pump learning.

Fuel Pump Learning Value Clearing should be performed under the following conditions.

- Fuel pump is changed.
- ECM is replaced with used one which stores the fuel pump learning value of other fuel pump.

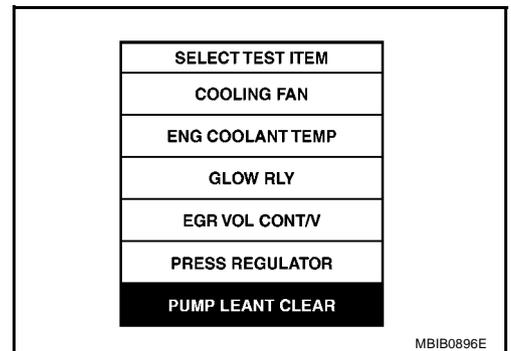
## OPERATION PROCEDURE

### NOTE:

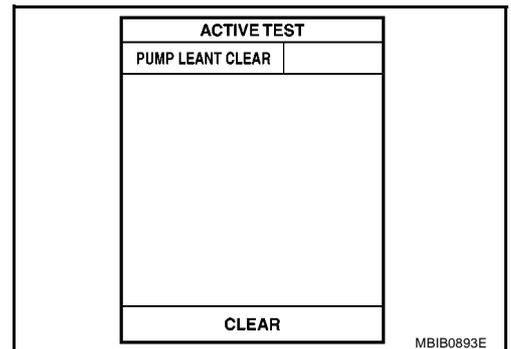
When removing fuel pump, perform Fuel Pump Learning Value Clearing before starting engine.

### ④ With CONSULT-II

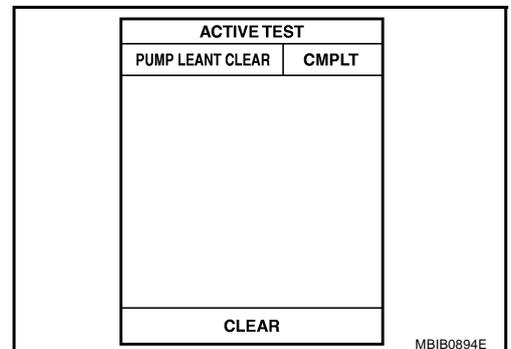
1. Turn ignition switch ON.
2. Select "PUMP LEARNT CLEAR" in "ACTIVE TEST" mode with CONSULT-II.



3. Touch "CLEAR" and wait a few seconds.



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



### ⊗ Without CONSULT-II

Fuel pump learning value can be erased from the back up memory in the ECM by the same operation as erasing DTC. In detail, refer to [EC-27, "Without CONSULT-II"](#).

## Injector Adjustment Value Registration

### DESCRIPTION

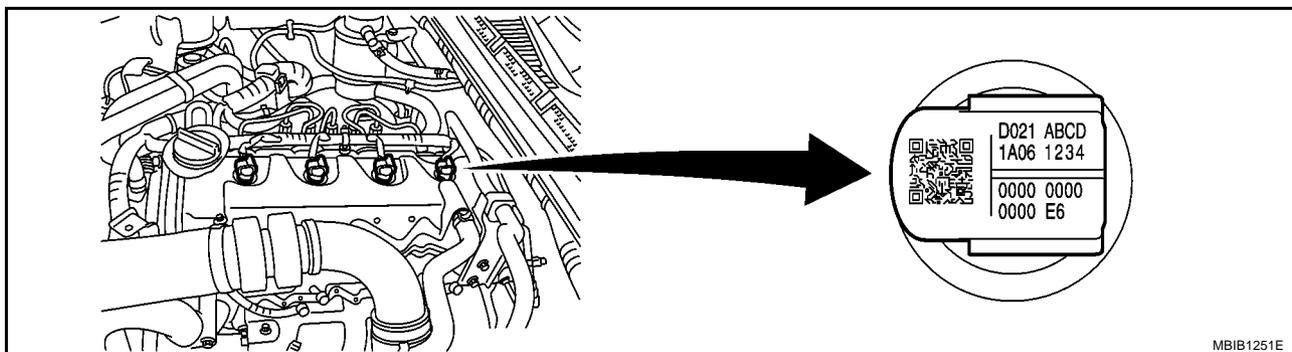
Injector adjustment value indicates manufacturing tolerance and the value is printed on the top of fuel injector. The injector adjustment value which is correctly stored in ECM is needed for precise fuel injection control. A performance of emission control and a drivability may effect when there is a mismatch between the following two values.

- The injector adjustment value stored in ECM
- The injector adjustment value of the injector which is installed on the vehicle

Injector Adjustment Value Registration must be performed after the following cases.

- Injector(s) are replaced.
- ECM is replaced.

For the first case, Injector Adjustment Value Registration for the replaced fuel injector must be performed. And for the second case, Injector Adjustment Value Registration for all the fuel injectors must be performed.



Example: Injector adjustment value = D021ABCD1A061234000000000000E6

### OPERATION PROCEDURE

#### NOTE:

- Before performing this procedure, record injector adjustment value printed on a fuel injector.
- When all fuel injectors are replaced or ECM is replaced, it is recommended to perform "INJ ADJ VAL CLR" in "WORK SUPPORT" mode before performing this procedure. By performing "INJ ADJ VAL CLR" in "WORK SUPPORT" mode, injector adjustment value stored in ECM is initialized.

1. Turn ignition switch ON (engine stopped).
2. Select "ENTER INJECTOR CALIB DATA" in "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START".

#### NOTE:

When touching "START", CONSULT-II reads injector adjustment values stored in ECM.

4. Select the number of the cylinder which needs Injector Adjustment Value Registration.
5. Input injector adjustment value, and touch "ENTER".

#### NOTE:

Input injector adjustment value is stored in CONSULT-II.

6. Repeat step 4 - 5 till there is no cylinder which needs Injector Adjustment Value Registration, and touch "START".

#### NOTE:

When touching "START", injector adjustment values stored in CONSULT-II are written onto ECM memory.

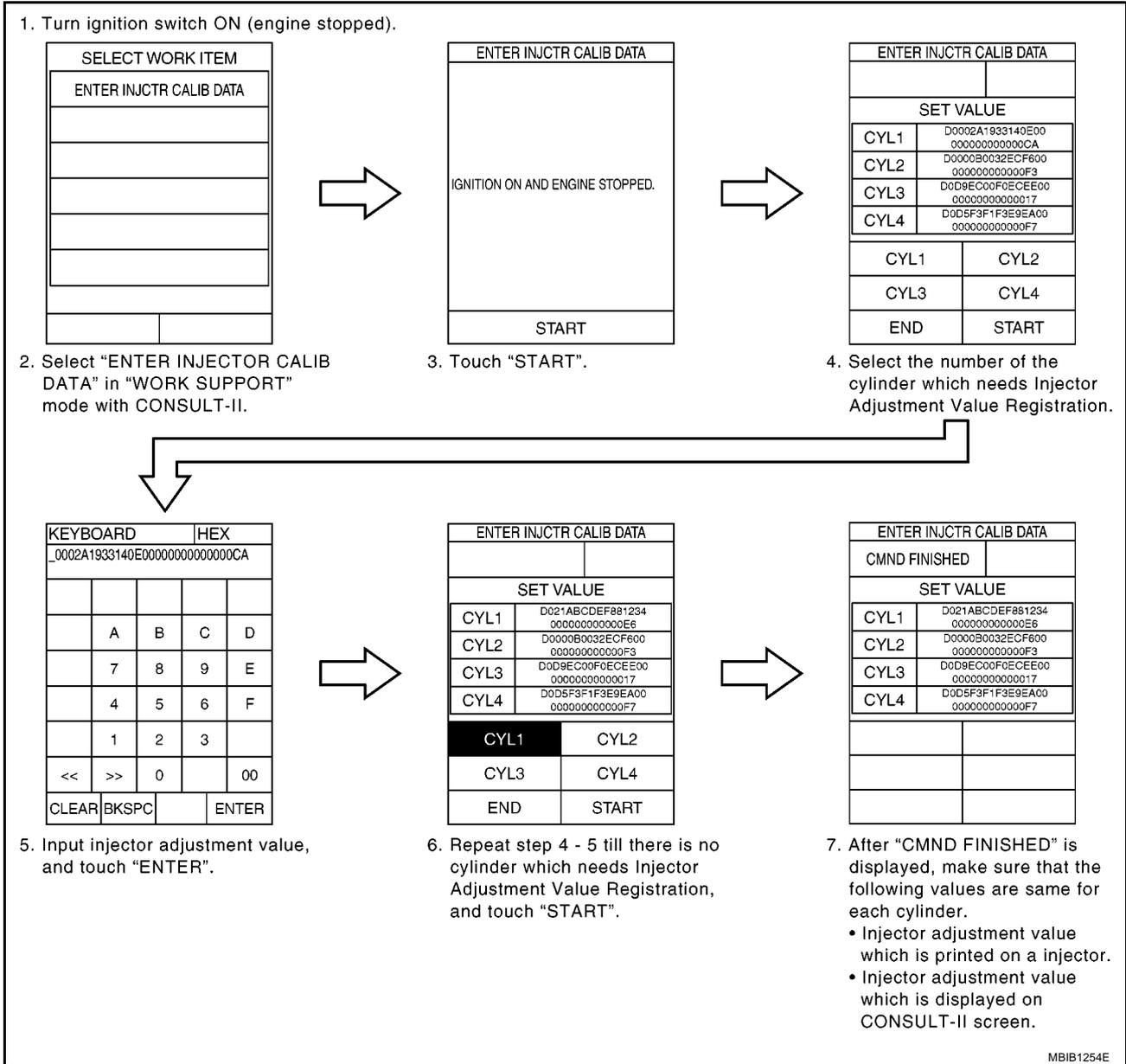
7. After "CMND FINISHED" is displayed, make sure that the following values are same for each cylinder.
  - Injector adjustment value which is printed on a fuel injector.
  - Injector adjustment value which is displayed on CONSULT-II screen.

#### NOTE:

In this step, CONSULT-II reads injector adjustment values stored in ECM and displays the values on the CONSULT-II screen. This is for checking if injector adjustment values are written onto ECM memory correctly.

# BASIC SERVICE PROCEDURE

- If DTC is detected, perform DTC Confirmation Procedure for the DTC, and check if the same DTC is detected again.



MBIB1254E

## ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

### DTC Detection Logic

EBS01KCN

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-6, "INDEX FOR DTC"](#).

### Diagnostic Trouble Code (DTC)

EBS01KCO

#### HOW TO READ DTC

The DTC can be read by the following methods.

#### With CONSULT-II

CONSULT-II displays the DTC in "SELF-DIAG RESULTS" mode. Example: P0117, P0335, P1268, etc. These DTCs are prescribed by ISO15031-5.

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

#### Without CONSULT-II

The number of blinks of the MI in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0117, 0335, 1260, etc.

- **Output of a DTC indicates a malfunction. However, the Diagnostic Test Mode II does not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

#### 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.)

**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.

SELECT SYSTEM
ENGINE

2. Turn CONSULT-II "ON" and touch "ENGINE".

SELECT DIAG MODE
SELF-DIAG RESULTS
DATA MONITOR
CAN DIAG SUPPORT MNTR
ACTIVE TEST
FUNCTION TEST
ECM PART NUMBER

3. Touch "SELF-DIAG RESULTS".

SELF DIAG RESULTS	
DTC RESULTS	TIME
ECT SEN/CIRCUIT [P0118]	0

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

PBIB2452E

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

#### Without CONSULT-II

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once.
2. Wait at least 10 seconds and then turn it ON (engine stopped) again.
3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal. Refer to [EC-29, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#).

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

- 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
  - Freeze frame data
  - Fuel pump learning value

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.

## Freeze Frame Data

EBS01KCP

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-28, "Freeze Frame Data"](#).

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-27, "HOW TO ERASE DTC"](#).

## NATS (Nissan Anti-theft System)

EBS01KCO

- If the security indicator lights up with the ignition switch in the ON position or "NATS MALFUNCTION" is displayed on "SELF-DIAG RESULTS" screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to [BL-170, "NATS\(Nissan Anti-Theft System\)"](#).
- Confirm no self-diagnostic results of NATS is displayed before touching "ERASE" in "SELF-DIAG 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.

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

SEF543X

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.

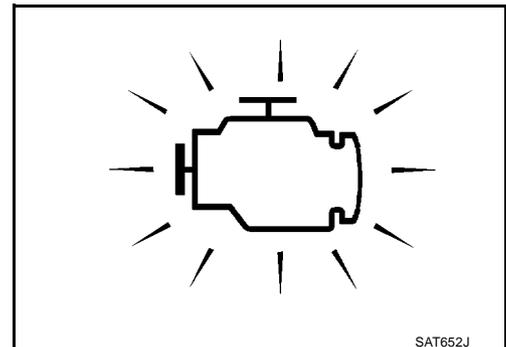
## Malfunction Indicator (MI)

EBS01KCR

### DESCRIPTION

The MI is located on the combination meter.

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 [EC-354, "MI & DATA LINK CONNECTORS"](#).
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.



## ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following three functions.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

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 <a href="#">EC-354</a> , "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.
Mode II	Ignition switch in ON position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs to be read.

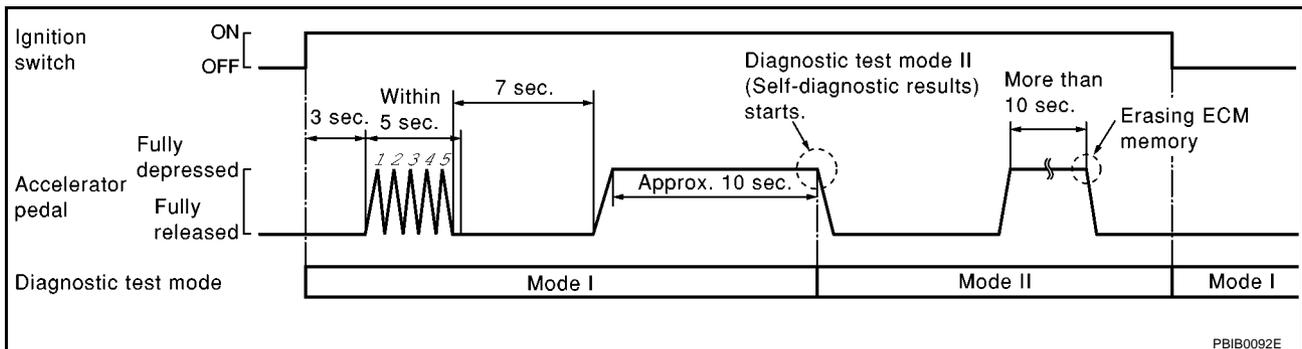
## HOW TO SWITCH DIAGNOSTIC TEST MODE

### NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.

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

1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.
  - a. Fully depress the accelerator pedal.
  - b. Fully release the accelerator pedal.
3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MI starts blinking.
4. Fully release the accelerator pedal.  
ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



# ON BOARD DIAGNOSTIC (OBD) SYSTEM

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

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-29, "How to Set Diagnostic Test Mode II \(Self-diagnostic Results\)"](#) .
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.  
The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

## DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MI on the combination meter should stay ON. If it remains OFF, check the bulb. Refer to [EC-354, "MI & DATA LINK CONNECTORS"](#) .

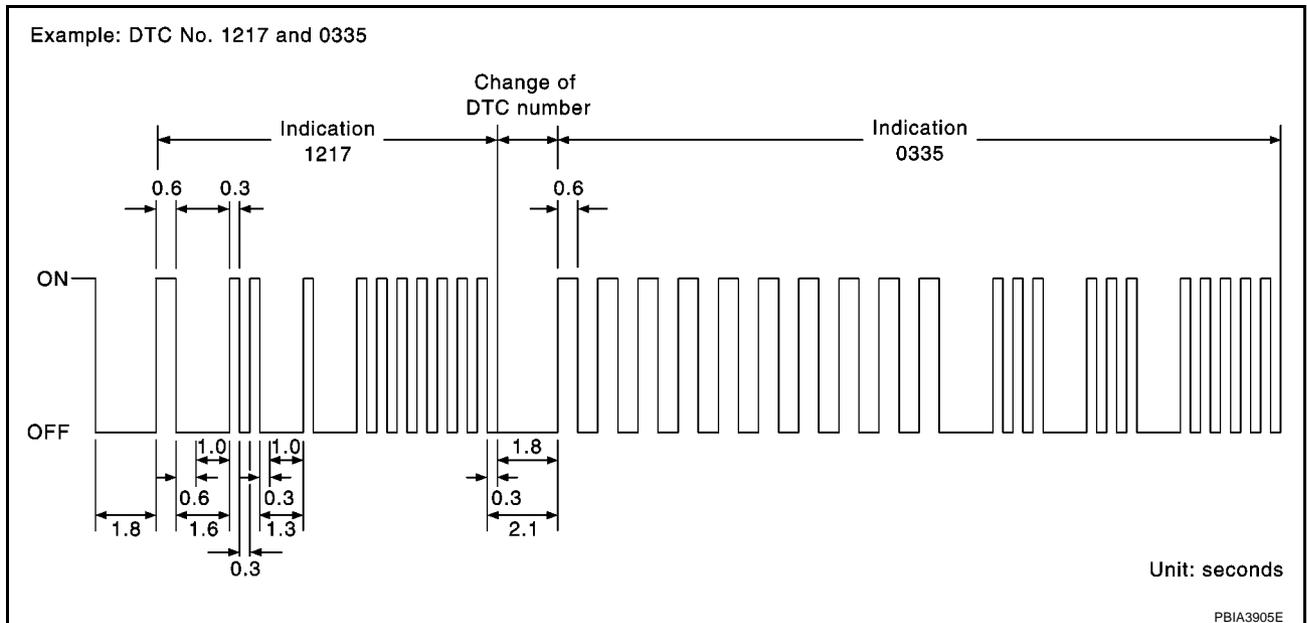
## DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

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

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

## DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

In this mode, the DTC is indicated by the number of blinks of the MI as shown below. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.

A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.

A change from one trouble code to another occurs at an interval of 1.8-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See [EC-6, "INDEX FOR DTC"](#) )

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

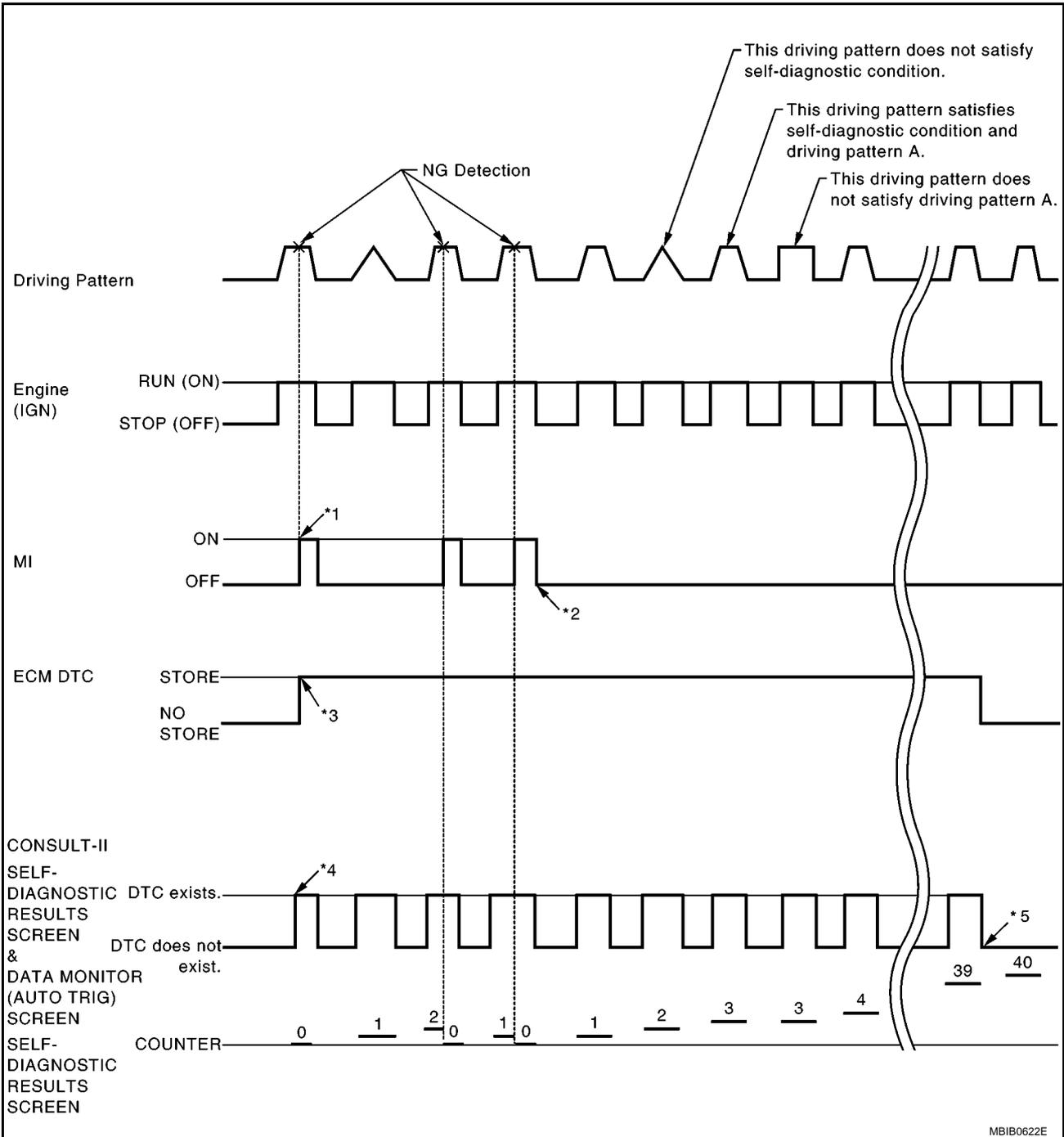
The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to [EC-29, "How to Set Diagnostic Test Mode II \(Self-diagnostic Results\)"](#) .

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

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

## Relationship Between MI, DTC, CONSULT-II and Driving Patterns

EBS01KCS



MBIB0622E

\*1: When a malfunction is detected, MI will light up.

\*2: MI will not light up after ignition switch is turned OFF.

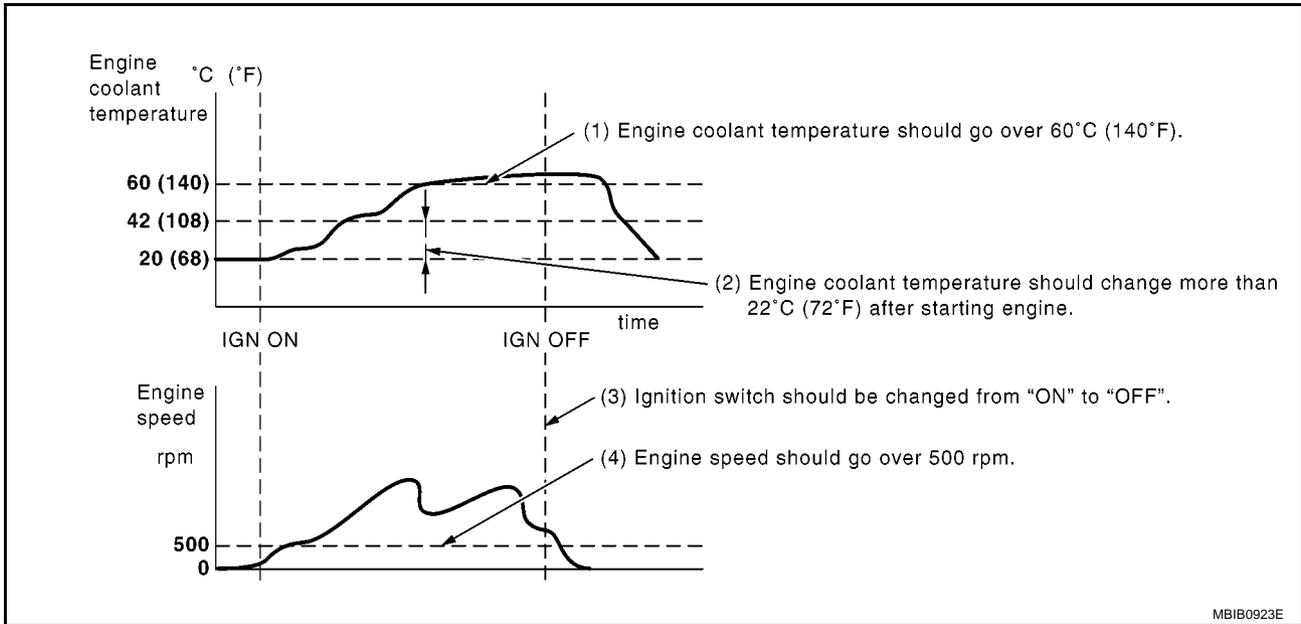
\*3: When a malfunction is detected for the first time, the DTC will be stored in ECM.

\*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.)

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

## DRIVING PATTERN A



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

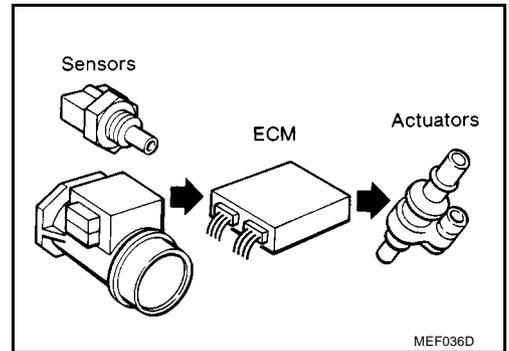
## TROUBLE DIAGNOSIS

PFP:00004

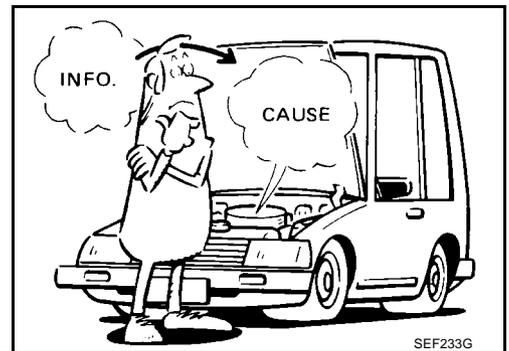
### Trouble Diagnosis Introduction INTRODUCTION

EBS01KCT

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.



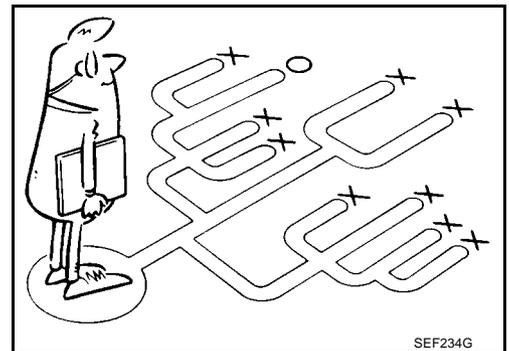
It is much more difficult to diagnose a malfunction that occurs intermittently rather than continuously. Most intermittent malfunctions are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



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-34, "WORK FLOW"](#).

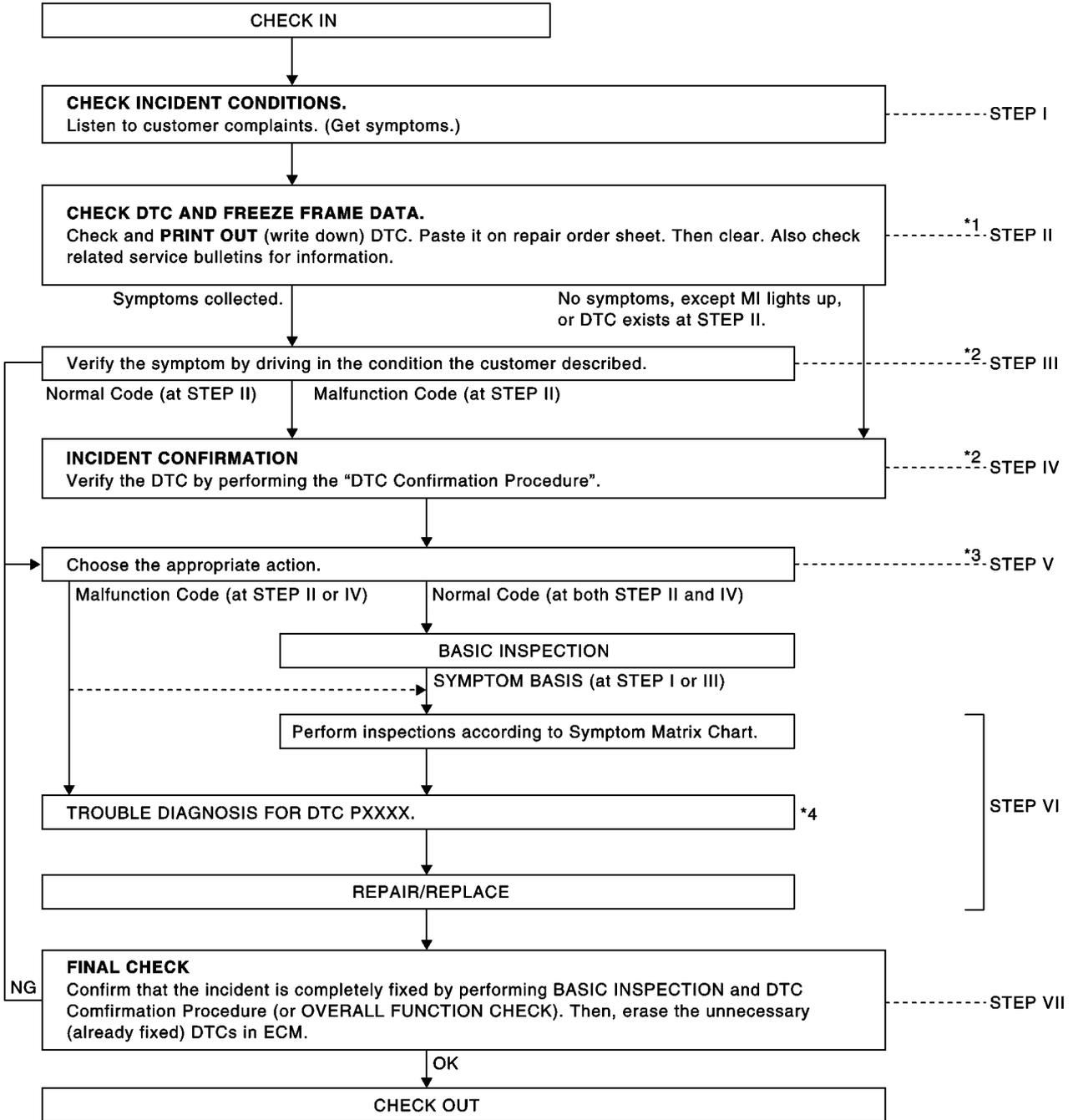
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A Diagnostic 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.



# TROUBLE DIAGNOSIS

## WORK FLOW



PBIB0477E

\*1 If time data of "SELF-DIAG RESULTS" is other than "0", perform [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

\*2 If the incident cannot be verified, perform [EC-70, "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-71, "POWER SUPPLY AND GROUND CIRCUIT"](#) .

\*4 If malfunctioning part cannot be detected, perform [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

# TROUBLE DIAGNOSIS

## Description for Work Flow

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the <a href="#">EC-35, "DIAGNOSTIC WORK SHEET"</a> .
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 <a href="#">EC-27</a> . If the incident cannot be verified, perform <a href="#">EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> . 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 <a href="#">EC-42</a> .) 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 <a href="#">EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> . 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 <a href="#">EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> . 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, <a href="#">EC-38</a> . Then perform inspections according to the Symptom Matrix Chart. Refer to <a href="#">EC-42</a> .
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 <a href="#">EC-52</a> or <a href="#">EC-66</a> . 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 <a href="#">GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident"</a> , "Circuit Inspection". Repair or replace the malfunction parts. If the malfunctioning part cannot be detected, perform <a href="#">EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> .
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 <a href="#">EC-27</a> .)

## 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



# TROUBLE DIAGNOSIS

## DTC Inspection Priority Chart

EBS01KCU

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-79, "DTC U1000 CAN COMMUNICATION LINE"](#).**

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> <li>● U1000 CAN communication line</li> <li>● P0016 Crankshaft position - camshaft position correlation</li> <li>● P0102 P0103 Mass air flow sensor</li> <li>● P0112 P0113 Intake air temperature sensor</li> <li>● P0117 P0118 Engine coolant temperature sensor</li> <li>● P0122 P0123 P0222 P0223 P2135 Accelerator pedal position sensor</li> <li>● P0182 P0183 Fuel pump temperature sensor</li> <li>● P0192 P0193 Fuel rail pressure sensor</li> <li>● P0237 P0238 Turbocharger boost sensor</li> <li>● P0335 P0336 Crankshaft position sensor</li> <li>● P0340 P0341 Camshaft position sensor</li> <li>● P0563 Battery voltage</li> <li>● P0605 P0606 P1616 ECM</li> <li>● P0642 P0643 P0652 P0653 Sensor power supply</li> <li>● P1610 - P1615 NATS</li> <li>● P1622 P1623 Injector adjustment value</li> <li>● P2228 P2229 Barometric pressure sensor</li> </ul>
2	<ul style="list-style-type: none"> <li>● P0089 P0628 P0629 P1272 - P1275 Fuel pump</li> <li>● P0200 - P0204 P1268 - P1271 P2146 - P2149 Fuel injector</li> <li>● P0686 ECM relay</li> </ul>
3	<ul style="list-style-type: none"> <li>● P0088 P0093 Fuel system</li> <li>● P0217 Engine over temperature (OVERHEAT)</li> <li>● P0234 Turbocharger system</li> <li>● P0501 P0502 P0503 ASCD vehicle speed sensor</li> <li>● P0504 ASCD brake switch</li> <li>● P0580 P0581 ASCD steering switch</li> </ul>

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# TROUBLE DIAGNOSIS

EBS01KCV

## Basic Inspection

### Precaution:

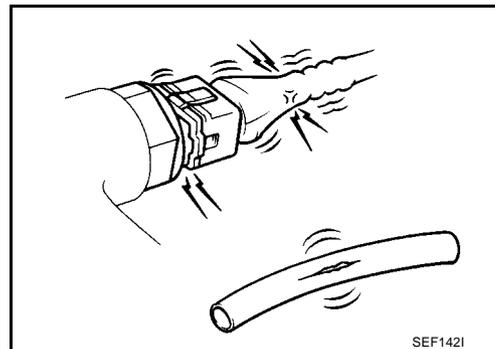
Perform Basic Inspection without electrical or mechanical loads applied;

- 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.
- Heater fan switch is OFF.
- Rear defogger switch is OFF.
- Heat up 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-8, "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.

>> GO TO 2.



## 2. PREPARATION FOR CHECKING IDLE SPEED

### ① With CONSULT-II

Connect CONSULT-II to the data link connector.

### ⊗ Without CONSULT-II

Install diesel tacho tester to the vehicle.

>> GO TO 3.

# TROUBLE DIAGNOSIS

## 3. CHECK IDLE SPEED

### With CONSULT-II

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

**M/T: 750±25 rpm (in Neutral position)**

**A/T: 750±25 rpm (in P or N position)**

### Without CONSULT-II

Read idle speed.

**M/T: 750±25 rpm (in Neutral position)**

**A/T: 750±25 rpm (in P or N position)**

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 4.

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

## 4. CHECK FOR INTAKE AIR LEAK

1. Stop engine.
2. 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

Use priming pump to bleed air from fuel system. Refer to [EC-23, "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.

**M/T: 750±25 rpm (in Neutral position)**

**A/T: 750±25 rpm (in P or N position)**

### Without CONSULT-II

Read idle speed.

**M/T: 750±25 rpm (in Neutral position)**

**A/T: 750±25 rpm (in P or N position)**

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 7.

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

## 7. DRAIN WATER FROM FUEL FILTER

1. Stop engine.
2. Drain water from fuel filter. Refer to [EC-23, "WATER DRAINING"](#).

>> GO TO 8.

# TROUBLE DIAGNOSIS

## 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.

**M/T: 750±25 rpm (in Neutral position)**  
**A/T: 750±25 rpm (in P or N position)**

### Without CONSULT-II

Read idle speed.

**M/T: 750±25 rpm (in Neutral position)**  
**A/T: 750±25 rpm (in P or N position)**

OK or NG

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

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

## 9. CHECK AIR CLEANER FILTER

1. Stop engine.
2. 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-5, "BATTERY"](#) .

OK or NG

- OK >> Check charging system. Refer to [SC-14, "CHARGING SYSTEM"](#) .  
NG >> Repair or replace.

## 12. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-92, "CHECKING COMPRESSION PRESSURE"](#) .

OK or NG

- OK >> GO TO 13.  
NG >> Follow the instruction of "CHECKING COMPRESSION PRESSURE".

# TROUBLE DIAGNOSIS

## 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.

**M/T: 750±25 rpm (in Neutral position)**

**A/T: 750±25 rpm (in P or N position)**

### Without CONSULT-II

Read idle speed.

**M/T: 750±25 rpm (in Neutral position)**

**A/T: 750±25 rpm (in P or N position)**

### OK or NG

OK >> **INSPECTION END**

NG >> 1. Replace fuel injector.

2. GO TO 3.

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

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# TROUBLE DIAGNOSIS

## Symptom Matrix Chart

EBS01KCW

SYSTEM — Basic engine control system	SYMPTOM													Reference page	
	HARD/NO START/RESTART (EXCP. HA)				ENGINE STALL			HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE	LOW IDLE		
	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								
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	<a href="#">EC-125</a>	
Glow control system	1	1	1	1					1					<a href="#">EC-295</a>	
Engine body	3	3	3	3	3	3	3		3	4	4		3	<a href="#">EM-106</a>	
EGR system										3	3			<a href="#">EC-302</a>	
Air cleaner and duct										3	3			<a href="#">EM-15</a>	
Fuel rail pressure relief valve	3	3	3	3	3	3	3	3		3	3		3	<a href="#">EC-88</a>	
ENGINE CONTROL	Fuel pump circuit	4	4	4	4	4	4	4	4		4	4		4	<a href="#">EC-217</a>
	Fuel injector circuit	1	1	1	1	1	1	1	1	1	1	1	1	<a href="#">EC-125</a>	
	Fuel injector adjustment value								1	1	1	1		<a href="#">EC-25</a>	
	Mass air flow sensor circuit								1		1	1		<a href="#">EC-92</a>	
	Engine coolant temperature circuit			1		1		1					1	<a href="#">EC-103</a>	
	Vehicle speed signal circuit										1			<a href="#">LAN-30</a>	
	Accelerator pedal position sensor circuit								1		1	1		<a href="#">EC-108</a> , <a href="#">EC-142</a> , <a href="#">EC-275</a>	
	Fuel rail pressure sensor circuit													<a href="#">EC-118</a>	

# TROUBLE DIAGNOSIS

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)				ENGINE STALL			HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE		LOW IDLE
SYSTEM — Basic engine control system		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							
		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			<a href="#">EC-159</a>
	Camshaft position sensor circuit			3	3										<a href="#">EC-171</a>
	Turbocharger boost sensor circuit								1		1	1			<a href="#">EC-153</a>
	Turbocharger boost control solenoid valve circuit								1		1	1			<a href="#">EC-309</a>
	Intake air control valve control solenoid valve circuit	1	1	1	1	1	1	1	1						<a href="#">EC-314</a>
	Start signal circuit	1	1	1	1	1		1	1		1	1			<a href="#">EC-348</a>
	Ignition switch circuit		1			1	1	1							<a href="#">EC-71</a>
	Heat up switch circuit												1		<a href="#">EC-319</a>
	Power supply for ECM circuit		1			1	1	1							<a href="#">EC-71</a>
	Cooling fan relay circuit														<a href="#">EC-132</a>
	EGR volume control valve circuit								1		1	1			<a href="#">EC-302</a>
	Glow relay circuit	1	1	1											<a href="#">EC-295</a>
	ECM relay (Self shut-off) circuit		1				1	1	1						<a href="#">EC-232</a>
	ECM	2	2	2	2	2	2	2	2	2	2	2	2	2	<a href="#">EC-213</a> , <a href="#">EC-215</a> , <a href="#">EC-269</a>
NATS (Nissan Anti-theft System)			1											<a href="#">EC-28</a>	

1 - 5: The numbers refer to the order of inspection.  
(continued on next page)

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# TROUBLE DIAGNOSIS

		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?	
Warranty symptom code		AG	AH	AJ	AK	AL	AM	AP		HA				
SYSTEM — Basic engine control system														
Fuel pump		5	5	5		5					1	1	—	
Fuel injector		3	3	3		4		3	3		1	1	<a href="#">EC-125</a>	
Glow control system									1				<a href="#">EC-295</a>	
Engine body			3	3	3	3	1		3				<a href="#">EM-106</a>	
EGR system								3					<a href="#">EC-302</a>	
Air cleaner and duct								3					<a href="#">EM-15</a>	
Fuel rail pressure relief valve		3	3	3		3							<a href="#">EC-88</a>	
ENGINE CONTROL	Fuel pump circuit	4	4	4		4					1	1	<a href="#">EC-217</a>	
	Fuel injector circuit	1	1	1		1		1	1		1	1	<a href="#">EC-125</a>	
	Fuel injector adjustment value	1	1			1		1	1			1	<a href="#">EC-25</a>	
	Mass air flow sensor circuit							1			1	1	<a href="#">EC-92</a>	
	Engine coolant temperature circuit	1	1		1						1	1	<a href="#">EC-103</a>	
	Vehicle speed signal circuit										1	1	<a href="#">LAN-30</a>	
	Accelerator pedal position sensor circuit			1								1	1	<a href="#">EC-108</a> , <a href="#">EC-142</a> , <a href="#">EC-275</a>
	Fuel rail pressure sensor circuit											1	1	<a href="#">EC-118</a>

# TROUBLE DIAGNOSIS

		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?
Warranty symptom code		AG	AH	AJ	AK	AL	AM	AP		HA			
ENGINE CONTROL	Crankshaft position sensor circuit	1	1								1	1	<a href="#">EC-159</a>
	Camshaft position sensor circuit										1	1	<a href="#">EC-171</a>
	Turbocharger boost sensor circuit										1	1	<a href="#">EC-153</a>
	Turbocharger boost control solenoid valve circuit							1	1				<a href="#">EC-309</a>
	Start signal circuit												<a href="#">EC-348</a>
	Ignition switch circuit												<a href="#">EC-71</a>
	Heat up switch circuit												<a href="#">EC-319</a>
	Power supply for ECM circuit										1	1	<a href="#">EC-71</a>
	Cooling fan relay circuit				2								<a href="#">EC-132</a>
	EGR volume control valve circuit							1					<a href="#">EC-302</a>
	Glow relay circuit								1				<a href="#">EC-295</a>
	ECM relay (Self shut-off) circuit											1	<a href="#">EC-232</a>
	ECM	2	2	2	2	2	2	2	2	2	2	2	<a href="#">EC-213</a> , <a href="#">EC-215</a> , <a href="#">EC-269</a>
NATS (Nissan Anti-theft System)												1	<a href="#">EC-28</a>

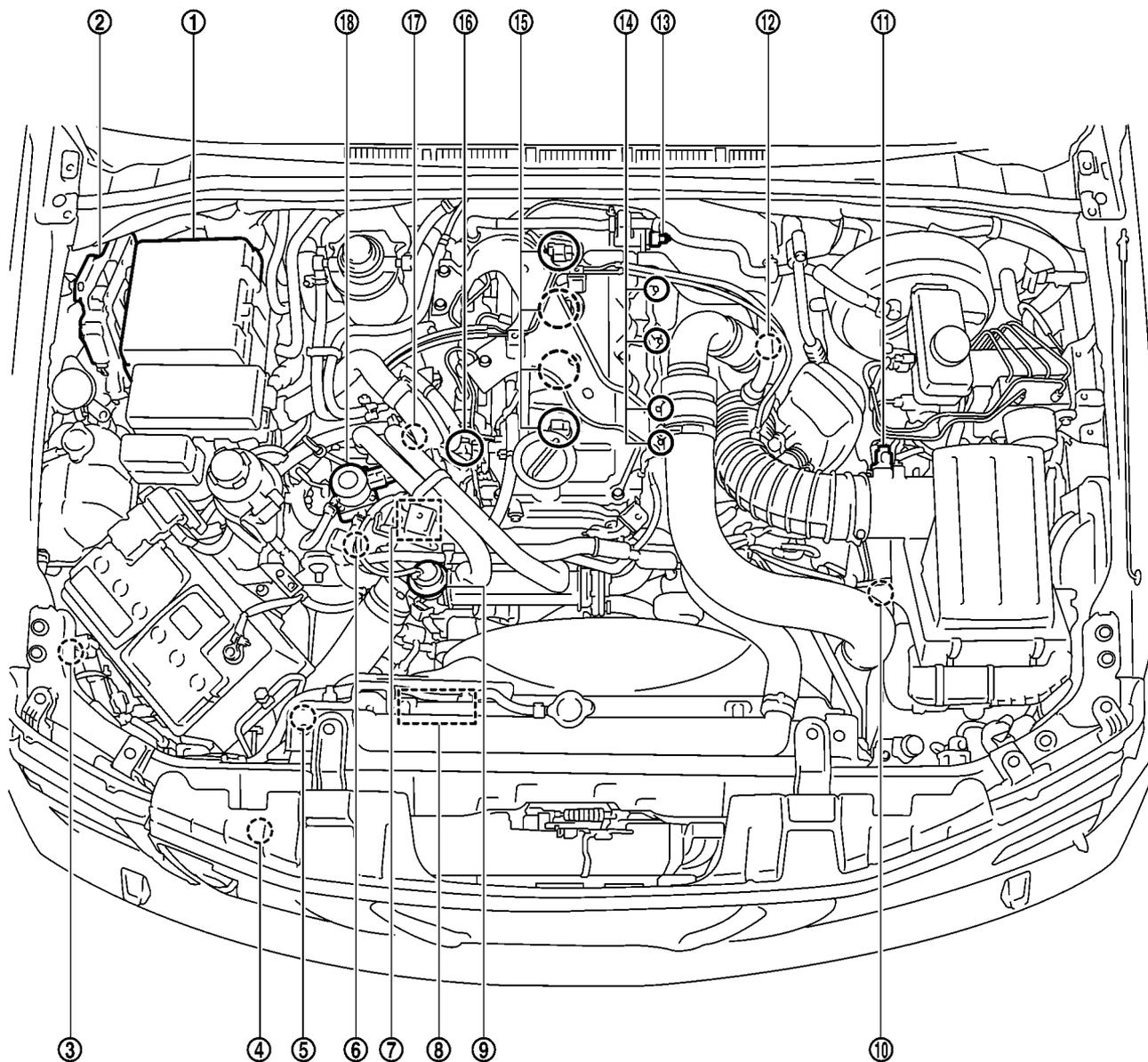
1 - 5: The numbers refer to the order of inspection.

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# TROUBLE DIAGNOSIS

## Engine Control Component Parts Location

EBS01KCX

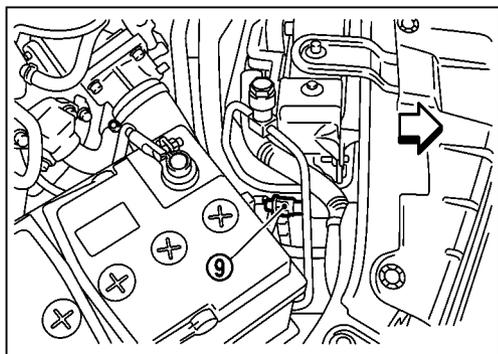
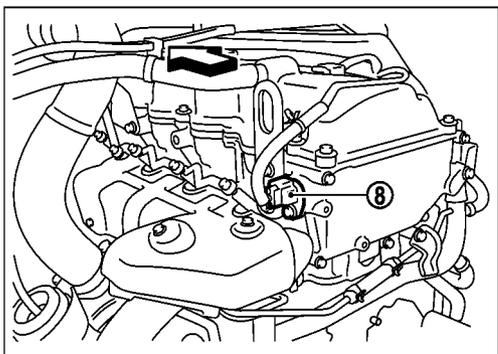
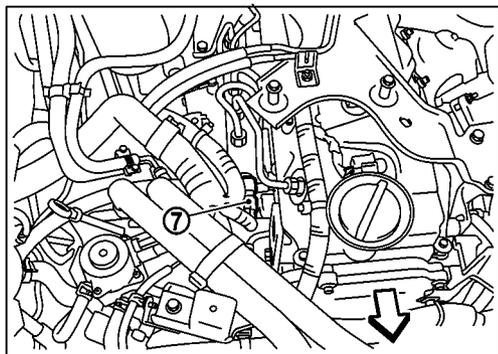
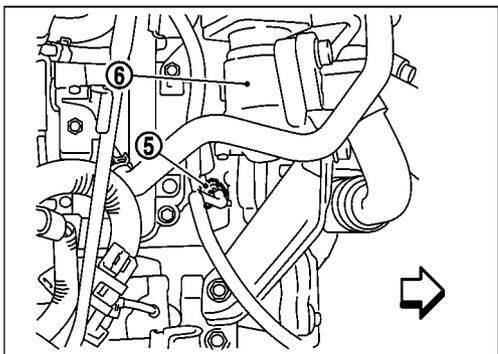
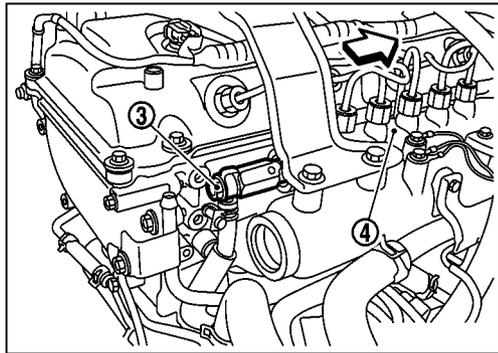
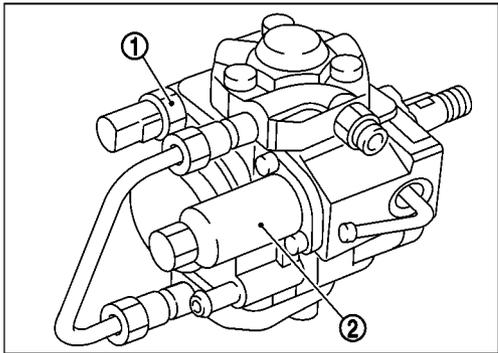


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|---|---|---|
| 1. IPDM E/R                                   | 2. ECM  | 3. Glow relay                           |
| 4. Turbocharger boost sensor                  | 5. Refrigerant pressure sensor                      | 6. Engine coolant temperature sensor    |
| 7. Fuel pump                                  | 8. Cooling fan motor                                | 9. Intake air control valve actuator    |
| 10. Turbocharger boost control solenoid valve | 11. Mass air flow sensor                            | 12. Turbocharger boost control actuator |
| 13. Camshaft position sensor                  | 14. Glow plug                                       | 15. Fuel injector                       |
| 16. Fuel rail pressure sensor                 | 17. Intake air control valve control solenoid valve | 18. EGR volume control valve            |

MBIB1198E

# TROUBLE DIAGNOSIS

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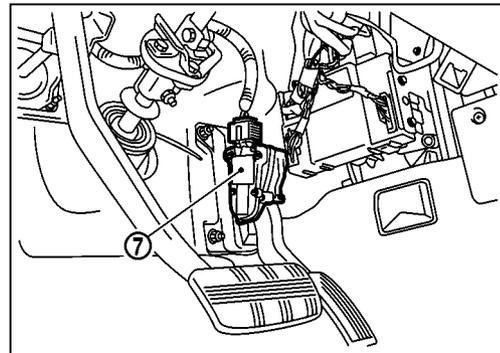
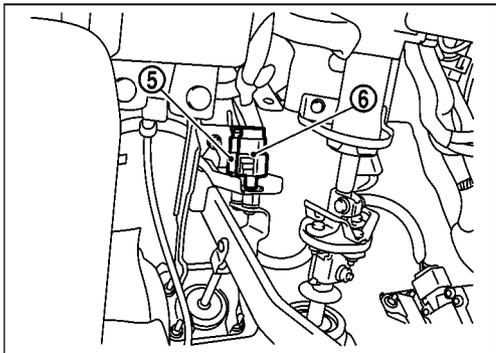
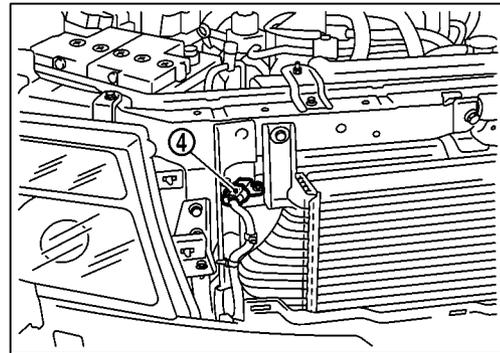
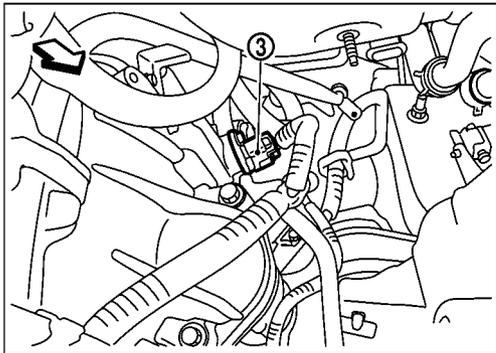
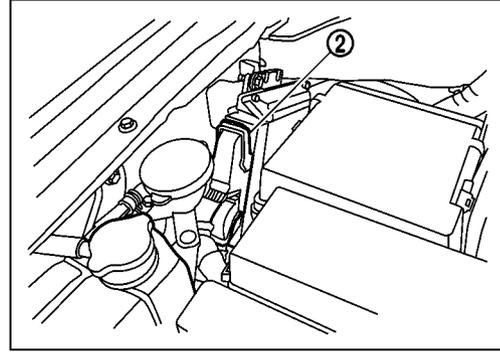
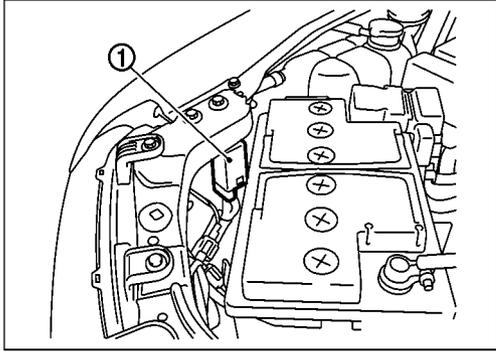


↔ : Vehicle front

- |                                 |                                      |                                    |
|---------------------------------|--------------------------------------|------------------------------------|
| 1. Fuel pump temperature sensor | 2. Fuel pump                         | 3. Fuel rail pressure relief valve |
| 4. Fuel rail                    | 5. Engine coolant temperature sensor | 6. EGR volume control valve        |
| 7. Fuel rail pressure sensor    | 8. Camshaft position sensor          | 9. Refrigerant pressure sensor     |

MBIB1388E

# TROUBLE DIAGNOSIS

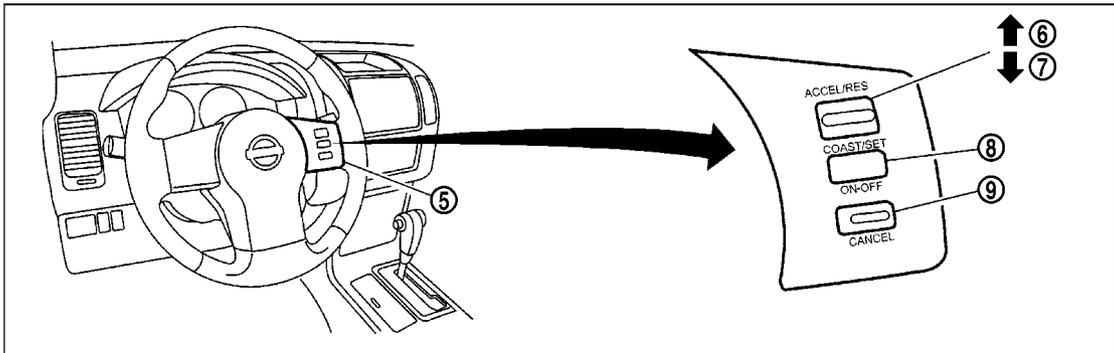
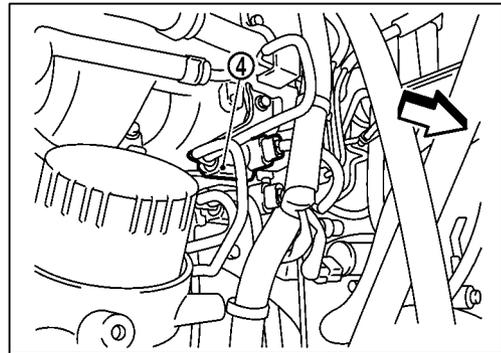
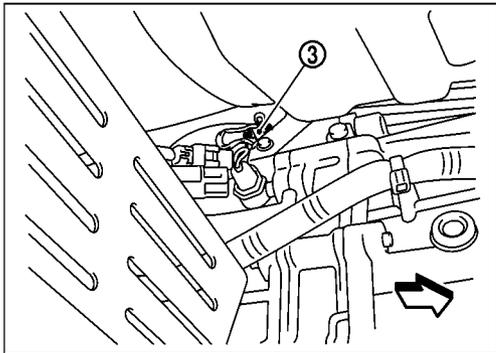
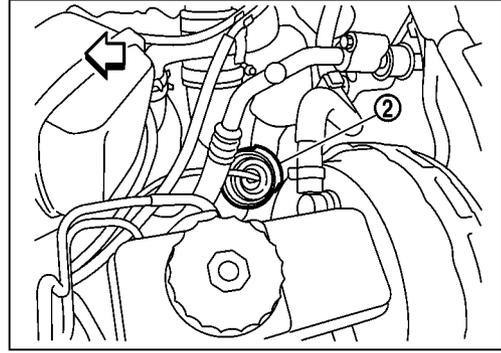
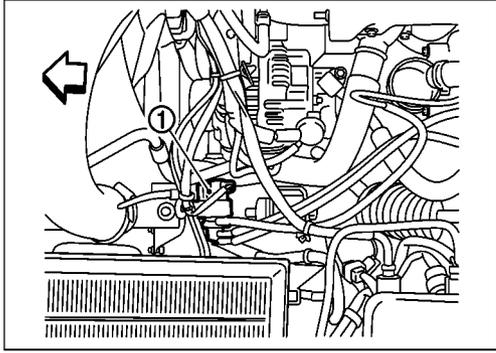


MBIB1249E

↙ : Vehicle front

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|--|----------------------|--|
| 1. Glow relay  | 2. ECM               | 3. Crankshaft position sensor<br>(View from under the vehicle) |
| 4. Turbocharger boost sensor<br>(View with front grille removed) | 5. ASCD brake switch | 6. Stop lamp switch  |
| 7. Accelerator pedal position sensor                             |                      |  |

# TROUBLE DIAGNOSIS



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← : Vehicle front

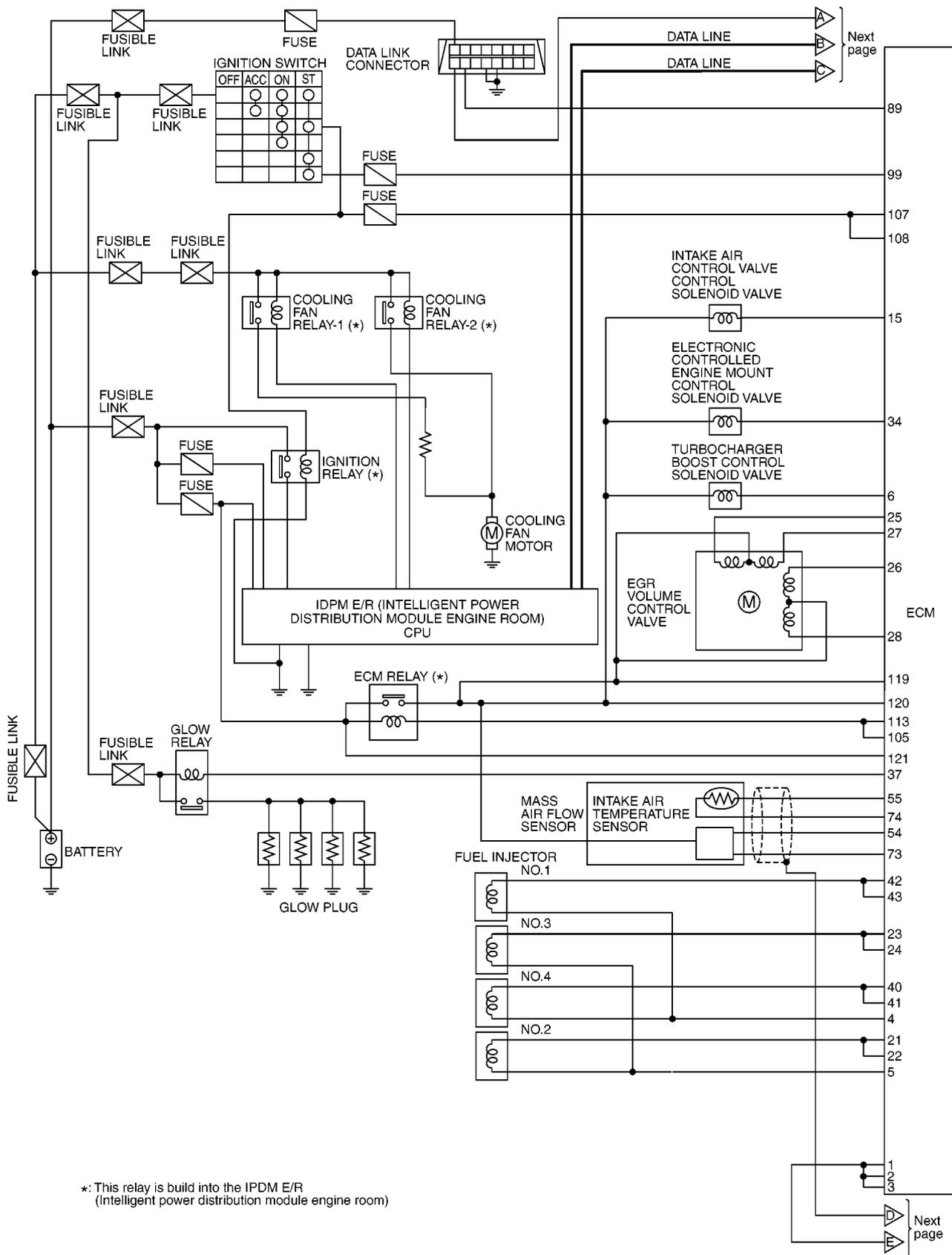
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|---|--|---|
| 1. Turbocharger boost control solenoid valve (View with air cleaner upper case removed) | 2. Turbocharger boost control actuator | 3. PNP switch (M/T) (View from under the vehicle) |
| 4. Intake air control valve control solenoid valve                                      | 5. ASCD steering switch                | 6. RESUME/ACCELERATE switch                       |
| 7. SET/COAST switch   | 8. MAIN switch                         | 9. CANCEL switch                                  |

MBIB1289E

# TROUBLE DIAGNOSIS

## Circuit Diagram

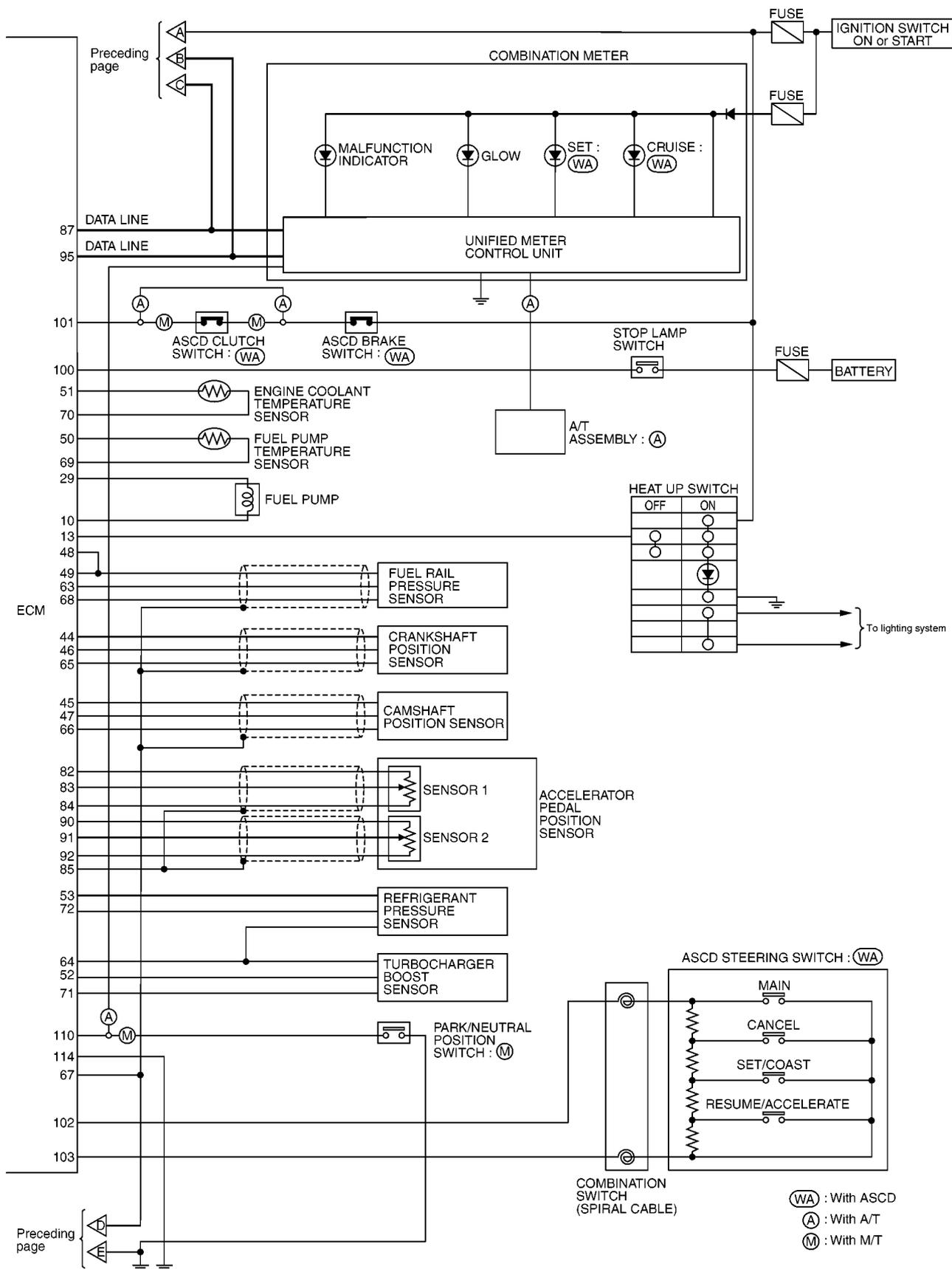
EBS01KCY



\*: This relay is built into the IPDM E/R (Intelligent power distribution module engine room)

MBWA1032E

# TROUBLE DIAGNOSIS

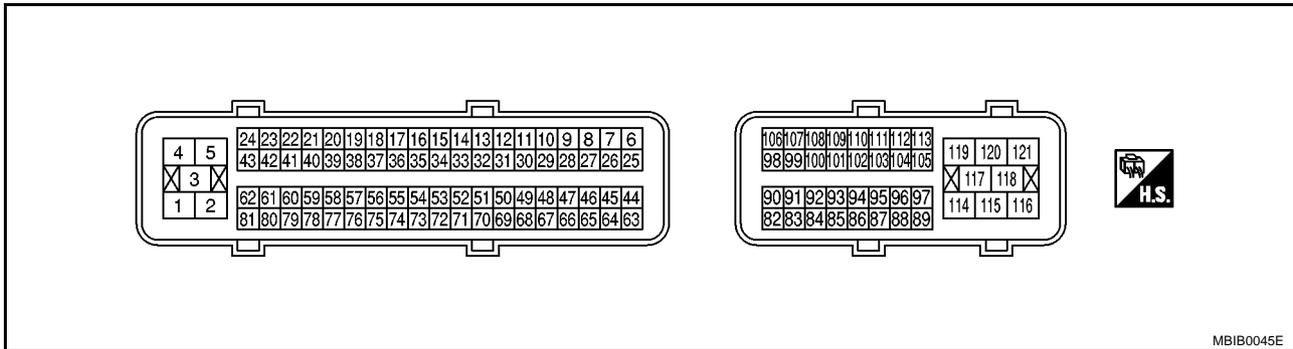


MBWA1363E

# TROUBLE DIAGNOSIS

## ECM Harness Connector Terminal Layout

EBS01KCZ

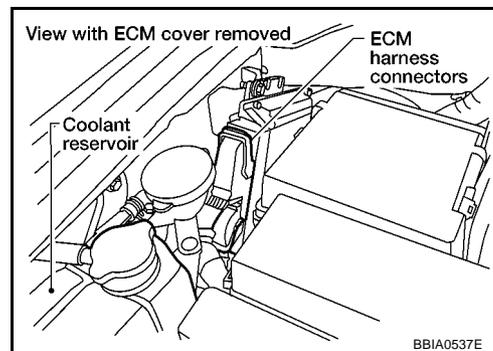


MBIB0045E

## ECM Terminals And Reference Value PREPARATION

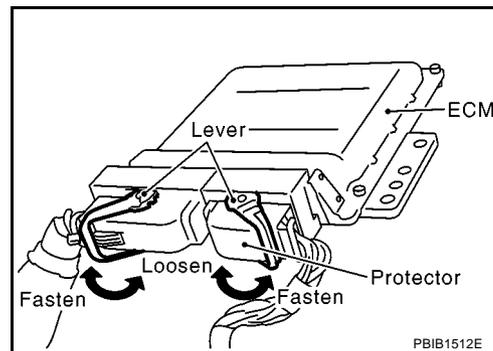
EBS01KD0

1. ECM located in the engine room passenger side behind coolant reservoir tank.
2. Remove ECM harness connector.



BBIA0537E

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.



PBIB1512E

## ECM INSPECTION TABLE

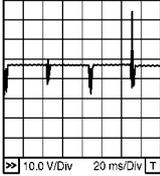
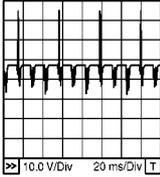
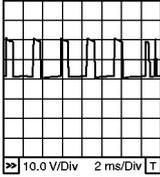
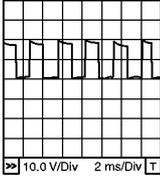
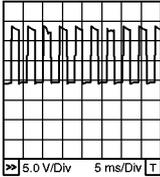
Remarks: Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

### 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.

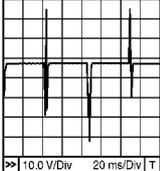
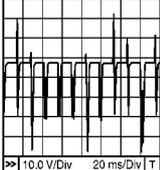
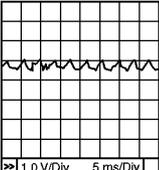
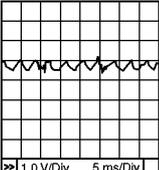
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
1	B	ECM ground	[Engine is running] ● Idle speed	Approximately 0V
2	B			
3	B			

# TROUBLE DIAGNOSIS

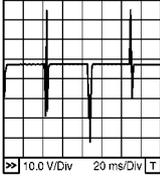
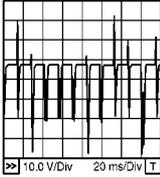
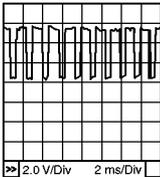
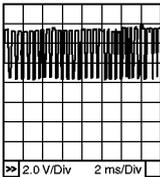
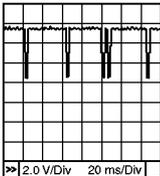
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
4  5	V	Fuel injector power supply (For cylinder No. 1 and 4)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★  <small>MBIB1295E</small>
	G		<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0V ★  <small>MBIB1296E</small>
6	BR	Turbocharger boost control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 6.3V ★  <small>MBIB0889E</small>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 8.6V ★  <small>MBIB0890E</small>
10	G	Fuel pump	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 5.8V ★  <small>MBIB0885E</small>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 5.5V ★  <small>MBIB0886E</small>
13	Y	Heat up switch	<b>[Ignition switch ON]</b> <ul style="list-style-type: none"> <li>● Heat up switch: OFF</li> </ul>	Approximately 0.3V
			<b>[Ignition switch ON]</b> <ul style="list-style-type: none"> <li>● Heat up switch: ON</li> </ul>	BATTERY VOLTAGE (11 - 14V)

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# TROUBLE DIAGNOSIS

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
15	GR	Intake air control valve control solenoid valve	<b>[Engine is running]</b>	BATTERY VOLTAGE (11 - 14V)
			<b>[Ignition switch OFF]</b> ● For a few seconds after turning ignition switch OFF	Approximately 0.3V
21 22 23 24	G P W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★  MBIB1297E
			<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Engine speed: 2,000 rpm	Approximately 8.0V ★  MBIB1298E
25 26 27 28	Y O GR V	EGR volume control valve	<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed	0.1 - 14V (Voltage signals of each ECM terminals differ according to the control position of EGR volume control valve.)
29	B	Fuel pump	<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed	0.5 - 1.0V ★  MBIB0887E
			<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Engine speed: 2,000 rpm	0.5 - 1.0V ★  MBIB0888E
37	G	Glow relay	Refer to <a href="#">EC-295. "GLOW CONTROL SYSTEM"</a> .	

# TROUBLE DIAGNOSIS

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
40 41 42 43	W GR W B	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★  <small>10.0 V/Div 20 ms/Div T</small> MBIB1297E
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0V ★  <small>10.0 V/Div 20 ms/Div T</small> MBIB1298E
44	W	Crankshaft position sensor power supply	<b>[Ignition switch ON]</b>	Approximately 5.3V
45	W	Camshaft position sensor power supply	<b>[Ignition switch ON]</b>	Approximately 5.3V
46	R	Crankshaft position sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 3.7V ★  <small>2.0 V/Div 2 ms/Div T</small> MBIB0879E
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 3.7V ★  <small>2.0 V/Div 2 ms/Div T</small> MBIB0880E
47	R	Camshaft position sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 4.9V ★  <small>2.0 V/Div 20 ms/Div T</small> MBIB0877E
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 4.9V ★  <small>2.0 V/Div 20 ms/Div T</small> MBIB0878E

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## TROUBLE DIAGNOSIS

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
48 49	L B	Fuel rail pressure sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.7 - 2.0V
			[Engine is running] ● Warm-up condition ● Engine speed: 2,000 rpm	2.0 - 2.3V
50	Y	Fuel pump temperature sensor	[Engine is running] ● Warm-up condition	Approximately 0.3 - 5.3V Output voltage varies with fuel pump temperature
51	SB	Engine coolant temperature sensor	[Engine is running] ● Warm-up condition	Approximately 0.3 - 5.3V Output voltage varies with engine coolant temperature
52	BR	Turbocharger boost sensor	[Engine is running] ● Warm-up condition ● Idle speed	2.1 - 2.4V
			[Engine is running] ● Warm-up condition ● Engine speed: 2,000 rpm	2.3 - 2.6V
53	W	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch: ON (Compressor operates)	1.0 - 4.0V
54	G	Mass air flow sensor	[Ignition switch: ON]	Approximately 0.7V
			[Engine is running] ● Warm-up condition ● Idle speed	1.6 - 2.0V
			[Engine is running] ● Warm-up condition ● Engine is revving from idle to about 4,000 rpm.	1.6 - 2.0V to Approximately 4.3V (Check for liner voltage rise in response to engine being increased to about 4,000 rpm)
55	W	Intake air temperature sensor	[Engine is running] ● Warm-up condition	Approximately 0.3 - 5.2V Output voltage varies with intake air temperature
63	R	Fuel rail pressure sensor power supply	[Ignition switch ON]	Approximately 5.3V
64	V	Sensor power supply (Turbocharger boost sensor / Refrigerant pressure sensor)	[Ignition switch ON]	Approximately 5.3V
65	B	Crankshaft position sensor ground	[Ignition switch ON]	Approximately 0.3V
66	B	Camshaft position sensor ground	[Ignition switch ON]	Approximately 0.3V
67	—	Sensor ground (Sensor shield circuit)	[Ignition switch ON]	Approximately 0.3V
68	W	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	LG	Engine coolant temperature sensor ground	[Ignition switch ON]	Approximately 0.3V

# TROUBLE DIAGNOSIS

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)	A
71	L	Turbocharger boost sensor ground	<b>[Ignition switch ON]</b>	Approximately 0.3V	EC
72	BR	Refrigerant pressure sensor ground	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0.3V	C
73	B	Mass air flow sensor ground	<b>[Ignition switch ON]</b>	Approximately 0.3V	D
74	R	Intake air temperature sensor ground	<b>[Ignition switch ON]</b>	Approximately 0.3V	D
82	W	Accelerator pedal position sensor 1 power supply	<b>[Ignition switch ON]</b>	Approximately 5.3V	E
83	R	Accelerator pedal position sensor 1	<b>[Ignition switch ON]</b> ● Engine: Stopped ● Accelerator pedal: Fully released	0.95 - 1.17V	F
			<b>[Ignition switch ON]</b> ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 4.6V	G
84	B	Accelerator pedal position sensor 1 ground	<b>[Ignition switch ON]</b>	Approximately 0.3V	H
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	<b>[Ignition switch ON]</b>	Approximately 0.3V	H
87	P	CAN communication line	<b>[Ignition switch ON]</b>	Approximately 2.0 - 2.6V Output voltage varies with the communication status.	I
89	SB	Data link connector	<b>[Ignition switch ON]</b> ● CONSULT-II: Disconnected	Approximately 0V - Battery voltage (11 - 14V)	J
90	W	Accelerator pedal position sensor 2 power supply	<b>[Ignition switch ON]</b>	Approximately 5.3V	K
91	R	Accelerator pedal position sensor 2	<b>[Ignition switch ON]</b> ● Engine: Stopped ● Accelerator pedal: Fully released	0.58 - 0.78V	L
			<b>[Ignition switch ON]</b> ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 2.3V	M
92	B	Accelerator pedal position sensor 2 ground	<b>[Ignition switch ON]</b>	Approximately 0.3V	
95	L	CAN communication line	<b>[Ignition switch ON]</b>	Approximately 2.6 - 3.2V Output voltage varies with the communication status.	
99	V	Start signal	<b>[Ignition switch ON]</b>	Approximately 0.3V	
			<b>[Ignition switch START]</b>	BATTERY VOLTAGE (11 - 14V)	
100	V	Stop lamp switch	<b>[Ignition switch OFF]</b> ● Brake pedal: Fully released	Approximately 0V	
			<b>[Ignition switch OFF]</b> ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)	

## TROUBLE DIAGNOSIS

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
101	W	ASCD brake switch	<b>[Ignition switch ON]</b> ● Brake pedal: Fully released (A/T) ● Clutch pedal and brake pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14V)
			<b>[Ignition switch ON]</b> ● Brake pedal: Slightly depressed (A/T) ● Clutch pedal and/or brake pedal: Slightly depressed (M/T)	Approximately 0V
102	SB	ASCD steering switch	<b>[Ignition switch ON]</b> ● ASCD steering switch: OFF	Approximately 4.3V
			<b>[Ignition switch ON]</b> ● ON/OFF switch: Pressed	Approximately 0.3V
			<b>[Ignition switch ON]</b> ● CANCEL switch: Pressed	Approximately 1.3V
			<b>[Ignition switch ON]</b> ● RESUME/ACCELERATE switch: Pressed	Approximately 3.3V
			<b>[Ignition switch ON]</b> ● SET/COAST switch: Pressed	Approximately 2.3V
103	B	ASCD steering switch ground	<b>[Ignition switch ON]</b>	Approximately 0.3V
105	BR	ECM relay (self shut-off)	<b>[Ignition switch ON]</b> <b>[Ignition switch OFF]</b> ● For a few seconds after turning ignition switch OFF	Approximately 1.0V
			<b>[Ignition switch OFF]</b> ● More than a few seconds after turning igni- tion switch OFF	BATTERY VOLTAGE (11 - 14V)
107 108	R R	Ignition switch	<b>[Ignition switch ON]</b>	BATTERY VOLTAGE (11 - 14V)
110	G (A/T) O (M/T)	Park/Neutral position switch	<b>[Ignition switch ON]</b> ● Shift lever: P or N (A/T), Neutral (M/T)	Approximately 0V
			<b>[Ignition switch ON]</b> ● Except the above position	BATTERY VOLTAGE (11 - 14V)
113	BR	ECM relay (self shut-off)	<b>[Ignition switch ON]</b> <b>[Ignition switch OFF]</b> ● For a few seconds after turning ignition switch OFF	Approximately 1.0V
			<b>[Ignition switch OFF]</b> ● More than a few seconds after turning igni- tion switch OFF	BATTERY VOLTAGE (11 - 14V)
114	B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Approximately 0V
119 120	R G	Power supply for ECM	<b>[Ignition switch ON]</b>	BATTERY VOLTAGE (11 - 14V)
121	V	Power supply for ECM (Back-up)	<b>[Ignition switch OFF]</b>	BATTERY VOLTAGE (11 - 14V)

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

# TROUBLE DIAGNOSIS

## CONSULT-II Function (ENGINE) FUNCTION

EBS01KD1

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as DTC and freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication 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
- Freeze frame data

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# TROUBLE DIAGNOSIS

## ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item		DIAGNOSTIC TEST MODE				
		SELF-DIAG RESULTS		DATA MON- ITOR	ACTIVE TEST	
		DTC	FREEZE FRAME DATA			
<b>ENGINE CONTROL COMPONENT PARTS</b>	<b>INPUT</b>	Crankshaft position sensor	×	×	×	
	Camshaft position sensor	×				
	Engine coolant temperature sensor	×	×	×		×
	Vehicle speed signal	×	×	×		
	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	×	×	×		
	Refrigerant pressure sensor			×		
	Battery voltage	×		×		
	Park/neutral position (PNP) switch			×		
	Heat up switch			×		
	Stop lamp switch	×		×		
	Barometric pressure sensor (built-into ECM)	×		×		
	ASCD steering switch	×		×		
	ASCD brake switch	×		×		
	ASCD clutch switch	×		×		
<b>OUTPUT</b>	Fuel pump	×		×		×
Fuel injector	×		×		×	
Glow relay			×		×	
Cooling fan relay	×		×		×	
Turbocharger boost control solenoid valve	×					
Intake air control valve control solenoid valve						
EGR volume control valve			×		×	

X: Applicable

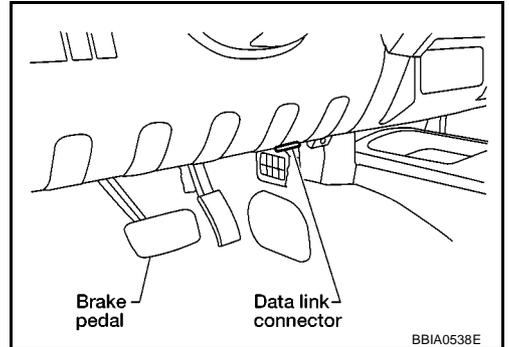
# TROUBLE DIAGNOSIS

## INSPECTION PROCEDURE

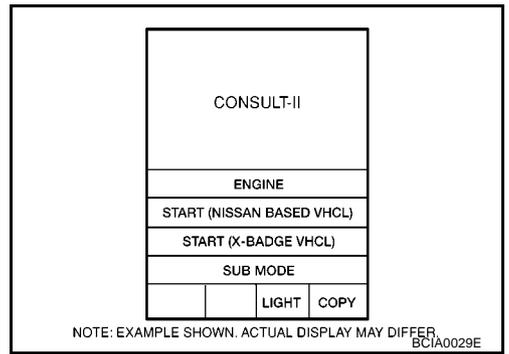
### CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

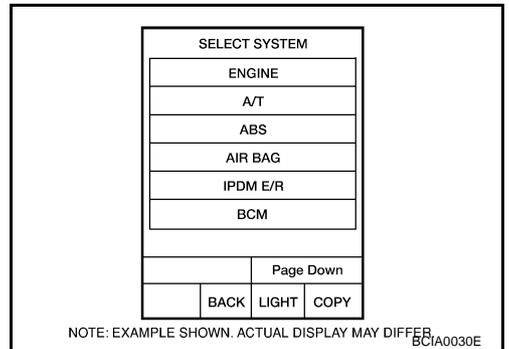
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located under LH dash panel near the hood opener handle.
3. Turn ignition switch ON.



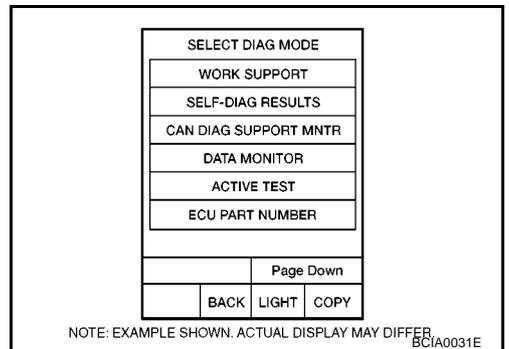
4. Touch "START (NISSAN BASED VHCL)".



5. Touch "ENGINE".  
If "ENGINE" is not indicated, go to [GI-50, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).



6. Perform each diagnostic test mode according to each service procedure.  
For further information, see the CONSULT-II Operation Manual.



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# TROUBLE DIAGNOSIS

## WORK SUPPORT MODE

### Work Item

WORK ITEM	DESCRIPTION	USAGE
ENTER INJCTR CALIB DATA	<ul style="list-style-type: none"> <li>Injector adjustment value is written onto ECM memory.</li> </ul>	When performing Injector Adjustment Value Registration.
CONFIG CLR	<ul style="list-style-type: none"> <li>ASCD application status stored in ECM is initialized.</li> </ul> <p><b>NOTE:</b> After the status is initialized, ECM recognizes ASCD application status when the following condition is met.</p> <ul style="list-style-type: none"> <li>For ASCD: ASCD MAIN switch is pressed.</li> </ul>	When initializing ASCD application status stored in ECM.
INJ ADJ VAL CLR	<ul style="list-style-type: none"> <li>Injector adjustment value stored in ECM is initialized.</li> </ul>	Before changing injector adjustment value stored in ECM, it is recommended to perform this work item.

## SELF-DIAGNOSTIC MODE

### Self Diagnostic Item

Regarding items detected in "SELF-DIAG RESULTS" mode, refer to — [EC-6, "INDEX FOR DTC"](#) .

### Freeze Frame Data

Freeze frame data item	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> <li>The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to <a href="#">EC-6, "INDEX FOR DTC"</a> .)</li> </ul>
CAL/LD VALUE [%]	<ul style="list-style-type: none"> <li>The calculated load value at the moment a malfunction is detected is displayed.</li> </ul>
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> <li>The engine coolant temperature at the moment a malfunction is detected is displayed.</li> </ul>
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> <li>The engine speed at the moment a malfunction is detected is displayed.</li> </ul>
VEHICL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> <li>The vehicle speed at the moment a malfunction is detected is displayed.</li> </ul>
INT MANI PRES [kPa]	<ul style="list-style-type: none"> <li>The intake manifold pressure at the moment a malfunction is detected is displayed.</li> </ul>

## DATA MONITOR MODE

MONITOR ITEM	ECM INPUT SIGNAL	MAIN SIGNALS	CONDITION	SPECIFICATION
CKPS-RPM (TDC) [rpm]	×	×	<ul style="list-style-type: none"> <li>The engine speed computed from the crankshaft position sensor signal is displayed.</li> </ul>	
COOLAN TEMP/S [°C] or [°F]	×	×	<ul style="list-style-type: none"> <li>The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.</li> </ul>	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]	×	×	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal is displayed.</li> </ul>	
FUEL TEMP SEN [°C] or [°F]	×	×	<ul style="list-style-type: none"> <li>The fuel temperature (determined by the signal voltage of the fuel pump temperature sensor) is displayed.</li> </ul>	
ACCEL POS SEN [V]	×	×	<ul style="list-style-type: none"> <li>The accelerator pedal position sensor 1 signal voltage is displayed.</li> </ul>	This signal is converted by ECM internally. Thus, these differ from ECM terminals voltage.
ACCEL SEN 2 [V]	×	×	<ul style="list-style-type: none"> <li>The accelerator pedal position sensor 2 signal voltage is displayed.</li> </ul>	This signal is converted by ECM internally. Thus, these differ from ECM terminals voltage.

## TROUBLE DIAGNOSIS

MONITOR ITEM	ECM INPUT SIG- NAL	MAIN SIG- NALS	CONDITION	SPECIFICATION	A
ACT CR PRESS [MPa]	×	×	<ul style="list-style-type: none"> <li>The Fuel rail pressure (determined by the signal voltage of the fuel rail pressure sensor) is displayed.</li> </ul>		EC
BATTERY VOLT [V]	×	×	<ul style="list-style-type: none"> <li>The power supply voltage of ECM is displayed.</li> </ul>		C
P/N POSI SW [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the park/neutral position switch signal.</li> </ul>		D
START SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the starter signal.</li> </ul>		E
AIR COND SIG [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.</li> </ul>		F
BRAKE SW [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the stop lamp switch signal.</li> </ul>		G
BRAKE SW2 [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the ASCD brake switch and ASCD clutch switch signal.</li> </ul>		H
IGN SW [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ignition switch signal.</li> </ul>		I
WARM UP SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from heat up switch signal.</li> </ul>		J
MAS AIR/FL SE [V]	×	×	<ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor is displayed.</li> </ul>	This signal is converted by ECM internally. Thus, these differ from ECM terminals voltage.	K
MAIN INJ WID [msec]		×	<ul style="list-style-type: none"> <li>Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.</li> </ul>		L
PUMP CURRENT [mA]		×	<ul style="list-style-type: none"> <li>Indicates the fuel pump power supply current from the ECM.</li> </ul>		M
GLOW RLY [ON/OFF]		×	<ul style="list-style-type: none"> <li>The glow relay control condition (determined by ECM according to the input signal) is displayed.</li> </ul>		
COOLING FAN [LOW/HI/OFF]		×	<ul style="list-style-type: none"> <li>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</li> </ul>		
EGR VOL CON/V [step]		×	<ul style="list-style-type: none"> <li>Indicates the EGR volume control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>		
INT/A VOLUME [mg/]			<ul style="list-style-type: none"> <li>The intake air volume computed from the mass air flow sensor signal is displayed.</li> </ul>		
BARO SEN [kPa]	×	×	<ul style="list-style-type: none"> <li>The barometric pressure (determined by the signal voltage from the absolute pressure sensor built into the ECM) is displayed.</li> </ul>		

## TROUBLE DIAGNOSIS

MONITOR ITEM	ECM INPUT SIGNAL	MAIN SIGNALS	CONDITION	SPECIFICATION
INT/M PRES SE [kPa]			<ul style="list-style-type: none"> <li>● Turbocharger boost (determined by the signal voltage from the turbocharger boost sensor) is displayed.</li> </ul>	
CYL COUNT [1/2/3/4]			<ul style="list-style-type: none"> <li>● The cylinder being injected is displayed.</li> <li>1 ... Cylinder No.1 is injected.</li> <li>2 ... Cylinder No.2 is injected.</li> <li>3 ... Cylinder No.3 is injected.</li> <li>4 ... Cylinder No.4 is injected.</li> </ul>	
SET SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition from SET/COAST switch signal.</li> </ul>	
RESUME/ACC SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition from RESUME/ACCEL switch signal.</li> </ul>	
CANCEL SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition from CANCEL switch signal.</li> </ul>	
MAIN SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition from MAIN switch signal.</li> </ul>	
ASCD APPLY [YES/NO]			<ul style="list-style-type: none"> <li>● Displaying ASCD application status stored in ECM.</li> </ul>	
VDC APPLY [YES/NO]			<ul style="list-style-type: none"> <li>● Displaying ESP application status stored in ECM.</li> </ul>	
AC PRESS SEN [V]			<ul style="list-style-type: none"> <li>● The signal voltage from the refrigerant pressure sensor is displayed.</li> </ul>	
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				

**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	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine.</li> <li>● A/C switch: OFF</li> <li>● Shift lever: P or N (A/T), Neutral (M/T)</li> <li>● Cut off each injector signal one at a time using CONSULT-II</li> </ul>	Engine runs rough or dies.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Compression</li> <li>● Fuel injector</li> </ul>
COOLING FAN *	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> <li>● Operate the cooling fan at LOW, HI speed and turn OFF using CONSULT-II.</li> </ul>	Cooling fan moves at LOW, HI speed and stops.	<ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Cooling fan motor</li> <li>● Cooling fan relay</li> </ul>
ENG COOLANT TEMP	<ul style="list-style-type: none"> <li>● Engine: Return to the original trouble condition</li> <li>● Change the engine coolant temperature using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Engine coolant temperature sensor</li> <li>● Fuel injector</li> </ul>

# TROUBLE DIAGNOSIS

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
GLOW RLY	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn the glow relay ON and OFF using CONSULT-II and listen to operating sound.</li> </ul>	Glow relay makes the operating sound.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Glow relay</li> </ul>
EGR VOL CONT/V	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> <li>Change EGR volume control valve opening step using CONSULT-II.</li> </ul>	EGR volume control valve makes an operating sound.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>EGR volume control valve</li> </ul>
PRES REGULATOR	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> <li>Change fuel rail pressure using CONSULT-II</li> </ul>	Fuel leaks.	<ul style="list-style-type: none"> <li>Fuel line</li> <li>Fuel pressure relief valve</li> </ul>
PUMP LEANT CLEAR	<ul style="list-style-type: none"> <li>This mode is used for performing Fuel Pump Learning Value Clearing. Refer to <a href="#">EC-24, "Fuel Pump Learning Value Clearing"</a>.</li> </ul>		

\*: 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.

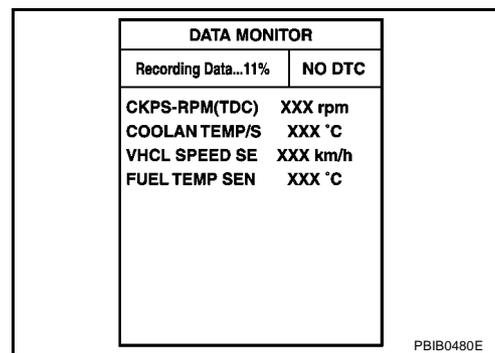
### 1. "AUTO TRIG" (Automatic trigger):

- 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.

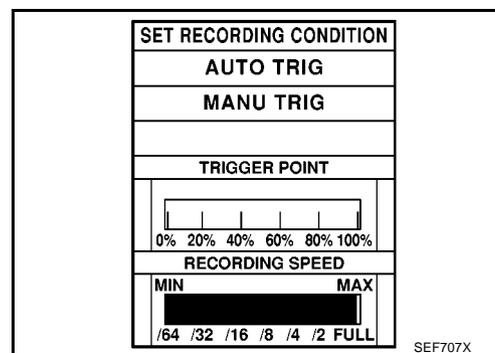
The recording time after the malfunction detection and the recording speed can be changed by "TRIGGER POINT" and "Recording Speed". Refer to CONSULT-II OPERATION MANUAL.



### 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"

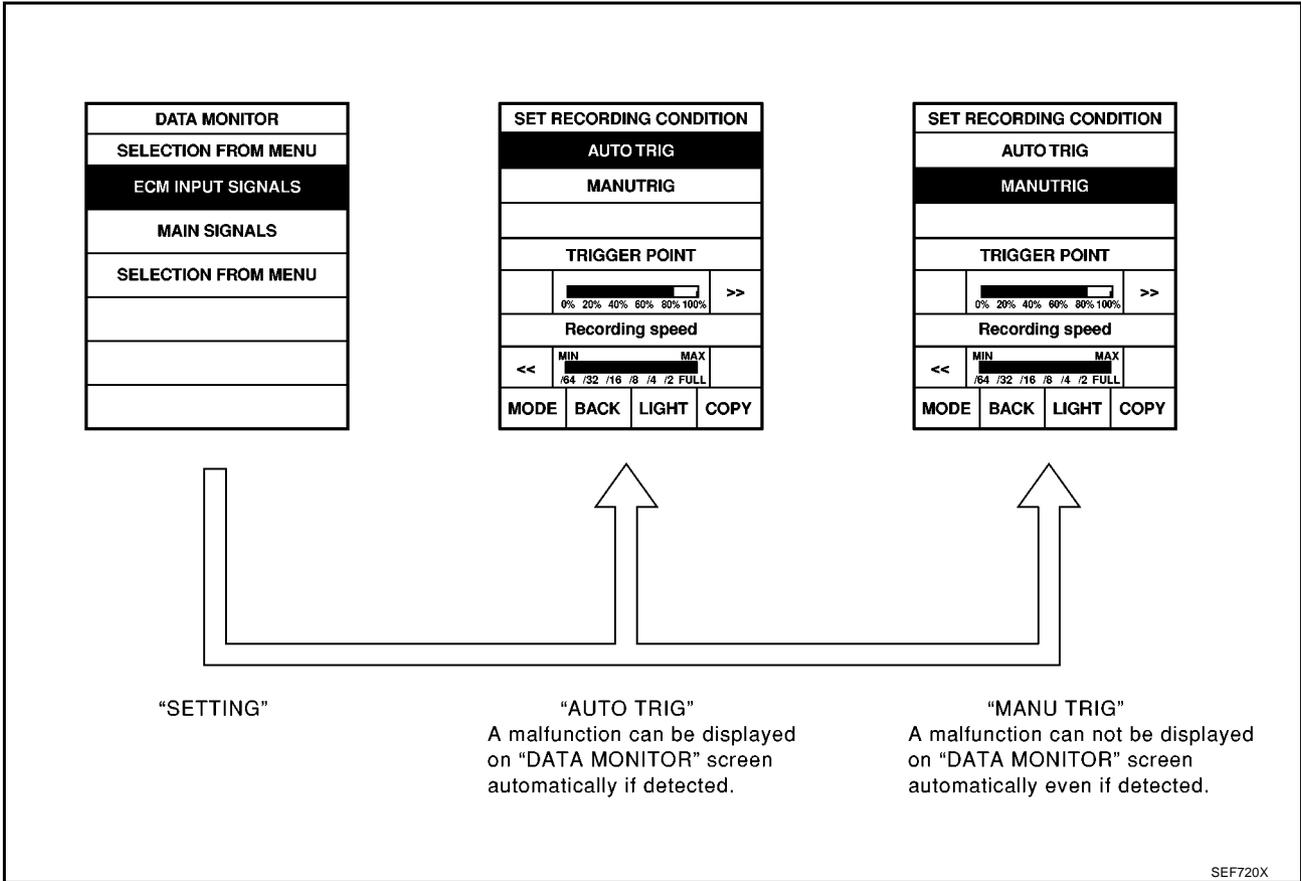
- While trying to detect the DTC by performing the DTC Confirmation Procedure, be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.
- While narrowing down the possible causes, CONSULT-II should be set in "DATA MONITOR (AUTO TRIG)" mode, especially 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"

# TROUBLE DIAGNOSIS

- 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

EBS01KD2

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	0.65 - 0.87V
		Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.28 - 0.48V
		Accelerator pedal: Fully depressed	More than 2.0V
ACT CR PRESS	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: P or N (A/T), Neutral (M/T) ● No load	Idle	25 - 35 MPa
		2,000 rpm	40 - 50 MPa
BATTERY VOLT	● Ignition switch: ON (Engine stopped)	11 - 14V	

# TROUBLE DIAGNOSIS

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T), Neutral (M/T)	ON
		Except above	OFF
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → OFF
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
BRAKE SW2	● Ignition switch: ON	● Brake pedal: Fully released (A/T) ● Clutch pedal and brake pedal: Fully released (M/T)	OFF
		● Brake pedal: Slightly depressed (A/T) ● Clutch pedal and/or brake pedal: Slightly depressed (M/T)	ON
IGN SW	● Ignition switch: ON → OFF		ON → OFF
WARM UP SW	● Ignition switch: ON	Heat up switch: OFF	OFF
		Heat up switch: ON	ON
MAS AIR/FL SE*	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: P or N (A/T), Neutral (M/T) ● No load	Ignition switch: ON (Engine stopped)	Approximately 0.4V
		Idle	1.3 - 1.7V
		Engine is revving from idle to about 4,000 rpm.	1.3 - 1.7V to Approximately 4.0V (Check for liner voltage rise in response to engine being increased to about 4,000 rpm)
MAIN INJ WID	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Idle speed	No load	0.50 - 0.70 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.50 - 0.80 msec
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: P or N (A/T), Neutral (M/T) ● No load	Idle	1,600 - 2,000 mA
		2,000 rpm	1,500 - 1,900 mA
GLOW RLY	Refer to <a href="#">EC-295. "GLOW CONTROL SYSTEM"</a> .		
COOLING FAN	● Engine: After warming up, idle the engine ● Air conditioner switch: OFF	Engine coolant temperature: 97°C (207°F) or less	OFF
		Engine coolant temperature: Between 98°C (208°F) and 104°C (219°F)	LOW
		Engine coolant temperature: 105°C (221°F) or more	HI
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: P or N (A/T), Neutral (M/T) ● No load	After 1 minute at idle	More than 10 steps
		Revvng engine from idle to 3,200 rpm	0 step
INT/A VOLUME	● Engine: After warming up, idle the engine		150 - 450 mg/

## TROUBLE DIAGNOSIS

MONITOR ITEM	CONDITION		SPECIFICATION
BARO SEN	● Ignition switch: ON		Altitude Approx. 0m: Approx. 100.62 kPa (1.0062 bar, 1.026 kg/cm <sup>2</sup> , 14.59 psi) Approx. 1,000 m: Approx. 88.95 kPa (0.8895 bar, 0.907 kg/cm <sup>2</sup> , 12.90 psi) Approx. 1,500 m: Approx. 83.16 kPa (0.8316 bar, 0.848 kg/cm <sup>2</sup> , 12.06 psi) Approx. 2,000 m: Approx. 78.36 kPa (0.7836 bar, 0.799 kg/cm <sup>2</sup> , 11.36 psi)
INT/M PRES SE [kPa]	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: P or N (A/T), Neutral (M/T) ● No load	Idle	Approx. 100.00 kPa
		3,600 rpm	Approx. 140.00 kPa
		4,000 rpm	Approx. 135.00 kPa
CYL COUNT	● Engine is running		1 → 3 → 4 → 2
SET SW	● Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF
RESUME/ACC SW	● Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
CANCEL SW	● Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
MAIN SW	● Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
ASCD APPLY	● Ignition switch: ON	Models with ASCD	YES
		Models without ASCD	NO
VDC APPLY	● Ignition switch: ON		NO
AC PRESS SEN	● Engine: Idle ● Both A/C switch and blower fan switch: ON (Compressor operates)		1.0 - 4.0V

**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.

# TROUBLE DIAGNOSIS

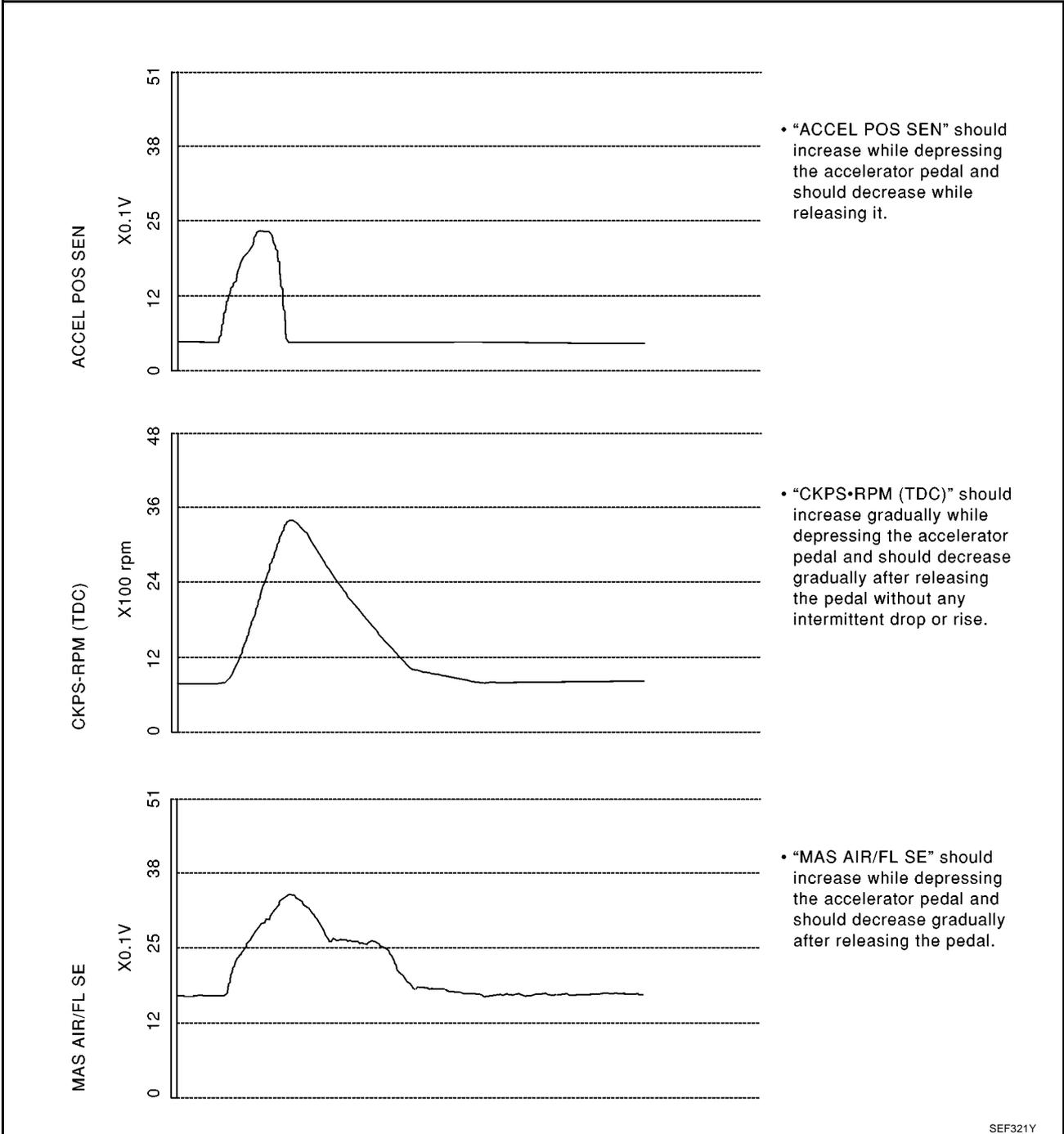
EBS01KD3

## Major Sensor Reference Graph in Data Monitor Mode

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.



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

# TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

## TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

### Description

EBS01KD4

Intermittent incidents 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 intermittent incidents occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

### COMMON INTERMITTENT INCIDENT 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

EBS01KD5

#### 1. INSPECTION START

Erase DTCs. Refer to [EC-27, "HOW TO ERASE DTC"](#) .

>> GO TO 2.

#### 2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.

Refer to [EC-78, "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.

# POWER SUPPLY AND GROUND CIRCUIT

PFP:24110

## POWER SUPPLY AND GROUND CIRCUIT

### ECM Terminals and Reference Value

EBS01KD6

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

**CAUTION:**

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
1 2 3	B B B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Approximately 0V
105	BR	ECM relay (self shut-off)	<b>[Ignition switch ON]</b> <b>[Ignition switch OFF]</b> ● For a few seconds after turning ignition switch OFF	Approximately 1.0V
			<b>[Ignition switch OFF]</b> ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
107 108	R R	Ignition switch	<b>[Ignition switch ON]</b>	BATTERY VOLTAGE (11 - 14V)
113	BR	ECM relay (self shut-off)	<b>[Ignition switch ON]</b> <b>[Ignition switch OFF]</b> ● For a few seconds after turning ignition switch OFF	Approximately 1.0V
			<b>[Ignition switch OFF]</b> ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
114	B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Approximately 0V
119 120	R G	Power supply for ECM	<b>[Ignition switch ON]</b>	BATTERY VOLTAGE (11 - 14V)
121	V	Power supply for ECM (Back-up)	<b>[Ignition switch OFF]</b>	BATTERY VOLTAGE (11 - 14V)

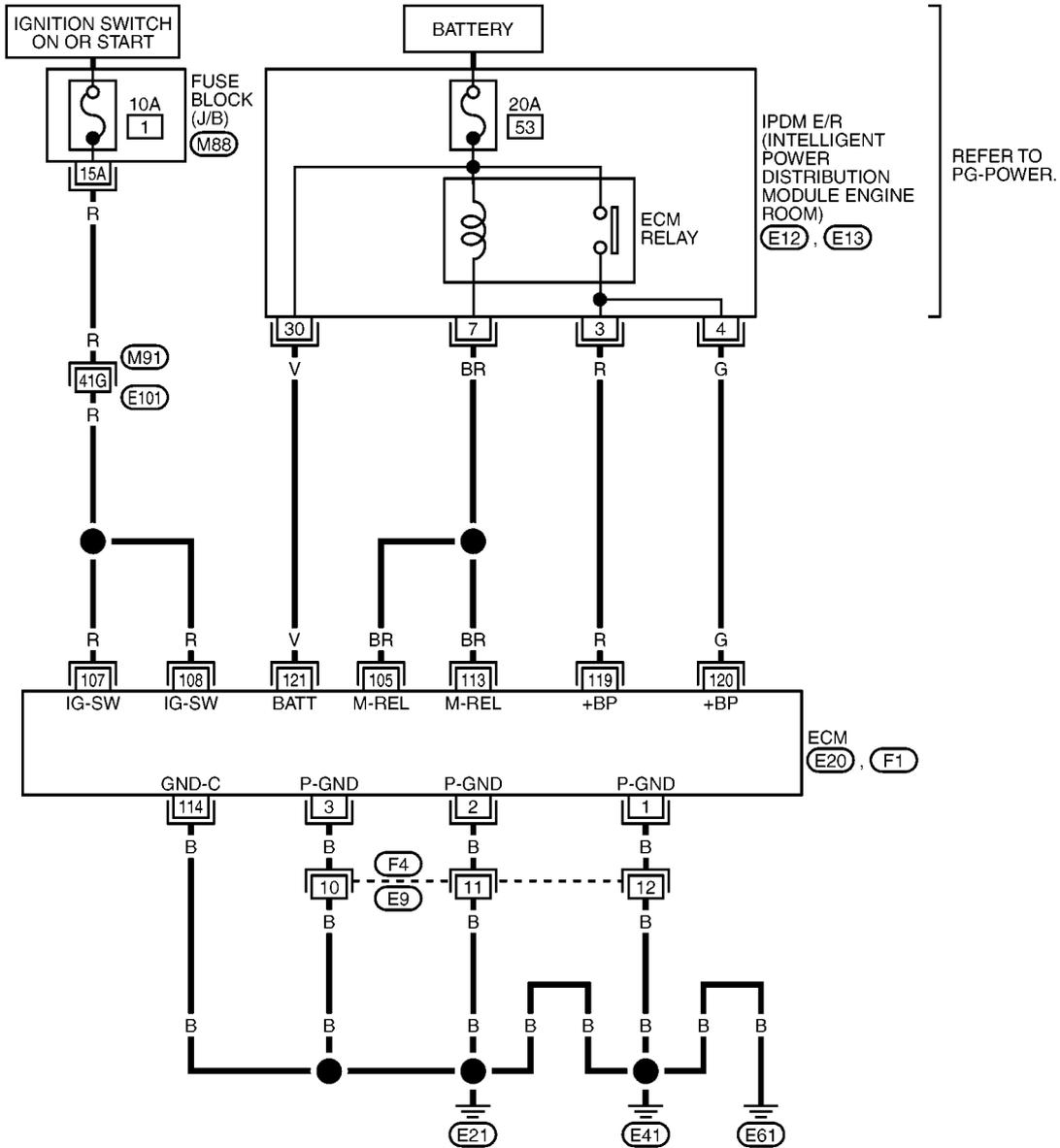
# POWER SUPPLY AND GROUND CIRCUIT

EBS01KD7

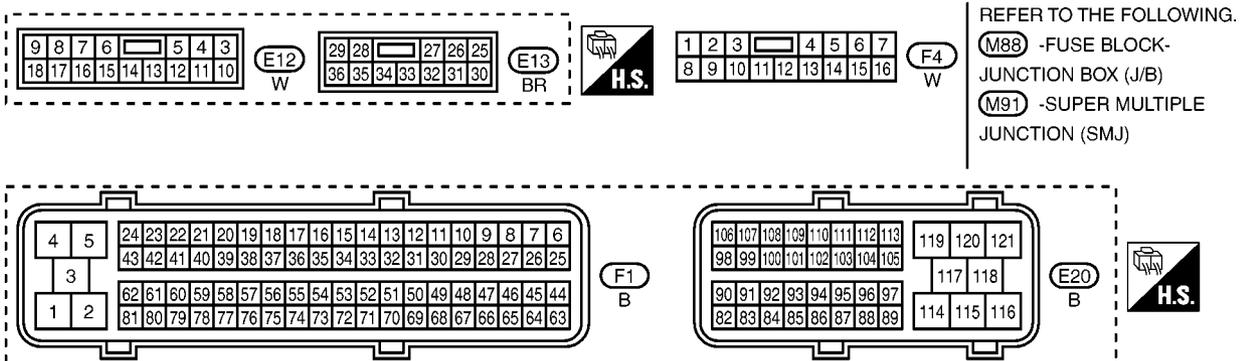
## Wiring Diagram

### EC-MAIN-01

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



REFER TO PG-POWER.



MBWA1034E

# POWER SUPPLY AND GROUND CIRCUIT

## Diagnostic Procedure

EBS01KD8

### 1. INSPECTION START

Start engine.

**Is engine running?**

Yes or No

Yes >> GO TO 7.

No >> GO TO 2.

### 2. CHECK ECM POWER SUPPLY CIRCUIT-I

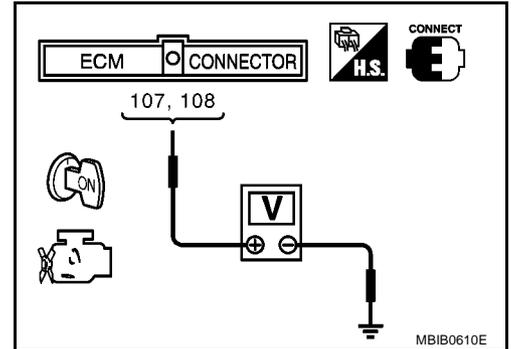
1. Turn ignition switch OFF and then ON.
2. Check voltage between ECM terminals 107, 108 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.



### 3. DETECT MALFUNCTIONING PART

Check the following.

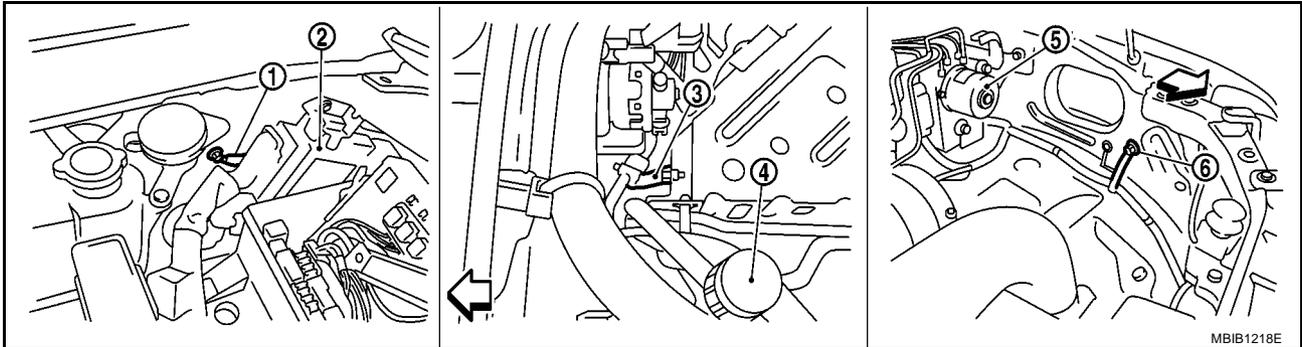
- Harness connectors M91, E101
- Fuse block (J/B) connector M88
- 10A fuse
- Harness for open or short between ECM and fuse

>> Repair harness or connectors.

# POWER SUPPLY AND GROUND CIRCUIT

## 4. CHECK GROUND CONNECTIONS-I

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



↶ : Vehicle front

- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

### OK or NG

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

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

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

**Continuity should exist.**

3. Also check harness for short to power.

### OK or NG

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

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F4, E9
- Harness for open or short between ECM and ground

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

# POWER SUPPLY AND GROUND CIRCUIT

## 7. CHECK ECM POWER SUPPLY CIRCUIT-II

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

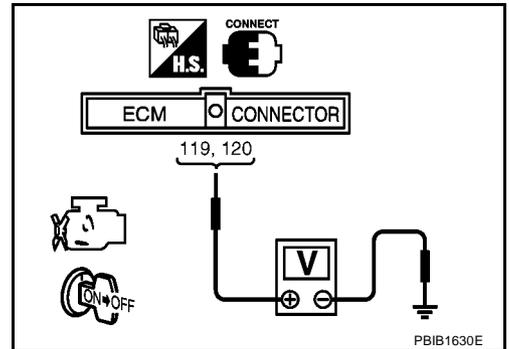
**Voltage:** After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V.

OK or NG

OK >> GO TO 11.

NG (Battery voltage does not exist.)>>GO TO 8.

NG (Battery voltage exists for more than a few seconds.)>>GO TO 10.



## 8. CHECK ECM POWER SUPPLY CIRCUIT-III

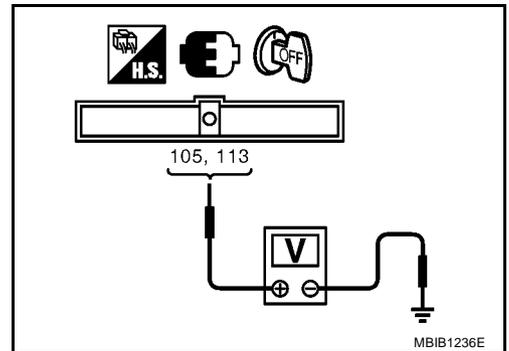
1. Turn ignition switch OFF, and wait at least 10 seconds.
2. Check voltage between ECM terminals 105, 113 and ground with CONSULT-II or tester.

**Voltage:** Battery voltage

OK or NG

OK >> GO TO 9.

NG >> GO TO 10.



## 9. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E12.
3. Check harness continuity between ECM terminal 119 and IPDM E/R terminal 3, ECM terminal 120 and IPDM E/R terminal 4. Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 12.

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

# POWER SUPPLY AND GROUND CIRCUIT

## 10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E12.
3. Check harness continuity between ECM terminals 105, 113 and IPDM E/R terminal 7.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 11.

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

## 11. CHECK ECM POWER SUPPLY CIRCUIT-VI

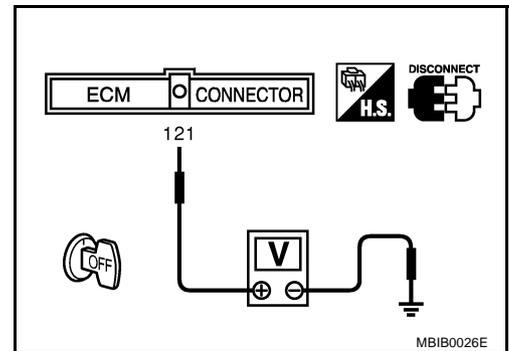
Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.



## 12. CHECK 20A FUSE

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

OK or NG

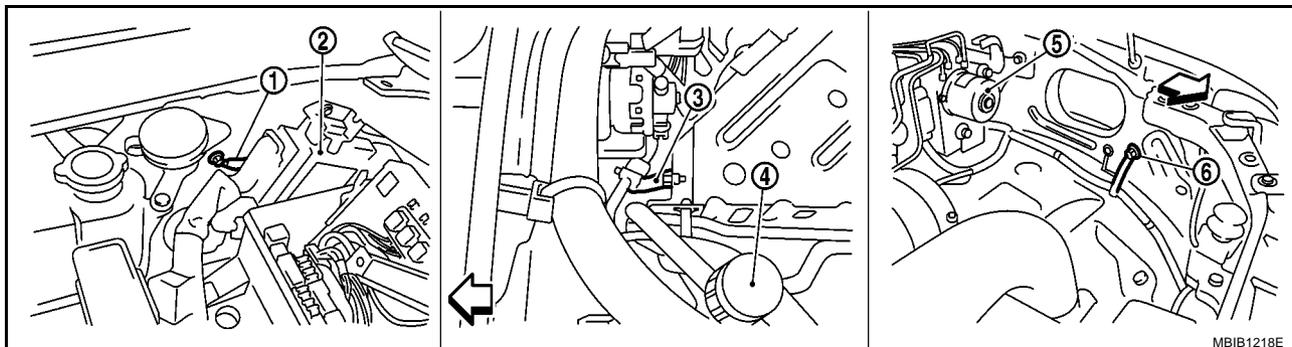
OK >> GO TO 13.

NG >> Replace 20A fuse.

# POWER SUPPLY AND GROUND CIRCUIT

## 13. CHECK GROUND CONNECTIONS-II

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#) .



↔ : Vehicle front

- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

### OK or NG

- OK >> GO TO 14.  
NG >> Repair or replace ground connections.

## 14. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

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

**Continuity should exist.**

2. Also check harness for short to power.

### OK or NG

- OK >> GO TO 16.  
NG >> GO TO 15.

## 15. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F4, E9
- Harness for open or short between ECM and ground

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

## 16. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

### OK or NG

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

# POWER SUPPLY AND GROUND CIRCUIT

EBS01KD9

## Ground Inspection

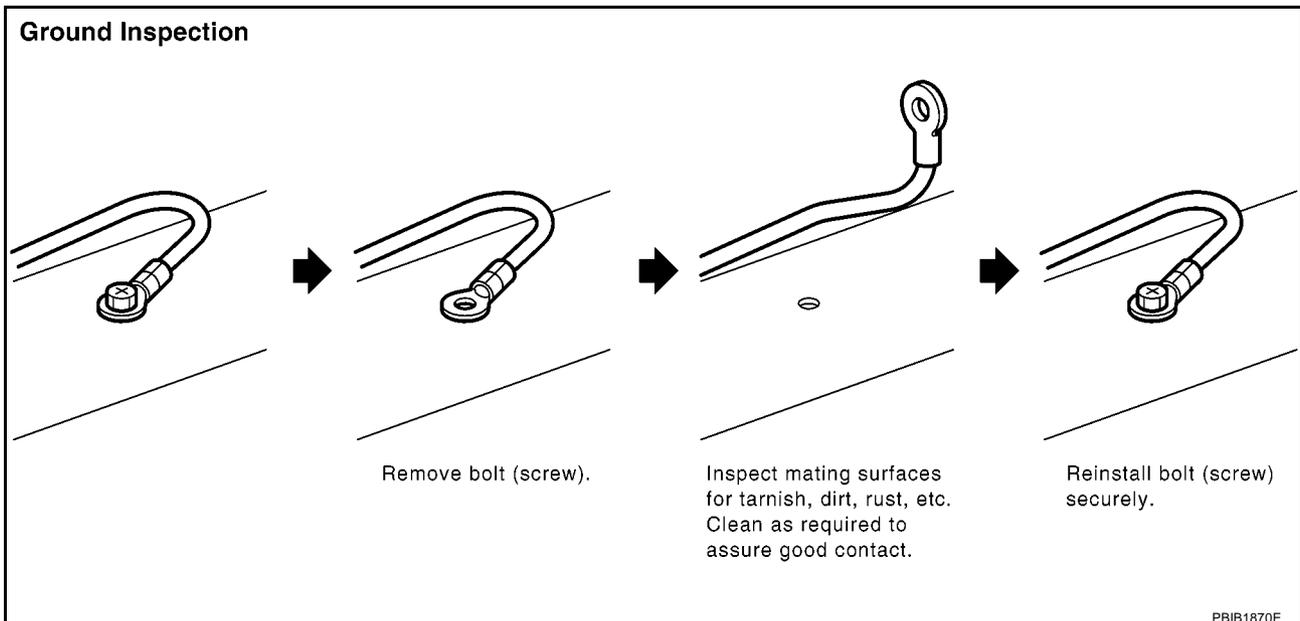
Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.

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 [PG-27, "Ground Distribution"](#) .



# DTC U1000 CAN COMMUNICATION LINE

## DTC U1000 CAN COMMUNICATION LINE

PFP:23710

### Description

EBS01KDA

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

EBS01KDB

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000 1000	CAN communication line	<ul style="list-style-type: none"><li>● ECM can not communicate to other control unit.</li><li>● ECM can not communicate for more than the specified time.</li></ul>	<ul style="list-style-type: none"><li>● Harness or connectors (CAN communication line is open or shorted)</li></ul>

### DTC Confirmation Procedure

EBS01KDC

#### NOTE:

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-81, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

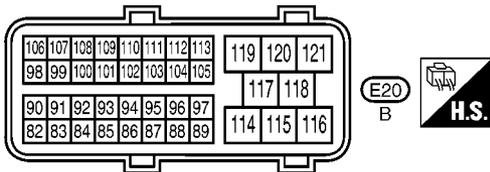
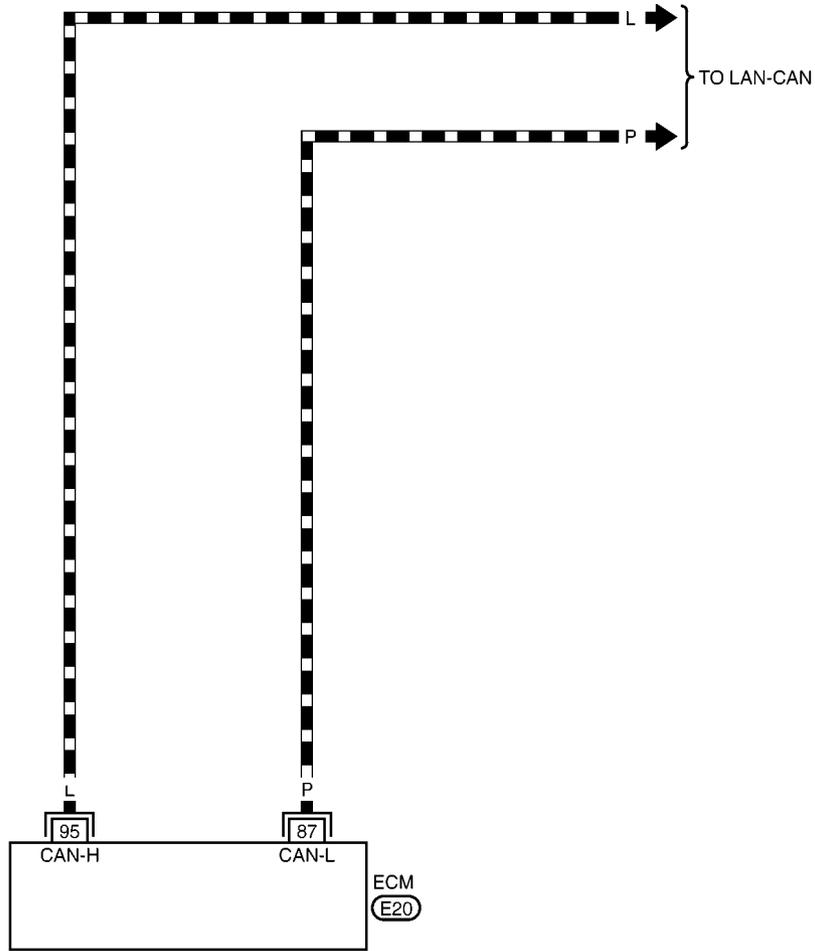
# DTC U1000 CAN COMMUNICATION LINE

## Wiring Diagram

EBS01KDD

### EC-CAN-01

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



MBWA1035E

# DTC U1000 CAN COMMUNICATION LINE

## Diagnostic Procedure

EBS01KDE

Go to [LAN-3, "Precautions When Using CONSULT-II"](#) .

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# DTC P0016 CKP - CMP CORRELATION

## DTC P0016 CKP - CMP CORRELATION

PFP:10328

### On Board Diagnosis Logic

EBS01KDF

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

#### NOTE:

If DTC P0016 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0016 0016	Crankshaft position - camshaft position correlation	The correlation between crankshaft position sensor signal and camshaft position sensor signal is out of the normal range.	<ul style="list-style-type: none"><li>● Camshaft position sensor</li><li>● Crankshaft position sensor</li><li>● Timing chain</li><li>● Signal plate</li></ul>

### DTC Confirmation Procedure

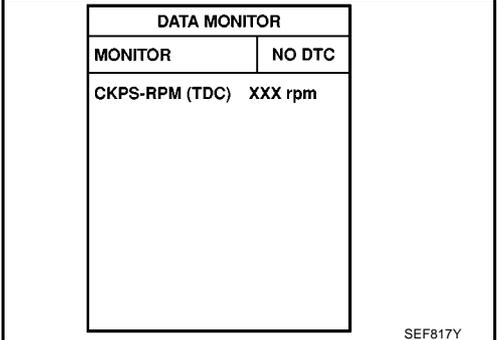
EBS01KDG

#### NOTE:

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

#### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If DTC is detected, go to [EC-82, "Diagnostic Procedure"](#).



DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

#### ⊗ WITHOUT CONSULT-II

1. Start engine and let it idle for at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-82, "Diagnostic Procedure"](#).

### Diagnostic Procedure

EBS01KDH

#### 1. CHECK CAMSHAFT POSITION SENSOR

Refer to [EC-175, "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.

# DTC P0016 CKP - CMP CORRELATION

---

## 3. CHECK CRANKSHAFT POSITION SENSOR

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Refer to [EC-164, "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-73, "SECONDARY TIMING CHAIN"](#) and [EM-79, "PRIMARY TIMING CHAIN"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace timing chain.

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## 6. CHECK INTERMITTENT INCIDENT

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Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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# DTC P0088 FUEL SYSTEM

## DTC P0088 FUEL SYSTEM

PFP:17520

### On Board Diagnosis Logic

EBS01KDI

#### NOTE:

If DTC P0088 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0088 0088	Fuel rail pressure too high	Fuel pressure is too much higher than the specified value.	<ul style="list-style-type: none"><li>● Fuel pump</li><li>● Fuel injector</li><li>● Fuel rail pressure sensor</li></ul>

### DTC Confirmation Procedure

EBS01KDJ

#### NOTE:

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

#### ④ WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. 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-84, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

#### ⊗ WITHOUT CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Keep engine speed more than 2,000 rpm for at least 20 seconds.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to [EC-84, "Diagnostic Procedure"](#) .

### Diagnostic Procedure

EBS01KDK

#### 1. CHECK FUEL RAIL PRESSURE SENSOR

Refer to [EC-122, "Component Inspection"](#) .

OK or NG

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

#### 2. CHECK FUEL INJECTOR

Refer to [EC-130, "Component Inspection"](#) .

OK or NG

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

# DTC P0088 FUEL SYSTEM

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## 3. CHECK FUEL PUMP

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Refer to [EC-221, "Component Inspection"](#) .

OK or NG

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

---

## 4. REPLACE FUEL PUMP

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1. Replace fuel pump.
2. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .

>> INSPECTION END

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## 5. CHECK INTERMITTENT INCIDENT

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Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Removal and Installation FUEL INJECTOR

Refer to [EM-44, "INJECTION TUBE AND FUEL INJECTOR"](#) .

### FUEL PUMP

Refer to [EM-49, "FUEL PUMP"](#) .

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# DTC P0089 FUEL PUMP

PF:16700

## DTC P0089 FUEL PUMP

### On Board Diagnosis Logic

EBS01KDM

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

#### NOTE:

If DTC P0089 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0089 0089	Fuel pump performance	Fuel pressure is too much higher than the target value.	<ul style="list-style-type: none"><li>● Fuel pump</li><li>● Air mixed with fuel</li><li>● Lack of fuel</li><li>● Fuel rail pressure sensor</li></ul>

### DTC Confirmation Procedure

EBS01KDN

#### NOTE:

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

#### ④ WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Let engine idle for at least 30 seconds.
4. If DTC is detected, go to [EC-87, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

#### ⊗ WITHOUT CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Let engine idle for at least 30 seconds.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to [EC-87, "Diagnostic Procedure"](#) .

# DTC P0089 FUEL PUMP

EBS01KDO

## Diagnostic Procedure

### 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-24, "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-86, "DTC Confirmation Procedure"](#) , again.
7. Is DTC detected again?

#### Without CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .
3. Start engine and let it idle for at least 60 seconds.
4. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
5. Perform [EC-86, "DTC Confirmation Procedure"](#) , again.
6. Is DTC detected again?

#### Yes or No

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

### 2. CHECK FUEL RAIL PRESSURE SENSOR

Refer to [EC-122, "Component Inspection"](#) .

#### OK or NG

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

### 3. CHECK FUEL PUMP

Refer to [EC-221, "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-24, "Fuel Pump Learning Value Clearing"](#) .

>> **INSPECTION END**

### 5. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

## Removal and Installation FUEL PUMP

Refer to [EM-49, "FUEL PUMP"](#) .

EBS01KDP

# DTC P0093 FUEL SYSTEM

## DTC P0093 FUEL SYSTEM

PFP:17520

### On Board Diagnosis Logic

EBS01KDD

**NOTE:**

If DTC P0093 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0093 0093	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.)	<ul style="list-style-type: none"> <li>● Fuel pump</li> <li>● Fuel rail</li> <li>● Fuel pipe</li> <li>● Fuel rail pressure relief valve</li> <li>● Air mixed with fuel</li> <li>● Lack of fuel</li> </ul>

### DTC Confirmation Procedure

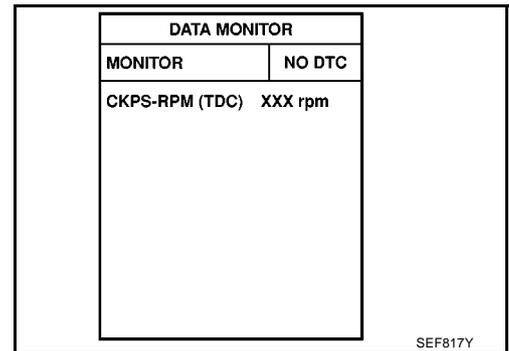
EBS01KDR

**NOTE:**

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-89, "Diagnostic Procedure"](#) .



**⊗ WITHOUT CONSULT-II**

1. Start engine and keep engine speed more than 4,000 rpm for at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-89, "Diagnostic Procedure"](#) .

## Diagnostic Procedure

### 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-24, "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-88, "DTC Confirmation Procedure"](#) , again.
7. Is DTC detected again?

#### Without CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .
3. Start engine and let it idle for at least 60 seconds.
4. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
5. Perform [EC-88, "DTC Confirmation Procedure"](#) , again.
6. 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-90, "Component Inspection"](#) .

#### OK or NG

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

### 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "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-24, "Fuel Pump Learning Value Clearing"](#).

>> INSPECTION END

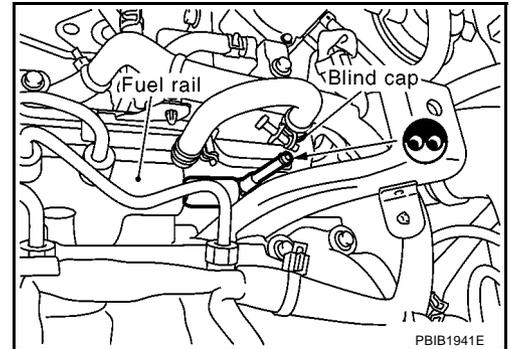
### Component Inspection FUEL RAIL PRESSURE RELIEF VALVE

EBS01KDT

④ 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 180 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

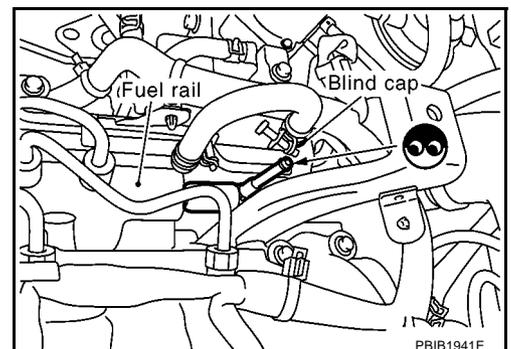
⊗ Without CONSULT-II

**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.



# DTC P0093 FUEL SYSTEM

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## Removal and Installation

EBS01KDU

### FUEL RAIL

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Refer to [EM-44, "INJECTION TUBE AND FUEL INJECTOR"](#) .

### FUEL PUMP

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Refer to [EM-49, "FUEL PUMP"](#) .

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# DTC P0102, P0103 MAF SENSOR

## DTC P0102, P0103 MAF SENSOR

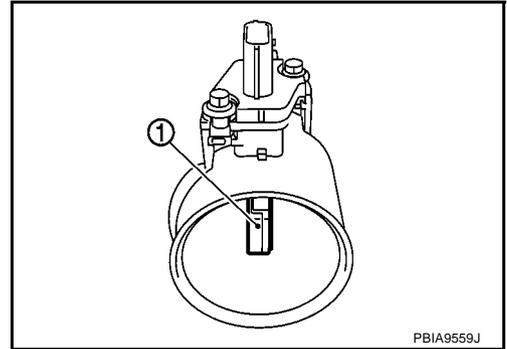
PFP:22680

### Component Description

EBS01KDV

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



PBIA9559J

### CONSULT-II Reference Value in Data Monitor Mode

EBS01KDW

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS AIR/FL SE*	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: P or N (A/T), Neutral (M/T)</li> <li>● No load</li> </ul>	Ignition switch: ON (Engine stopped)	Approximately 0.4V
		Idle	1.3 - 1.7V
		Engine is revving from idle to about 4,000 rpm.	1.3 - 1.7V to Approximately 4.0V (Check for liner voltage rise in response to engine being increased to about 4,000 rpm)

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

### ECM Terminals and Reference Value

EBS01KDX

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

#### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
54	G	Mass air flow sensor	[Ignition switch: ON]	Approximately 0.7V
			[Engine is running]	1.6 - 2.0V
			<ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	
67	—	Sensor ground (Sensor shield circuit)	[Engine is running]	1.6 - 2.0V to Approximately 4.3V (Check for liner voltage rise in response to engine being increased to about 4,000 rpm)
			<ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine is revving from idle to about 4,000 rpm.</li> </ul>	
73	B	Mass air flow sensor ground	[Ignition switch ON]	Approximately 0.3V

# DTC P0102, P0103 MAF SENSOR

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
105 113	BR BR	ECM relay (self shut-off)	<b>[Ignition switch ON]</b> <b>[Ignition switch OFF]</b> <ul style="list-style-type: none"> <li>For a few seconds after turning ignition switch OFF</li> </ul>	Approximately 1.0V
			<b>[Ignition switch OFF]</b> <ul style="list-style-type: none"> <li>More than a few seconds after turning ignition switch OFF</li> </ul>	BATTERY VOLTAGE (11 - 14V)
119 120	R G	Power supply for ECM	<b>[Ignition switch ON]</b>	BATTERY VOLTAGE (11 - 14V)

## On Board Diagnosis Logic

EBS01KDZ

The MI will not light up for these self-diagnoses.

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

## DTC Confirmation Procedure

EBS01KDZ

### NOTE:

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

### ④ WITH CONSULT-II

- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-II.
- Wait at least 5 seconds.
- If DTC is detected, go to [EC-95, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

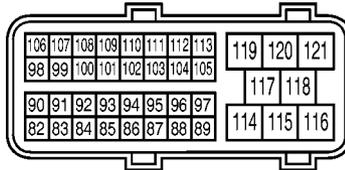
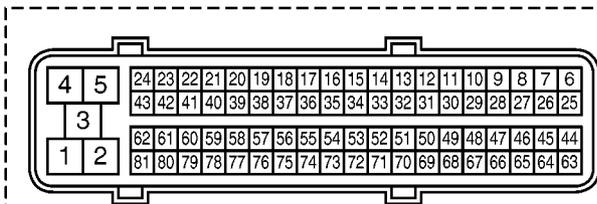
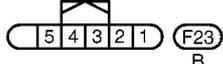
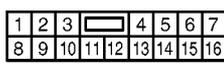
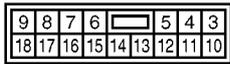
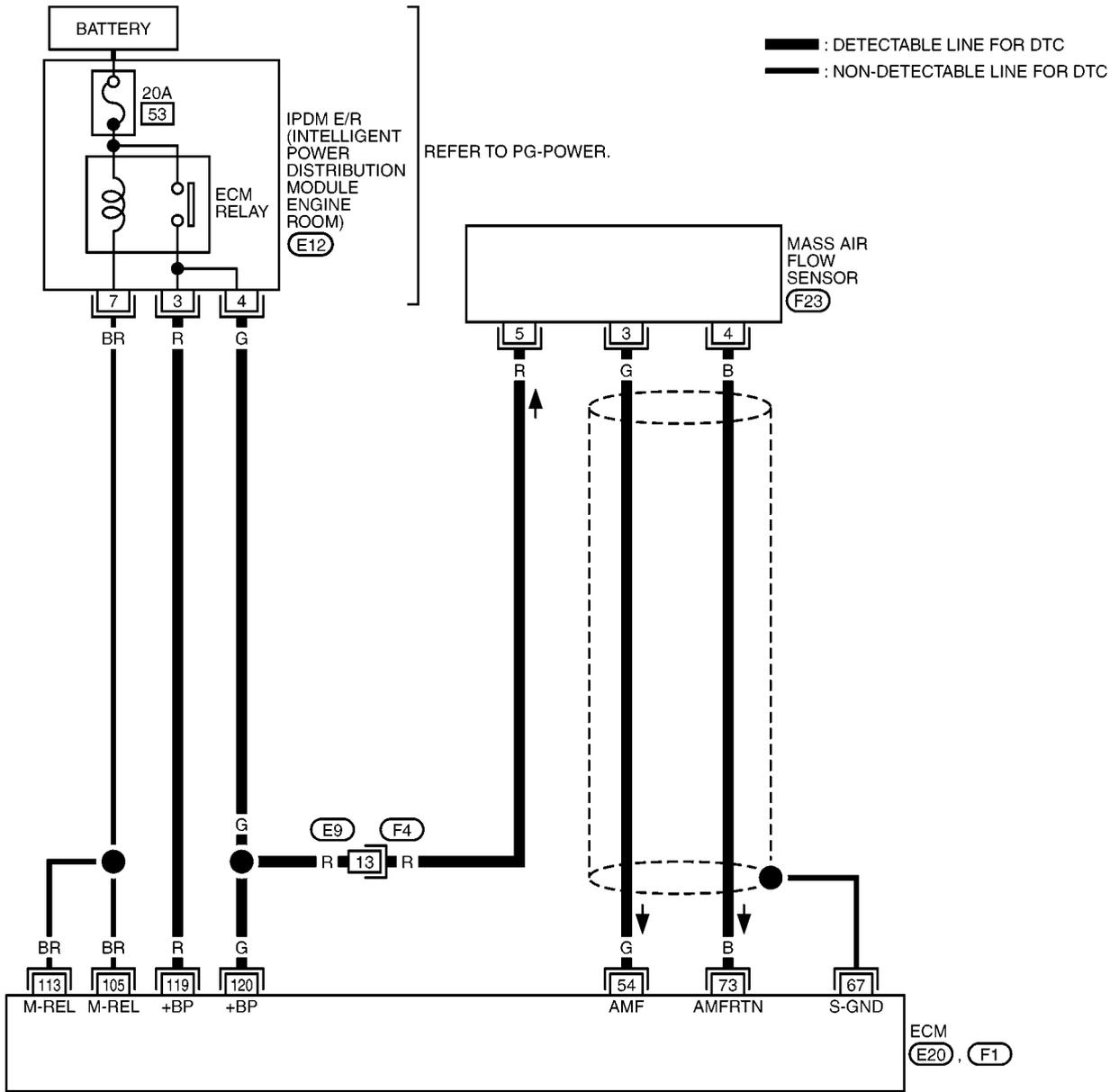
- Turn ignition switch ON and wait at least 5 seconds.
- Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
- Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
- If DTC is detected, go to [EC-95, "Diagnostic Procedure"](#).

# DTC P0102, P0103 MAF SENSOR

EBS01KE0

## EC-MAFS-01

### Wiring Diagram



MBWA1036E

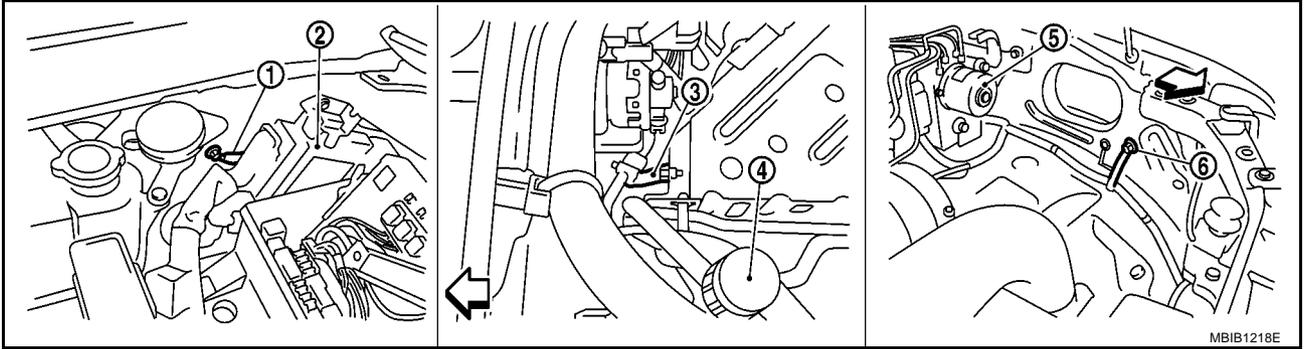
# DTC P0102, P0103 MAF SENSOR

EBS01KE1

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

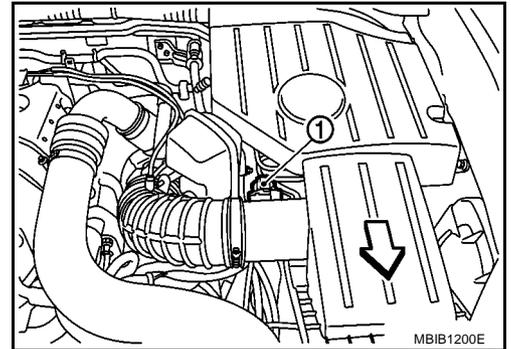
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### OK or NG

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

### 2. CHECK MAFS POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor (1) harness connector.  
- ←: Vehicle front
2. Turn ignition switch ON.

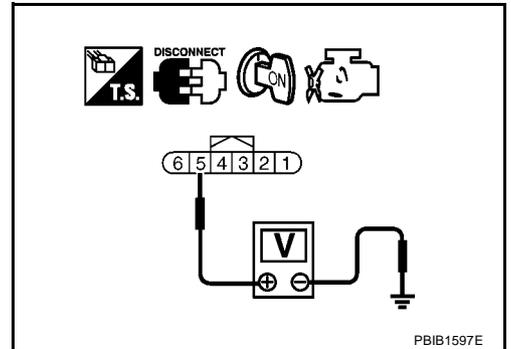


3. Check voltage between MAF sensor terminal 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

#### OK or NG

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



# DTC P0102, P0103 MAF SENSOR

---

## 3. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E9, F4
- Harness for open or short between IPDM E/R and mass air flow sensor
- Harness for open or short between ECM and mass air flow sensor

>> 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 MAF 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 MAF 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 MASS AIR FLOW SENSOR

---

Refer to [EC-96, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace mass air flow sensor.

## 7. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## Component Inspection MASS AIR FLOW SENSOR

EBS01KE2

 **With CONSULT-II**

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT-II and select "DATA MONITOR" mode.

# DTC P0102, P0103 MAF SENSOR

4. Select "MAS AIR/FL SE" and check indication under the following conditions.

Condition	MAS AIR/FL SE (V)
Ignition switch ON (Engine stopped.)	Approx. 0.4
Idle (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7
Idle to about 4,000 rpm	1.3 - 1.7 to Approx. 4.0*

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

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

## ⊗ Without CONSULT-II

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

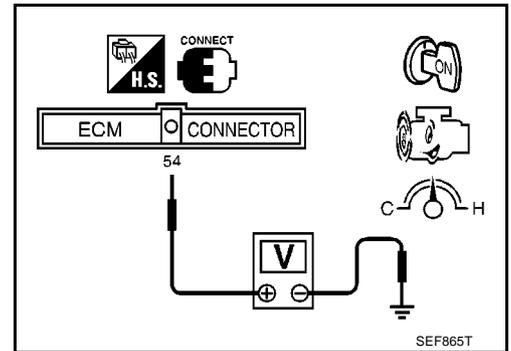
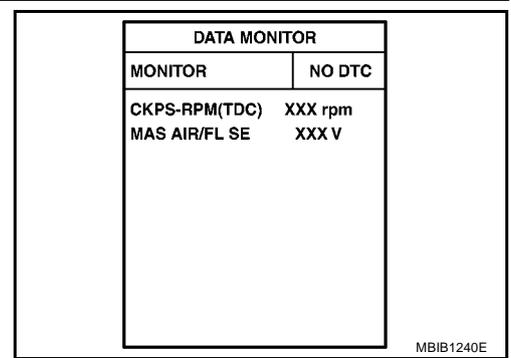
Condition	Voltage V
Ignition switch ON (Engine stopped.)	Approx. 0.7
Idle (Engine is warmed-up to normal operating temperature.)	1.6 - 2.0
Idle to about 4,000 rpm	1.6 - 2.0 to Approx. 4.3*

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

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

## Removal and Installation MASS AIR FLOW SENSOR

Refer to [EM-15. "AIR CLEANER AND AIR DUCT"](#) .



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# DTC P0112, P0113 IAT SENSOR

PFP:22630

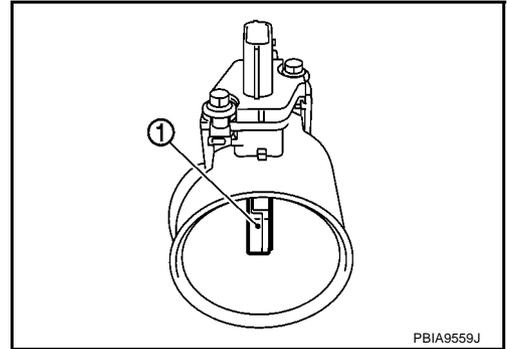
## DTC P0112, P0113 IAT SENSOR

### Component Description

EBS01KE4

The intake air temperature sensor is built into mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.

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



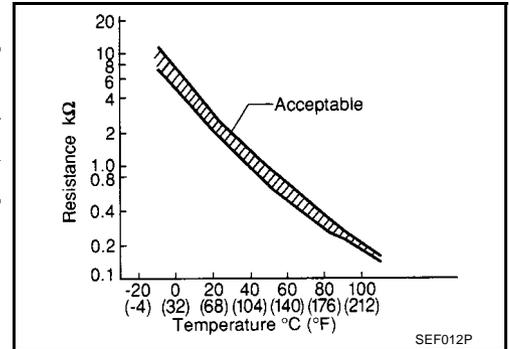
### <Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	2.4	1.800 - 2.200
80 (176)	0.8	0.283 - 0.359

\*: 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

EBS01KE5

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.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air temperature sensor</li> </ul>
P0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

### DTC Confirmation Procedure

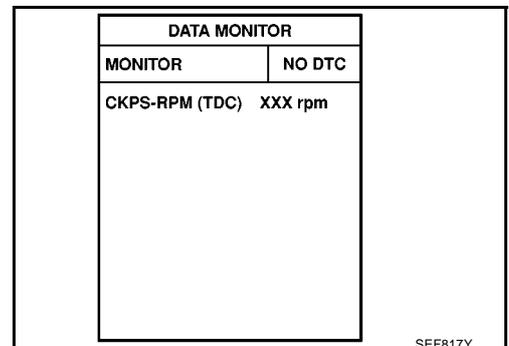
EBS01KE6

#### NOTE:

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

#### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-101, "Diagnostic Procedure"](#).



#### ⊗ WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.

## DTC P0112, P0113 IAT SENSOR

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2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-101, "Diagnostic Procedure"](#) .

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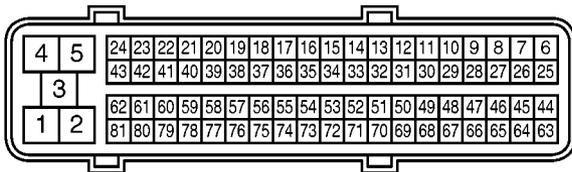
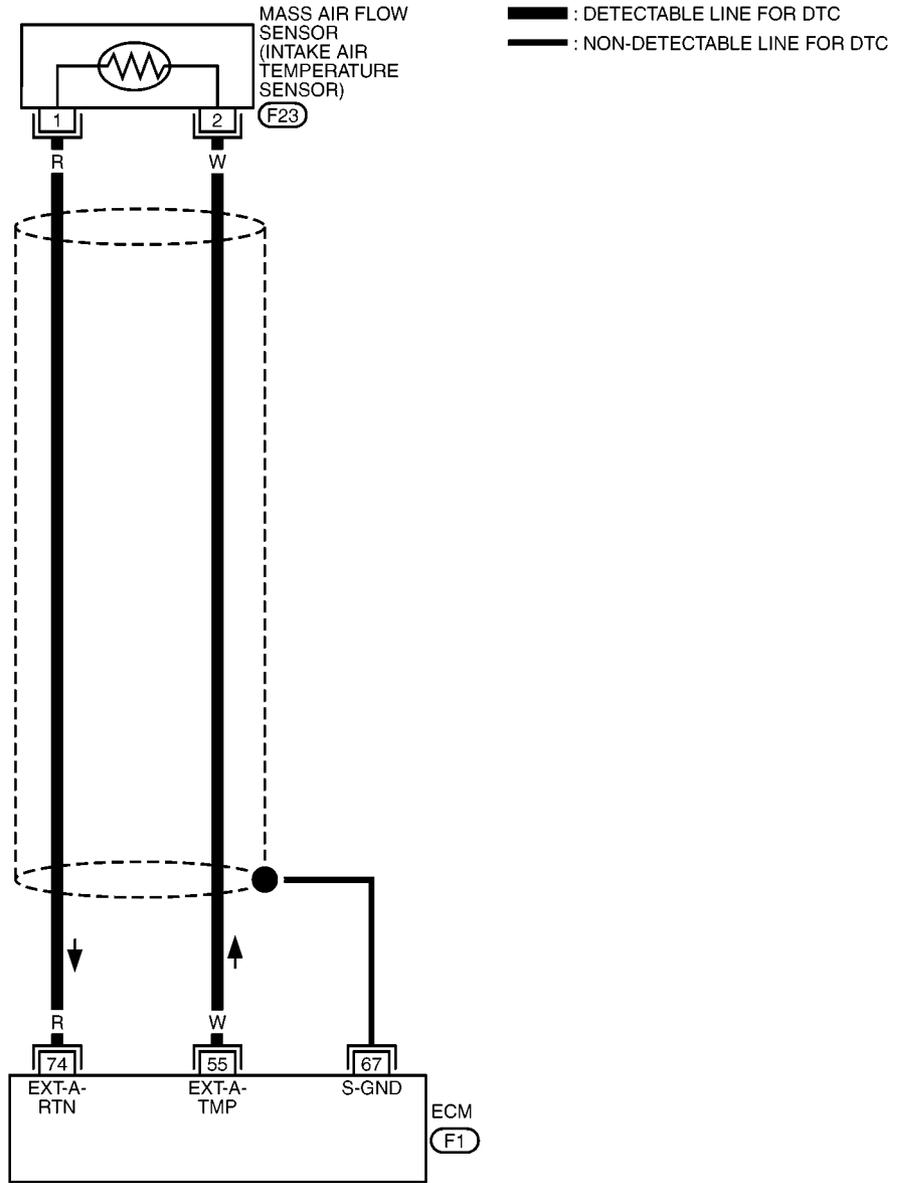
M

# DTC P0112, P0113 IAT SENSOR

## Wiring Diagram

EBS01KE7

### EC-IATS-01



MBWA1037E

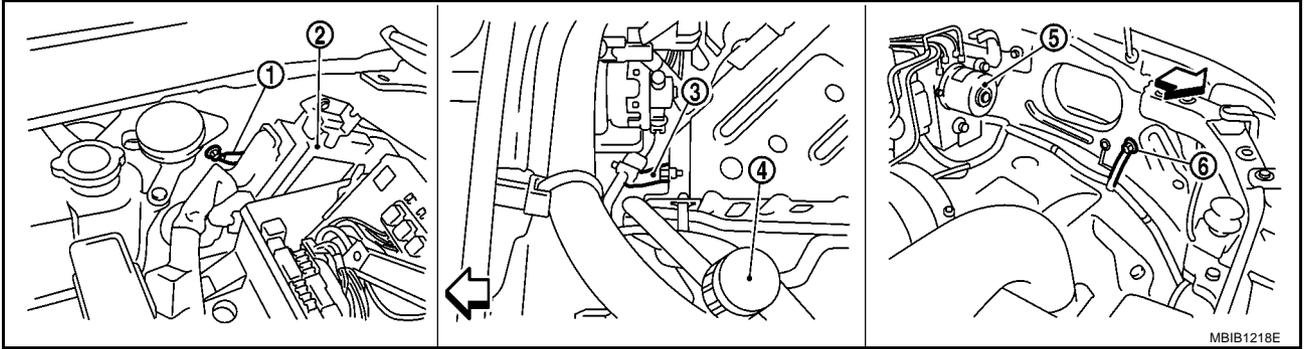
# DTC P0112, P0113 IAT SENSOR

EBS01KE8

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

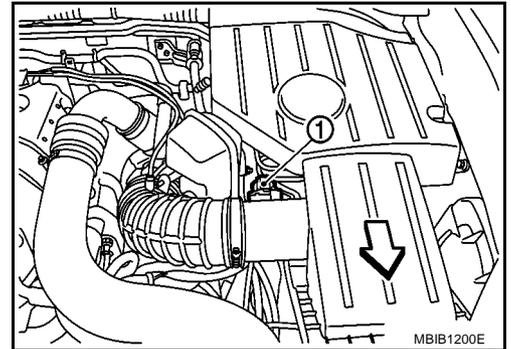
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### 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) (1) harness connector.  
- ←: Vehicle front
2. Turn ignition switch ON.

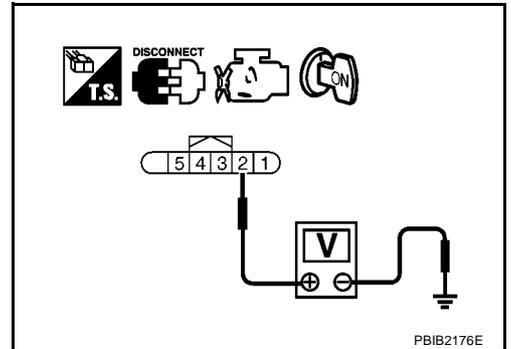


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-II or tester.

**Voltage: Approximately 5.3V**

#### OK or NG

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



## DTC P0112, P0113 IAT SENSOR

### 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-102, "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-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

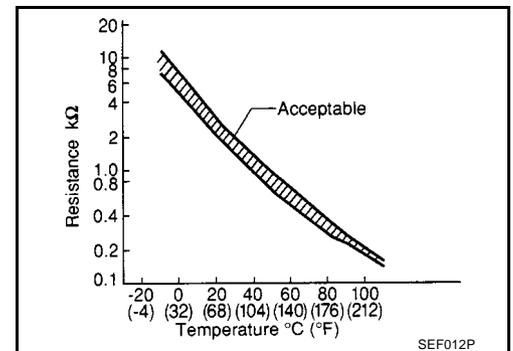
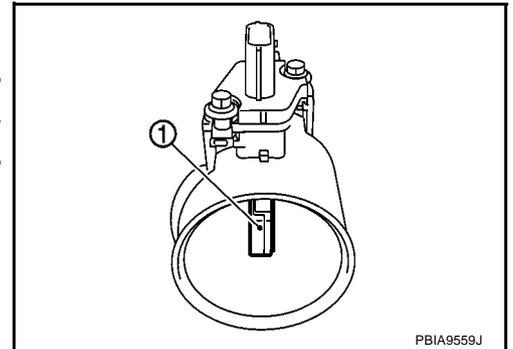
#### Component Inspection INTAKE AIR TEMPERATURE SENSOR

EBS01KE9

1. Check resistance between mass air flow sensor (1) terminals 1 and 2 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.800 - 2.200

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



#### Removal and Installation MASS AIR FLOW SENSOR

EBS01KEA

Refer to [EM-15, "AIR CLEANER AND AIR DUCT"](#) .

# DTC P0117, P0118 ECT SENSOR

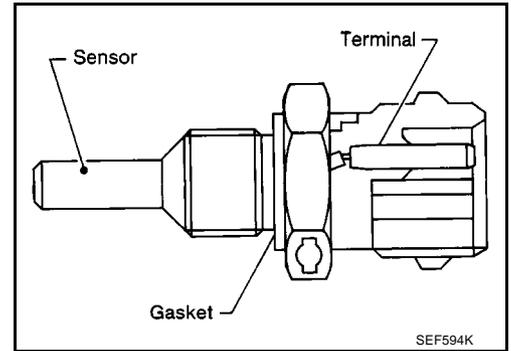
## DTC P0117, P0118 ECT SENSOR

PFP:22630

### Description

EBS01KEB

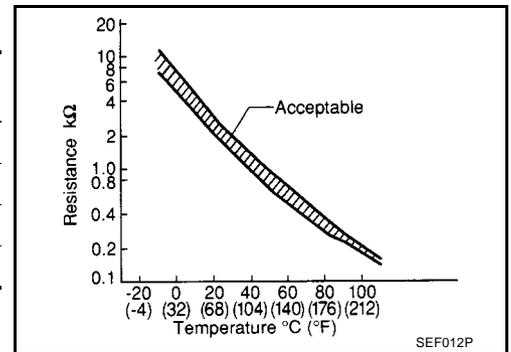
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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

EBS01KEC

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Engine coolant temperature sensor</li> </ul>
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

### DTC Confirmation Procedure

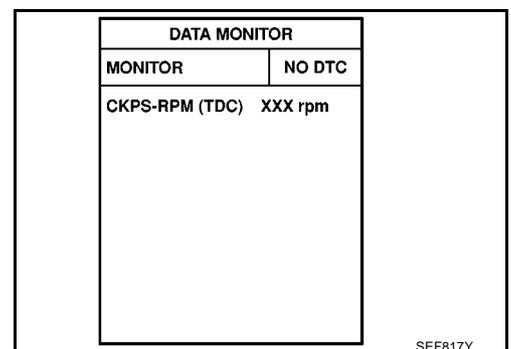
EBS01KED

#### NOTE:

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-106, "Diagnostic Procedure"](#).



## DTC P0117, P0118 ECT SENSOR

---

### ⊗ WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-106, "Diagnostic Procedure"](#) .



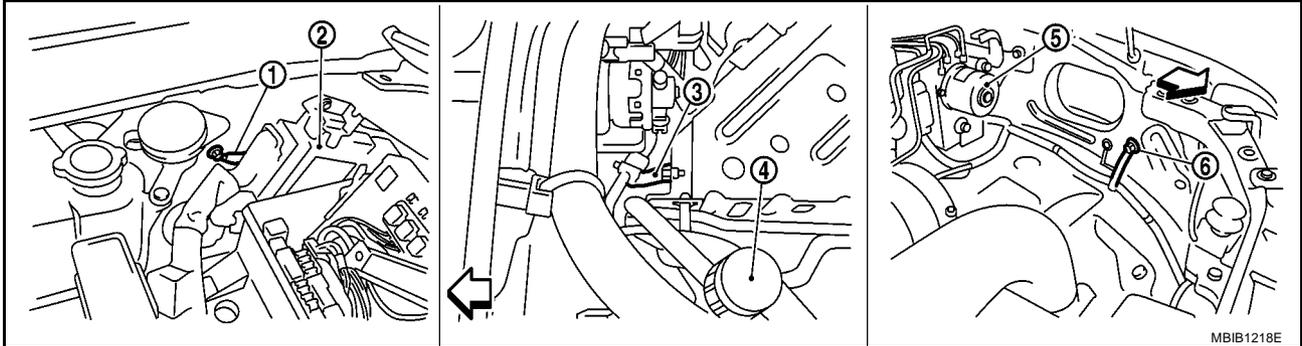
# DTC P0117, P0118 ECT SENSOR

EBS01KEF

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

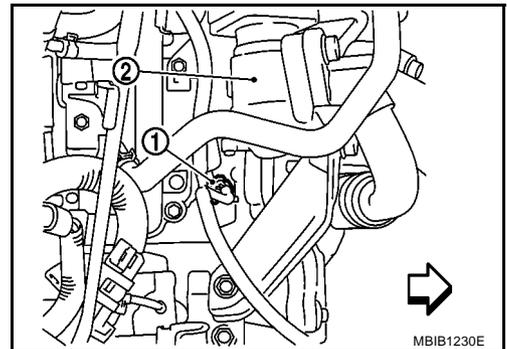
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### 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 (1) harness connector.  
- ←: Vehicle front  
- EGR volume control valve (2)
2. Turn ignition switch ON.

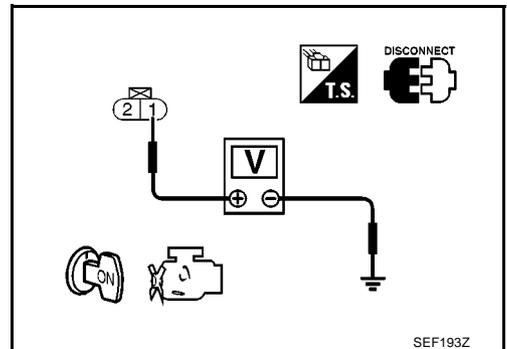


3. Check voltage between ECT sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5.3V**

#### OK or NG

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



# DTC P0117, P0118 ECT SENSOR

## 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 2 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-107, "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace engine coolant temperature sensor.

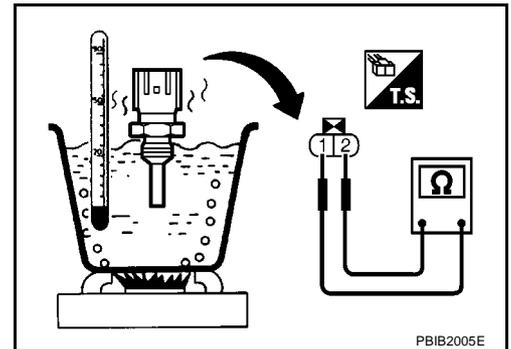
## 5. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

### Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

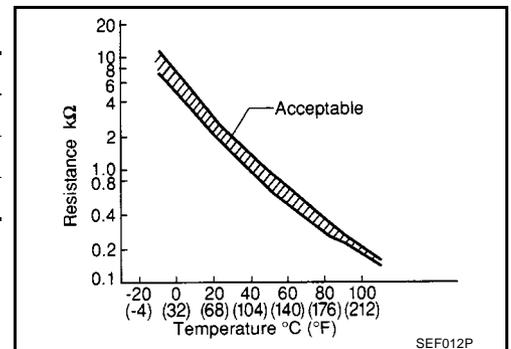
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



#### <Reference data>

Engine coolant temperature °C (°F)	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 ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EM-92, "CYLINDER HEAD"](#).

# DTC P0122, P0123 APP SENSOR

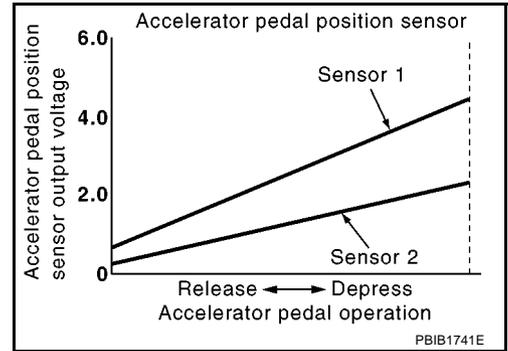
## DTC P0122, P0123 APP SENSOR

PFP:18002

### Description

EBS01KEI

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

EBS01KEJ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.65 - 0.87V
		Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.28 - 0.48V
		Accelerator pedal: Fully depressed	More than 2.0V

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

### ECM Terminals and Reference Value

EBS01KEK

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

#### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	W	Accelerator pedal position sensor 1 power supply	[Ignition switch ON]	Approximately 5.3V
83	R	Accelerator pedal position sensor 1	[Ignition switch ON] ● Engine stopped ● Accelerator pedal: Fully released	0.95 - 1.17V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal: Fully depressed	More than 4.6V
84	B	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	W	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5.3V

# DTC P0122, P0123 APP SENSOR

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	R	Accelerator pedal position sensor 2	[Ignition switch ON] ● Engine stopped ● Accelerator pedal: Fully released	0.58 - 0.78V
			[Ignition switch ON] ● Engine stopped ● Accelerator pedal: Fully depressed	More than 2.3V
92	B	Accelerator pedal position sensor 2 ground	[Ignition switch ON]	Approximately 0.3V

## On Board Diagnosis Logic

EBS01KEL

The MI will not light up for these self-diagnoses.

### NOTE:

If DTC P0122 or P0123 is displayed with DTC P0642 or P0643, first perform the trouble diagnosis for DTC P0642 or P0643. Refer to [EC-222, "DTC P0642, P0643 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The APP sensor 1 circuit is open or shorted.)</li> <li>● Accelerator pedal position sensor (Accelerator pedal position sensor 1)</li> </ul>
P0123 0123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

## DTC Confirmation Procedure

EBS01KEM

### NOTE:

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-111, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

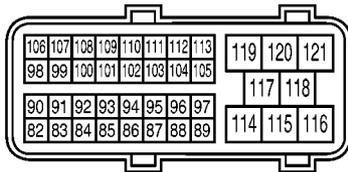
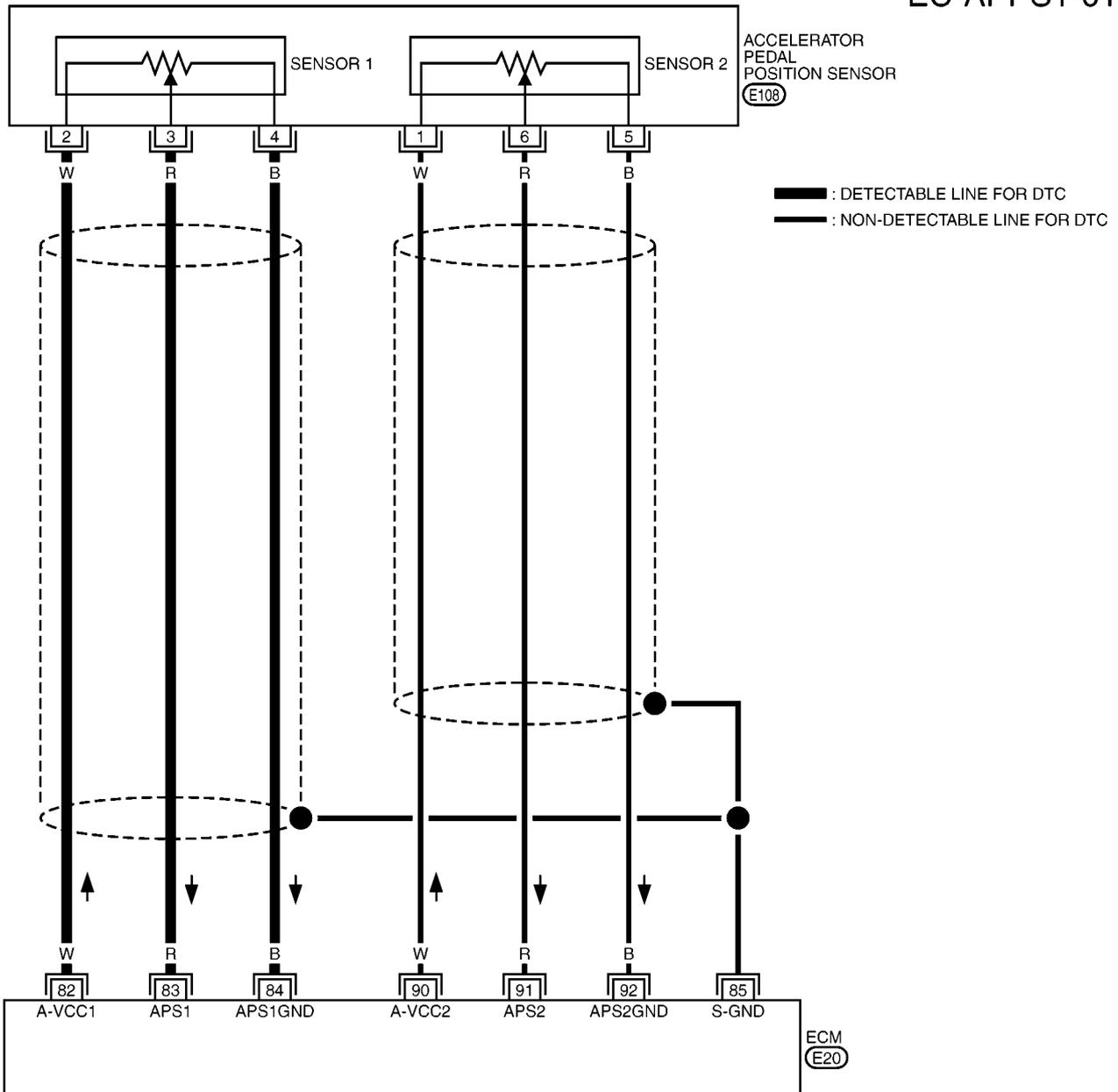
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-111, "Diagnostic Procedure"](#).

# DTC P0122, P0123 APP SENSOR

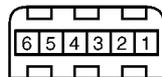
EBS01KEN

## Wiring Diagram

EC-APPS1-01



E20  
B



E108  
B

MBWA1039E

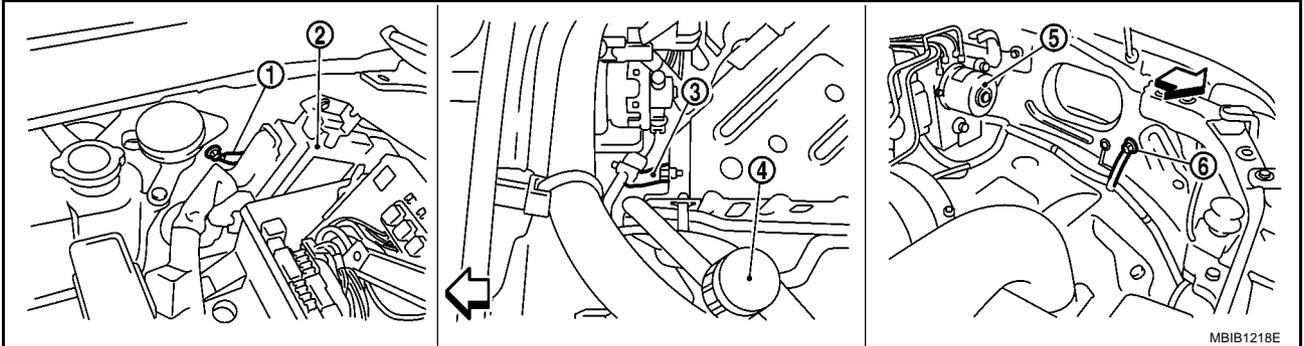
# DTC P0122, P0123 APP SENSOR

EBS01KEO

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

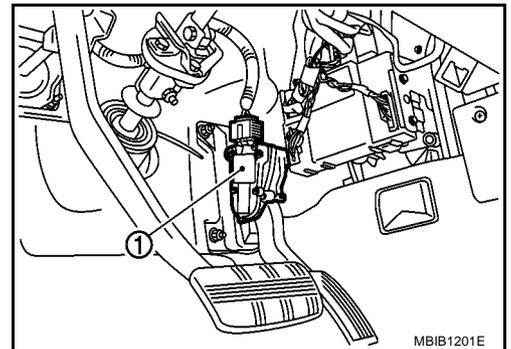
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### OK or NG

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

### 2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

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

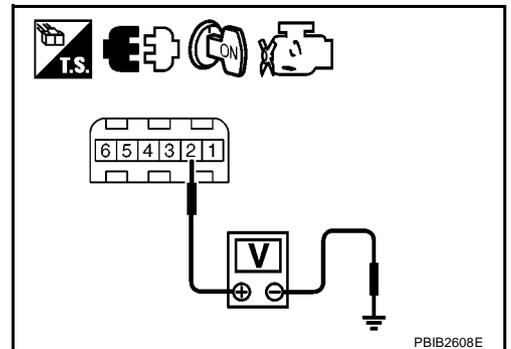


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

**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.



## DTC P0122, P0123 APP SENSOR

### 3. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between 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 4.

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

### 4. 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 5.

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

### 5. CHECK APP SENSOR

Refer to [EC-112, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace accelerator pedal assembly.

### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

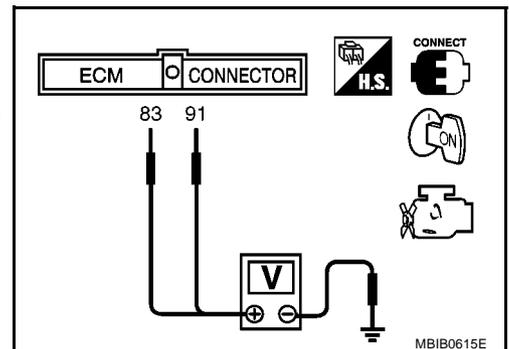
>> INSPECTION END

### Component Inspection ACCELERATOR PEDAL POSITION SENSOR

EBS01KEP

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 ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.95 - 1.17V
	Fully depressed	More than 4.6V
91 (Accelerator pedal position sensor 2)	Fully released	0.58 - 0.78V
	Fully depressed	More than 2.3V



4. If NG, replace accelerator pedal assembly.

### Removal and Installation ACCELERATOR PEDAL

EBS01KEQ

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

# DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

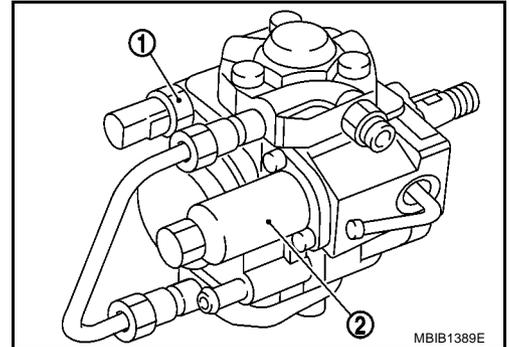
## DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

PPF:16700

### Description

EBS01KER

Fuel pump temperature sensor (1) is built in the fuel pump (2). 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

EBS01KES

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

EBS01KET

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

#### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
50	Y	Fuel pump temperature sensor	<b>[Engine is running]</b> ● Warm-up condition	Approximately 0.3 - 5.3V Output voltage varies with fuel pump temperature
69	B	Fuel pump temperature sensor ground	<b>[Ignition switch ON]</b>	Approximately 0.3V

### On Board Diagnosis Logic

EBS01KEU

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	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 0183	Fuel pump temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

# DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

EBS01KEV

## DTC Confirmation Procedure

### NOTE:

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

### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-116, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-116, "Diagnostic Procedure"](#)

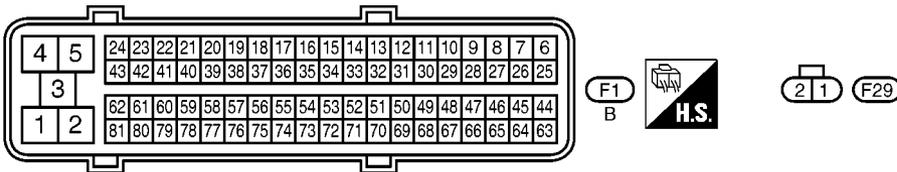
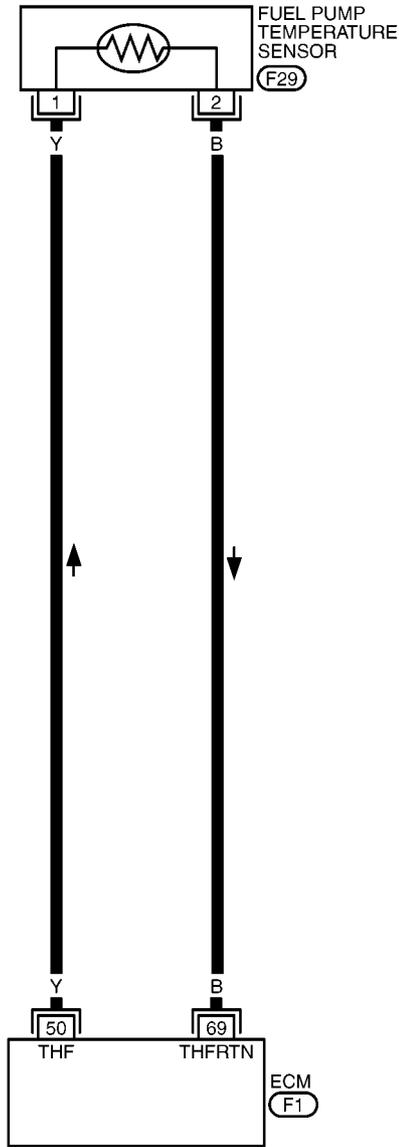
# DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

## Wiring Diagram

EBS01KEW

EC-FTS-01

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



MBWA1040E

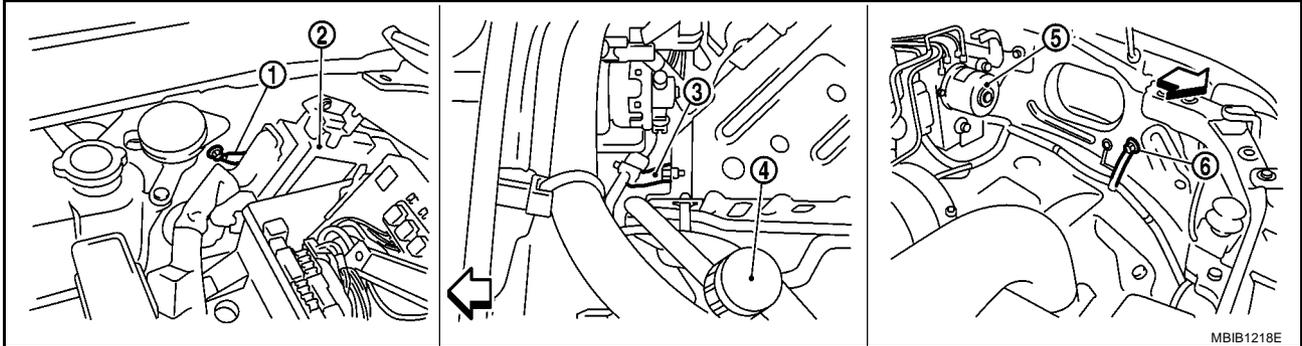
# DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

EBS01KEX

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

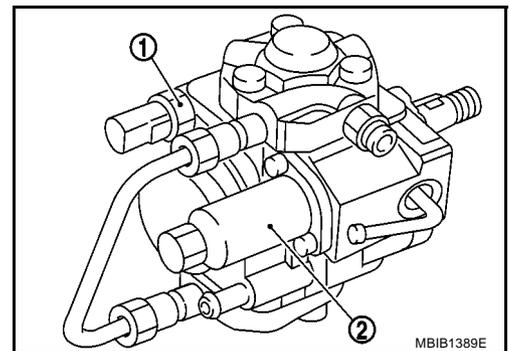
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### 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 (1) harness connector.  
- Fuel pump (2)
2. Turn ignition switch ON.

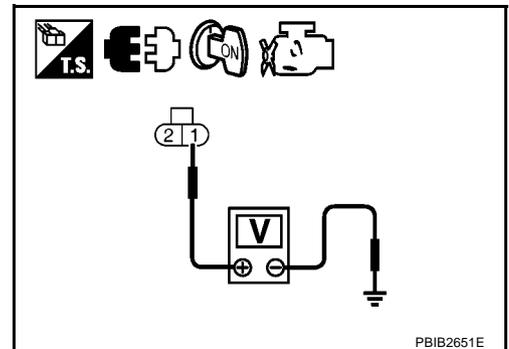


3. Check voltage between fuel pump temperature sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5.3V**

#### OK or NG

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



## DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

### 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 2 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-70, "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-24, "Fuel Pump Learning Value Clearing"](#) .

>> **INSPECTION END**

### Removal and Installation FUEL PUMP

EBS01KEY

Refer to [EM-49, "FUEL PUMP"](#) .

# DTC P0192, P0193 FRP SENSOR

## DTC P0192, P0193 FRP SENSOR

PFP:16638

### Description

EBS01KEZ

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

EBS01KF0

Specification data are reference values.

MONITOR	CONDITION		SPECIFICATOIN
ACT CR PRESS	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: P or N (A/T), Neutral (M/T)</li> <li>● No load</li> </ul>	Idle	25 - 35 MPa
		2,000 rpm	40 - 50 MPa

### ECM Terminals and Reference Value

EBS01KF1

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

#### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48 49	L B	Fuel rail pressure sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.7 - 2.0V
			[Engine is running] ● Warm-up condition ● Engine speed: 2,000 rpm	2.0 - 2.3V
63	R	Fuel rail pressure sensor power supply	[Ignition switch ON]	Approximately 5.3V
67	—	Sensor ground (Sensor shield circuit)	[Ignition switch ON]	Approximately 0.3V
68	W	Fuel rail pressure sensor ground	[Ignition switch ON]	Approximately 0.3V

### On Board Diagnosis Logic

EBS01KF2

The MI will not light up for these self-diagnoses.

#### NOTE:

If DTC P0192 or P0193 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0192 0192	Fuel rail pressure sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Fuel rail temperature sensor</li> </ul>
P0193 0193	Fuel rail pressure sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

# DTC P0192, P0193 FRP SENSOR

EBS01KF3

## DTC Confirmation Procedure

### NOTE:

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

### Ⓟ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-121, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⓧ WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-121, "Diagnostic Procedure"](#) .

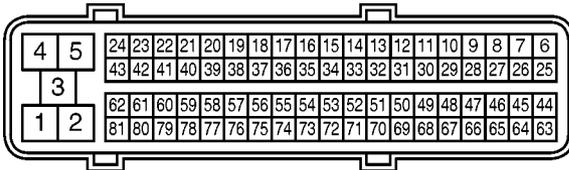
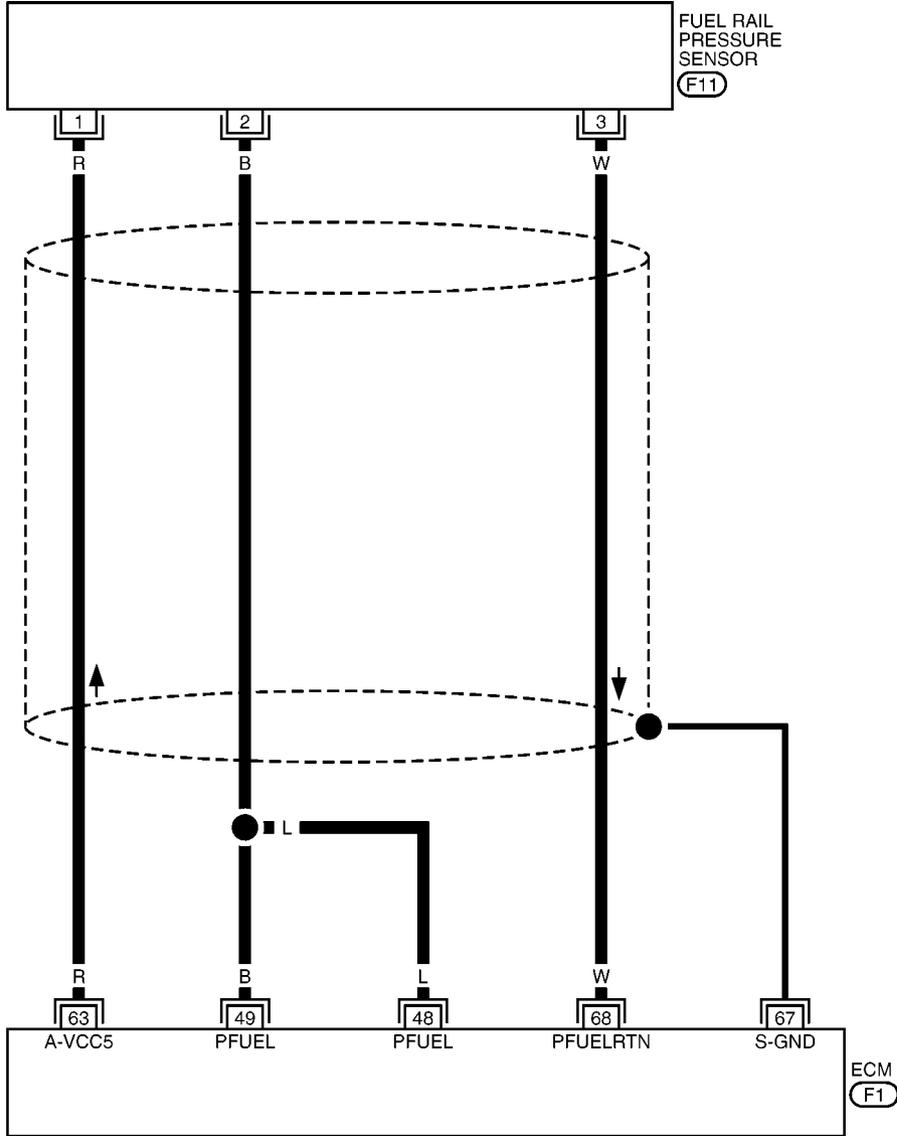
# DTC P0192, P0193 FRP SENSOR

## Wiring Diagram

EBS01KF4

### EC-FRPS-01

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



F1  
B



3 2 1 F11

MBWA1041E

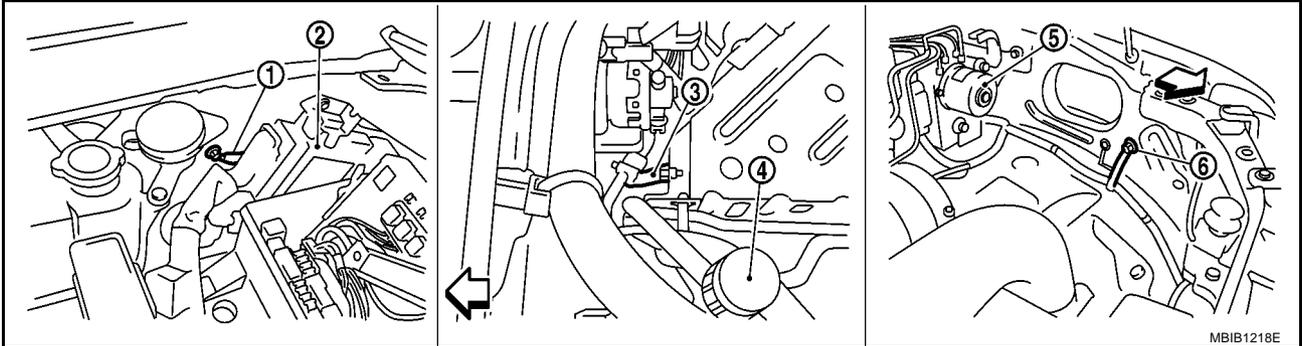
# DTC P0192, P0193 FRP SENSOR

EBS01KF5

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

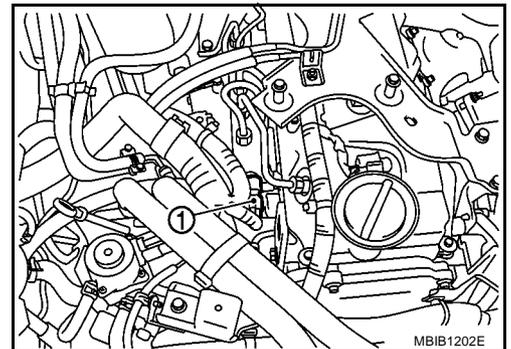
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### 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 (1) harness connector.
2. Turn ignition switch ON.

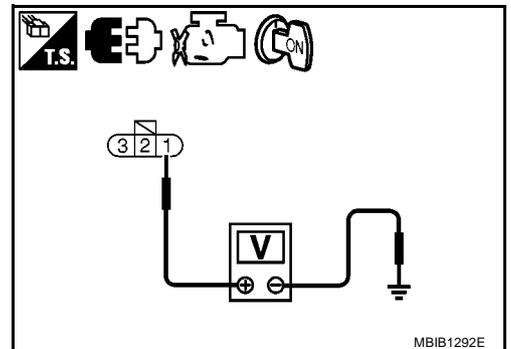


3. Check voltage between fuel rail pressure sensor terminal 1 and ground with CONSULT-II or tester.

**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.



## DTC P0192, P0193 FRP SENSOR

### 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-122, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace fuel rail.

### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

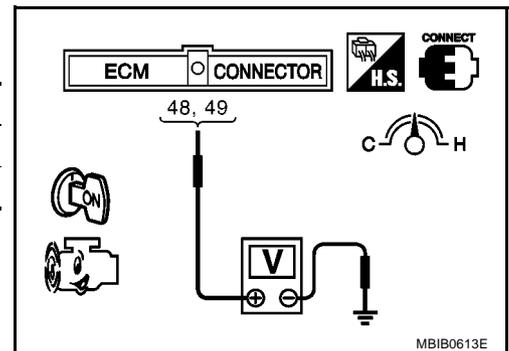
### Component Inspection FUEL RAIL PRESSURE SENSOR

EBS01KF6

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.



EBS01KF7

### Removal and Installation FUEL RAIL

Refer to [EM-44, "INJECTION TUBE AND FUEL INJECTOR"](#) .

# DTC P0200 FUEL INJECTOR

## DTC P0200 FUEL INJECTOR

PPF:16600

### On Board Diagnosis Logic

EBS01KF8

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0200 0200	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

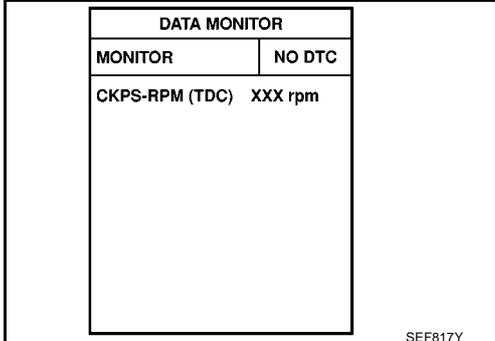
EBS01KF9

#### NOTE:

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-123, "Diagnostic Procedure"](#) .



DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

#### WITHOUT CONSULT-II

1. Start engine and let it idle for at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-123, "Diagnostic Procedure"](#) .

### Diagnostic Procedure

EBS01KFA

#### 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-123, "DTC Confirmation Procedure"](#) , again.
5. Is DTC P0200 displayed again?

#### Without CONSULT-II

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
3. Perform [EC-123, "DTC Confirmation Procedure"](#) , again.
4. Is DTC 0200 displayed again?

#### Yes or No

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

## DTC P0200 FUEL INJECTOR

---

### 2. REPLACE ECM

---

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to [BL-172, "ECM Re-communicating Function"](#) .
3. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .
4. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

>> INSPECTION END

# DTC P0201 - P0204 FUEL INJECTOR

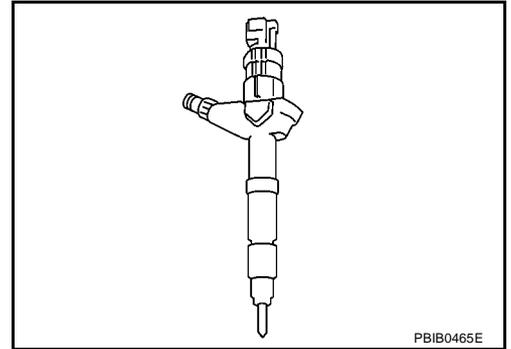
## DTC P0201 - P0204 FUEL INJECTOR

PF16600

### Component Description

EBS01KFB

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 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.



### CONSULT-II Reference Value in Data Monitor Mode

EBS01KFC

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAIN INJ WID	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: P or N (A/T), Neutral (M/T)</li> <li>● Idle speed</li> </ul>	No load 0.50 - 0.70 msec
	<ul style="list-style-type: none"> <li>● Blower fan switch: ON</li> <li>● Rear window defogger switch: ON</li> </ul>	0.50 - 0.80 msec

### ECM Terminals and Reference Value

EBS01KFD

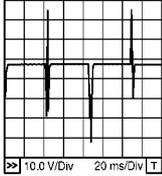
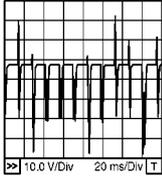
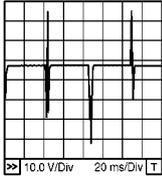
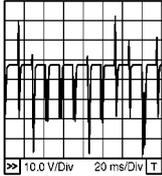
Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

#### 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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
4	V	Fuel injector power supply (For cylinder No. 1 and 4)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <p><b>NOTE:</b> The pulse cycle changes depending on rpm at idle</p>	<p>Approximately 7.5V ★</p>
5	G	Fuel injector power supply (For cylinder No. 2 and 3)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 8.0V ★</p>

# DTC P0201 - P0204 FUEL INJECTOR

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	G P W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★  MBIB1297E
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0V ★  MBIB1298E
40 41 42 43	W GR W B	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★  MBIB1297E
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0V ★  MBIB1298E

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

## On Board Diagnosis Logic

EBS01KFE

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0201 0201	No. 1 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 1 cylinder fuel injector.	<ul style="list-style-type: none"> <li>● Harness or connectors (The fuel injector circuit is open.)</li> <li>● Fuel injector</li> </ul>
P0202 0202	No. 2 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 2 cylinder fuel injector.	
P0203 0203	No. 3 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 3 cylinder fuel injector.	
P0204 0204	No. 4 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 4 cylinder fuel injector.	

# DTC P0201 - P0204 FUEL INJECTOR

EBS01KFF

## DTC Confirmation Procedure

### NOTE:

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

### TESTING CONDITION

Before performing the following procedure, confirm the ambient temperature is more than -20°C (-4°F).

#### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If DTC is detected, go to [EC-129, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

#### ⊗ WITHOUT CONSULT-II

1. Start engine and let it idle for at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-129, "Diagnostic Procedure"](#) .

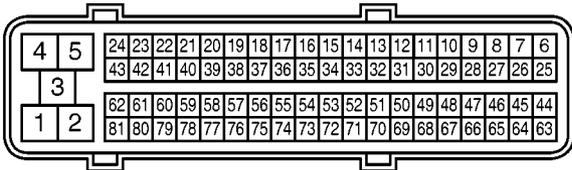
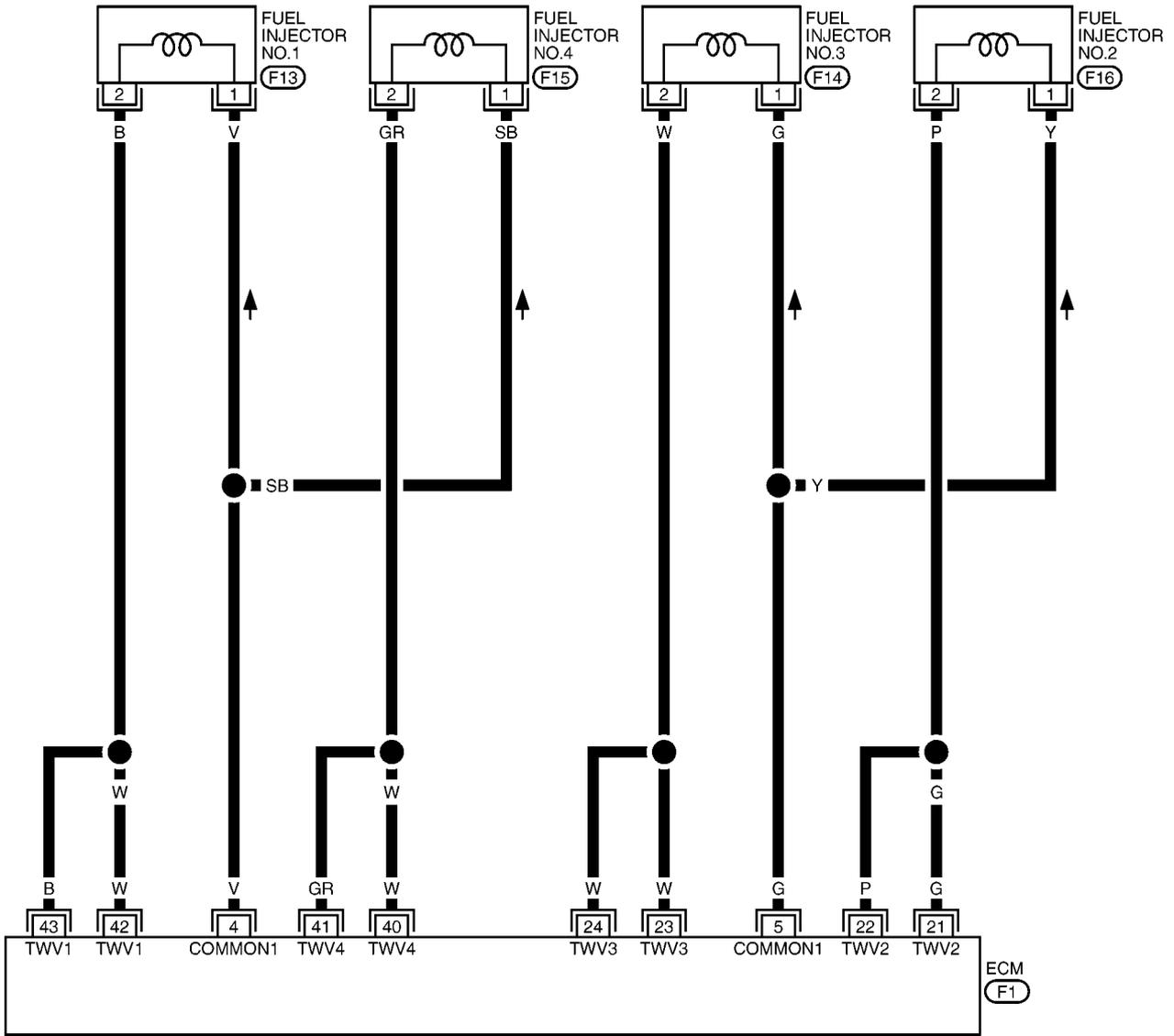
# DTC P0201 - P0204 FUEL INJECTOR

## Wiring Diagram

EBS01KFG

### EC-INJECT-01

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



(F1) B H.S.

1 (F13) (F14) (F15) (F16)  
 2 LGR LGR LGR LGR

MBWA1042E

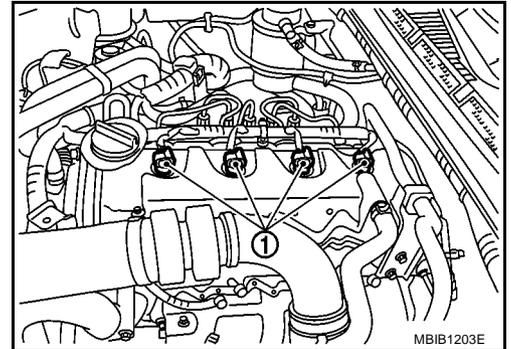
# DTC P0201 - P0204 FUEL INJECTOR

EBS01KFH

## Diagnostic Procedure

### 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 (1) 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	1	No.1
P0202	5	1	No.2
P0203	5	1	No.3
P0204	4	1	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 INJECTOR 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	2	No.1
P0202	21, 22	2	No.2
P0203	23, 24	2	No.3
P0204	40, 41	2	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-130, "Component Inspection"](#) .

OK or NG

OK >> GO TO 4.

NG >> Replace fuel injector.

# DTC P0201 - P0204 FUEL INJECTOR

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## 4. CHECK FUEL INJECTOR-II

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### With CONSULT-II

1. Remove two fuel injectors.

**NOTE:**

One is from malfunctioning cylinder and the other is from any cylinder other than the malfunctioning cylinder.

2. Swap the two fuel injectors to the other cylinder.
3. Reconnect ECM harness connector and fuel injector harness connectors.
4. Turn ignition switch ON.
5. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .
6. Select "SELF DIAG RESULTS" mode with CONSULT-II.
7. Touch "ERASE".
8. Perform [EC-127, "DTC Confirmation Procedure"](#) .
9. Is DTC displayed for the other cylinder?

### Without CONSULT-II

1. Remove two fuel injectors.

**NOTE:**

One is from malfunctioning cylinder and the other is from any cylinder other than the malfunctioning cylinder.

2. Swap the two fuel injectors to the other cylinder.
3. Reconnect ECM harness connector and fuel injector harness connectors.
4. Turn ignition switch ON.
5. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .
6. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
7. Perform DTC Confirmation Procedure, [EC-127, "DTC Confirmation Procedure"](#) .
8. Is DTC displayed for the other cylinder?

Yes or No

- Yes >> GO TO 5.  
No >> GO TO 6.

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## 5. REPLACE FUEL INJECTOR

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1. Replace fuel injector of malfunctioning cylinder.
2. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

>> INSPECTION END

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## 6. CHECK INTERMITTENT INCIDENT

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Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection

#### FUEL INJECTOR

1. Disconnect fuel injector harness connector.

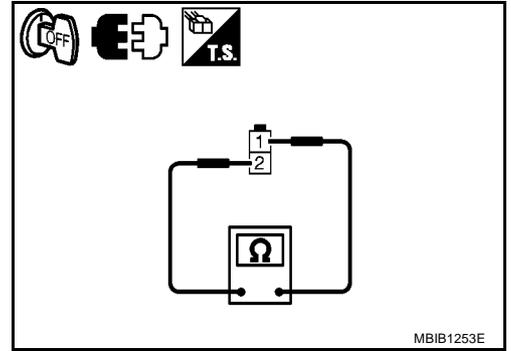
EBS01KFI

## DTC P0201 - P0204 FUEL INJECTOR

2. Check resistance between terminals as shown in the figure.

**Resistance: 0.2 - 0.8Ω [at 10 - 60°C (50 - 140°F)]**

3. If NG, replace fuel injector.



### Removal and Installation FUEL INJECTOR

Refer to [EM-44, "INJECTION TUBE AND FUEL INJECTOR"](#) .

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

# DTC P0217 ENGINE OVER TEMPERATURE

## DTC P0217 ENGINE OVER TEMPERATURE

PFP:21481

### Description SYSTEM DESCRIPTION

EBS01KFK

#### NOTE:

If DTC P0217 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to [EC-79, "DTC U1000 CAN COMMUNICATION LINE"](#).

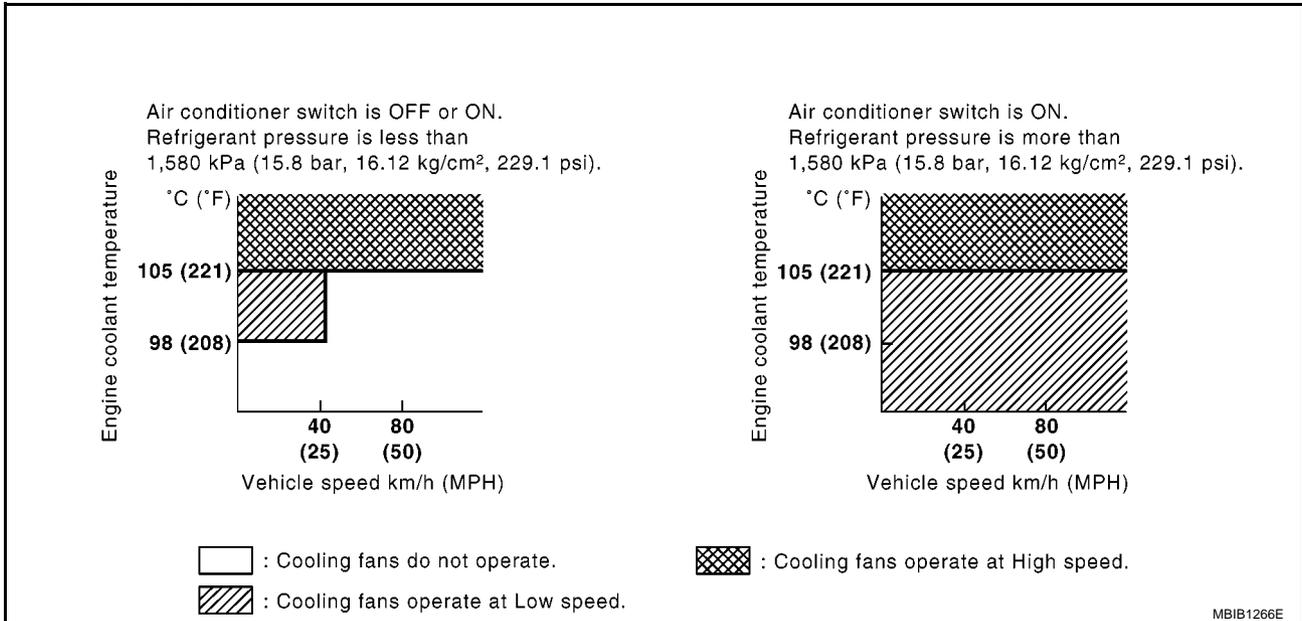
### Cooling Fan Control

Sensor	Input Signal to ECM	ECM function	Actuator
Wheel sensor	Vehicle speed*	Cooling fan control	IPDM E/R (Cooling fan relays)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner ON signal*		
Refrigerant pressure sensor	Refrigerant pressure		

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

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

### Cooling Fan Operation



### Cooling Fan Relay Operation

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

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

### COMPONENT DESCRIPTION

#### Cooling Fan Motor

The cooling fan operates at each speed when the current flows in the cooling fan motor as follows.

Cooling fan speed	Cooling fan motor terminals	
	(+)	(-)
Low (LOW)	1	3
High (HI)	2	3

# DTC P0217 ENGINE OVER TEMPERATURE

## CONSULT-II Reference Value in Data Monitor Mode

EBS01KFL

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> <li>● Air conditioner switch: OFF</li> </ul>	Engine coolant temperature: 97°C (207°F) or less	OFF
		Engine coolant temperature: Between 98°C (208°F) and 104°C (219°F)	LOW
		Engine coolant temperature: 105°C (221°F) or more	HI

## On Board Diagnosis Logic

EBS01KFM

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0217 0217	Engine over temperature (Overheat)	<ul style="list-style-type: none"> <li>● Cooling fan does not operate properly (Overheat).</li> <li>● Cooling fan system does not operate properly (Overheat).</li> <li>● Engine coolant was not added to the system using the proper filling method.</li> <li>● Engine coolant is not within the specified range.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (The cooling fan circuit is open or shorted.)</li> <li>● IPDM E/R</li> <li>● Cooling fan</li> <li>● Cooling fan (Crankshaft driven)</li> <li>● Radiator hose</li> <li>● Radiator</li> <li>● Radiator cap</li> <li>● Reservoir tank</li> <li>● Reservoir tank cap</li> <li>● Water pump</li> <li>● Thermostat</li> </ul> <p>For more information, refer to <a href="#">EC-140, "Main 12 Causes of Overheating"</a>.</p>

### CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [CO-7, "Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [LU-6, "Changing Engine Oil"](#).

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-16, "Engine Coolant Mixture Ratio"](#).
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

## Overall Function Check

EBS01KFN

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

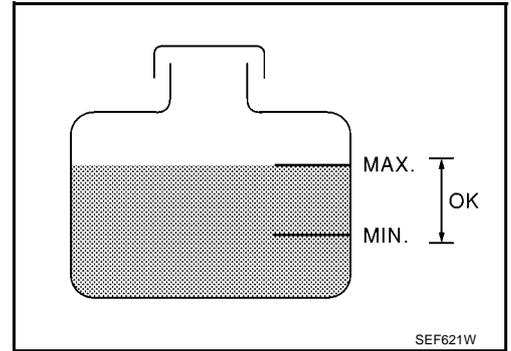
### WARNING:

- Never remove a radiator cap and/or a reservoir tank cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator and the reservoir tank.
- 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.

# DTC P0217 ENGINE OVER TEMPERATURE

## Ⓟ 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-137, "Diagnostic Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-137, "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-137, "Diagnostic Procedure"](#).

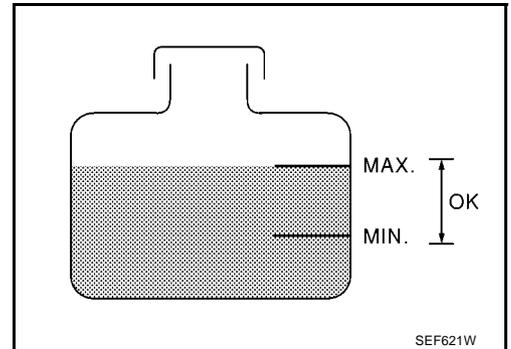


ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF111X

## ⓧ 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-137, "Diagnostic Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-137, "Diagnostic Procedure"](#).

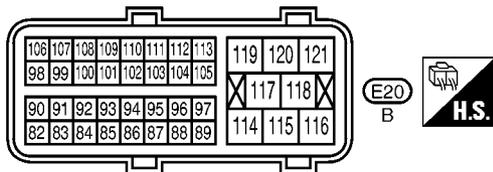
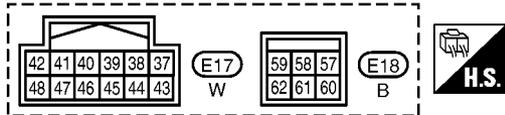
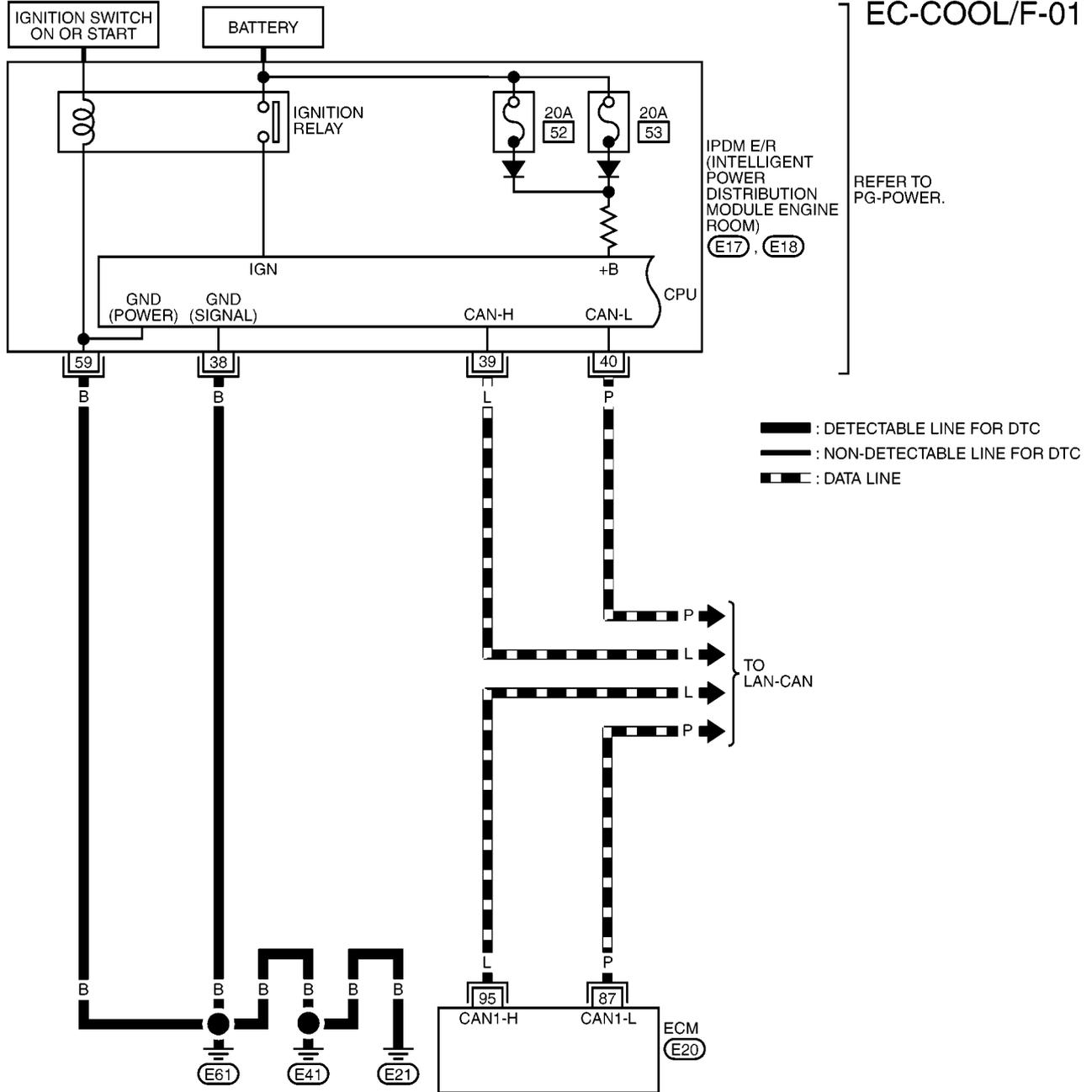


3. Perform IPDM E/R auto active test and check cooling fan motors operation, refer to [PG-19, "Auto Active Test"](#).
4. If NG, go to [EC-137, "Diagnostic Procedure"](#).

# DTC P0217 ENGINE OVER TEMPERATURE

EBS01KFO

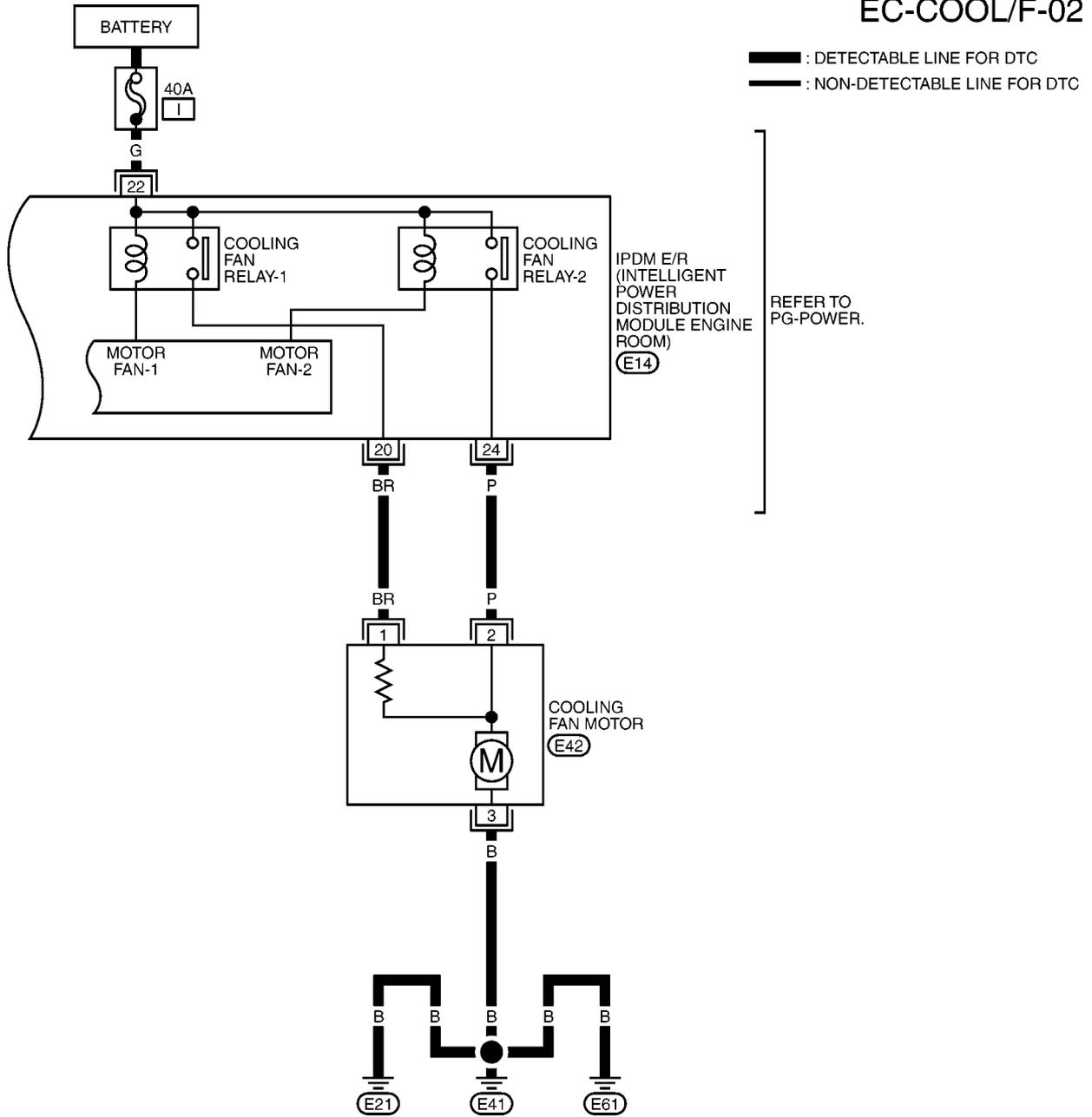
## Wiring Diagram



MBWA1332E

# DTC P0217 ENGINE OVER TEMPERATURE

## EC-COOL/F-02



E14  
W



E42  
GR

# DTC P0217 ENGINE OVER TEMPERATURE

EBS01KFP

## Diagnostic Procedure

### 1. CHECK COOLING FAN (CRANKSHAFT DRIVEN) OPERATION

1. Start engine and let it idle.
2. Make sure that cooling fan (crankshaft driven) operates normally.

OK or NG

OK (With CONSULT-II)>>GO TO 2.

OK (Without CONSULT-II)>>GO TO 3.

NG >> Check cooling fan (crankshaft driven). Refer to [CO-19, "Removal and Installation"](#) .

### 2. CHECK COOLING FAN OPERATION

#### Ⓟ With CONSULT-II

1. Start engine and let it idle.
2. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that cooling fan operate at each speed (LOW/HI).

OK or NG

OK >> GO TO 4.

NG >> Check cooling fan control circuit. (Go to [EC-139, "PROCEDURE A"](#) .)

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

SEF784Z

### 3. CHECK COOLING FAN OPERATION

#### ⓧ Without CONSULT-II

1. Perform IPDM E/R auto active test and check cooling fan motors operation, refer to [PG-19, "Auto Active Test"](#) .
2. Make sure that cooling fan operate at each speed (Low/High).

OK or NG

OK >> GO TO 4.

NG >> Check cooling fan control circuit. (Go to [EC-139, "PROCEDURE A"](#) .)

### 4. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops. Refer to [CO-7, "CHECKING RADIATOR SYSTEM FOR LEAKS"](#) .

- Reservoir tank (1)
- SST (EG17650301): A

#### **CAUTION:**

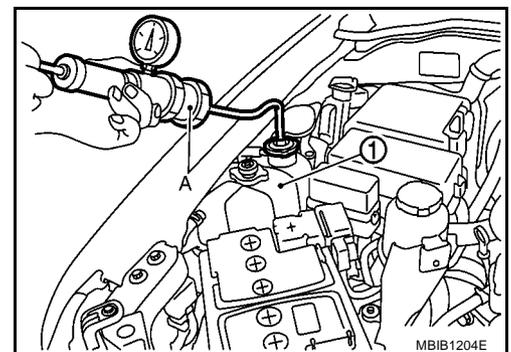
**Higher than the specified pressure may cause radiator damage. Pressure should not drop.**

OK or NG

OK >> GO TO 5.

NG >> Check the following for leak. Refer to [CO-7, "CHECKING RADIATOR SYSTEM FOR LEAKS"](#) .

- Hose
- Radiator
- Radiator cap
- Water pump
- Reservoir tank



## DTC P0217 ENGINE OVER TEMPERATURE

### 5. CHECK RESERVOIR TANK CAP

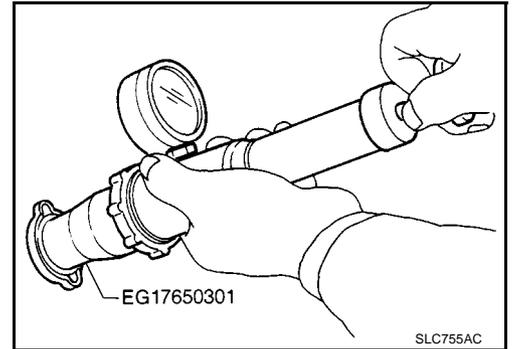
Apply pressure to cap with a tester and check reservoir tank cap relief pressure.

Refer to [CO-13, "Checking Reservoir Tank Cap"](#).

OK or NG

OK >> GO TO 6.

NG >> Replace reservoir tank cap.



### 6. CHECK COMPONENT PARTS

Check the following.

- Thermostat. Refer to [CO-23, "THERMOSTAT AND WATER PIPING"](#).
- Engine coolant temperature sensor. Refer to [EC-107, "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning component.

### 7. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to [EC-140, "Main 12 Causes of Overheating"](#).

>> **INSPECTION END**

# DTC P0217 ENGINE OVER TEMPERATURE

## PROCEDURE A

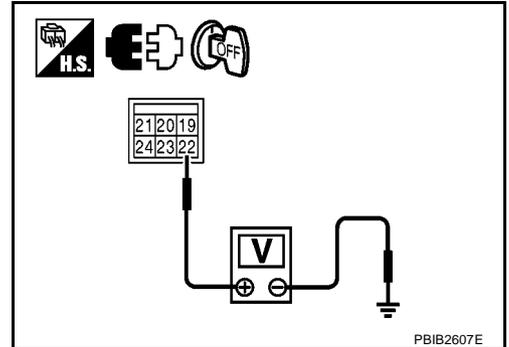
### 1. CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connectors E14.
3. Check voltage between IPDM E/R terminal 22 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

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



### 2. DETECT MALFUNCTIONING PART

Check the following.

- 40A fusible link
- Harness for open or short between IPDM E/R and battery

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

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

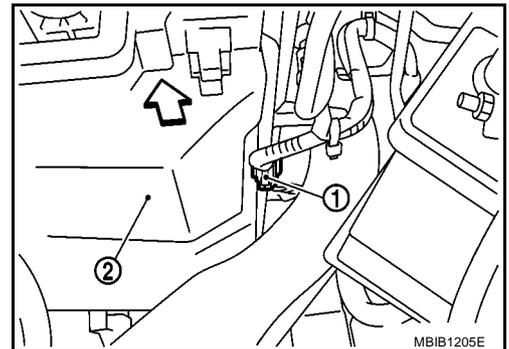
1. Disconnect cooling fan motor (1) harness connector.
  - ↶: Vehicle front
  - Radiator shroud (upper) (2)
2. Check harness continuity between the following;  
cooling fan motor terminal 1 and IPDM E/R terminal 20,  
cooling fan motor terminal 2 and IPDM E/R terminal 24.  
Refer to Wiring Diagram.

**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 COOLING FAN MOTOR GROUND CIRCUIT FOR OPEN OR SHORT

1. Check harness continuity between cooling fan motor terminal 3 and ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to power.

OK or NG

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

# DTC P0217 ENGINE OVER TEMPERATURE

## 5. CHECK COOLING FAN MOTOR

Refer to [EC-141, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace cooling fan motors.

## 6. CHECK INTERMITTENT INCIDENT

Perform [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-14, "IPDM E/R \(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM\)"](#) .

NG >> Repair or replace harness or connector.

## Main 12 Causes of Overheating

EBS01KFQ

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> <li>● Blocked radiator</li> <li>● Blocked condenser</li> <li>● Blocked radiator grille</li> <li>● Blocked bumper</li> </ul>	● Visual	No blocking	—
	2	● Coolant mixture	● Coolant tester	50 - 50% coolant mixture	See <a href="#">MA-16, "Engine Coolant Mixture Ratio"</a> .
	3	● Coolant level	● Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See <a href="#">CO-7, "LEVEL CHECK"</a> .
	4	● Reservoir tank cap	● Pressure tester	See <a href="#">CO-13, "Checking Reservoir Tank Cap"</a> .	
ON*2	5	● Coolant leaks	● Visual	No leaks	See <a href="#">CO-7, "CHECKING RADIATOR SYSTEM FOR LEAKS"</a> .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See <a href="#">CO-23, "THERMOSTAT AND WATER PIPING"</a> .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P0217 ( <a href="#">EC-132</a> ) .
ON*2	7	● Cooling fan (Crankshaft driven)	● Visual	Operating	See <a href="#">CO-19, "COOLING FAN"</a> .
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See <a href="#">CO-7, "Changing Engine Coolant"</a> .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See <a href="#">CO-7, "LEVEL CHECK"</a> .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See <a href="#">EM-92, "CYLINDER HEAD"</a> .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See <a href="#">EM-110, "CYLINDER BLOCK"</a> .

\*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-4, "OVERHEATING CAUSE ANALYSIS"](#) .

# DTC P0217 ENGINE OVER TEMPERATURE

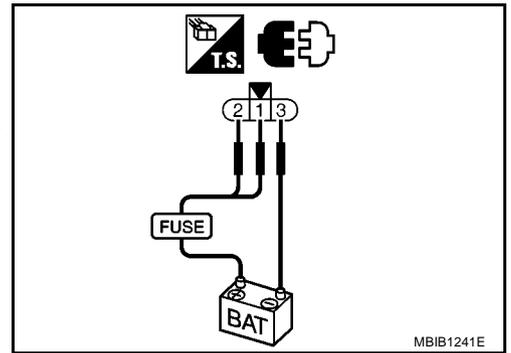
## Component Inspection COOLING FAN MOTOR

EBS01KFR

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

Cooling fan speed	Cooling fan motor terminals	
	(+)	(-)
Low (LOW)	1	3
High (HI)	2	3

**Cooling fan motor should operate.**  
If NG, replace cooling fan motor.



MBIB1241E

A  
EC  
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# DTC P0222, P0223 APP SENSOR

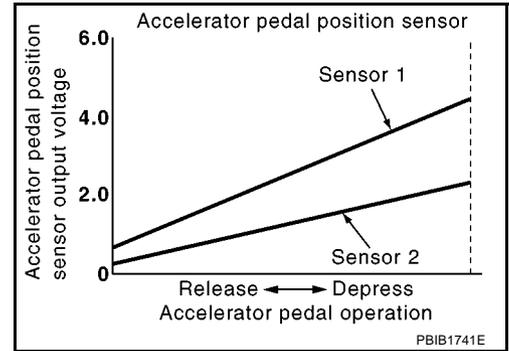
## DTC P0222, P0223 APP SENSOR

PFP:18002

### Description

EBS01KFS

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

EBS01KFT

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.65 - 0.87V
		Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.28 - 0.48V
		Accelerator pedal: Fully depressed	More than 2.0V

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

### ECM Terminals and Reference Value

EBS01KFU

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

#### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	W	Accelerator pedal position sensor 1 power supply	[Ignition switch ON]	Approximately 5.3V
83	R	Accelerator pedal position sensor 1	[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully released	0.95 - 1.17V
			[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 4.6V
84	B	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	W	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5.3V

# DTC P0222, P0223 APP SENSOR

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	R	Accelerator pedal position sensor 2	[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully released	0.58 - 0.78V
			[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 2.3V
92	B	Accelerator pedal position sensor 2 ground	[Ignition switch ON]	Approximately 0.3V

## On Board Diagnosis Logic

EBS01KFW

The MI will not light up for these self-diagnoses.

### NOTE:

If DTC P0222 or P0223 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	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 0223	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

## DTC Confirmation Procedure

EBS01KFW

### NOTE:

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

### ④ WITH CONSULT-II

- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-II.
- Wait at least 5 seconds.
- If DTC is detected, go to [EC-145, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

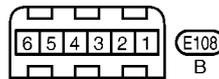
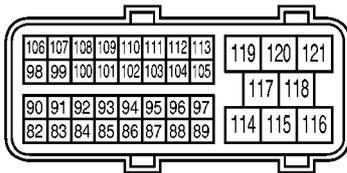
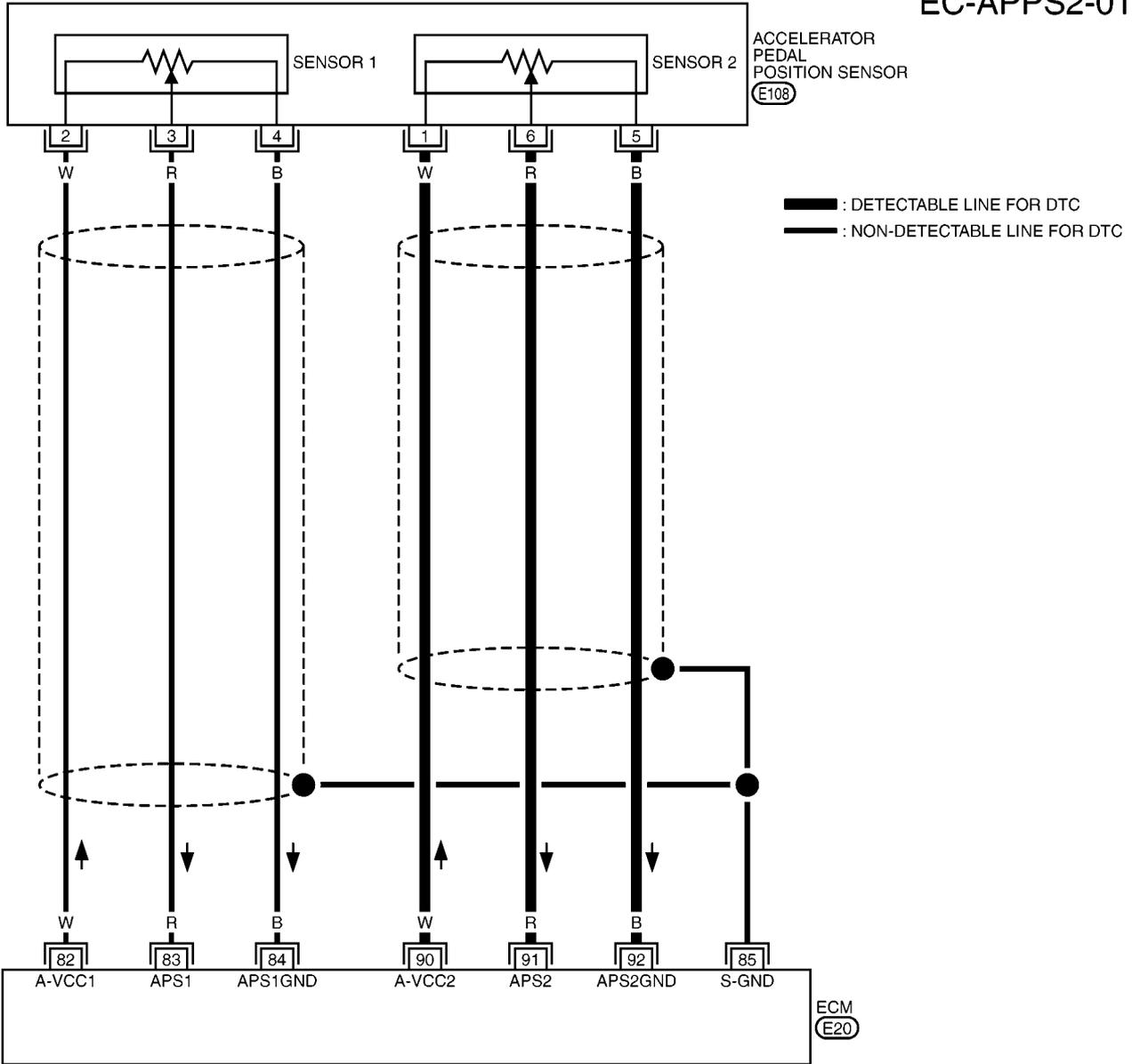
- Turn ignition switch ON and wait at least 5 seconds.
- Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
- Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
- If DTC is detected, go to [EC-145, "Diagnostic Procedure"](#).

# DTC P0222, P0223 APP SENSOR

EBS01KFX

## EC-APPS2-01

### Wiring Diagram



MBWA1043E

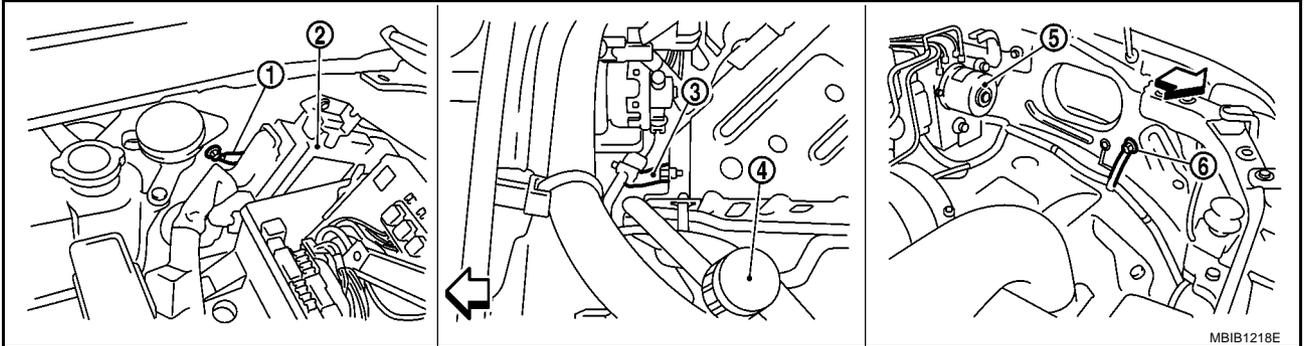
# DTC P0222, P0223 APP SENSOR

EBS01KFY

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

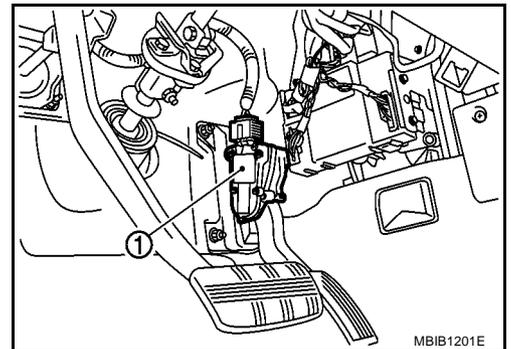
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### 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 (1) harness connector.
2. Turn ignition switch ON.

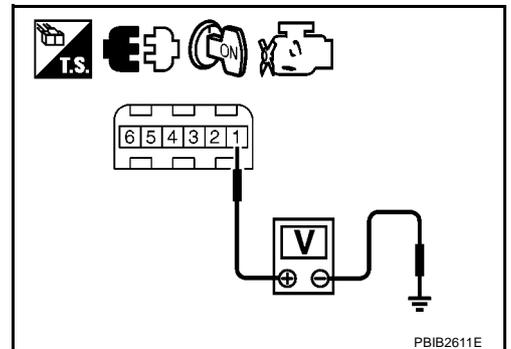


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5.3V**

#### OK or NG

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



## DTC P0222, P0223 APP SENSOR

### 3. 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 4.

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

### 4. 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 5.

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

### 5. CHECK APP SENSOR

Refer to [EC-146, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace accelerator pedal assembly.

### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

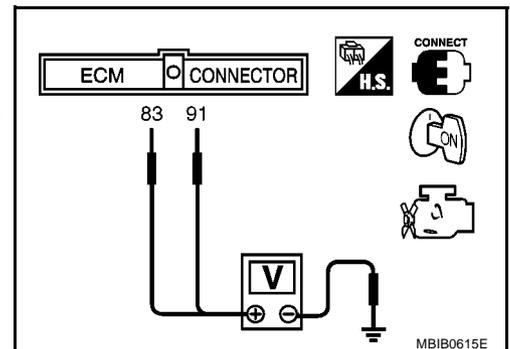
>> INSPECTION END

### Component Inspection ACCELERATOR PEDAL POSITION SENSOR

EBS01KFZ

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 ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.95 - 1.17V
	Fully depressed	More than 4.6V
91 (Accelerator pedal position sensor 2)	Fully released	0.58 - 0.78V
	Fully depressed	More than 2.3V



4. If NG, replace accelerator pedal assembly.

### Removal and Installation ACCELERATOR PEDAL

EBS01KG0

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

# DTC P0234 TC SYSTEM

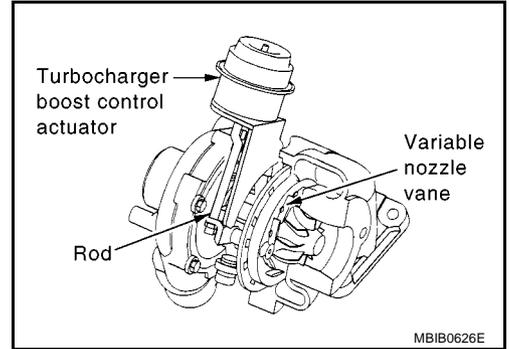
## DTC P0234 TC SYSTEM

PFP:14411

### Description

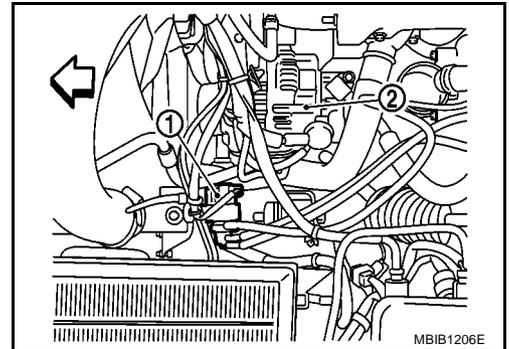
EBS01KG1

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 (1) is moved by ON/OFF pulse from the ECM. The longer the ON pulse, the charge air pressure rises.

- ↶: Vehicle front
- Alternator (2)



### ECM Terminals and Reference Value

EBS01KG3

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
6	BR	Turbocharger boost control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Idle speed</li> </ul>	<p>Approximately 6.3V ★</p> <p>10.0 V/Div 2 ms/Div T</p> <p>MBIB0899E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 8.6V ★</p> <p>10.0 V/Div 2 ms/Div T</p> <p>MBIB0890E</p>

# DTC P0234 TC SYSTEM

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
105 113	BR BR	ECM relay (self shut-off)	<b>[Ignition switch ON]</b> <b>[Ignition switch OFF]</b> <ul style="list-style-type: none"> <li>For a few seconds after turning ignition switch OFF</li> </ul>	Approximately 1.0V
			<b>[Ignition switch OFF]</b> <ul style="list-style-type: none"> <li>More than a few seconds after turning ignition switch OFF</li> </ul>	BATTERY VOLTAGE (11 - 14V)
119 120	R G	Power supply for ECM	<b>[Ignition switch ON]</b>	BATTERY VOLTAGE (11 - 14V)

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

## On Board Diagnosis Logic

EBS01KG4

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

### NOTE:

If DTC P0234 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#).

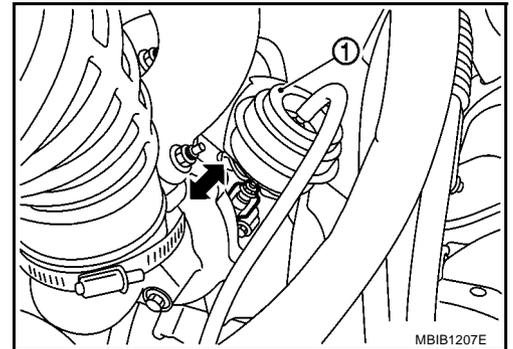
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0234 0234	Turbocharger overboost condition	ECM detects turbocharger boost pressure is excessively high.	<ul style="list-style-type: none"> <li>Turbocharger</li> <li>Vacuum pump</li> <li>Turbocharger boost sensor</li> <li>Turbocharger boost control solenoid valve</li> </ul>

## Overall Function Check

EBS01KG5

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

- Start engine and let it idle.
- Make sure that turbocharger control actuator (1) rod moves slightly when engine is started.
- If NG, go to [EC-150, "Diagnostic Procedure"](#).

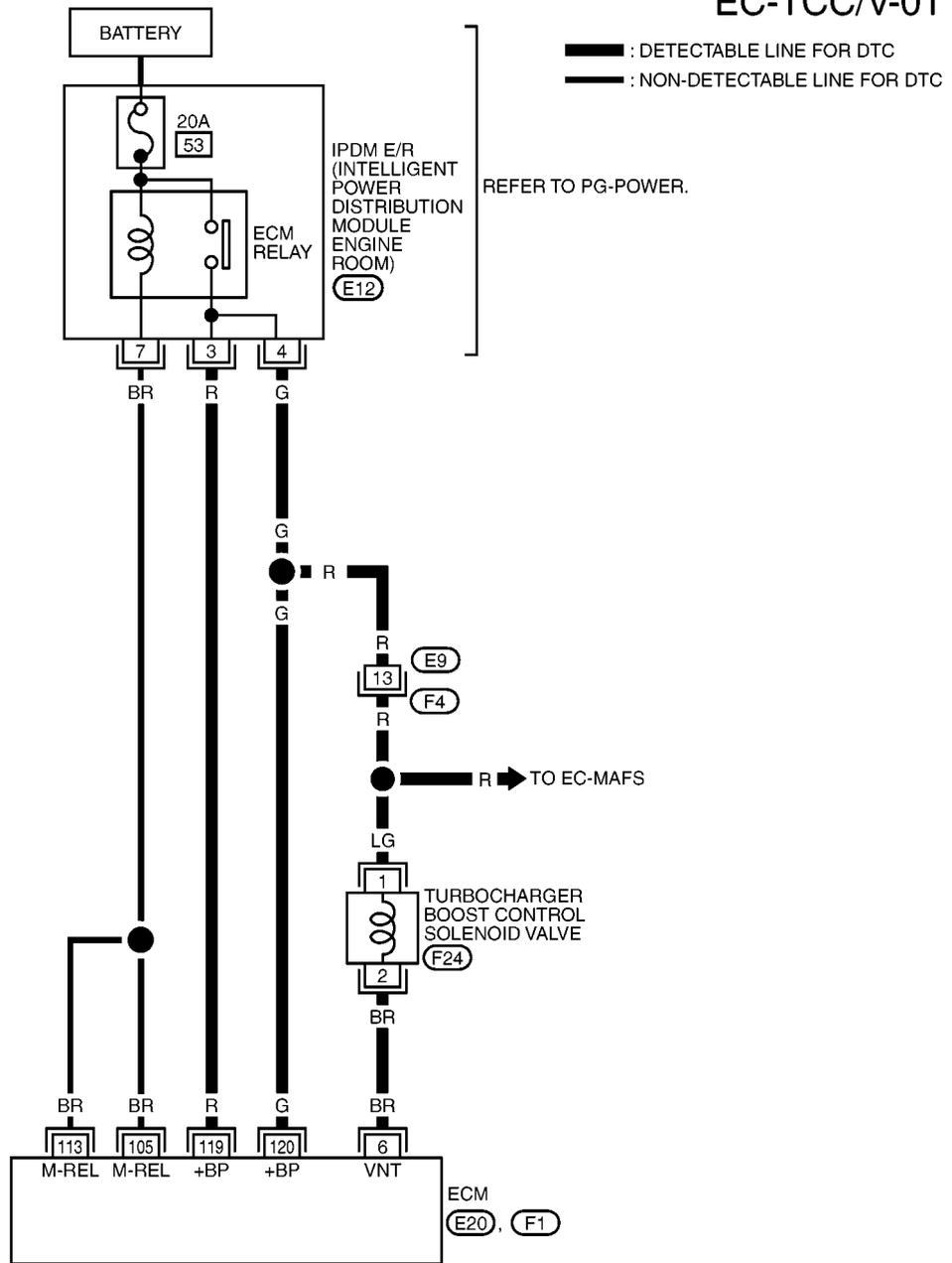


# DTC P0234 TC SYSTEM

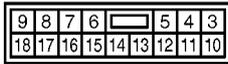
## Wiring Diagram

EBS01KG6

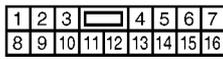
### EC-TCC/V-01



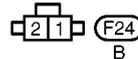
A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



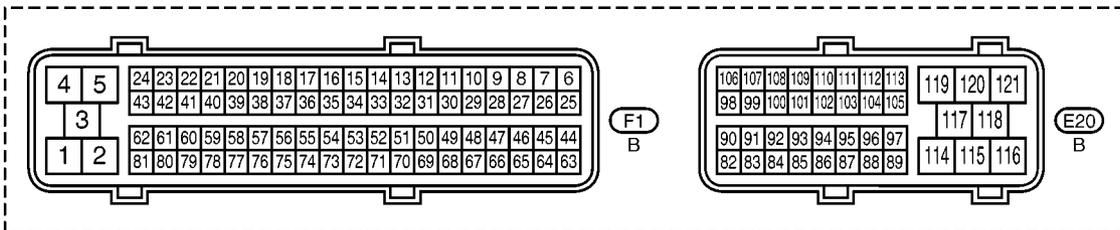
E12  
W



F4  
W



F24  
B



F1  
B

E20  
B



MBWA1044E

## Diagnostic Procedure

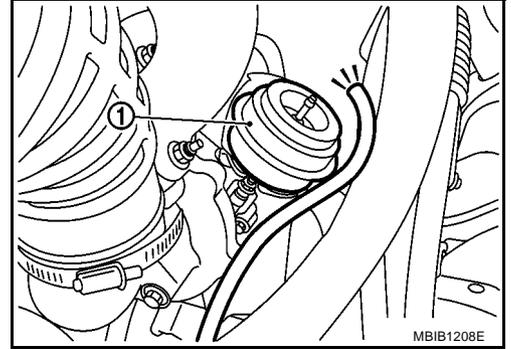
### 1. CHECK VACUUM SOURCE

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

**Vacuum should exist.**

OK or NG

- OK >> GO TO 8.  
 NG >> GO TO 2.

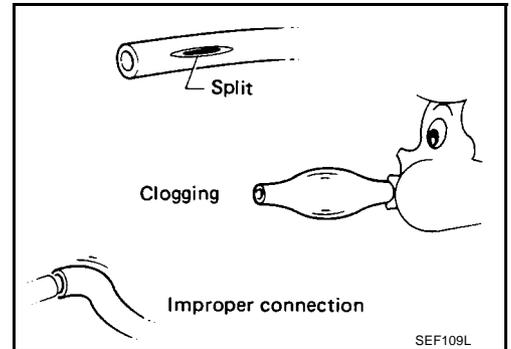


### 2. CHECK VACUUM HOSES AND VACUUM GALLERY

1. Turn ignition switch OFF.
2. Check vacuum hoses and vacuum gallery for clogging, cracks or improper connection.  
 Refer to [EC-16, "Vacuum Hose Drawing"](#).

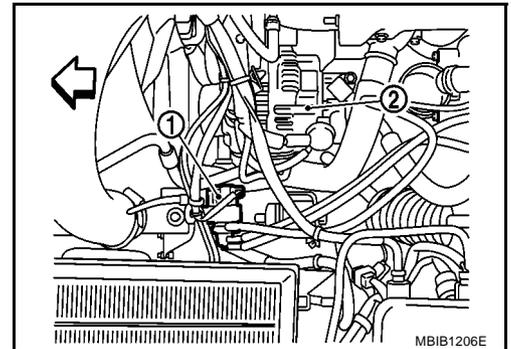
OK or NG

- 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 (1) harness connector.
  - ↖ : Vehicle front
  - Alternator (2)
2. Turn ignition switch ON.

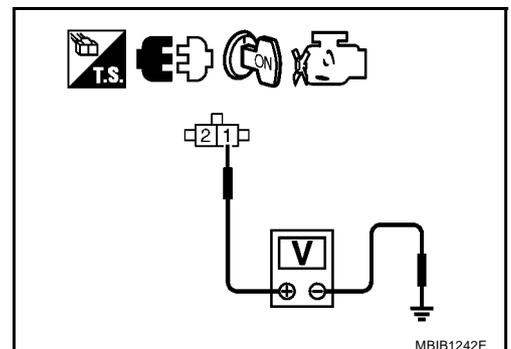


3. Check voltage between turbocharger boost control solenoid valve terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

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



# DTC P0234 TC SYSTEM

## 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F4
- Harness for open or short between IPDM E/R and turbocharger boost control solenoid valve
- Harness for open or short between ECM and turbocharger boost control solenoid valve

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

## 5. 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 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 6.

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

## 6. CHECK TURBOCHARGE BOOST CONTROL SOLENOID VALVE

Refer to [EC-152, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace turbocharger boost control solenoid valve.

## 7. CHECK VACUUM PUMP

Refer to [EM-42, "VACUUM PUMP"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace vacuum pump assembly.

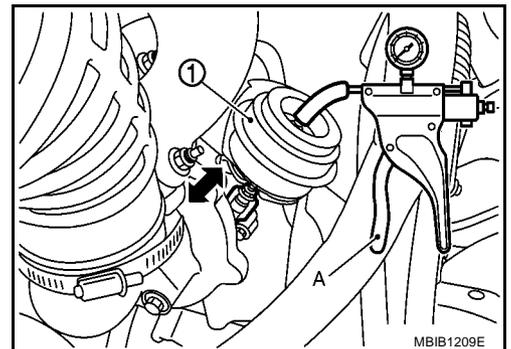
## 8. CHECK TURBOCHARGER BOOST CONTROL ACTUATOR

1. Turn ignition switch OFF.
2. Install a vacuum pump A to turbocharger boost control actuator (1).
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 9.

NG >> Replace turbocharger assembly.



## 9. CHECK TURBOCHARGER BOOST SENSOR

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

OK or NG

- OK >> GO TO 10.
- NG >> Replace turbocharger boost sensor.

## 10. CHECK INTERMITTENT INCIDENT

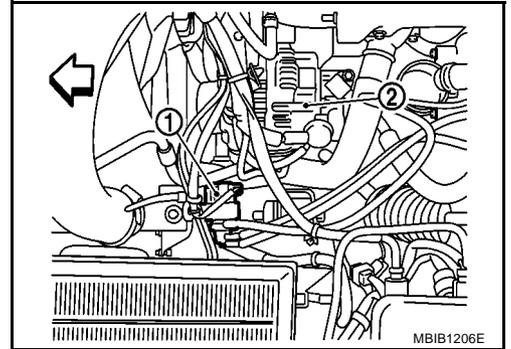
Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection TURBOCHARGER BOOST CONTROL SOLENOID VALVE

EBS01KG8

1. Disconnect turbocharger boost control solenoid valve (1) harness connector.
  - ↶ : Vehicle front
  - Alternator (2)

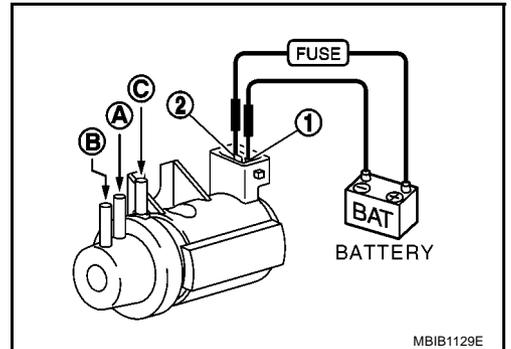


2. Apply 12V direct current between turbocharger boost control solenoid valve terminals.
3. Check air passage continuity of turbocharger boost control solenoid valve under the following conditions.

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 TURBOCHARGER BOOST CONTROL SOLENOID VALVE

EBS01KG9

Refer to [EM-18, "CHARGE AIR COOLER"](#) .

# DTC P0237, P0238 TC BOOST SENSOR

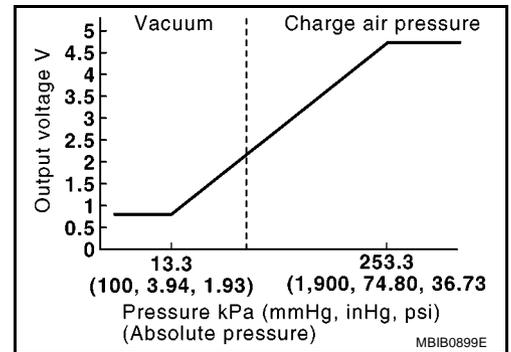
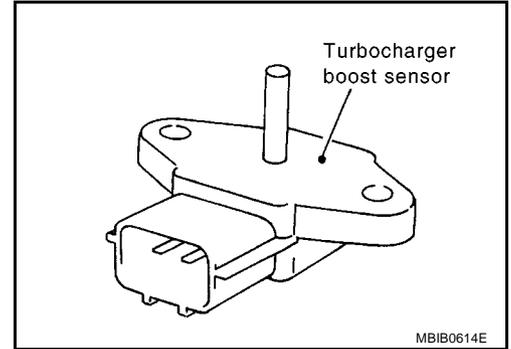
## DTC P0237, P0238 TC BOOST SENSOR

PFPP:22365

### Component Description

EBS01KGA

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

EBS01KGB

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
INT/M PRES SE [kPa]	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Air conditioner switch: OFF</li> <li>Shift lever: P or N (A/T), Neutral (M/T)</li> <li>No load</li> </ul>	Idle
		3,600 rpm
		4,000 rpm
		Approx. 100.00 kPa
		Approx. 140.00 kPa
		Approx. 135.00 kPa

### ECM Terminals and Reference Value

EBS01KGC

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.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
52	BR	Turbocharger boost sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Idle speed</li> </ul>	2.1 - 2.4V
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	2.3 - 2.6V
64	V	Turbocharger boost sensor power supply	<b>[Ignition switch ON]</b>	Approximately 5.3V
71	L	Turbocharger boost sensor ground	<b>[Ignition switch ON]</b>	Approximately 0.3V

# DTC P0237, P0238 TC BOOST SENSOR

EBS01KGD

## On Board Diagnosis Logic

The MI will not light up for these self-diagnoses.

### NOTE:

If DTC P0237 or P0238 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0237 0237	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 0238	Turbocharger boost sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

## DTC Confirmation Procedure

EBS01KGE

### NOTE:

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

### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-156, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-156, "Diagnostic Procedure"](#) .

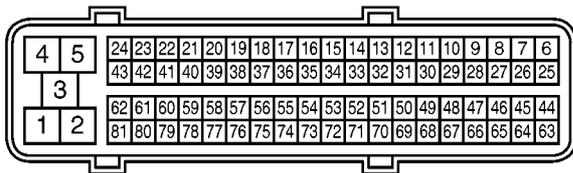
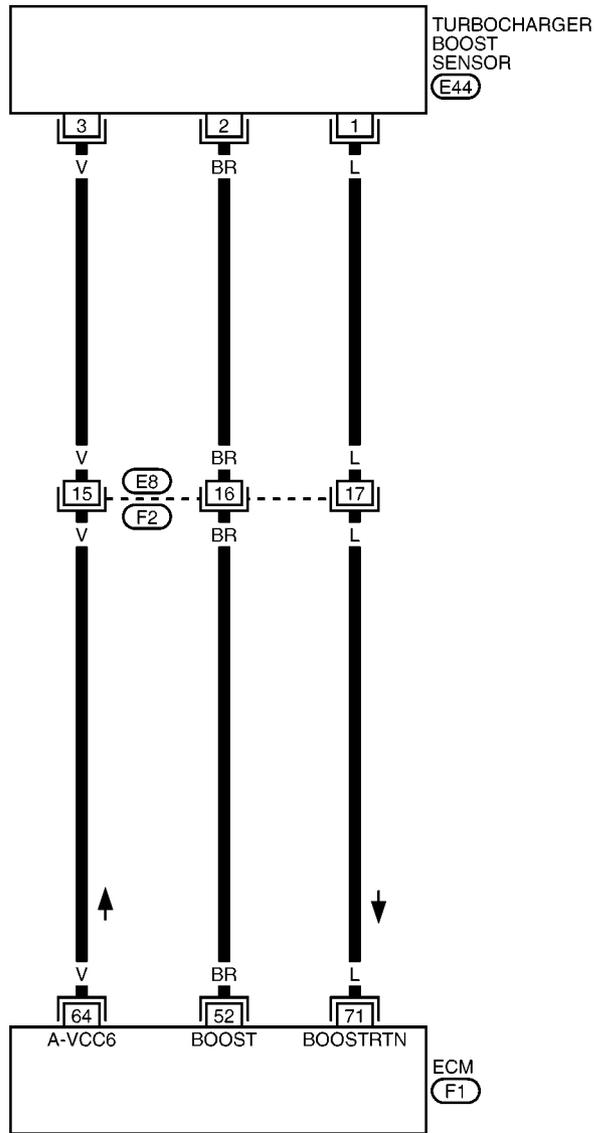
# DTC P0237, P0238 TC BOOST SENSOR

## Wiring Diagram

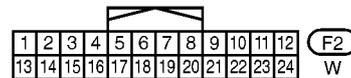
EBS01KGF

### EC-BOOST-01

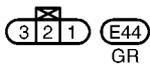
: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



F1 B H.S.



F2 W



MBWA1045E

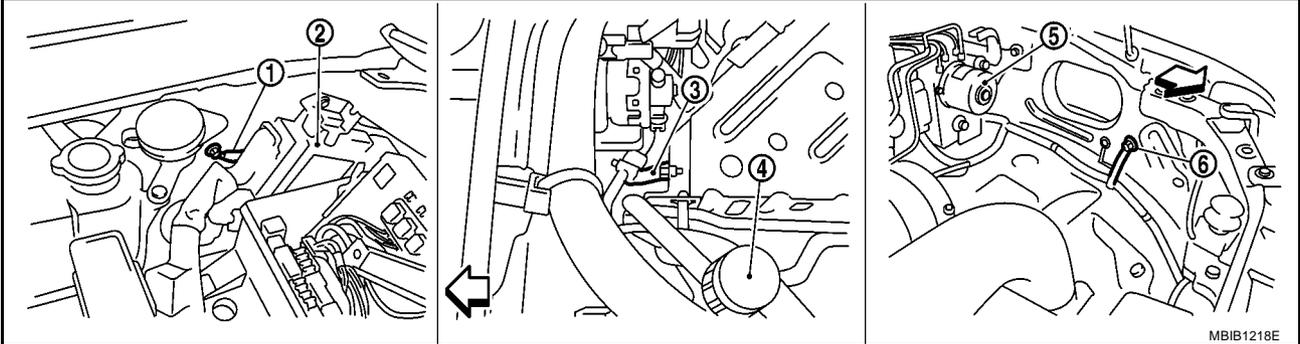
# DTC P0237, P0238 TC BOOST SENSOR

EBS01KGG

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

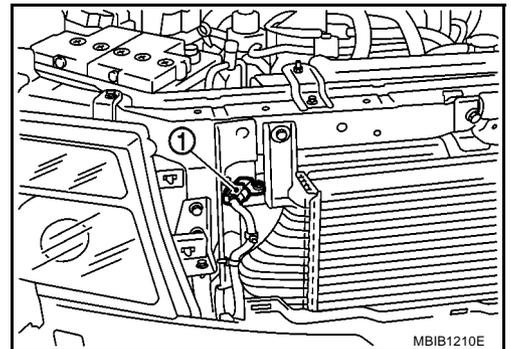
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### 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 (1) harness connector.
2. Turn ignition switch ON.

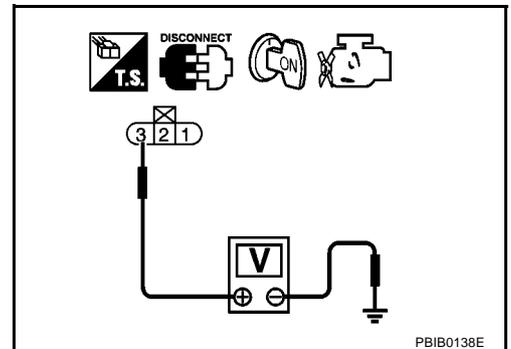


3. Check voltage between turbocharge boost sensor terminal 3 and ground with CONSULT-II or tester.

**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.



## DTC P0237, P0238 TC BOOST SENSOR

---

### 3. CHECK TURBOCHARGER 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 1 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 TURBOCHARGER 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-158, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace turbocharger boost sensor.

---

### 6. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

# DTC P0237, P0238 TC BOOST SENSOR

EBS01KGH

## Component Inspection

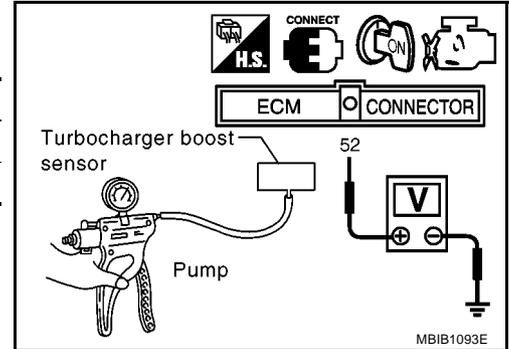
### CHECK TURBOCHARGER BOOST SENSOR

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 ECM terminal 52 and ground under the following conditions.

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 TURBOCHARGER BOOST SENSOR

Refer to [EM-18, "CHARGE AIR COOLER"](#) .

EBS01KGI

# DTC P0335 CKP SENSOR

## DTC P0335 CKP SENSOR

PF:23731

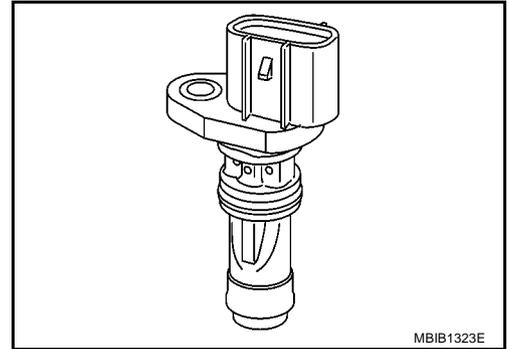
### Description

EBS01KGJ

The crankshaft position (CKP) sensor is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet and Hall IC.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change. The changing gap causes the magnetic field near the sensor to change. Due to the changing magnetic field, the voltage from the sensor changes. The ECM receives the voltage signal and detects the fluctuation of the engine revolution.



### CONSULT-II Reference Value in Data Monitor Mode

EBS01KGL

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
CKPS-RPM (TDC)	<ul style="list-style-type: none"> <li>Run engine and compare CONSULT-II value with the tachometer indication.</li> </ul>	Almost the same speed as the tachometer indication

### ECM Terminals and Reference Value

EBS01KGL

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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
44	W	Crankshaft position sensor power supply	[Ignition switch ON]	Approximately 5.3V
46	R	Crankshaft position sensor	[Engine is running] <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 3.7V ★ MBIB0879E
			[Engine is running] <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 3.7V ★ MBIB0880E
65	B	Crankshaft position sensor ground	[Ignition switch ON]	Approximately 0.3V
67	—	Sensor ground (Sensor shield circuit)	[Ignition switch ON]	Approximately 0.3V

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

# DTC P0335 CKP SENSOR

EBS01KGM

## On Board Diagnosis Logic

### NOTE:

If DTC P0335 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor circuit	Crankshaft position sensor signal is not detect by the ECM when engine is running.	<ul style="list-style-type: none"><li>● Harness or connectors (The sensor circuit is open or shorted.)</li><li>● Crankshaft position sensor</li></ul>

## DTC Confirmation Procedure

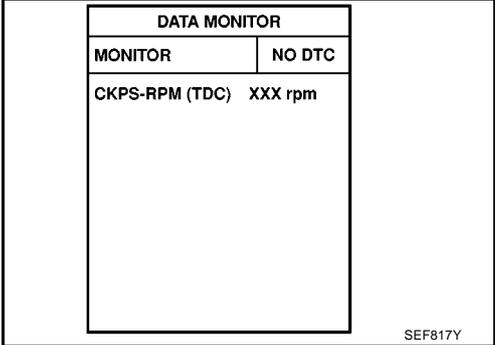
EBS01KGN

### NOTE:

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

### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.  
If engine can not start, keep ignition switch at START position for 5 seconds.
4. If DTC is detected, go to [EC-162, "Diagnostic Procedure"](#).



DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

1. Start engine and let it idle for at least 5 seconds.  
If engine can not start, keep ignition switch at START position for 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-162, "Diagnostic Procedure"](#).

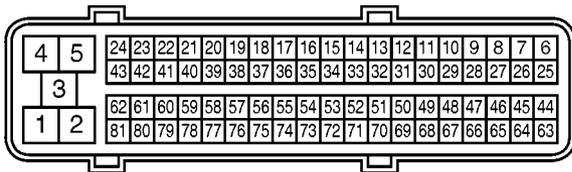
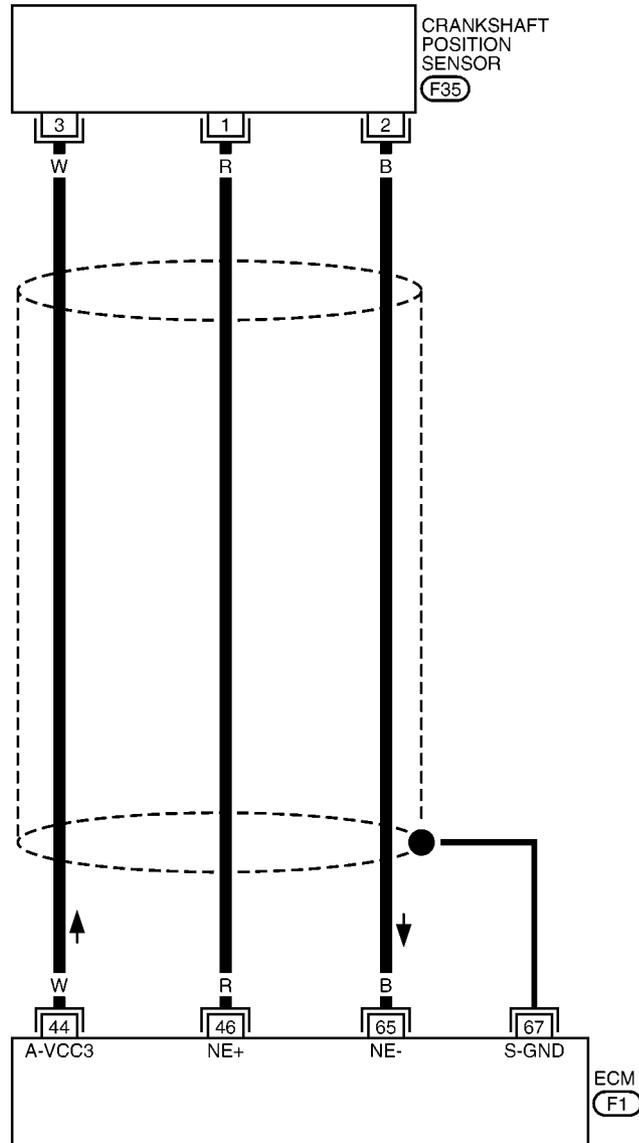
# DTC P0335 CKP SENSOR

## Wiring Diagram

EBS01KGO

EC-CKPS-01

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



(F1) B



(3 2 1) (F35) B

MBWA1046E

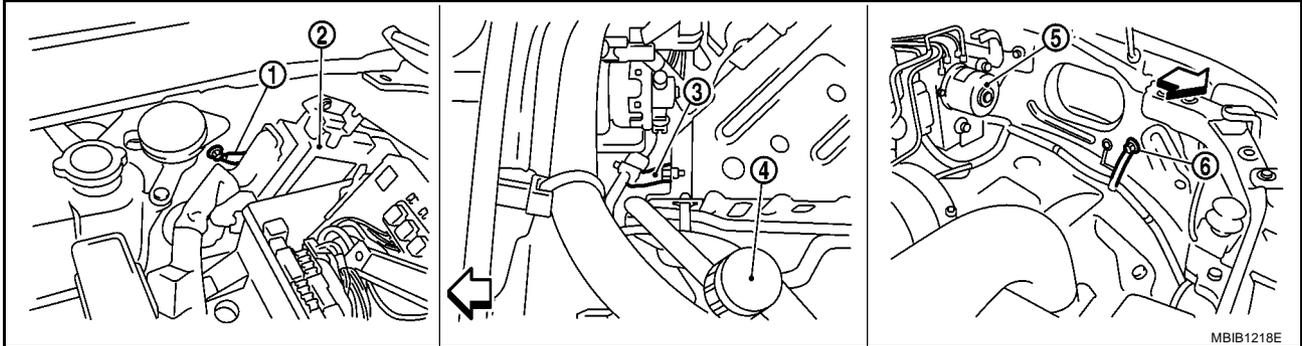
# DTC P0335 CKP SENSOR

EBS01KGP

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



↔ : Vehicle front

1. Body ground E21

2. ECM

3. Body ground E41

4. A/C high-pressure service valve

5. ABS actuator and electric unit  
(control unit)

6. Body ground E61

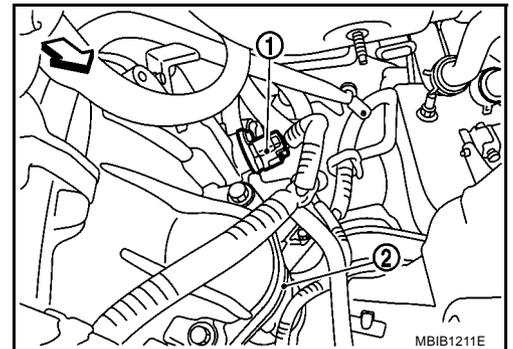
#### OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

### 2. CHECK CKP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position sensor (1) harness connector.
  - Illustration shows the view from under the vehicle
  - ↔: Vehicle front
  - Starter motor (2)
2. Turn ignition switch ON.



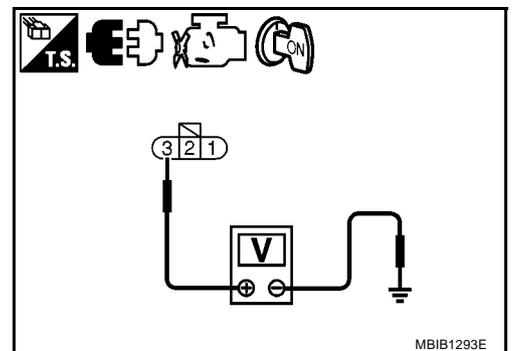
3. Check voltage between CKP sensor terminal 3 and ground with CONSULT-II or tester.

**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.



# DTC P0335 CKP SENSOR

---

## 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 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 5.

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

---

## 5. CHECK CRANKSHAFT POSITION SENSOR

---

Refer to [EC-164, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace crankshaft position sensor.

---

## 6. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

A

EC

C

D

E

F

G

H

I

J

K

L

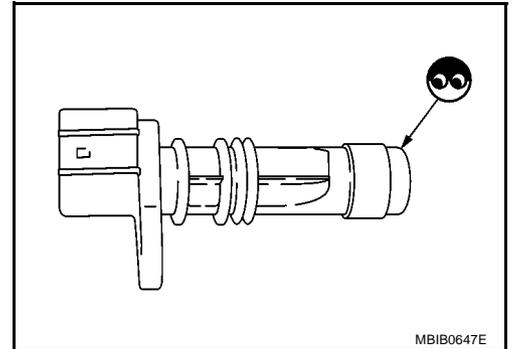
M

# DTC P0335 CKP SENSOR

EBS01KGQ

## Component Inspection CRANKSHAFT POSITION SENSOR

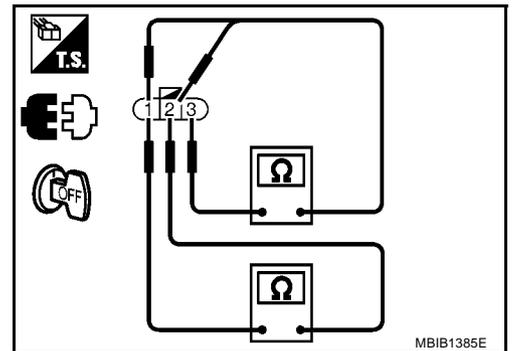
1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
3 (+) - 1 (-)	
3 (+) - 2 (-)	

6. If NG, replace crankshaft position sensor.



## Removal and Installation CRANKSHAFT POSITION SENSOR

EBS01KGR

Refer to [EM-36, "OIL PAN AND OIL STRAINER"](#) .

# DTC P0336 CKP SENSOR

## DTC P0336 CKP SENSOR

PF:23731

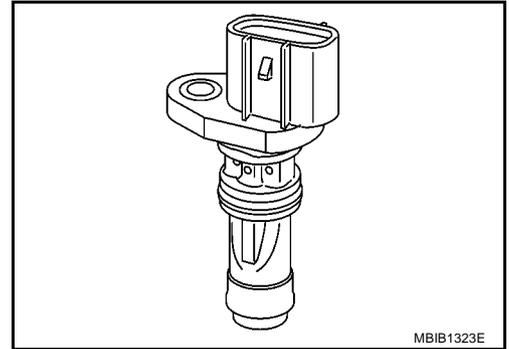
### Description

EBS01KGS

The crankshaft position (CKP) sensor is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet and Hall IC.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change. The changing gap causes the magnetic field near the sensor to change. Due to the changing magnetic field, the voltage from the sensor changes. The ECM receives the voltage signal and detects the fluctuation of the engine revolution.



### CONSULT-II Reference Value in Data Monitor Mode

EBS01KGT

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
CKPS-RPM (TDC)	<ul style="list-style-type: none"> <li>Run engine and compare CONSULT-II value with the tachometer indication.</li> </ul>	Almost the same speed as the tachometer indication.

### ECM Terminals and Reference Value

EBS01KGU

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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
44	W	Crankshaft position sensor power supply	[Ignition switch ON]	Approximately 5.3V
46	R	Crankshaft position sensor	[Engine is running] <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 3.7V ★ MBIB0879E
			[Engine is running] <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 3.7V ★ MBIB0880E
65	B	Crankshaft position sensor ground	[Ignition switch ON]	Approximately 0.3V
67	—	Sensor ground (Sensor shield circuit)	[Ignition switch ON]	Approximately 0.3V

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

# DTC P0336 CKP SENSOR

## On Board Diagnosis Logic

EBS01KGV

### NOTE:

If DTC P0336 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0336 0336	Crankshaft position sensor circuit range/performance	Crankshaft position sensor signal is not in the normal pattern when engine is running.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Crankshaft position sensor</li> <li>● Signal plate</li> </ul>

## DTC Confirmation Procedure

EBS01KGW

### NOTE:

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

### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.  
If engine can not start, keep ignition switch at START position for 5 seconds.
4. If DTC is detected, go to [EC-168, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

1. Start engine and let it idle for at least 5 seconds.  
If engine can not start, keep ignition switch at START position for 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-168, "Diagnostic Procedure"](#).

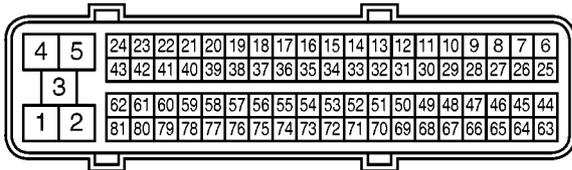
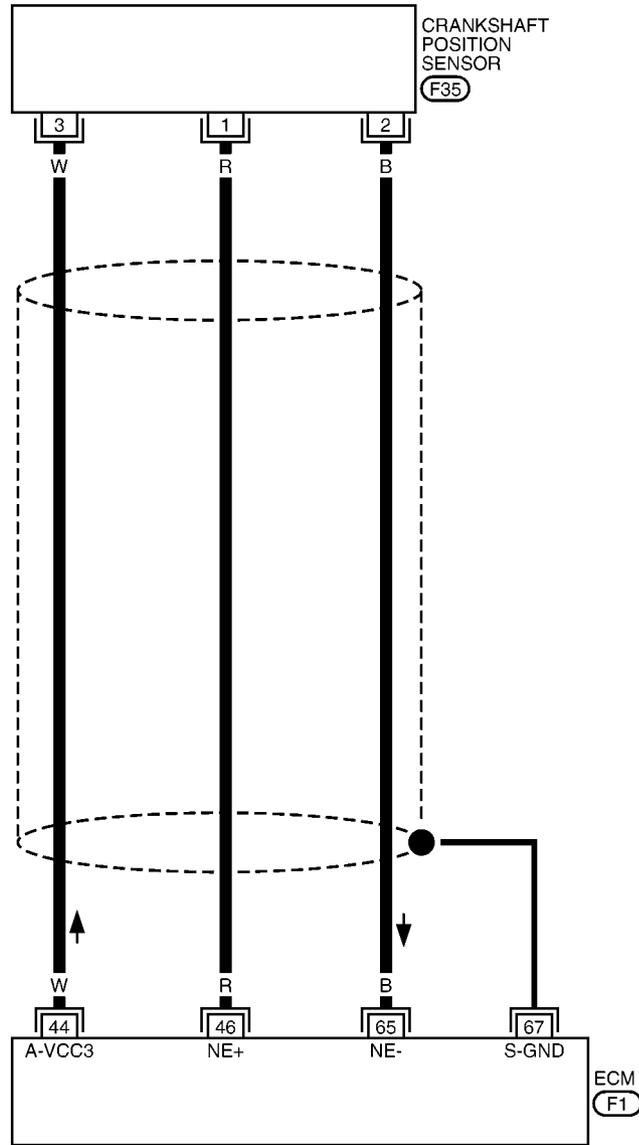
# DTC P0336 CKP SENSOR

## Wiring Diagram

EBS01KGX

EC-CKPS-01

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



(F1) B



(3 2 1) (F35) B

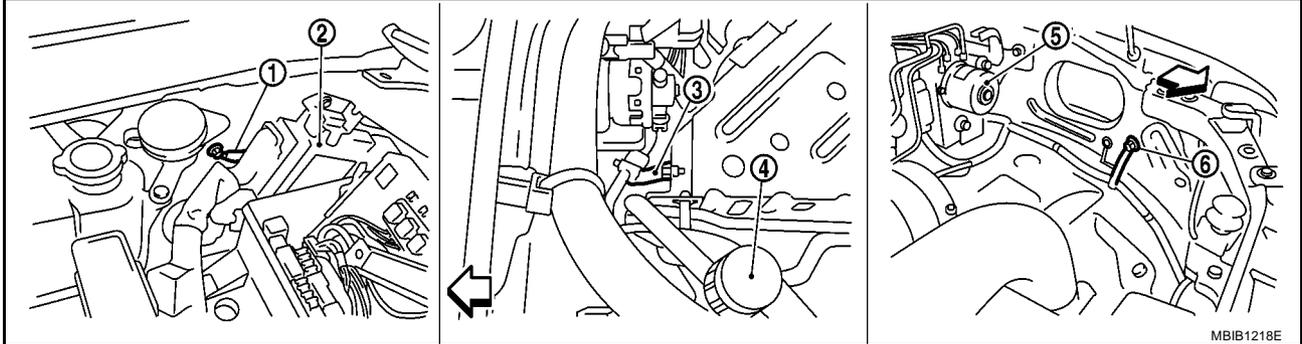
# DTC P0336 CKP SENSOR

EBS01KGY

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



↔ : Vehicle front

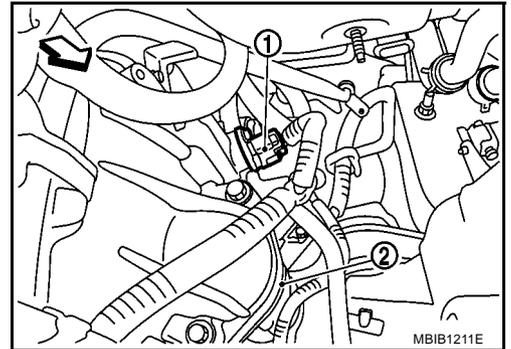
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### 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 (1) harness connector.
  - Illustration shows the view from under the vehicle
  - ↔: Vehicle front
  - Starter motor (2)
2. Turn ignition switch ON.



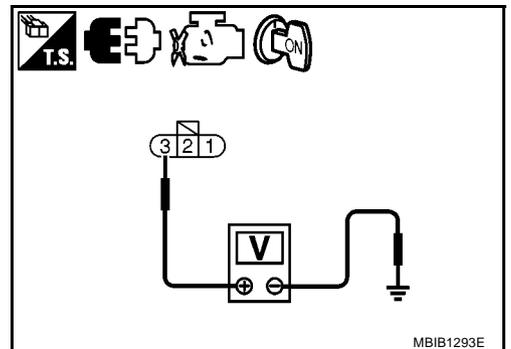
3. Check voltage between CKP sensor terminal 3 and ground with CONSULT-II or tester.

**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.



# DTC P0336 CKP SENSOR

---

## 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 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

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

---

## 5. CHECK CRANKSHAFT POSITION SENSOR

---

Refer to [EC-170, "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-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

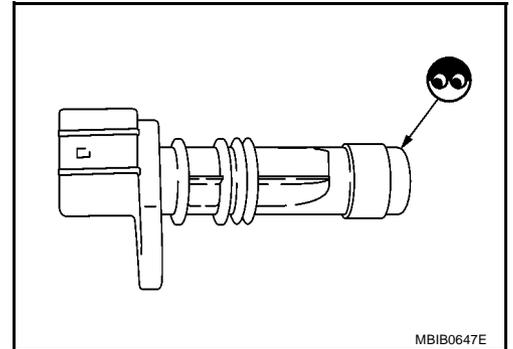
**>> INSPECTION END**

# DTC P0336 CKP SENSOR

EBS01KGZ

## Component Inspection CRANKSHAFT POSITION SENSOR

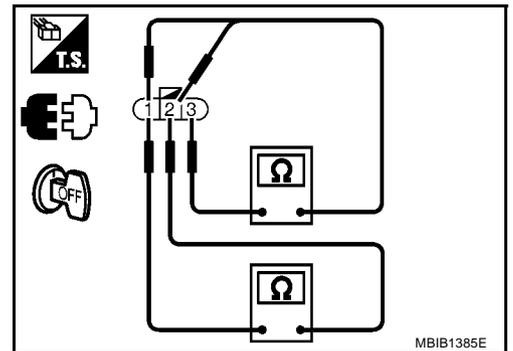
1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
3 (+) - 1 (-)	
3 (+) - 2 (-)	

6. If NG, replace crankshaft position sensor.



## Removal and Installation CRANKSHAFT POSITION SENSOR

EBS01KH0

Refer to [EM-36. "OIL PAN AND OIL STRAINER"](#) .

# DTC P0340 CMP SENSOR

## DTC P0340 CMP SENSOR

PFP:23731

### Description

EBS01KH1

The camshaft position (CMP) sensor senses the retraction with camshaft (left side) to identify a particular cylinder. The camshaft position (CMP) sensor senses the piston position.

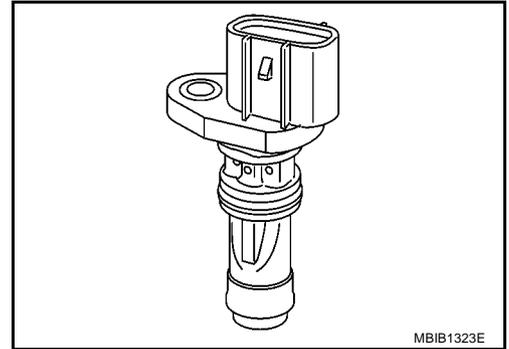
When the crankshaft position (CKP) sensor system becomes inoperative, the camshaft position (CMP) sensor provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

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

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.



### ECM Terminals and Reference Value

EBS01KH2

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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
45	W	Camshaft position sensor power supply	[Ignition switch ON]	Approximately 5.3V
47	R	Camshaft position sensor	[Engine is running] <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 4.9V ★ MBIB0877E
			[Engine is running] <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 4.9V ★ MBIB0878E
66	B	Camshaft position sensor ground	[Ignition switch ON]	Approximately 0.3V
67	—	Sensor ground (Sensor shield circuit)	[Ignition switch ON]	Approximately 0.3V

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

# DTC P0340 CMP SENSOR

EBS01KH3

## On Board Diagnosis Logic

### NOTE:

If DTC P0340 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor circuit	Camshaft position sensor signal is not detect by the ECM when engine is running.	<ul style="list-style-type: none"><li>● Harness or connectors (The sensor circuit is open or shorted.)</li><li>● Camshaft position sensor</li></ul>

## DTC Confirmation Procedure

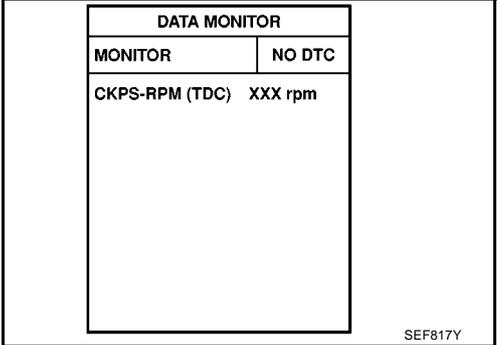
EBS01KH4

### NOTE:

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

### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.  
If engine can not start, keep ignition switch at START position for 5 seconds.
4. If DTC is detected, go to [EC-174, "Diagnostic Procedure"](#) .



DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

1. Start engine and let it idle for at least 5 seconds.  
If engine can not start, keep ignition switch at START position for 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-174, "Diagnostic Procedure"](#) .



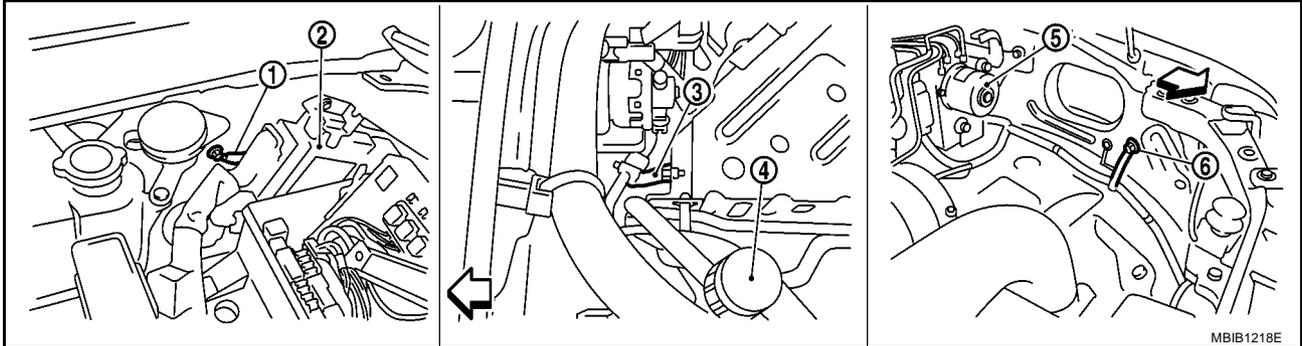
# DTC P0340 CMP SENSOR

EBS01KH6

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



↔ : Vehicle front

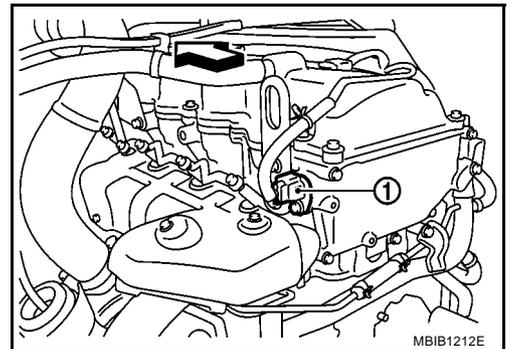
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### OK or NG

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

### 2. CHECK CMP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (1) harness connector.  
- ↔: Vehicle front
2. Turn ignition switch ON.

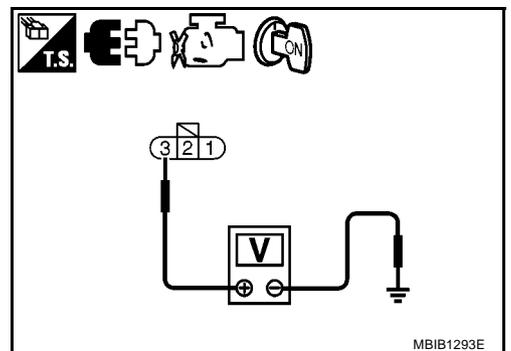


3. Check voltage between CMP sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5.3V**

#### OK or NG

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



# DTC P0340 CMP SENSOR

## 3. 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 4.

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

## 4. 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 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 CAMSHAFT POSITION SENSOR

Refer to [EC-175, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace camshaft position sensor.

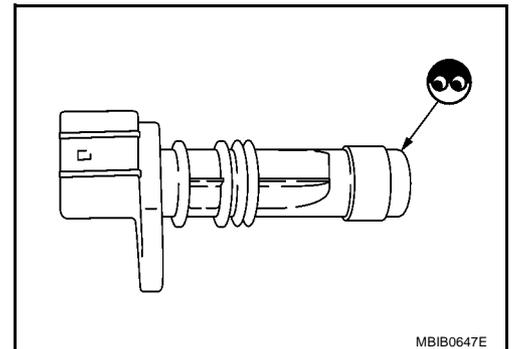
## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection 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.

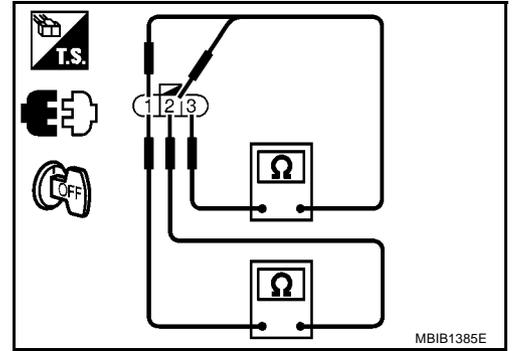


## DTC P0340 CMP SENSOR

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
3 (+) - 1 (-)	
3 (+) - 2 (-)	

6. If NG, replace camshaft position sensor.



### Removal and Installation CAMSHAFT POSITION SENSOR

Refer to [EM-59, "CAMSHAFT"](#) .

EBS01KH8

# DTC P0341 CMP SENSOR

PFP:23731

## DTC P0341 CMP SENSOR

### Description

EBS01KH9

The camshaft position (CMP) sensor senses the retraction with camshaft (left side) to identify a particular cylinder. The camshaft position (CMP) sensor senses the piston position.

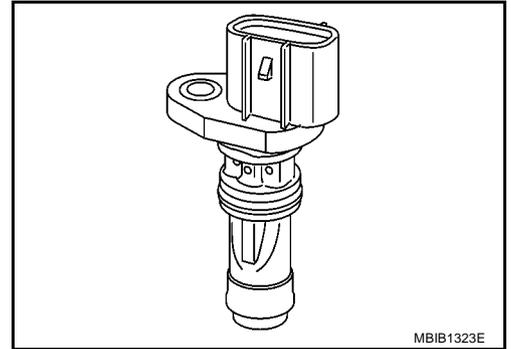
When the crankshaft position (CKP) sensor system becomes inoperative, the camshaft position (CMP) sensor provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

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

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.



### ECM Terminals and Reference Value

EBS01KHA

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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
45	W	Camshaft position sensor power supply	[Ignition switch ON]	Approximately 5.3V
47	R	Camshaft position sensor	[Engine is running] ● Warm-up condition ● Idle speed <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 4.9V ★  MBIB0877E
			[Engine is running] ● Warm-up condition ● Engine speed: 2,000 rpm	Approximately 4.9V ★  MBIB0878E
66	B	Camshaft position sensor ground	[Ignition switch ON]	Approximately 0.3V
67	—	Sensor ground (Sensor shield circuit)	[Ignition switch ON]	Approximately 0.3V

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

# DTC P0341 CMP SENSOR

## On Board Diagnosis Logic

EBS01KHB

### NOTE:

If DTC P0341 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0341 0341	Camshaft position sensor circuit range/performance	Camshaft position sensor signal is not in the normal pattern when engine is running.	<ul style="list-style-type: none"> <li>● Harness connectors (The sensor circuit is opener shorted.)</li> <li>● Camshaft position sensor</li> <li>● Starter motor</li> <li>● Starting system circuit</li> <li>● Signal plate</li> </ul>

## DTC Confirmation Procedure

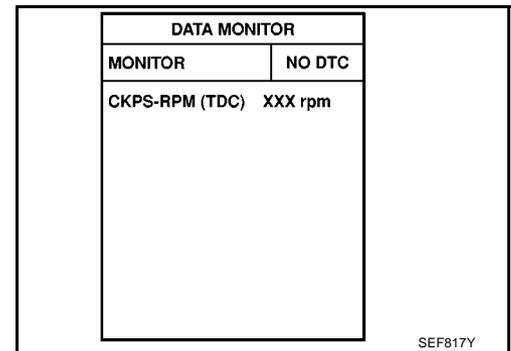
EBS01KHC

### NOTE:

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

### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.  
If engine can not start, keep ignition switch at START position for 5 seconds.
4. If DTC is detected, go to [EC-180, "Diagnostic Procedure"](#) .



### ⊗ WITHOUT CONSULT-II

1. Start engine and let it idle for at least 5 seconds.  
If engine can not start, keep ignition switch at START position for 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-180, "Diagnostic Procedure"](#) .

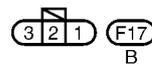
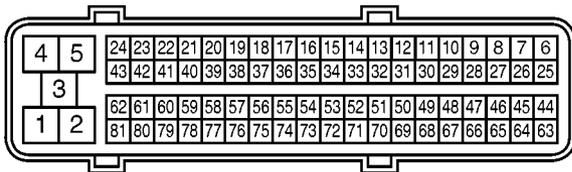
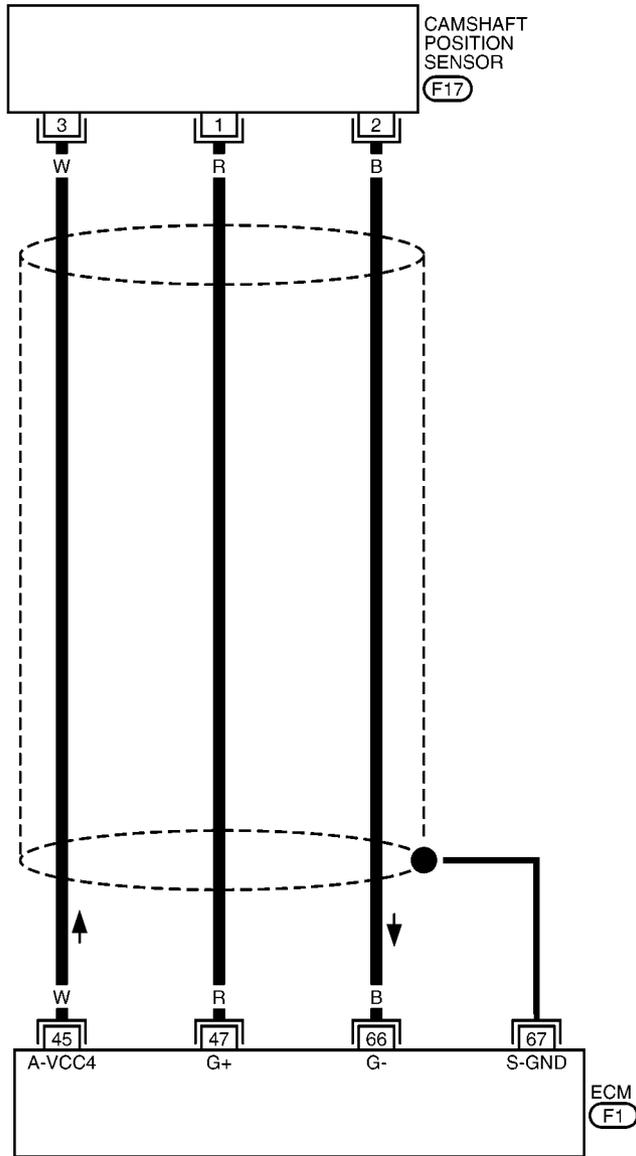
# DTC P0341 CMP SENSOR

## Wiring Diagram

EBS01KHD

EC-CMPS-01

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



MBWA1047E

# DTC P0341 CMP SENSOR

EBS01KHE

## Diagnostic Procedure

### 1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

**Does the starter motor operate?**

**Does the engine turn over?**

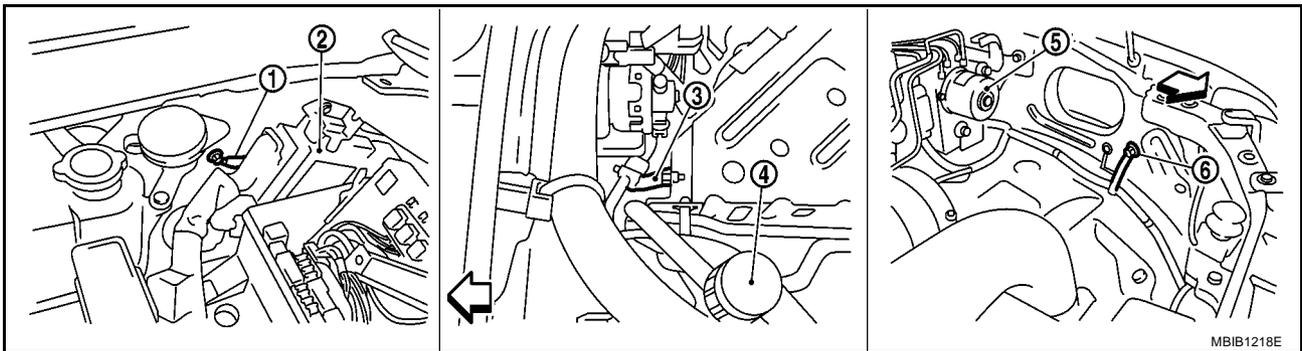
Yes or No

Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-27, "STARTING SYSTEM"](#) .)

### 2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#) .



← : Vehicle front

1. Body ground E21

2. ECM

3. Body ground E41

4. A/C high-pressure service valve

5. ABS actuator and electric unit  
(control unit)

6. Body ground E61

OK or NG

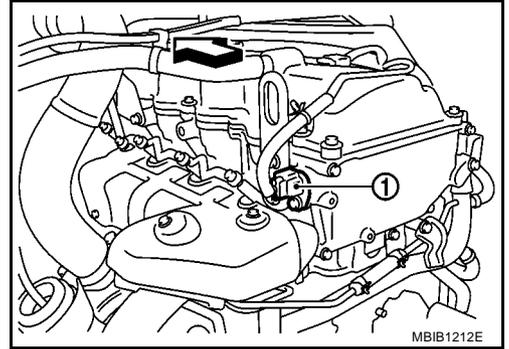
OK >> GO TO 3.

NG >> Repair or replace ground connections.

# DTC P0341 CMP SENSOR

## 3. CHECK CMP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (1) harness connector.
  - ⇐: Vehicle front
2. Turn ignition switch ON.

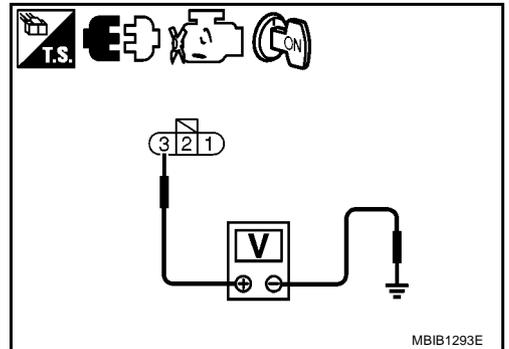


3. Check voltage between CMP sensor terminal 3 and ground with CONSULT-II or tester.

**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 and short to power.

OK or NG

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

## 6. CHECK CAMSHAFT POSITION SENSOR

Refer to [EC-182, "Component Inspection"](#).

OK or NG

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

# DTC P0341 CMP SENSOR

## 7. CHECK CAMSHAFT (LEFT SIDE)

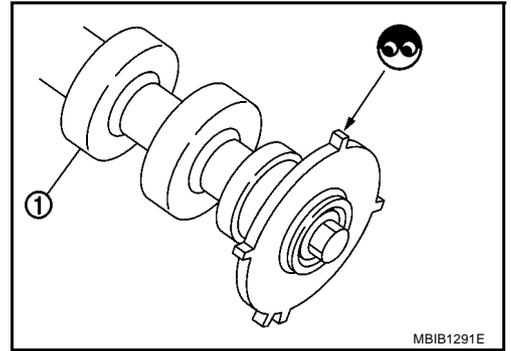
Check the following.

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

OK or NG

OK >> GO TO 8.

NG >> Remove debris and clean the signal plate of camshaft (left side) rear end or replace signal plate.



## 8. CHECK INTERMITTENT INCIDENT

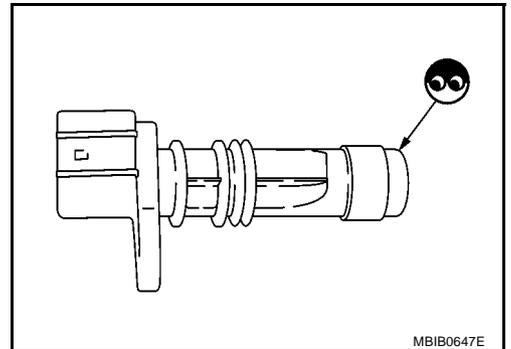
Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection CAMSHAFT POSITION SENSOR

EBS01KHF

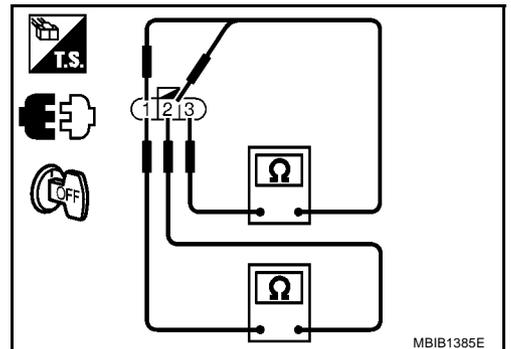
1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
3 (+) - 1 (-)	
3 (+) - 2 (-)	

6. If NG, replace camshaft position sensor.



### Removal and Installation CAMSHAFT POSITION SENSOR

EBS01KHG

Refer to [EM-59, "CAMSHAFT"](#) .

# DTC P0501 ASCD VEHICLE SPEED SENSOR

## DTC P0501 ASCD VEHICLE SPEED SENSOR

PFP:24810

### Component Description

EBS01KHH

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-355, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for ASCD functions.

### On Board Diagnosis Logic

EBS01KHI

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-79, "DTC U1000 CAN COMMUNICATION LINE"](#).
- If DTC P0501 is displayed with DTC P0606, first perform the trouble diagnosis for DTC P0606. Refer to [EC-215, "DTC P0606 ECM"](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0501 0501	Vehicle speed sensor range/performance	A change of vehicle speed signal is excessively large during specified time.	<ul style="list-style-type: none"> <li>● Harness or connectors (The CAN communication line is open or shorted.)</li> <li>● Combination meter</li> <li>● ABS actuator and electric unit (control unit)</li> <li>● Wheel sensor</li> <li>● ECM</li> </ul>

### DTC Confirmation Procedure

EBS01KHJ

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

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

#### TESTING CONDITION:

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

#### ④ WITH CONSULT-II

1. Start engine.
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-184, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm
VHCL SPEED SE	XXX km/h

MBIB1085E

# DTC P0501 ASCD VEHICLE SPEED SENSOR

---

## ⊗ WITHOUT CONSULT-II

### TESTING CONDITION:

Step 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

1. Start engine.
2. Drive the vehicle at more than 10 km/h (6 MPH).
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to [EC-184, "Diagnostic Procedure"](#) .

## Diagnostic Procedure

EBS01KHK

### 1. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

---

Refer to [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"](#) .

>> INSPECTION END

# DTC P0502 ASCD VEHICLE SPEED SENSOR

## DTC P0502 ASCD VEHICLE SPEED SENSOR

PPF:24810

### Component Description

EBS01KHL

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-355, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for ASCD functions.

### On Board Diagnosis Logic

EBS01KHM

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-79, "DTC U1000 CAN COMMUNICATION LINE"](#).
- If DTC P0502 is displayed with DTC P0606, first perform the trouble diagnosis for DTC P0606. Refer to [EC-215, "DTC P0606 ECM"](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0502 0502	Vehicle speed sensor circuit low input	Vehicle speed signal is excessively low compared with the driving condition.	<ul style="list-style-type: none"> <li>● Harness or connectors (The CAN communication line is open or shorted.)</li> <li>● Combination meter</li> <li>● ABS actuator and electric unit (control unit)</li> <li>● Wheel sensor</li> <li>● ECM</li> </ul>

### DTC Confirmation Procedure

EBS01KHN

#### 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.
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 (M/T)	Released
Shift lever	1st position

4. If DTC is detected, go to [EC-186, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

MBIB1084E

# DTC P0502 ASCD VEHICLE SPEED SENSOR

## ⊗ WITHOUT CONSULT-II

### TESTING CONDITION:

Step 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

1. Start engine and warm it up to normal operating temperature.
2. Maintain the following condition for at least 5 seconds.

Engine speed	More than 2,800 rpm
Clutch pedal (M/T)	Released
Shift lever	1st position

3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to [EC-188, "Diagnostic Procedure"](#) .

## Diagnostic Procedure

EBS01KHO

### 1. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Refer to [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"](#) .

>> INSPECTION END

# DTC P0503 ASCD VEHICLE SPEED SENSOR

## DTC P0503 ASCD VEHICLE SPEED SENSOR

PPF:24810

### Component Description

EBS01KHP

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-355, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for ASCD functions.

### On Board Diagnosis Logic

EBS01KHQ

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-79, "DTC U1000 CAN COMMUNICATION LINE"](#).
- If DTC P0503 is displayed with DTC P0606, first perform the trouble diagnosis for DTC P0606. Refer to [EC-215, "DTC P0606 ECM"](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0503 0503	Vehicle speed sensor circuit high input	Vehicle speed signal is excessively high compared with the driving condition.	<ul style="list-style-type: none"> <li>● Harness or connectors (The CAN communication line is open or shorted.)</li> <li>● Combination meter</li> <li>● ABS actuator and electric unit (control unit)</li> <li>● Wheel sensor</li> <li>● ECM</li> </ul>

### DTC Confirmation Procedure

EBS01KHR

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

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

#### TESTING CONDITION:

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

#### ④ WITH CONSULT-II

1. Start engine.
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-188, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm
VHCL SPEED SE	XXX km/h

MBIB1085E

# DTC P0503 ASCD VEHICLE SPEED SENSOR

---

## ⊗ WITHOUT CONSULT-II

### TESTING CONDITION:

Step 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

1. Start engine.
2. Drive the vehicle at more than 10 km/h (6 MPH).
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to [EC-188, "Diagnostic Procedure"](#) .

## Diagnostic Procedure

EBS01KHS

### 1. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

---

Refer to [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"](#) .

>> INSPECTION END

# DTC P0504 ASCD BRAKE SWITCH

## DTC P0504 ASCD BRAKE SWITCH

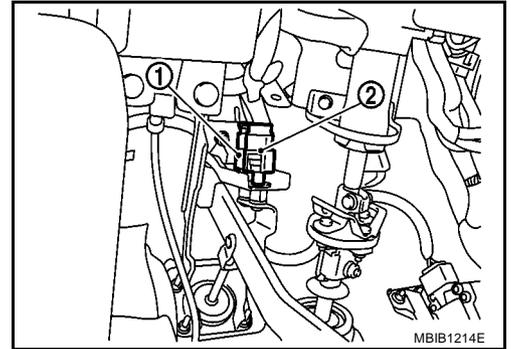
PF2:25320

### Component Description

EBS01KHT

When the brake pedal is depressed, ASCD brake switch (1) and stop lamp switch (2) are turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).

Refer to [EC-355, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



### CONSULT-II Reference Value in Data Monitor Mode

EBS01KHU

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: Fully released (A/T) ● Clutch pedal and brake pedal: Fully released (M/T)	OFF
		● Brake pedal: Slightly depressed (A/T) ● Clutch pedal and/or brake pedal: Slightly depressed (M/T)	ON

### ECM Terminals and Reference Value

EBS01KHV

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

#### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
100	V	Stop lamp switch	<b>[Ignition switch OFF]</b> ● Brake pedal fully released	Approximately 0V
			<b>[Ignition switch OFF]</b> ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
101	W	ASCD brake switch	<b>[Ignition switch ON]</b> ● Brake pedal: Fully released (A/T) ● Clutch pedal and brake pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14V)
			<b>[Ignition switch ON]</b> ● Brake pedal: Slightly depressed (A/T) ● Clutch pedal and/or brake pedal: Slightly depressed (M/T)	Approximately 0V

# DTC P0504 ASCD BRAKE SWITCH

EBS01KHW

## On Board Diagnosis Logic

The MI will not light up for this diagnosis.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0504 0504	ASCD brake switch	<ul style="list-style-type: none"> <li>● 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.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (The stop lamp switch circuit is open or shorted.)</li> <li>● Harness or connectors (The ASCD brake switch circuit is open or shorted.)</li> <li>● Harness or connectors (The ASCD clutch switch circuit is open or shorted.) (M/T)</li> <li>● Stop lamp switch</li> <li>● ASCD brake switch</li> <li>● ASCD clutch switch (M/T)</li> <li>● Incorrect stop lamp switch installation</li> <li>● Incorrect ASCD brake switch installation</li> <li>● Incorrect ASCD clutch switch installation (M/T)</li> <li>● ECM</li> </ul>

## DTC confirmation Procedure

EBS01KHX

### 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.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Press MAIN switch and make sure that CRUISE indicator lights up.
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

If DTC is detected, go to [EC-193, "Diagnostic Procedure"](#) .  
If DTC is not detected, go to the following step.

5. 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.

6. If DTC is detected, go to [EC-193, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm
VHCL SPEED SE	XXX km/h

MBIB1085E

# DTC P0504 ASCD BRAKE SWITCH

## ⊗ WITHOUT CONSULT-II

1. Start engine.
2. Press MAIN switch and make sure that CRUISE indicator lights up.
3. Drive the vehicle for at least 5 consecutive seconds under the following condition.

Vehicle speed	More than 5 km/h (3 MPH)
Selector lever	Suitable position

4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.  
If DTC is detected, go to [EC-193, "Diagnostic Procedure"](#) .  
If DTC is not detected, go to the following step.
6. Start engine.
7. Drive the vehicle for at least 5 consecutive seconds under the following condition.

Vehicle speed	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.

8. If DTC is detected, go to [EC-193, "Diagnostic Procedure"](#) .

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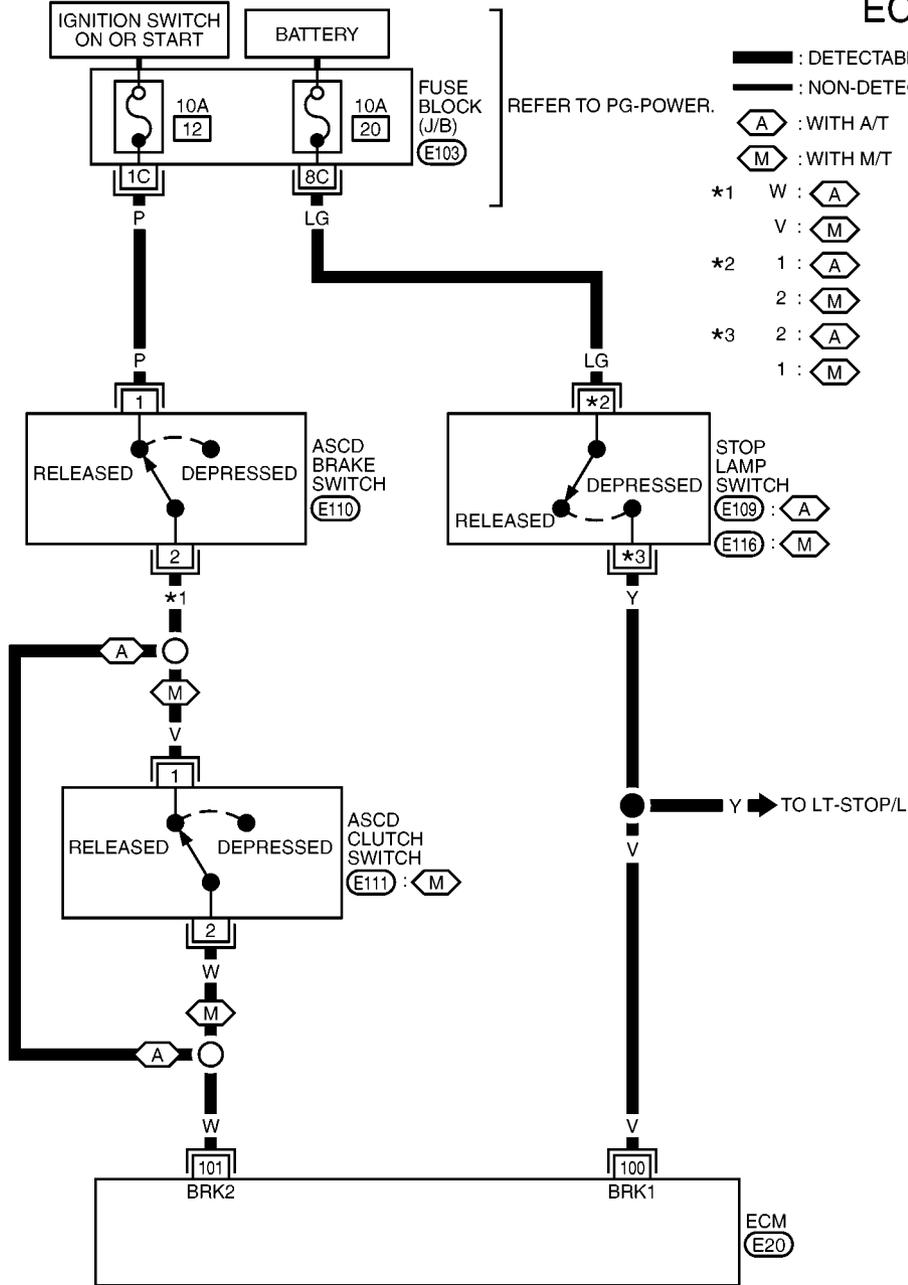
M

# DTC P0504 ASCD BRAKE SWITCH

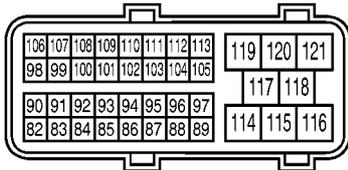
EBS01KHY

## Wiring Diagram

### EC-ASC/BS-01



- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ⬡ : WITH A/T
- ⬢ : WITH M/T
- \*1 W : ⬡
- V : ⬢
- \*2 1 : ⬡
- 2 : ⬢
- \*3 2 : ⬡
- 1 : ⬢



(E20) B



4 3

2 1

(E109) W

2

1

(E110) BR

1 2

(E111) L

REFER TO THE FOLLOWING.

(E103) -FUSE BLOCK-JUNCTION BOX (J/B)

1 2

(E116) B

# DTC P0504 ASCD BRAKE SWITCH

EBS01KHZ

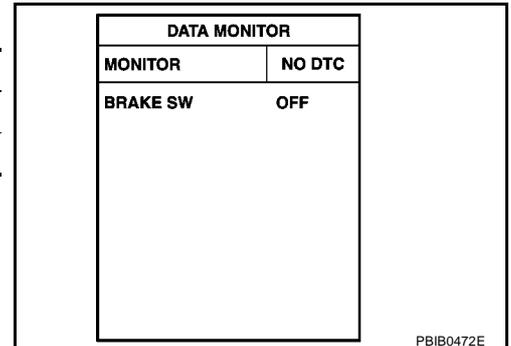
## Diagnostic Procedure A/T MODELS

### 1. CHECK OVERALL FUNCTION-I

#### ④ 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
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON



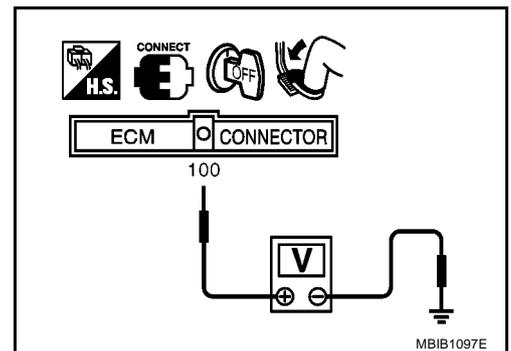
#### ⊗ Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 100 and ground under the following conditions.

CONDITION	VOLTAGE
Brake pedal: Fully released	Approximately 0V
Brake pedal: Slightly depressed	Battery voltage

#### OK or NG

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



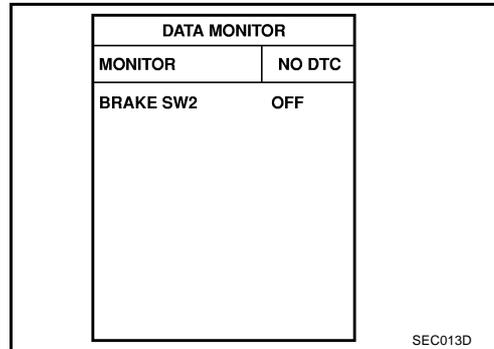
# DTC P0504 ASCD BRAKE SWITCH

## 2. CHECK OVERALL FUNCTION-II

### With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

CONDITION	INDICATION
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON



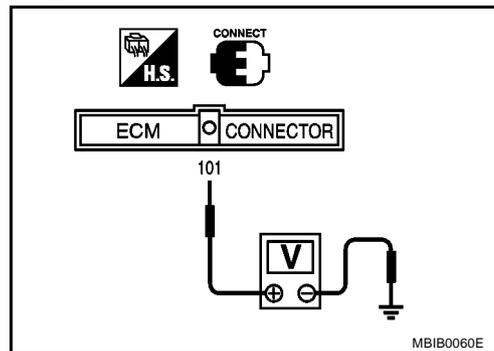
### Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
Brake pedal: Fully released	Battery voltage
Brake pedal: Slightly depressed	Approximately 0V

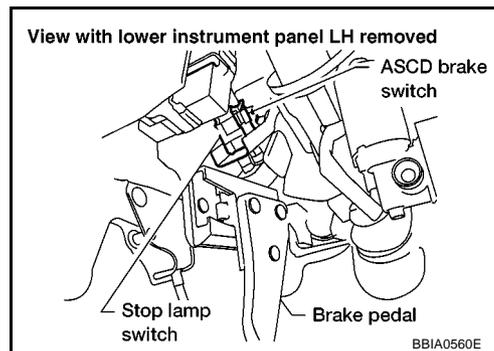
OK or NG

- OK >> GO TO 11.
- NG >> GO TO 7.



## 3. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

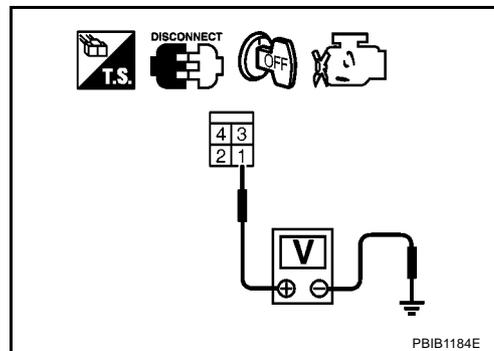


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

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



# DTC P0504 ASCD BRAKE SWITCH

## 4. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between stop lamp switch and battery

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

## 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 6.

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

## 6. CHECK STOP LAMP SWITCH

Refer to [EC-202, "Component Inspection"](#).

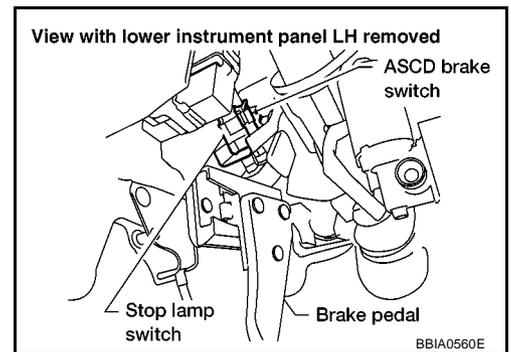
OK or NG

OK >> GO TO 11.

NG >> Replace stop lamp switch.

## 7. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.



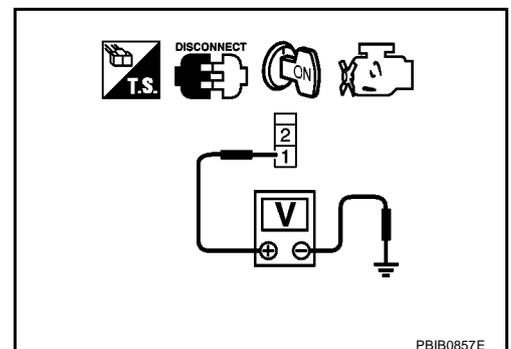
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.



# DTC P0504 ASCD BRAKE SWITCH

---

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

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

## 9. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and ASCD brake switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 10.

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

## 10. CHECK ASCD BRAKE SWITCH

---

Refer to [EC-341, "Component Inspection"](#)

OK or NG

OK >> GO TO 11.

NG >> Replace ASCD brake switch.

## 11. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DTC P0504 ASCD BRAKE SWITCH

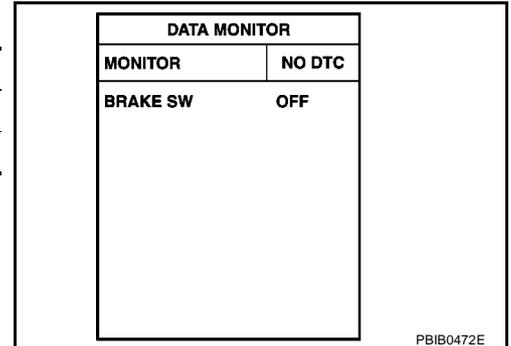
## M/T MODELS

### 1. CHECK OVERALL FUNCTION-I

#### ④ 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.

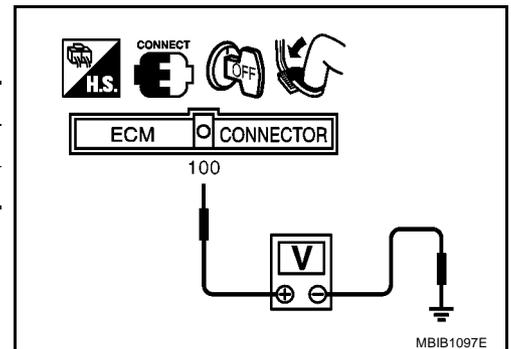
CONDITION	INDICATION
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON



#### ⊗ Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 100 and ground under the following conditions.

CONDITION	VOLTAGE
Brake pedal: Fully released	Approximately 0V
Brake pedal: Slightly depressed	Battery voltage



#### OK or NG

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

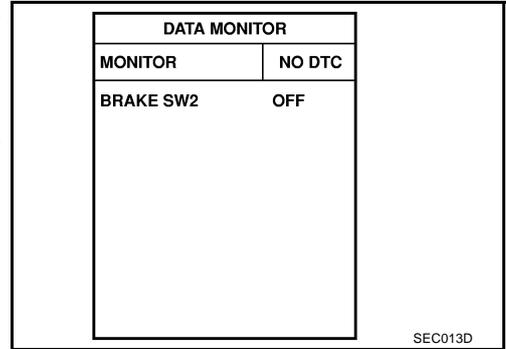
# DTC P0504 ASCD BRAKE SWITCH

## 2. CHECK OVERALL FUNCTION-II

### With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

CONDITION	INDICATION
Clutch pedal and brake pedal: Fully released	OFF
Clutch pedal and/or brake pedal: Slightly depressed	ON



### Without CONSULT-II

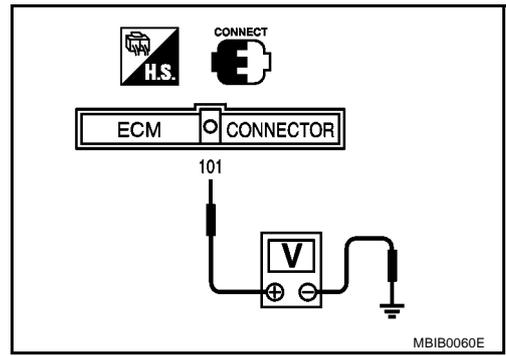
Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
Clutch pedal and brake pedal: Fully released	Battery voltage
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0V

OK or NG

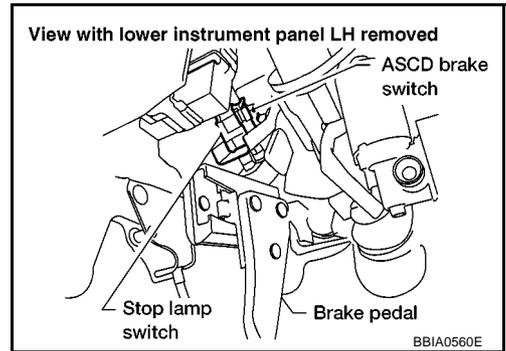
OK >> GO TO 14.

NG >> GO TO 7.



## 3. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.



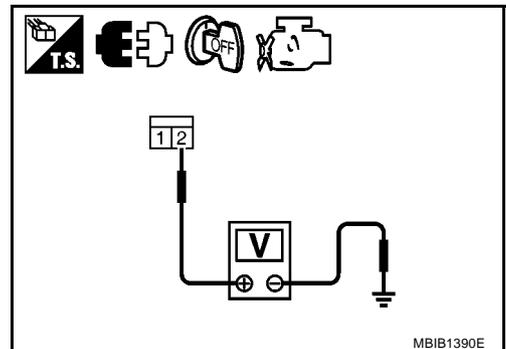
3. Check voltage between stop lamp switch terminal 2 and ground with CONSULT -II or tester.

**Voltage: Battery voltage**

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.



# DTC P0504 ASCD BRAKE SWITCH

## 4. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

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

## 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 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 6.

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

## 6. CHECK STOP LAMP SWITCH

Refer to [EC-202, "Component Inspection"](#).

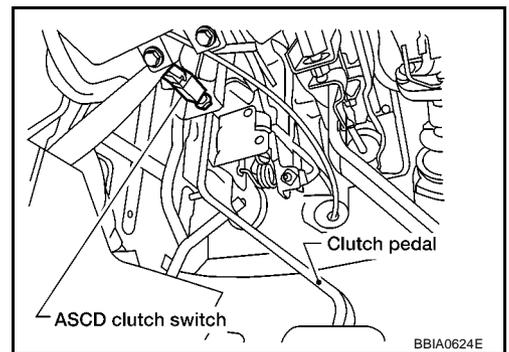
OK or NG

OK >> GO TO 14.

NG >> Replace stop lamp switch.

## 7. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.



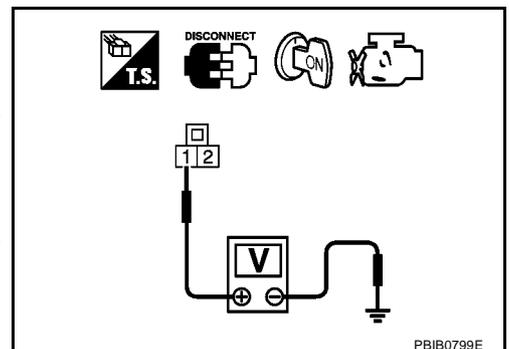
4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
Brake pedal: Fully released	Battery voltage
Brake pedal: Slightly depressed	Approx. 0V

OK or NG

OK >> GO TO 12.

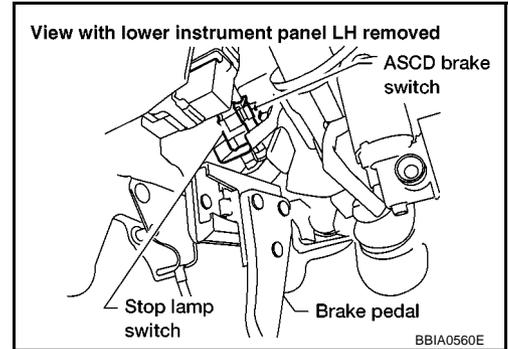
NG >> GO TO 8.



# DTC P0504 ASCD BRAKE SWITCH

## 8. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.

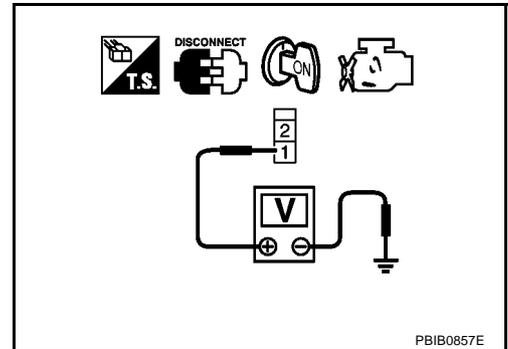


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

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



## 9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

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

## 10. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD brake clutch 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 11.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 11. CHECK ASCD BRAKE SWITCH

Refer to [EC-202, "Component Inspection"](#).

OK or NG

- OK >> GO TO 14.
- NG >> Replace ASCD brake switch.

# DTC P0504 ASCD BRAKE SWITCH

---

## 12. 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 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 13.

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

---

## 13. CHECK ASCD CLUTCH SWITCH

---

Refer to [EC-202, "Component Inspection"](#) .

OK or NG

OK >> GO TO 14.

NG >> Replace ASCD clutch switch.

---

## 14. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

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# DTC P0504 ASCD BRAKE SWITCH

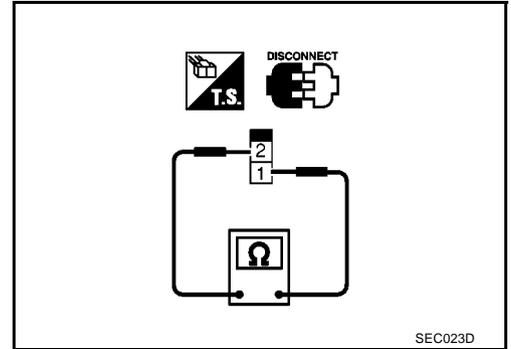
EBS01K10

## Component Inspection ASC D BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released	Should exist
Brake pedal: Slightly depressed	Should not exist

If NG, adjust ASCD brake switch installation, refer to [BR-6](#), "[BRAKE PEDAL](#)", and perform step 3 again.

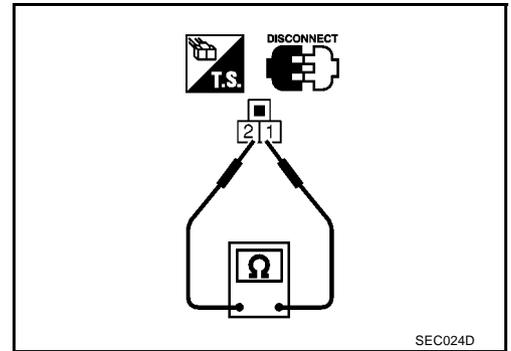


## ASC D CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

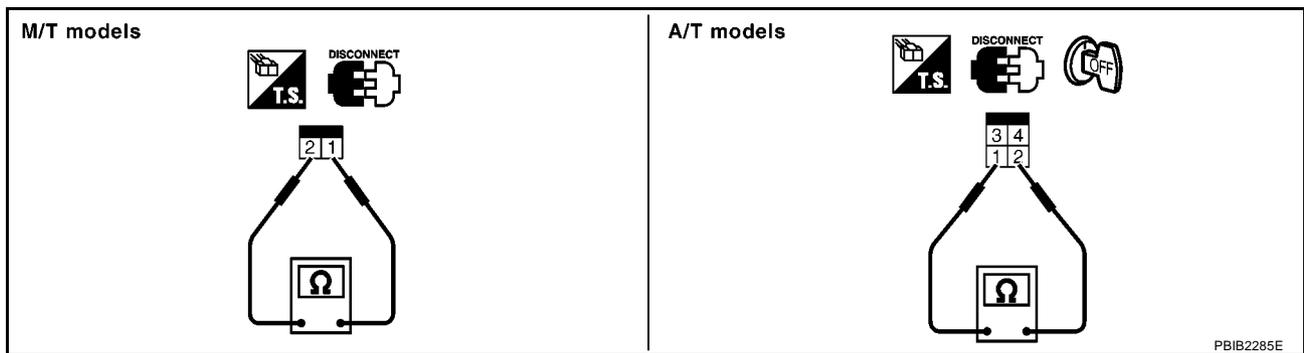
Condition	Continuity
Clutch pedal: Fully released	Should exist
Clutch pedal: Slightly depressed	Should not exist

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), "[CLUTCH PEDAL](#)", and perform step 3 again.



## STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released	Should not exist
Brake pedal: Slightly depressed	Should exist

If NG, adjust stop lamp switch installation, refer to [BR-6](#), "[BRAKE PEDAL](#)", and perform step 3 again.

# DTC P0563 BATTERY VOLTAGE

## DTC P0563 BATTERY VOLTAGE

PFP:24410

### On Board Diagnosis Logic

EBS01K11

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0563 0563	Battery voltage high	An excessively high voltage from the battery is sent to ECM.	<ul style="list-style-type: none"><li>● Battery</li><li>● Battery terminal</li><li>● Alternator</li><li>● Incorrect jump starting</li></ul>

### DTC Confirmation Procedure

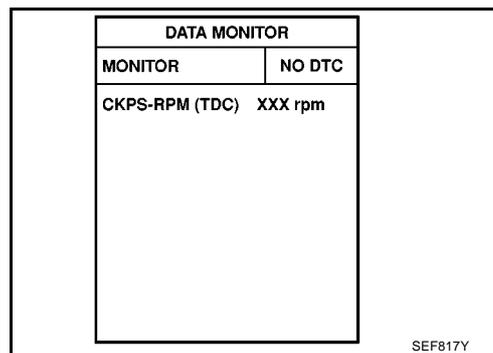
EBS01K12

#### NOTE:

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-203, "Diagnostic Procedure"](#) .



#### ⓧ WITHOUT CONSULT-II

1. Start engine and let it idle for at least 35 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-203, "Diagnostic Procedure"](#) .

### Diagnostic Procedure

EBS01K13

#### 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 type of alternator are installed.

Refer to, [SC-5, "BATTERY"](#) and [SC-14, "CHARGING SYSTEM"](#) .

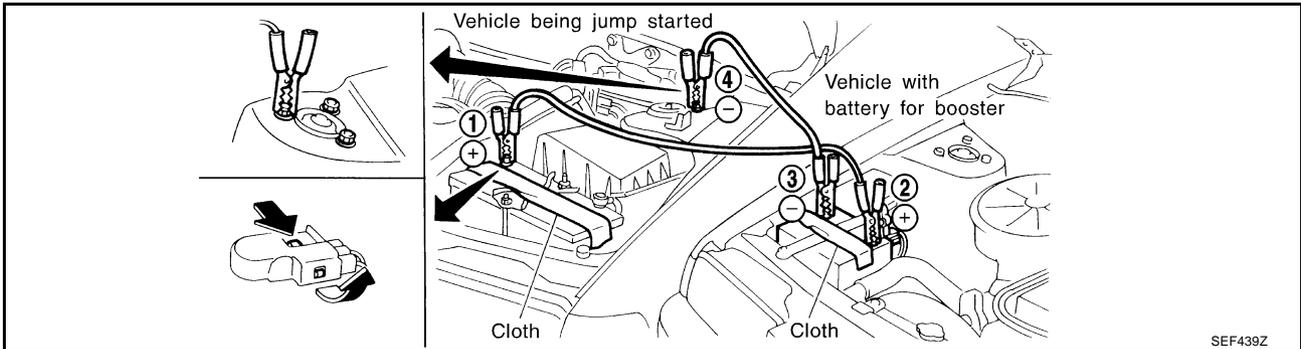
OK or NG

- OK >> GO TO 5.  
NG >> Replace with the proper one.

# DTC P0563 BATTERY VOLTAGE

## 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

### With CONSULT-II

1. Select "SELF DIAG RESULTS" mode with CONSULT-II.
2. Touch "ERASE".
3. Perform [EC-203, "DTC Confirmation Procedure"](#), again.
4. Is DTC P0563 displayed again?

### Without CONSULT-II

1. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#).
2. Perform [EC-203, "DTC Confirmation Procedure"](#), again.
3. Is DTC 0563 displayed again?

Yes or No

Yes >> GO TO 6.

No >> GO TO 7.

## 6. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to [BL-172, "ECM Re-communicating Function"](#).
3. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#).
4. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#).

>> INSPECTION END

## DTC P0563 BATTERY VOLTAGE

---

### 7. CHECK ELECTRICAL PARTS DAMAGE

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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.

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# DTC P0580, P0581 ASCD STEERING SWITCH

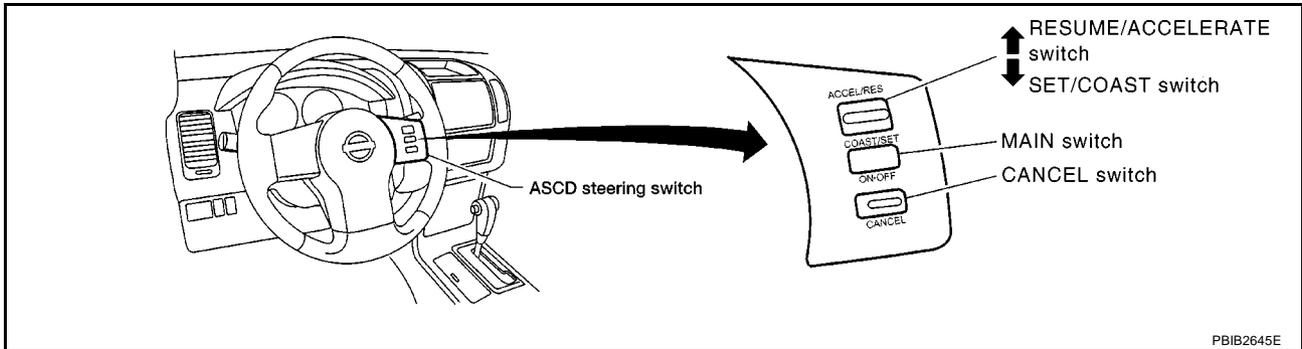
## DTC P0580, P0581 ASCD STEERING SWITCH

PF:25551

### Component Description

EBS01K14

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



PBIB2645E

Refer to [EC-355. "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.

### CONSULT-II Reference Value in Data Monitor Mode

EBS01K15

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	● Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	● Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	● Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	● Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF

### ECM Terminals and Reference Value

EBS01K16

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

#### CAUTION:

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

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	SB	ASCD steering switch	[Ignition switch ON] ● ASCD steering switch: OFF	Approximately 4.3V
			[Ignition switch ON] ● MAIN switch: Pressed	Approximately 0.3V
			[Ignition switch ON] ● CANCEL switch: Pressed	Approximately 1.3V
			[Ignition switch ON] ● RESUME/ACCELERATE switch: Pressed	Approximately 3.3V
			[Ignition switch ON] ● SET/COAST switch: Pressed	Approximately 2.3V
103	B	ASCD steering switch ground	[Ignition switch ON]	Approximately 0.3V

# DTC P0580, P0581 ASCD STEERING SWITCH

## On Board Diagnosis Logic

EBS01K17

The MI will not light up for these diagnoses.

**NOTE:**

If DTC P0580 or P0581 is displayed with DTC P0606, first perform the trouble diagnosis for DTC P0606. Refer to [EC-215, "DTC P0606 ECM"](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0580 0580	ASCD steering switch circuit low input	<ul style="list-style-type: none"> <li>ECM detects that the ASCD steering switch is stuck ON.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The switch circuit is open or shorted.)</li> </ul>
P0581 0581	ASCD steering switch circuit high input	<ul style="list-style-type: none"> <li>An excessively high voltage signal from the ASCD steering switch is sent to ECM.</li> </ul>	<ul style="list-style-type: none"> <li>ASCD steering switch</li> <li>ECM</li> </ul>

## DTC Confirmation Procedure

EBS01K18

**NOTE:**

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 MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. 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-209, "Diagnostic Procedure"](#) .

**ⓧ WITHOUT CONSULT-II**

1. Turn ignition switch ON and wait at least 10 seconds.
2. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
3. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
7. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
8. If DTC is detected, go to [EC-209, "Diagnostic Procedure"](#) .

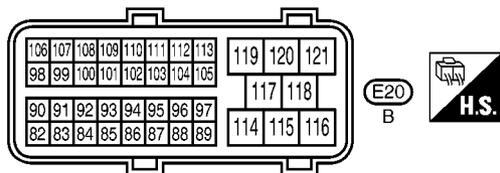
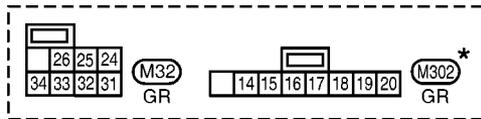
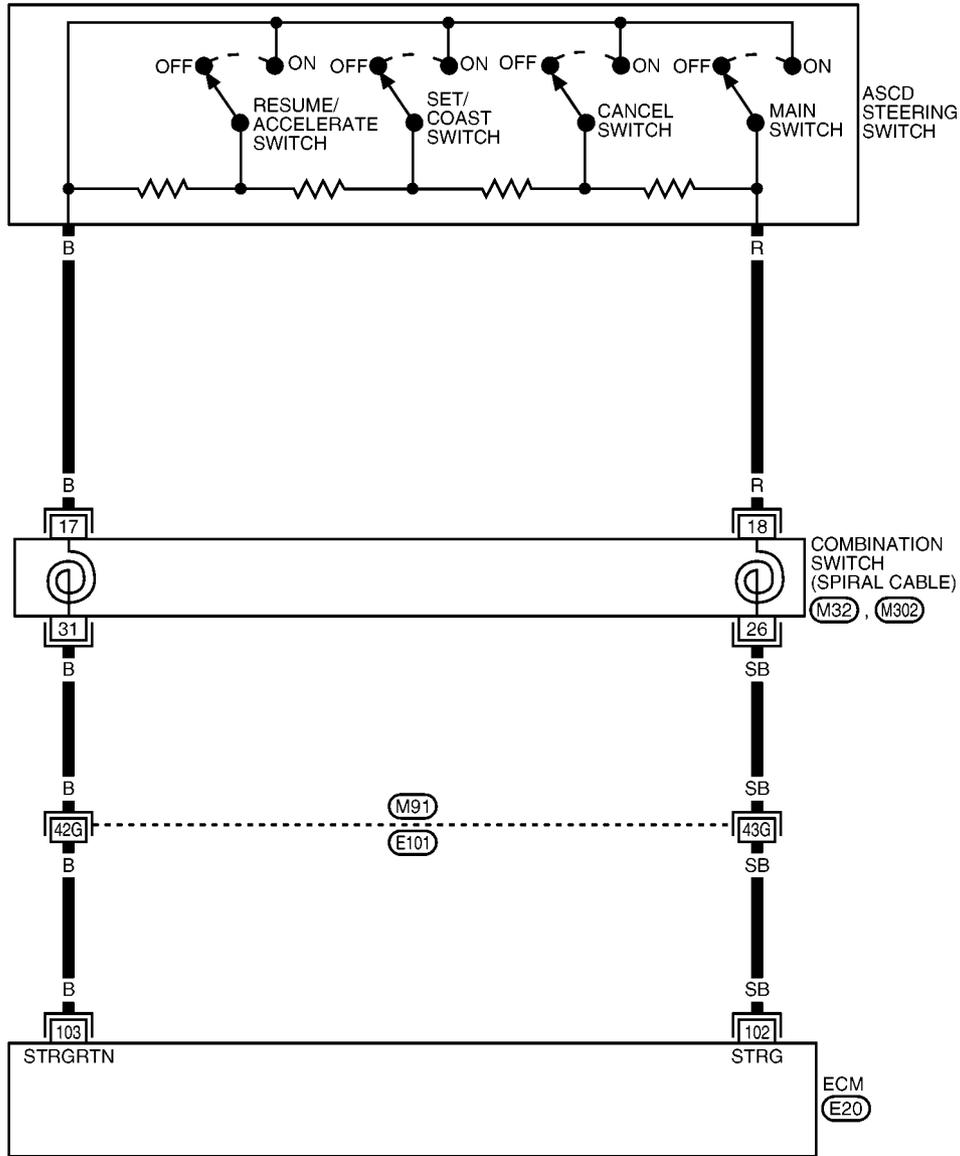
# DTC P0580, P0581 ASCD STEERING SWITCH

## Wiring Diagram

EBS01K19

### EC-ASC/SW-01

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



REFER TO THE FOLLOWING.

(M91) -SUPER MULTIPLE JUNCTION (SMJ)

\* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

MBWA1049E

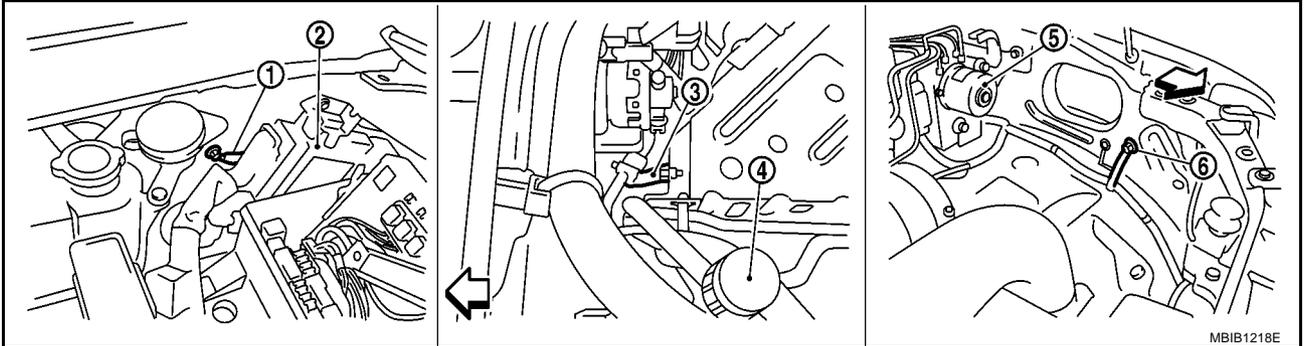
# DTC P0580, P0581 ASCD STEERING SWITCH

EBS01KIA

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### OK or NG

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

## DTC P0580, P0581 ASCD STEERING SWITCH

### 2. 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
MAIN switch	MAIN SW	Pressed	ON
		Released	OFF
CANCEL switch	CANCEL SW	Pressed	ON
		Released	OFF
RESUME/ACCELERATE switch	RESUME/ACC SW	Pressed	ON
		Released	OFF
SET/COAST switch	SET SW	Pressed	ON
		Released	OFF

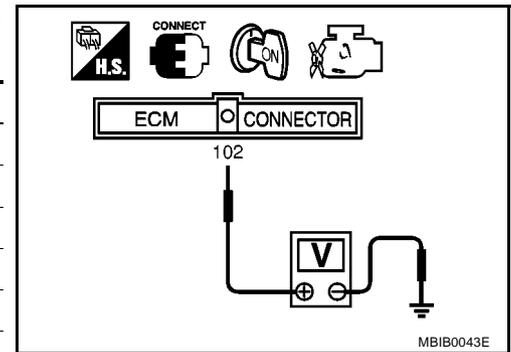
DATA MONITOR	
MONITOR	NO DTC
MAIN SW	OFF
CANCEL SW	OFF
RESUME/ACC SW	OFF
SET SW	OFF

SEC006D

#### Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 102 and ground with pressing each button.

Switch	Condition	Voltage [V]
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4.3
CANCEL switch	Pressed	Approx. 1.3
	Released	Approx. 4.3
RESUME/ACCELERATE switch	Pressed	Approx. 3.3
	Released	Approx. 4.3
SET/COAST switch	Pressed	Approx. 2.3
	Released	Approx. 4.3



#### OK or NG

- OK >> GO TO 8.  
 NG >> GO TO 3.

### 3. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination switch harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between combination switch terminal 17 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 5.  
 NG >> GO TO 4.

# DTC P0580, P0581 ASCD STEERING SWITCH

---

## 4. DETECT MALFUNCTIONING PART

---

Check the following.

- Combination switch (spiral cable)
- Harness connectors M91, E101
- Harness for open and short between ECM and combination switch

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

---

## 5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Check harness continuity between ECM terminal 102 and combination switch terminal 18. Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

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

---

## 6. DETECT MALFUNCTIONING PART

---

Check the following.

- Combination switch (spiral cable)
- Harness connectors M91, E101
- Harness for open and short between ECM and combination switch

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

---

## 7. CHECK ASCD STEERING SWITCH

---

Refer to [EC-212, "Component Inspection"](#)

OK or NG

- OK >> GO TO 8.
- NG >> Replace ASCD steering switch.

---

## 8. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

A  
EC  
C  
D  
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G  
H  
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J  
K  
L  
M

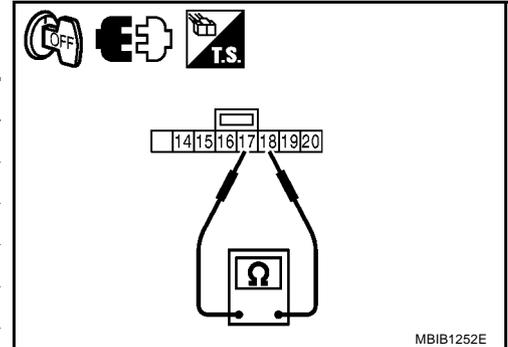
# DTC P0580, P0581 ASCD STEERING SWITCH

EBS01K1B

## Component Inspection ASCD STEERING SWITCH

1. Disconnect combination switch.
2. Check continuity between combination switch terminals 17 and 18 with pushing each switch.

Switch	Condition	Resistance [ $\Omega$ ]
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4,000
CANCEL switch	Pressed	Approx. 250
	Released	Approx. 4,000
RESUME/ACCELERATE switch	Pressed	Approx. 1,480
	Released	Approx. 4,000
SET/COAST switch	Pressed	Approx. 660
	Released	Approx. 4,000



# DTC P0605 ECM

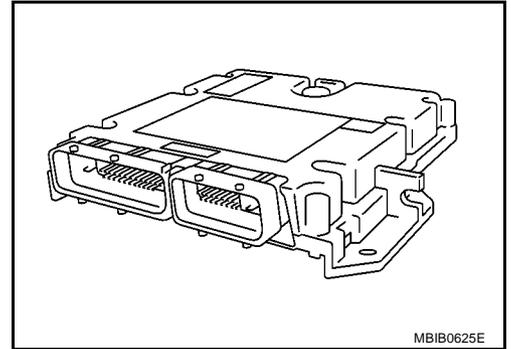
## DTC P0605 ECM

PF:23710

### Description

EBS01KIC

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

EBS01KID

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0605 0605	Engine control module (ROM)	ECM ROM is malfunctioning.	● ECM

### DTC Confirmation Procedure

EBS01KIE

#### NOTE:

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-214, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

#### WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-214, "Diagnostic Procedure"](#) .

## Diagnostic Procedure

### 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-213, "DTC Confirmation Procedure"](#) , again.
5. Is DTC P0605 displayed again?

#### Without CONSULT-II

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
3. Perform [EC-213, "DTC Confirmation Procedure"](#) , again.
4. Is DTC 0605 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 [BL-172, "ECM Re-communicating Function"](#) .
3. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .
4. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

>> **INSPECTION END**

# DTC P0606 ECM

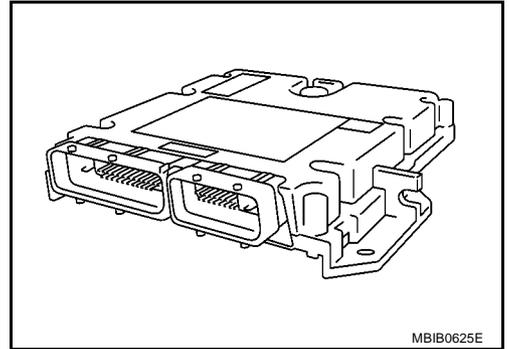
## DTC P0606 ECM

PF:23710

### Description

EBS01KIG

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



### On Board Diagnosis Logic

EBS01KIH

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0606 0606	Engine control module (Processor)	ECM calculation function is malfunctioning.	● ECM

### DTC Confirmation Procedure

EBS01KII

#### NOTE:

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-216, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

#### WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-216, "Diagnostic Procedure"](#) .

## Diagnostic Procedure

### 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-215, "DTC Confirmation Procedure"](#) , again.
5. Is DTC P0606 displayed again?

#### Without CONSULT-II

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
3. Perform [EC-215, "DTC Confirmation Procedure"](#) , again.
4. Is DTC 0606 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 [BL-172, "ECM Re-communicating Function"](#) .
3. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .
4. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

>> **INSPECTION END**

# DTC P0628, P0629 FUEL PUMP

## DTC P0628, P0629 FUEL PUMP

PF:16700

### Description

EBS01K1K

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

EBS01K1L

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PUMP CURRENT	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: P or N (A/T), Neutral (M/T) ● No load	Idle 1,600 - 2,000 mA
	2,000 rpm	1,500 - 1,900 mA

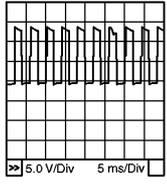
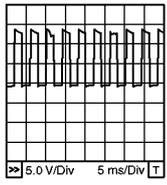
### ECM Terminals and Reference Value

EBS01K1M

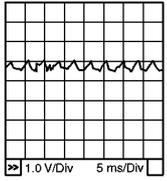
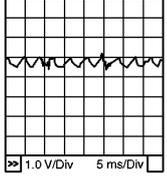
Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

#### 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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
10	G	Fuel pump	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 5.8V ★  MBIB0885E
			[Engine is running] ● Warm-up condition ● Engine speed: 2,000 rpm	Approximately 5.5V ★  MBIB0886E

# DTC P0628, P0629 FUEL PUMP

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	B	Fuel pump	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0887E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0888E</p>

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

## On Board Diagnosis Logic

EBS01K1N

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0628 0628	Fuel pump control circuit low input	ECM detects a control circuit for the fuel pump is open or short to ground.	<ul style="list-style-type: none"> <li>● Harness or connectors (The fuel pump circuit is open or shorted.)</li> <li>● Fuel pump</li> </ul>
P0629 0629	Fuel pump control circuit high output	ECM detects a control circuit for the fuel pump is short to power.	

## DTC Confirmation Procedure

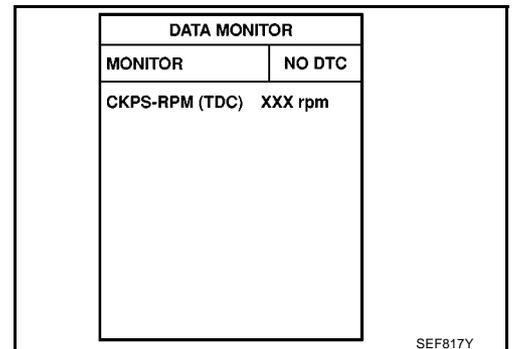
EBS01K1O

### NOTE:

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-220, "Diagnostic Procedure"](#) .



SEF817Y

### WITHOUT CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Let engine idle for at least 5 seconds.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to [EC-220, "Diagnostic Procedure"](#) .

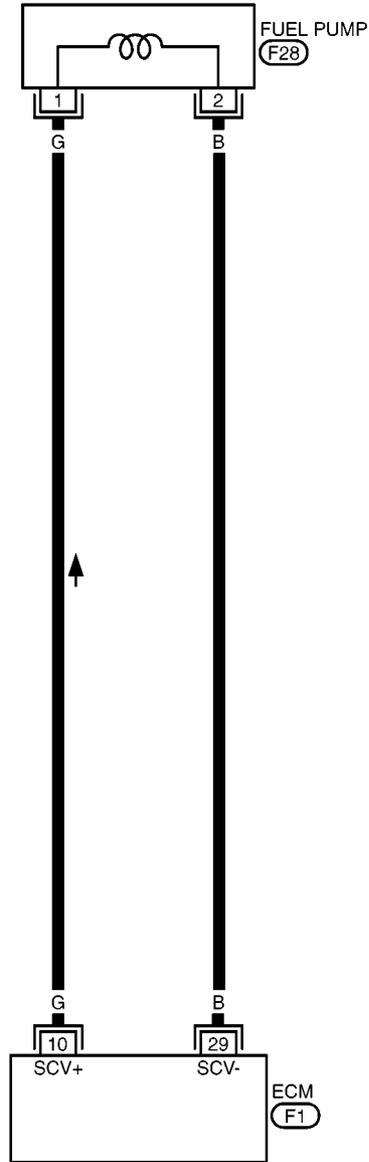
# DTC P0628, P0629 FUEL PUMP

## Wiring Diagram

EBS01KIP

### EC-F/PUMP-01

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



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

4	5	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6
		43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
	3	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
1	2	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63



# DTC P0628, P0629 FUEL PUMP

EBS01KIQ

## Diagnostic Procedure

### 1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump (2) harness connector.
  - Fuel pump temperature sensor (1)
3. Check harness continuity between ECM terminal 10 and fuel pump terminal 1.  
Refer to Wiring Diagram.

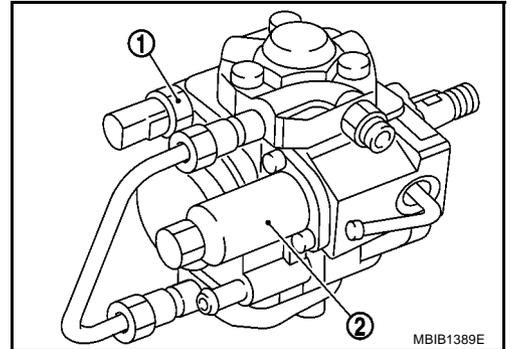
**Continuity should exist.**

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 to [EC-221, "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-24, "Fuel Pump Learning Value Clearing"](#) .

>> INSPECTION END

### 5. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

# DTC P0628, P0629 FUEL PUMP

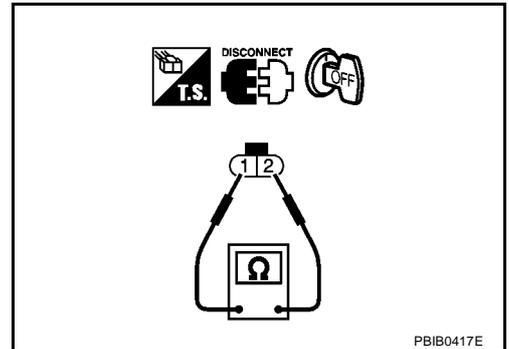
## Component Inspection FUEL PUMP

EBS01K1R

1. Disconnect fuel pump harness connector.
2. Check resistance between fuel pump terminals 1 and 2.

**Resistance: 1.5 - 3.0Ω [at 10 - 60°C (50 - 140°F)]**

3. If NG, replace fuel pump.



## Removal and Installation FUEL PUMP

EBS01K1S

Refer to [EM-49, "FUEL PUMP"](#) .

A  
EC  
C  
D  
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I  
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L  
M

## DTC P0642, P0643 SENSOR POWER SUPPLY

### DTC P0642, P0643 SENSOR POWER SUPPLY

PFP:18002

#### ECM Terminals and Reference Value

*EBS01KIT*

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

**CAUTION:**

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	W	Accelerator pedal position sensor 1 power supply	<b>[Ignition switch ON]</b>	Approximately 5.3V
83	R	Accelerator pedal position sensor 1	<b>[Ignition switch ON]</b> ● Engine: Stopped ● Accelerator pedal: Fully released	0.95 - 1.17V
			<b>[Ignition switch ON]</b> ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 4.6V
84	B	Accelerator pedal position sensor 1 ground	<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed	Approximately 0.3V
90	W	Accelerator pedal position sensor 2 power supply	<b>[Ignition switch ON]</b>	Approximately 5.3V
91	R	Accelerator pedal position sensor 2	<b>[Ignition switch ON]</b> ● Engine: Stopped ● Accelerator pedal: Fully released	0.58 - 0.78V
			<b>[Ignition switch ON]</b> ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 2.3V
92	B	Accelerator pedal position sensor 2 ground	<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed	Approximately 0.3V

### On Board Diagnosis Logic

*EBS01KIT*

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0642	Sensor power supply circuit low	ECM detects a voltage of power source for sensor is excessively low.	<ul style="list-style-type: none"> <li>● Harness or connectors (The APP sensor 1 power supply circuit is shorted.)</li> <li>● Accelerator pedal position sensor (Accelerator pedal position sensor 1)</li> </ul>
P0643	Sensor power supply circuit high	ECM detects a voltage of power source for Sensor is excessively high.	

# DTC P0642, P0643 SENSOR POWER SUPPLY

EBS01KIV

## DTC Confirmation Procedure

### NOTE:

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

### Ⓟ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-225, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⓧ WITHOUT CONSULT-II

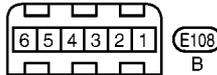
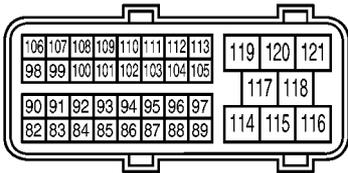
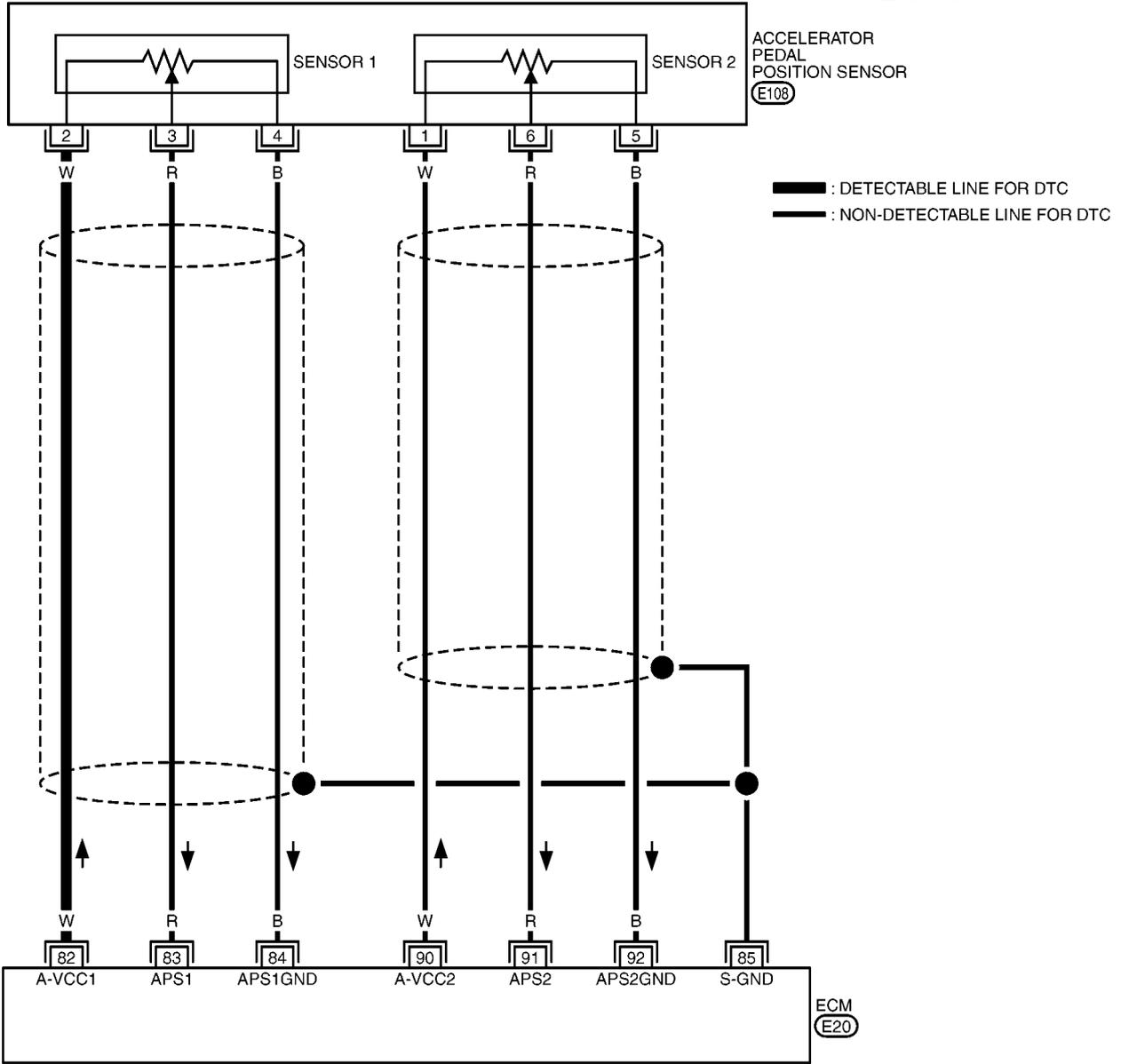
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-225, "Diagnostic Procedure"](#) .

# DTC P0642, P0643 SENSOR POWER SUPPLY

EBS01KIW

## Wiring Diagram

EC-APP1PW-01



MBWA1051E

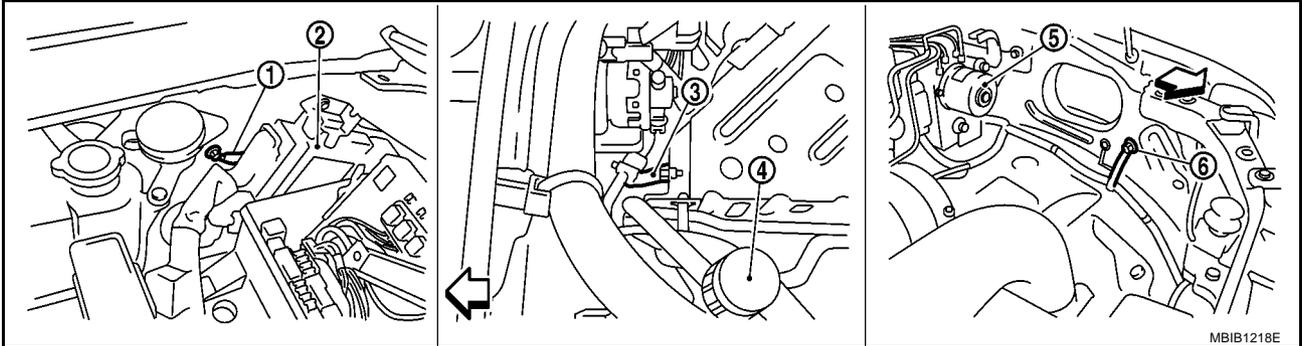
# DTC P0642, P0643 SENSOR POWER SUPPLY

EBS01K1X

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#) .



← : Vehicle front

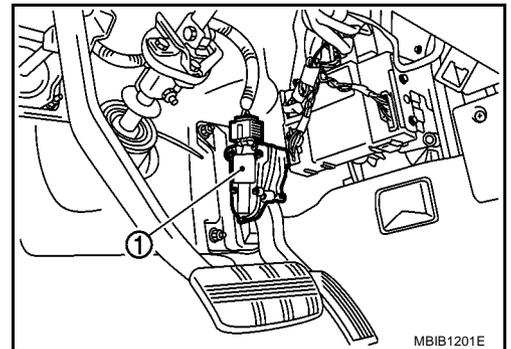
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### OK or NG

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

### 2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

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

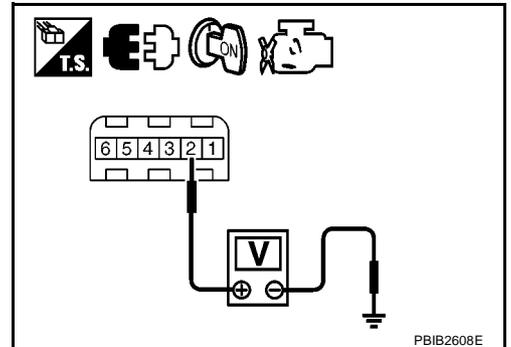


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

**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 APP SENSOR

Refer to [EC-146, "Component Inspection"](#) .

#### OK or NG

- OK >> GO TO 4.  
NG >> Replace accelerator pedal assembly.

## DTC P0642, P0643 SENSOR POWER SUPPLY

---

### 4. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

# DTC P0652, P0653 SENSOR POWER SUPPLY

## DTC P0652, P0653 SENSOR POWER SUPPLY

PF18002

### ECM Terminals and Reference Value

EBS01KIY

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

**CAUTION:**

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
44	W	Crankshaft position sensor power supply	[Ignition switch ON]	Approximately 5.3V
45	W	Camshaft position sensor power supply	[Ignition switch ON]	Approximately 5.3V
63	R	Fuel rail pressure sensor power supply	[Ignition switch ON]	Approximately 5.3V
64	V	Sensor power supply (Turbocharger boost sensor / Refrigerant pressure sensor)	[Ignition switch ON]	Approximately 5.3V
82	W	Accelerator pedal position sensor 1 power supply	[Ignition switch ON]	Approximately 5.3V
83	R	Accelerator pedal position sensor 1	[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully released	0.95 - 1.17V
			[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 4.6V
84	B	Accelerator pedal position sensor 1 ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0.3V
85	—	Sensor ground (Accelerator pedal position sensor shield circuit)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0.3V
90	W	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5.3V
91	R	Accelerator pedal position sensor 2	[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully released	0.58 - 0.78V
			[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 2.3V
92	B	Accelerator pedal position sensor 2 ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0.3V

# DTC P0652, P0653 SENSOR POWER SUPPLY

EBS01K1Z

## On Board Diagnosis Logic

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0652 0652	Sensor power supply circuit low	ECM detects a voltage of power source for sensor is excessively low.	<ul style="list-style-type: none"> <li>● Harness or connectors (APP sensor 2 power supply circuit is shorted.) (Crankshaft position sensor circuit is shorted.) (Camshaft position sensor circuit is shorted.) (Fuel rail pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Turbocharger boost sensor circuit is shorted.)</li> <li>● Accelerator pedal position sensor (APP sensor 2)</li> <li>● Crankshaft position sensor</li> <li>● Camshaft position sensor</li> <li>● Fuel rail pressure sensor</li> <li>● Refrigerant pressure sensor</li> <li>● Turbocharger boost sensor</li> </ul>
P0653 0653	Sensor power supply circuit high	ECM detects a voltage of power source for sensor is excessively high.	

## DTC Confirmation Procedure

EBS01K1J0

### NOTE:

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

### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-230, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

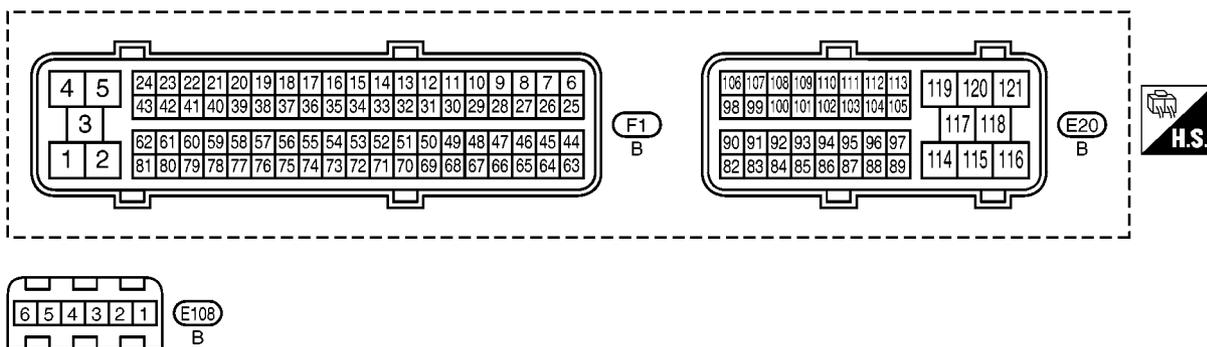
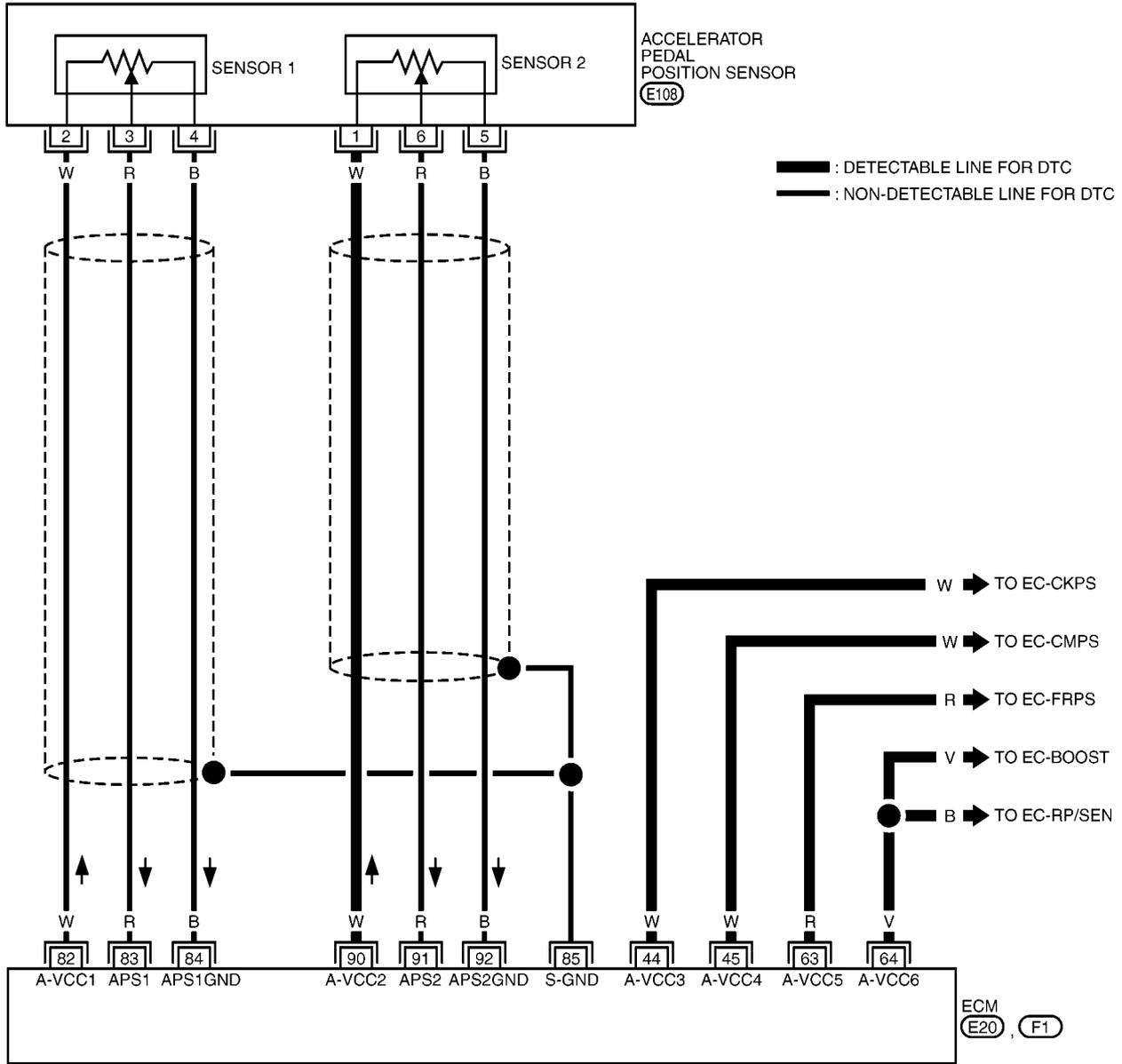
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-230, "Diagnostic Procedure"](#) .

# DTC P0652, P0653 SENSOR POWER SUPPLY

## Wiring Diagram

EBS01KJ1

### EC-APP2PW-01



MBWA1052E

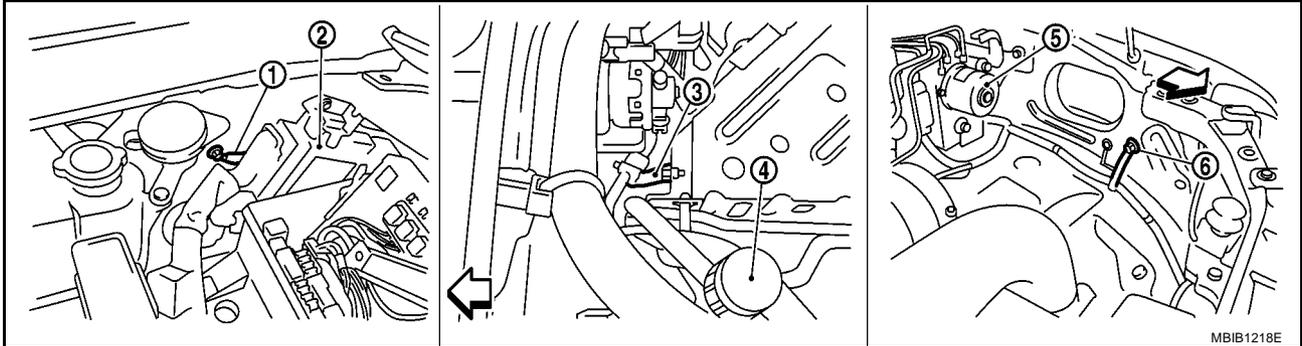
# DTC P0652, P0653 SENSOR POWER SUPPLY

EBS01KJ2

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

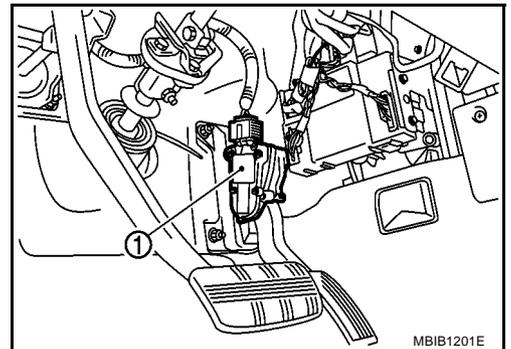
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### 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 (1) harness connector.
2. Turn ignition switch ON.

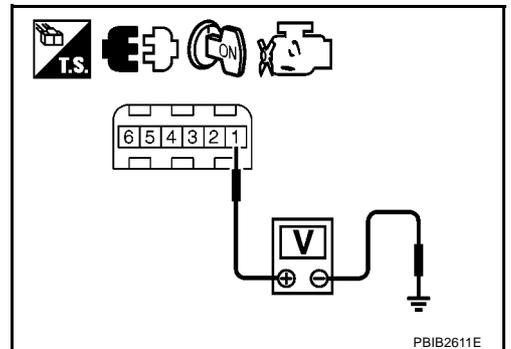


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5.3V**

#### OK or NG

- OK >> GO TO 5.  
NG >> GO TO 3.



# DTC P0652, P0653 SENSOR POWER SUPPLY

## 3. CHECK SENSOR POWER SUPPLY CIRCUITS

Check the following.

Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
90	APP sensor terminal 1	<a href="#">EC-229</a>
44	Crankshaft position sensor terminal 3	<a href="#">EC-161</a>
45	Camshaft position sensor terminal 3	<a href="#">EC-173</a>
63	Fuel rail pressure sensor terminal 1	<a href="#">EC-120</a>
64	Refrigerant pressure sensor terminal 3	<a href="#">EC-326</a>
64	Turbocharger boost sensor terminal 3	<a href="#">EC-155</a>

OK or NG

OK >> GO TO 4.

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

## 4. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (Refer to [EC-164, "Component Inspection"](#) .)
- Camshaft position sensor (Refer to [EC-175, "Component Inspection"](#) .)
- Fuel rail pressure sensor (Refer to [EC-122, "Component Inspection"](#) .)
- Refrigerant pressure sensor (Refer to [ATC-92, "COMPONENT INSPECTION"](#) .)
- Turbocharger boost sensor (Refer to [EC-158, "Component Inspection"](#) .)

OK or NG

OK >> GO TO 5.

NG >> Replace malfunctioning component.

## 5. CHECK APP SENSOR

Refer to [EC-146, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace accelerator pedal assembly.

## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

# DTC P0686 ECM RELAY

PF2:25230

## DTC P0686 ECM RELAY

### ECM Terminals and Reference valve

EBS01KJ3

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

#### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
105 113	BR BR	ECM relay (self shut-off)	[Ignition switch ON] [Ignition switch OFF] ● For a few seconds after turning ignition switch OFF	Approximately 1.0V
			[Ignition switch OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
107 108	R R	Ignition switch	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14V)
119 120	R G	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14V)

## On Board Diagnosis Logic

EBS01KJ4

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0686 0686	ECM relay circuit	ECM detects ECM relay is stuck closed even if ignition switch OFF.	<ul style="list-style-type: none"> <li>● Harness or connectors (The ECM relay circuit is shorted.)</li> <li>● ECM relay</li> </ul>

## DTC Confirmation Procedure

EBS01KJ5

#### NOTE:

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

#### ④ WITH CONSULT-II

1. Turn ignition switch ON and 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-235, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

#### ⊗ WITHOUT CONSULT-II

1. Turn ignition switch ON and then turn OFF.
2. Wait at least 30 seconds.
3. Turn ignition switch ON.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.

## DTC P0686 ECM RELAY

---

5. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
6. If DTC is detected, go to [EC-235, "Diagnostic Procedure"](#) .

A

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# DTC P0686 ECM RELAY

EBS01KJ7

## Diagnostic Procedure

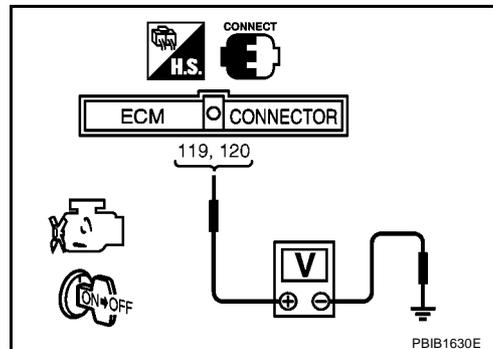
### 1. CHECK ECM RELAY INPUT SIGNAL CIRCUIT

1. Turn ignition switch ON and then OFF.
2. 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 approximately 0V.

#### OK or NG

- OK >> GO TO 5.  
NG >> GO TO 2.



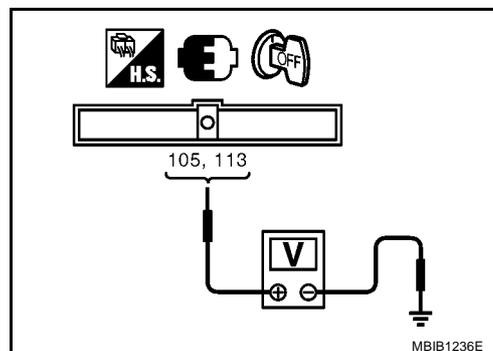
### 2. CHECK ECM RELAY OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF, and wait at least 10 seconds.
2. Check voltage between ECM terminals 105, 113 and ground with CONSULT-II or tester.

**Voltage:** Battery voltage

#### OK or NG

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



### 3. CHECK ECM RELAY OUTPUT SIGNAL CIRCUIT FOR SHORT TO GROUND

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E12.
3. Check harness continuity between ECM terminals 105, 113 or IPDM E/R terminal 7 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

#### OK or NG

- OK >> GO TO 4.  
NG >> Repair short to ground in harness or connectors.

### 4. CHECK ECM RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E12.
3. Check harness continuity between ECM terminal 119 and IPDM E/R terminal 3, ECM terminal 120 and IPDM E/R terminal 4. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

#### OK or NG

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

## DTC P0686 ECM RELAY

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### 5. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

#### OK or NG

OK >> Replace IPDM E/R.

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

# DTC P1268 - P1271 FUEL INJECTOR

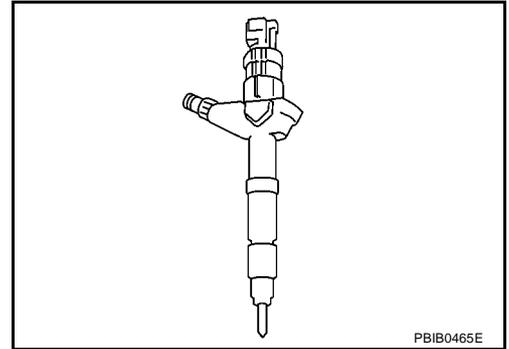
## DTC P1268 - P1271 FUEL INJECTOR

PFP:16600

### Component Description

EBS01KJ8

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 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.



### CONSULT-II Reference Value in Data Monitor Mode

EBS01KJ9

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: P or N (A/T), Neutral (M/T)</li> <li>● Idle speed</li> </ul>	No load	0.50 - 0.70 msec
		Blower fan switch: ON Rear window defogger switch: ON	0.50 - 0.80 msec

### ECM Terminals and Reference Value

EBS01KJA

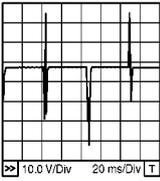
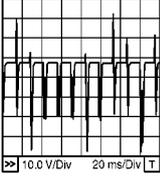
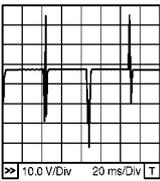
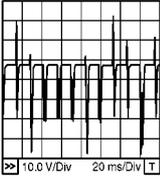
Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

#### 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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
4	V	Fuel injector power supply (For cylinder No. 1 and 4) Fuel injector power supply (For cylinder No. 2 and 3)	[Engine is running] <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★  MBIB1295E
5	G		[Engine is running] <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0V ★  MBIB1296E

# DTC P1268 - P1271 FUEL INJECTOR

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	G P W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <p><b>NOTE:</b> The pulse cycle changes depending on rpm at idle</p>	<p>Approximately 7.5V ★</p>  <p style="text-align: right; font-size: small;">MBIB1297E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 8.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB1298E</p>
40 41 42 43	W GR W B	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <p><b>NOTE:</b> The pulse cycle changes depending on rpm at idle</p>	<p>Approximately 7.5V ★</p>  <p style="text-align: right; font-size: small;">MBIB1297E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 8.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB1298E</p>

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

## On Board Diagnosis Logic

EBS01KJB

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1268 1268	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.	<ul style="list-style-type: none"> <li>● Injector adjustment value</li> <li>● Fuel injector</li> </ul>
P1269 1269	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 1270	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 1271	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 P1268 - P1271 FUEL INJECTOR

EBS01KJC

## DTC Confirmation Procedure

### 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-241, "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.

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm
COOLAN TEMP/S	XXX °C

PBIB2156E

5. If DTC is detected, go to [EC-241, "Diagnostic Procedure"](#) .

### ⓧ WITHOUT CONSULT-II

1. Start engine and let it idle for about 15 minutes.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-241, "Diagnostic Procedure"](#) .  
If DTC is not detected, go to next step.
5. Set voltmeter probes between ECM terminal 70 (engine coolant temperature sensor signal) and ground.
6. Restart engine and drive vehicle and maintain the following conditions for at least 60 seconds.

Engine speed	700 - 2000 rpm (A constant rotation is maintained)
Voltage between ECM terminal 70 and ground	More than 0.6V
Shift lever	Suitable position
Accelerator pedal	Hold the accelerator pedal as steady as possible.

7. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
8. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
9. If DTC is detected, go to [EC-241, "Diagnostic Procedure"](#) .

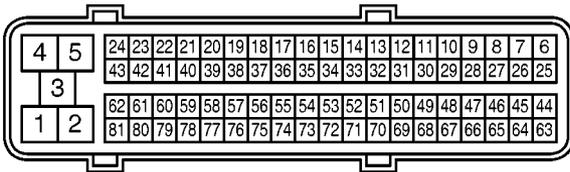
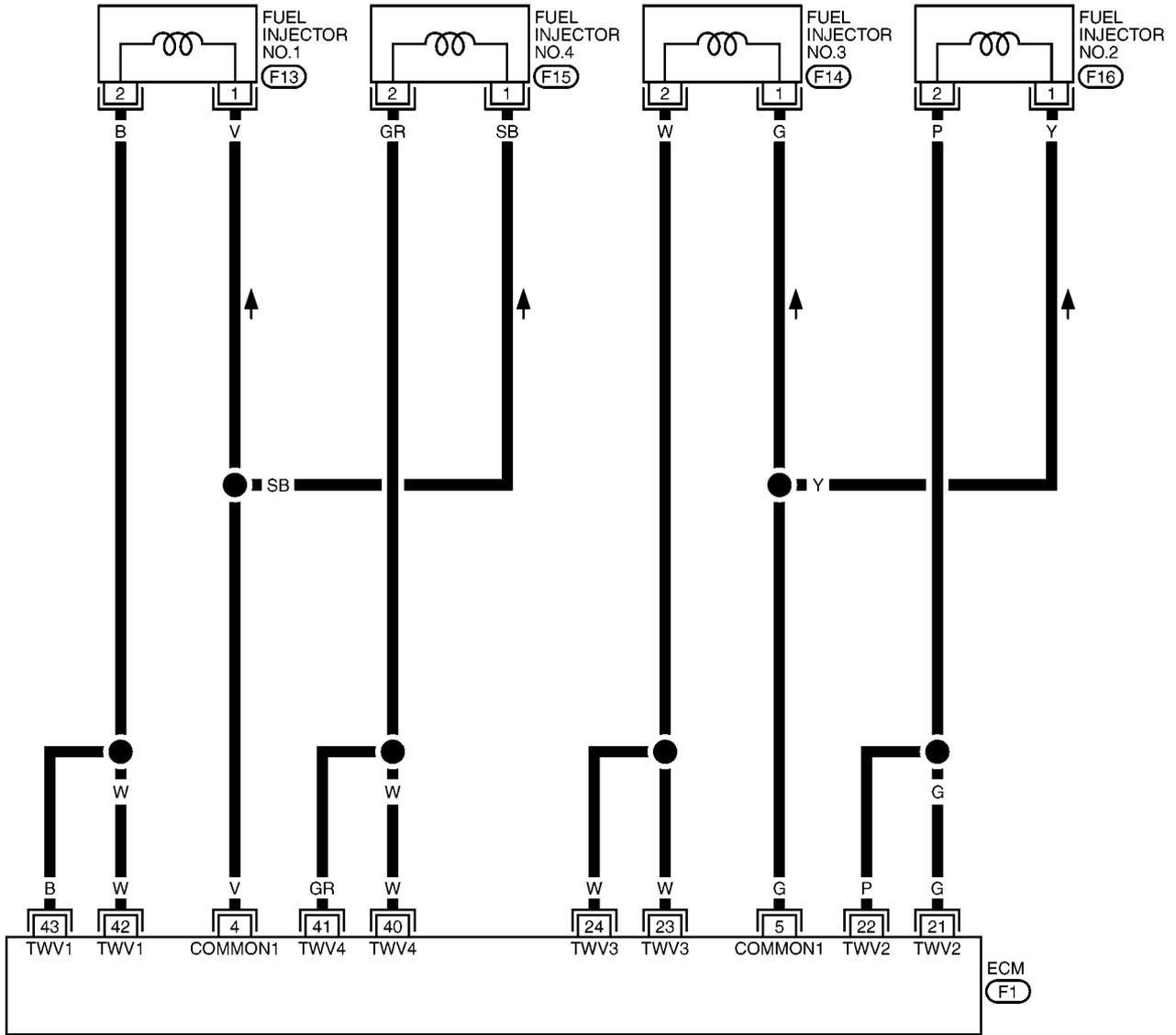
# DTC P1268 - P1271 FUEL INJECTOR

## Wiring Diagram

EBS01KJD

### EC-INJECT-01

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



MBWA1042E

# DTC P1268 - P1271 FUEL INJECTOR

EBS01KJE

## Diagnostic Procedure

### 1. CHECK INJECTOR ADJUSTMENT VALUE

1. Turn ignition switch ON.
2. Select "ENTER INJECTOR CALIB DATA" in "WORK SUPPORT" mode with CONSULT-II.
3. Check injector adjustment values displayed on CONSULT-II screen.

**The value displayed on CONSULT-II screen should be same as injector adjustment value printed on each fuel injector.**

#### OK or NG

- OK >> GO TO 2.  
 NG >> Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#).

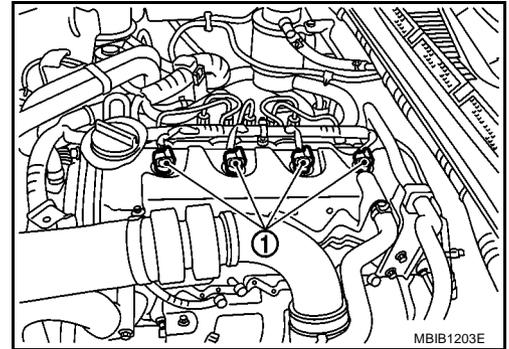
ENTER INJECTR CALIB DATA	
SET VALUE	
CYL1	D0002A1933140E00 000000000000CA
CYL2	D0000B0032ECF600 000000000000F3
CYL3	D0D9EC00F0CEEE00 00C00000000017
CYL4	D0D5F3F1F3E9EA00 000000000000F7
CYL1	CYL2
CYL3	CYL4
END	START

MBIB1255E

### 2. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector (1) 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	1	No.1
P1269	5	1	No.2
P1270	5	1	No.3
P1271	4	1	No.4



**Continuity should exist.**

5. 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.

## DTC P1268 - P1271 FUEL INJECTOR

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### 3. 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	2	No.1
P1269	21, 22	2	No.2
P1270	23, 24	2	No.3
P1271	40, 41	2	No.4

**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 INJECTOR-I

---

Refer to [EC-243, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace fuel injector.

# DTC P1268 - P1271 FUEL INJECTOR

## 5. CHECK FUEL INJECTOR-II

### With CONSULT-II

1. Remove two fuel injectors.

#### NOTE:

One is from malfunctioning cylinder and the other is from any cylinder other than the malfunctioning cylinder.

2. Swap the two fuel injectors to the other cylinder.
3. Reconnect ECM harness connector and fuel injector harness connector.
4. Turn ignition switch ON.
5. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#).
6. Select "SELF DIAG RESULTS" mode with CONSULT-II.
7. Touch "ERASE".
8. Perform [EC-239, "DTC Confirmation Procedure"](#).
9. Is DTC displayed for the other cylinder?

### Without CONSULT-II

1. Remove two fuel injectors.

#### NOTE:

One is from malfunctioning cylinder and the other is from any cylinder other than the malfunctioning cylinder.

2. Swap the two fuel injectors to the other cylinder.
3. Reconnect ECM harness connector and fuel injector harness connector.
4. Turn ignition switch ON.
5. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#).
6. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#).
7. Perform [EC-239, "DTC Confirmation Procedure"](#).
8. Is DTC displayed for the other cylinder?

#### Yes or No

- Yes >> GO TO 6.  
No >> GO TO 7.

## 6. REPLACE FUEL INJECTOR

1. Replace fuel injector of malfunctioning cylinder.
2. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#).

>> INSPECTION END

## 7. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

### Component Inspection FUEL INJECTOR

EBS01KJF

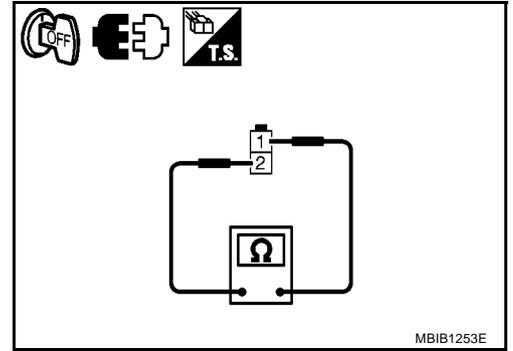
1. Disconnect fuel injector harness connector.

## DTC P1268 - P1271 FUEL INJECTOR

2. Check resistance between terminals as shown in the figure.

**Resistance: 0.2 - 0.8Ω [at 10 - 60°C (50 - 140°F)]**

3. If NG, replace fuel injector.



### Removal and Installation FUEL INJECTOR

Refer to [EM-44, "INJECTION TUBE AND FUEL INJECTOR"](#) .

EBS01KJG

# DTC P1272 FUEL PUMP

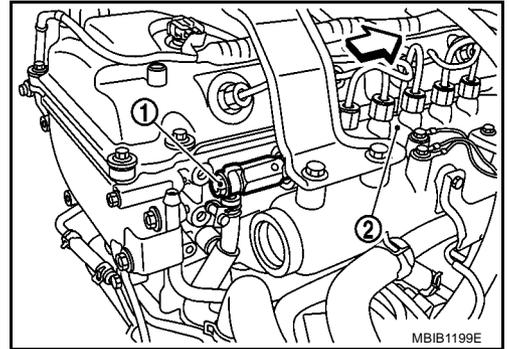
## DTC P1272 FUEL PUMP

PFP:16700

### Description

When the fuel pressure in fuel rail increases to excessively high, fuel pressure relief valve (1) opens to carry excess fuel to the return hose.

- ↔: Vehicle front
- Fuel rail (2)



### CONSULT-II Reference Value in Data Monitor Mode

EBS01KJJ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PUMP CURRENT	<ul style="list-style-type: none"> <li>• Engine: After warming up</li> <li>• Air conditioner switch: OFF</li> <li>• Shift lever: P or N (A/T), Neutral (M/T)</li> <li>• No load</li> </ul>	Idle 1,600 - 2,000 mA
	2,000 rpm	1,500 - 1,900 mA

### ECM Terminals and Reference Value

EBS01KJJ

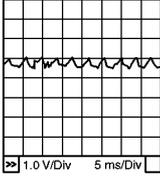
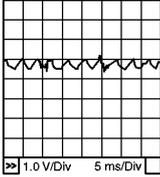
Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

#### 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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
10	G	Fuel pump	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Idle speed</li> </ul>	<p>Approximately 5.8V ★</p> <p>5.0 V/Div 5 ms/Div</p> <p>MBIB0885E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 5.5V ★</p> <p>5.0 V/Div 5 ms/Div</p> <p>MBIB0886E</p>

# DTC P1272 FUEL PUMP

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	B	Fuel pump	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0887E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0888E</p>

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

## On Board Diagnosis Logic

EBS01KJK

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

### NOTE:

If DTC P1272 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1272 1272	Fuel rail pressure relief valve open	Fuel rail pressure relief valve is open because of fuel pressure control system malfunction.	<ul style="list-style-type: none"> <li>● Harness or connectors (Fuel pump circuit is open or shorted.)</li> <li>● Fuel pump</li> <li>● Fuel rail pressure sensor</li> <li>● Air mixed with fuel</li> <li>● Lack of fuel</li> </ul>

## DTC Confirmation Procedure

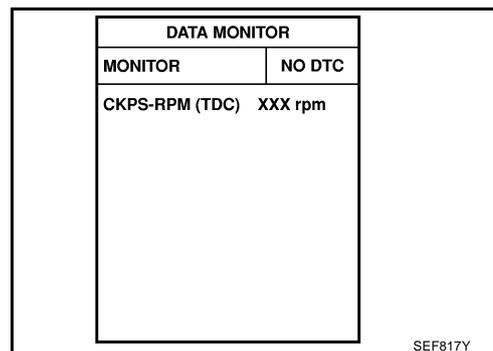
EBS01KJL

### NOTE:

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-249, "Diagnostic Procedure"](#).



#### WITHOUT CONSULT-II

1. Start engine and keep engine speed more than 4,000 rpm for at least 5 seconds, then release the accelerator pedal.

## DTC P1272 FUEL PUMP

---

2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-249, "Diagnostic Procedure"](#) .

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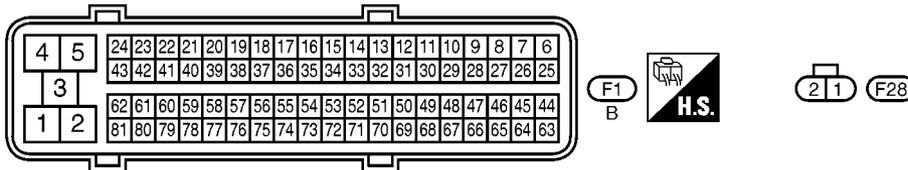
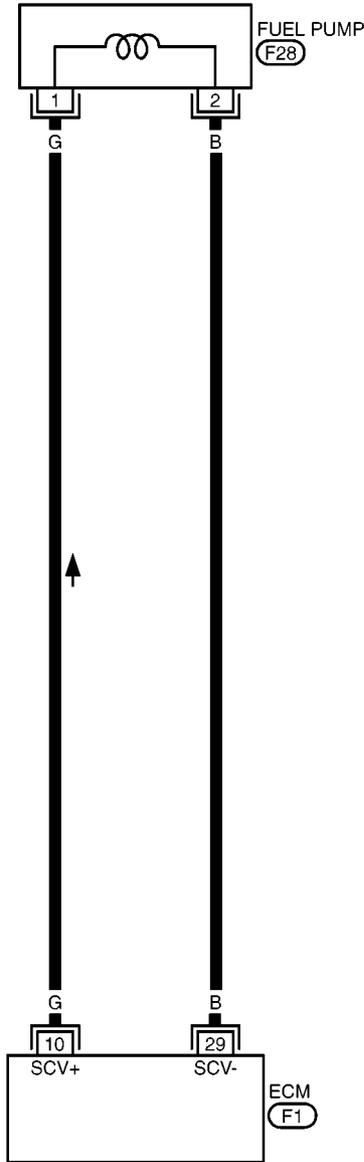
# DTC P1272 FUEL PUMP

## Wiring Diagram

EBS01KJM

### EC-F/PUMP-01

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



MBWA1050E

# DTC P1272 FUEL PUMP

EBS01KJN

## Diagnostic Procedure

### 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.

#### ④ With CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "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-246, "DTC Confirmation Procedure"](#) , again.
7. Is DTC detected again?

#### ⊗ Without CONSULT-II

1. Turn ignition switch ON.
2. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .
3. Start engine and let it idle for at least 60 seconds.
4. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
5. Perform [EC-246, "DTC Confirmation Procedure"](#) , again.
6. Is DTC displayed 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 (2) harness connector.
  - Fuel pump temperature sensor (1)
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.

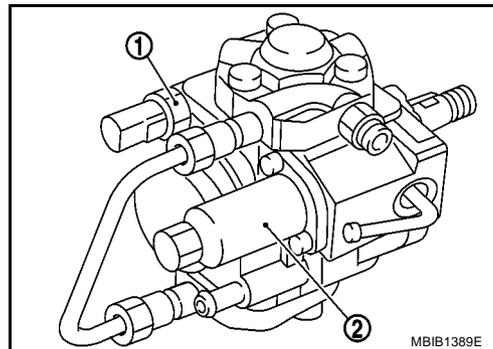
**Continuity should exist.**

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.



# DTC P1272 FUEL PUMP

## 4. CHECK FUEL PUMP

Refer to [EC-250, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 7.

## 5. CHECK FUEL RAIL PRESSURE SENSOR

Refer to [EC-122, "Component Inspection"](#) .

OK or NG

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

## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "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-24, "Fuel Pump Learning Value Clearing"](#) .

>> INSPECTION END

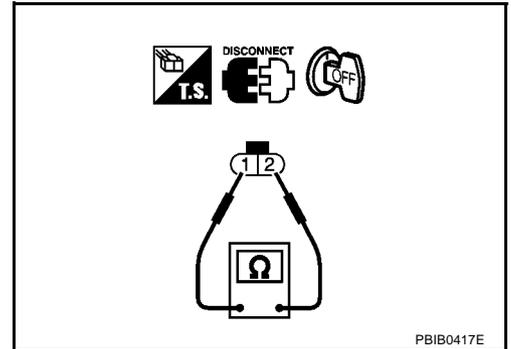
### Component Inspection FUEL PUMP

EBS01KJO

1. Disconnect fuel pump harness connector.
2. Check resistance between fuel pump terminals 1 and 2.

**Resistance: 1.5 - 3.0Ω [at 10 - 60°C (50 - 140°F)]**

3. If NG, replace fuel pump.



EBS01KJP

### Removal and Installation FUEL RAIL

Refer to [EM-44, "INJECTION TUBE AND FUEL INJECTOR"](#) .

### FUEL PUMP

Refer to [EM-49, "FUEL PUMP"](#) .

# DTC P1273 FUEL PUMP

## DTC P1273 FUEL PUMP

PF:16700

### Description

EBS01KJQ

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

EBS01KJR

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> </ul>	Idle	1,600 - 2,000 mA
	<ul style="list-style-type: none"> <li>● Shift lever: P or N (A/T), Neutral (M/T)</li> <li>● No load</li> </ul>	2,000 rpm	1,500 - 1,900 mA

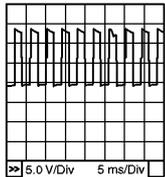
### ECM Terminals and Reference Value

EBS01KJS

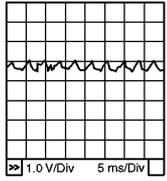
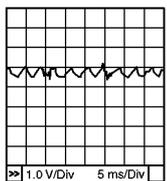
Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

#### 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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
10	G	Fuel pump	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>Approximately 5.8V ★</p>  <p>MBIB0885E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 5.5V ★</p>  <p>MBIB0886E</p>

# DTC P1273 FUEL PUMP

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	B	Fuel pump	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0887E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0888E</p>

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

## On Board Diagnosis Logic

EBS01KJT

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

**NOTE:**

If DTC P1273 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1273 1273	Fuel pump insufficient flow	ECM detects the abnormal pulse of fuel pressure.	<ul style="list-style-type: none"> <li>● Harness or connectors (The fuel pump circuit is open or shorted.)</li> <li>● Fuel pump</li> <li>● Injector adjustment value</li> <li>● Air mixed with fuel</li> <li>● Lack of fuel</li> <li>● Fuel rail pressure sensor</li> </ul>

## DTC Confirmation Procedure

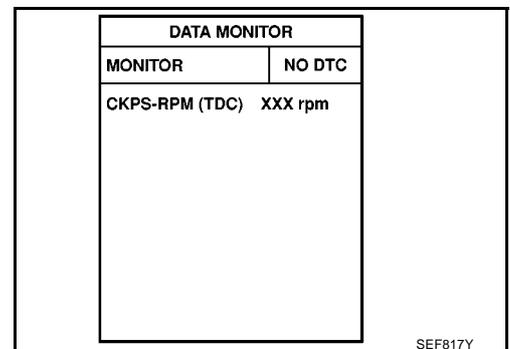
EBS01KJU

**NOTE:**

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-255, "Diagnostic Procedure"](#).



SEF817Y

**WITHOUT CONSULT-II**

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

## DTC P1273 FUEL PUMP

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2. Keep engine speed more than 2,000 rpm for at least 10 seconds.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to [EC-255, "Diagnostic Procedure"](#) .

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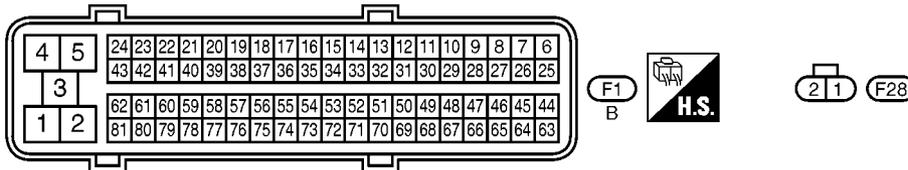
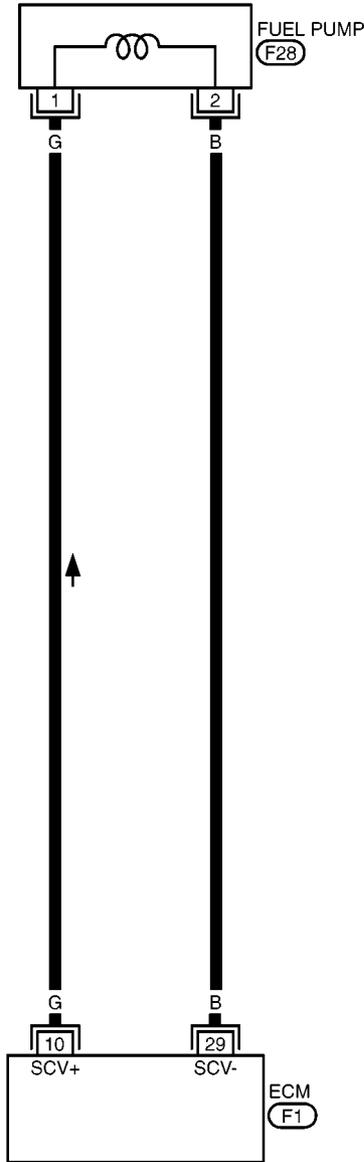
# DTC P1273 FUEL PUMP

## Wiring Diagram

EBS01KJV

### EC-F/PUMP-01

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



MBWA1050E

# DTC P1273 FUEL PUMP

EBS01KJW

## Diagnostic Procedure

### 1. CHECK INJECTOR ADJUSTMENT VALUE

1. Turn ignition switch ON.
2. Select "ENTER INJECTOR CALIB DATA" in "WORK SUPPORT" mode with CONSULT-II.
3. Check injector adjustment values displayed on CONSULT-II screen.

**The value displayed on CONSULT-II screen should be same as injector adjustment value printed on each fuel injector.**

#### OK or NG

- OK >> GO TO 2.  
NG >> Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#).

ENTER INJECTR CALIB DATA	
SET VALUE	
CYL1	D0002A1933140E00 000000000000CA
CYL2	D0000B0032ECF600 000000000000F3
CYL3	D0D9EC00F0ECE00 00000000000017
CYL4	D0D5F3F1F3E9EA00 000000000000F7
CYL1	CYL2
CYL3	CYL4
END	START

MBIB1255E

### 2. 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-24, "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-252, "DTC Confirmation Procedure"](#), again.
7. Is DTC detected again?

#### ⓧ Without CONSULT-II

1. Turn ignition switch ON.
2. Clear fuel pump learning value. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#).
3. Start engine and let it idle for at least 60 seconds.
4. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#).
5. Perform [EC-252, "DTC Confirmation Procedure"](#), again.
6. Is DTC displayed again?

#### Yes or No

- Yes >> GO TO 3.  
No >> **INSPECTION END**

## DTC P1273 FUEL PUMP

### 3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump (2) harness connector.
  - Fuel pump temperature sensor (1)
3. Check harness continuity between ECM terminal 10 and fuel pump terminal 1.  
Refer to Wiring Diagram.

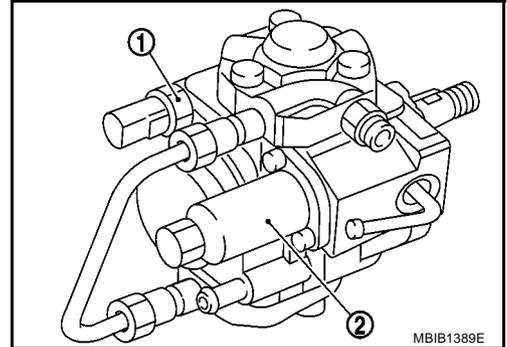
**Continuity should exist.**

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

OK or NG

OK >> GO TO 4.

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



### 4. 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 5.

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

### 5. CHECK FUEL RAIL PRESSURE SENSOR

Refer to [EC-122, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace fuel rail.

### 6. CHECK FUEL PUMP

Refer to [EC-257, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> GO TO 7.

### 7. REPLACE FUEL PUMP

1. Replace fuel pump.
2. Perform Fuel Pump Learning Valve Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .

>> **INSPECTION END**

### 8. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DTC P1273 FUEL PUMP

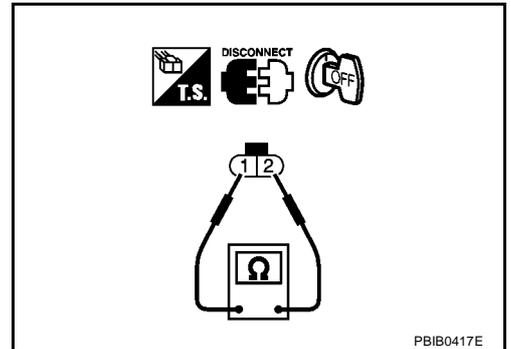
## Component Inspection FUEL PUMP

EBS01KJX

1. Disconnect fuel pump harness connector.
2. Check resistance between fuel pump terminals 1 and 2.

**Resistance: 1.5 - 3.0Ω [at 10 - 60°C (50 - 140°F)]**

3. If NG, replace fuel pump.



## Removal and Installation FUEL PUMP

EBS01KJY

Refer to [EM-49, "FUEL PUMP"](#) .

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# DTC P1274 FUEL PUMP

## DTC P1274 FUEL PUMP

PFP:16700

### Description

EBS01KJZ

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

EBS01KK0

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PUMP CURRENT	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> </ul>	Idle
	<ul style="list-style-type: none"> <li>● Shift lever: P or N (A/T), Neutral (M/T)</li> <li>● No load</li> </ul>	2,000 rpm
		1,600 - 2,000 mA
		1,500 - 1,900 mA

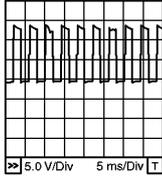
### ECM Terminals and Reference Value

EBS01KK1

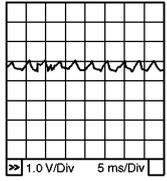
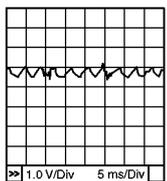
Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

#### 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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
10	G	Fuel pump	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>Approximately 5.8V ★</p>  <p>MBIB0885E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 5.5V ★</p>  <p>MBIB0886E</p>

# DTC P1274 FUEL PUMP

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	B	Fuel pump	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0887E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0888E</p>

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

## On Board Diagnosis Logic

EBS01KK2

**NOTE:**

If DTC P1274 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1274 1274	Fuel pump protection	Fuel pressure is too much higher than the target value.	<ul style="list-style-type: none"> <li>● Harness or connectors (The fuel pump circuit is open or shorted.)</li> <li>● Fuel pump</li> <li>● Fuel rail pressure sensor</li> </ul>

## DTC Confirmation Procedure

EBS01KK3

**NOTE:**

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

**④ WITH CONSULT-II**

1. 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-261, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

**⊗ WITHOUT CONSULT-II**

1. Start engine and let idle for at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-261, "Diagnostic Procedure"](#) .

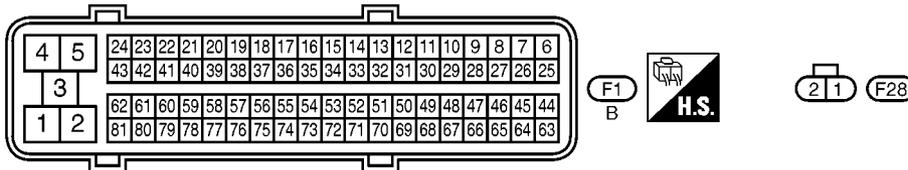
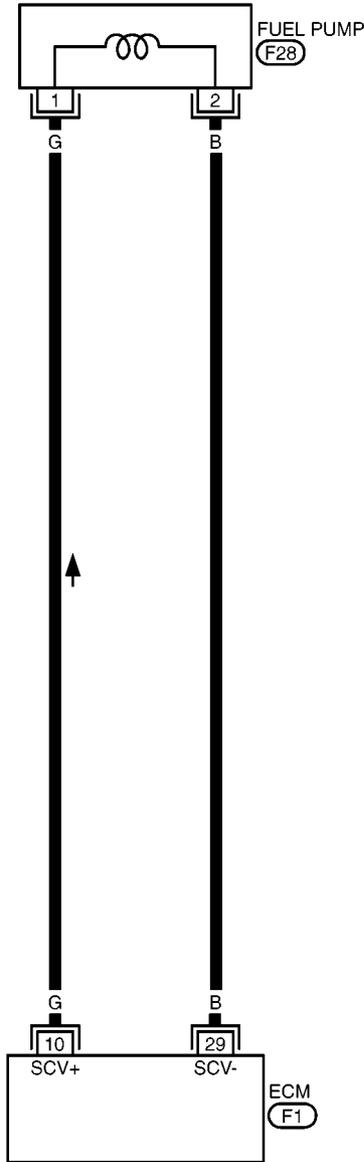
# DTC P1274 FUEL PUMP

## Wiring Diagram

EBS01KK4

### EC-F/PUMP-01

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



MBWA1050E

# DTC P1274 FUEL PUMP

EBS01KK5

## Diagnostic Procedure

### 1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump (2) harness connector.
  - Fuel pump temperature sensor (1)
3. Check harness continuity between ECM terminal 10 and fuel pump terminal 1.  
Refer to Wiring Diagram.

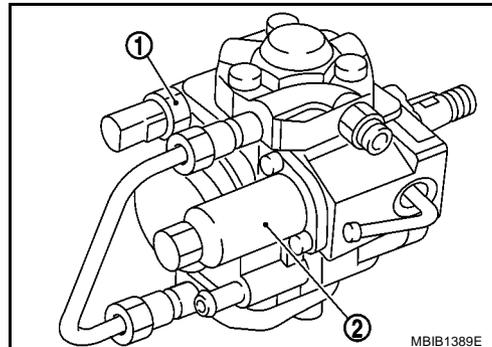
**Continuity should exist.**

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-122, "Component Inspection"](#) .

OK or NG

OK >> GO TO 4.

NG >> Replace fuel rail.

### 4. CHECK FUEL PUMP

Refer to [EC-262, "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-24, "Fuel Pump Learning Value Clearing"](#) .

>> INSPECTION END

### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## DTC P1274 FUEL PUMP

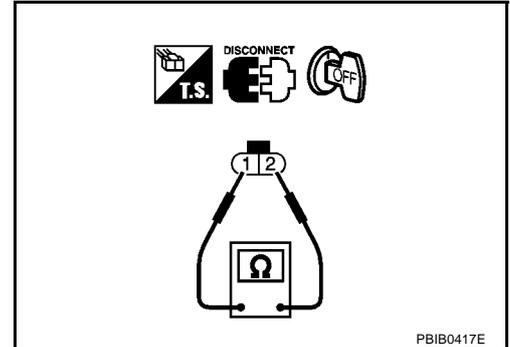
### Component Inspection FUEL PUMP

EBS01KK6

1. Disconnect fuel pump harness connector.
2. Check resistance between fuel pump terminals 1 and 2.

**Resistance: 1.5 - 3.0Ω [at 10 - 60°C (50 - 140°F)]**

3. If NG, replace fuel pump.



PBIB0417E

### Removal and Installation FUEL PUMP

EBS01KK7

Refer to [EM-49, "FUEL PUMP"](#) .

# DTC P1275 FUEL PUMP

## DTC P1275 FUEL PUMP

PF:16700

### Description

EBS01KK8

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

EBS01KK9

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PUMP CURRENT	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> </ul>	Idle	1,600 - 2,000 mA
	<ul style="list-style-type: none"> <li>● Shift lever: P or N (A/T), Neutral (M/T)</li> <li>● No load</li> </ul>	2,000 rpm	1,500 - 1,900 mA

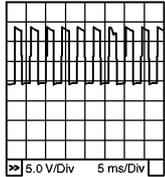
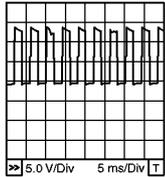
### ECM Terminals and Reference Value

EBS01KKA

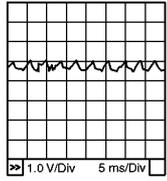
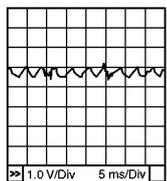
Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

#### 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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
10	G	Fuel pump	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>Approximately 5.8V ★</p>  <p>MBIB0885E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 5.5V ★</p>  <p>MBIB0886E</p>

# DTC P1275 FUEL PUMP

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
29	B	Fuel pump	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0887E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>0.5 - 1.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB0888E</p>

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

## On Board Diagnosis Logic

EBS01KKB

**NOTE:**

If DTC P1275 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1275 1275	Fuel pump exchange	Fuel pressure is too much higher than the target value.	<ul style="list-style-type: none"> <li>● Harness or connectors (The fuel pump circuit is open or shorted.)</li> <li>● Fuel pump</li> <li>● Fuel rail pressure sensor</li> </ul>

## DTC Confirmation Procedure

EBS01KKC

**NOTE:**

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

**④ WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. 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-267, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

**⊗ WITHOUT CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Keep engine speed more than 2,000 rpm for at least 60 seconds.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.

## DTC P1275 FUEL PUMP

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5. If DTC is detected, go to [EC-267, "Diagnostic Procedure"](#) .

A

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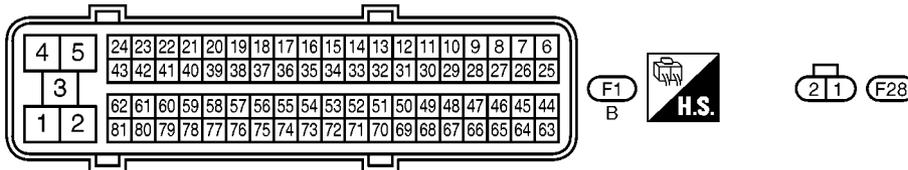
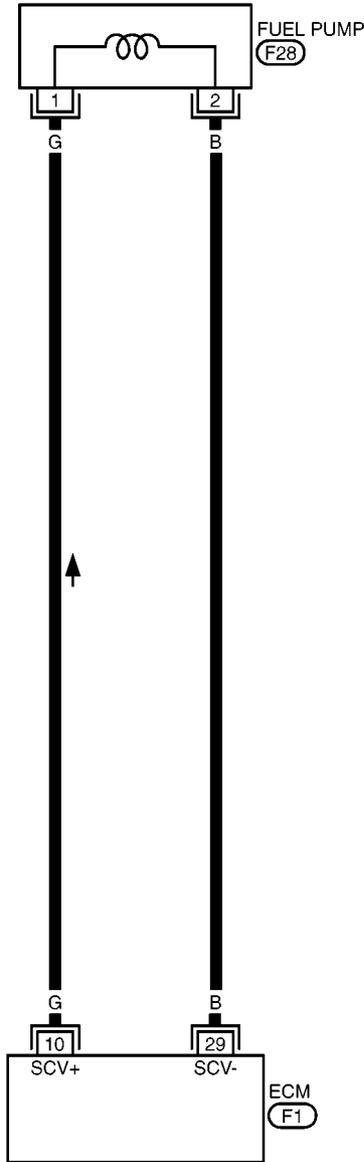
# DTC P1275 FUEL PUMP

## Wiring Diagram

EBS01KKD

### EC-F/PUMP-01

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



MBWA1050E

# DTC P1275 FUEL PUMP

EBS01KKE

## Diagnostic Procedure

### 1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and fuel pump (2) harness connectors.
  - Fuel pump temperature sensor (1)
3. Check harness continuity between ECM terminal 10 and fuel pump terminal 1.  
Refer to Wiring Diagram.

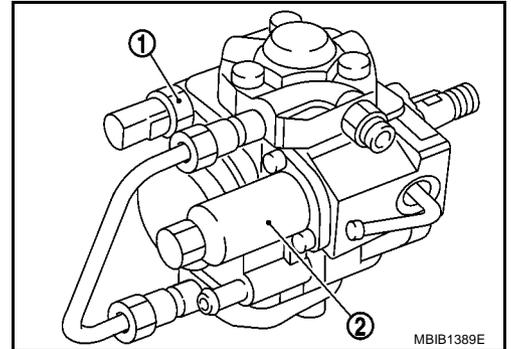
**Continuity should exist.**

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-122, "Component Inspection"](#) .

OK or NG

OK >> GO TO 4.

NG >> Replace fuel rail.

### 4. CHECK FUEL PUMP

Refer to [EC-268, "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-24, "Fuel Pump Learning Value Clearing"](#) .

>> INSPECTION END

### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

# DTC P1275 FUEL PUMP

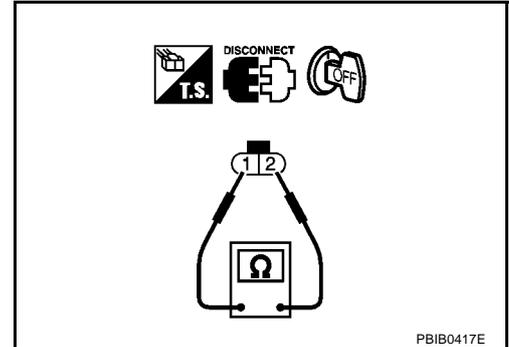
## Component Inspection FUEL PUMP

EBS01KKF

1. Disconnect fuel pump harness connector.
2. Check resistance between fuel pump terminals 1 and 2.

**Resistance: 1.5 - 3.0Ω [at 10 - 60°C (50 - 140°F)]**

3. If NG, replace fuel pump.



## Removal and Installation FUEL PUMP

EBS01KKG

Refer to [EM-49, "FUEL PUMP"](#) .

# DTC P1616 ECM

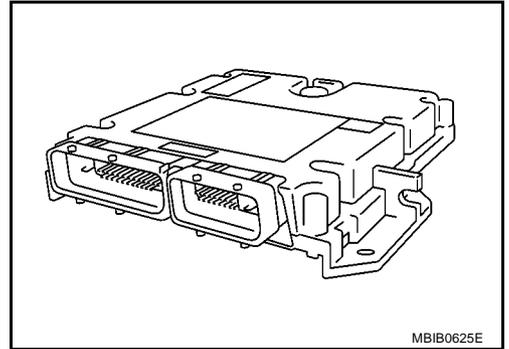
PF2:23710

## DTC P1616 ECM

### Description

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.

EBS01KKH



MBIB0625E

### On Board Diagnosis Logic

EBS01KKI

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1616 1616	Engine control module (ROM)	ECM ROM is malfunctioning.	● ECM

### DTC Confirmation Procedure

EBS01KKJ

#### NOTE:

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

#### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-270, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

#### ⊗ WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-270, "Diagnostic Procedure"](#) .

## Diagnostic Procedure

### 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-269, "DTC Confirmation Procedure"](#) , again.
5. Is DTC P1616 displayed again?

#### Without CONSULT-II

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
3. Perform [EC-269, "DTC Confirmation Procedure"](#) , again.
4. Is DTC 1616 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 [BL-172, "ECM Re-communicating Function"](#) .
3. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .
4. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

>> **INSPECTION END**

# DTC P1622 INJECTOR ADJUSTMENT VALUE

## DTC P1622 INJECTOR ADJUSTMENT VALUE

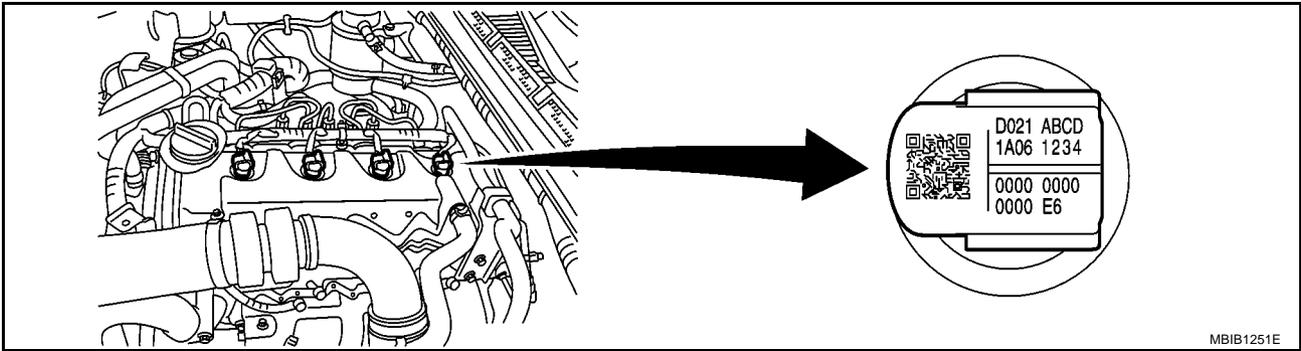
PFP:23710

### Description

EBS01KKL

Injector adjustment value indicates manufacturing tolerance and the value is printed on the top of fuel injector. The injector adjustment value which is correctly stored in ECM is needed for precise fuel injection control. A performance of emission control and a drivability may effect when there is a mismatch between the following two values.

- The injector adjustment value stored in ECM
- The injector adjustment value of the fuel injector which is installed on the vehicle



Example: Injector adjustment value = D021ABCD1A061234000000000000E6

### On Board Diagnosis Logic

EBS01KKM

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1622 1622	Injector adjustment value data uninput	Injector adjustment value is not stored in ECM.	<ul style="list-style-type: none"> <li>• Injector adjustment value (Injector adjustment value has not been written onto ECM memory yet, or the value has been initialized.)</li> </ul>

### DTC Confirmation Procedure

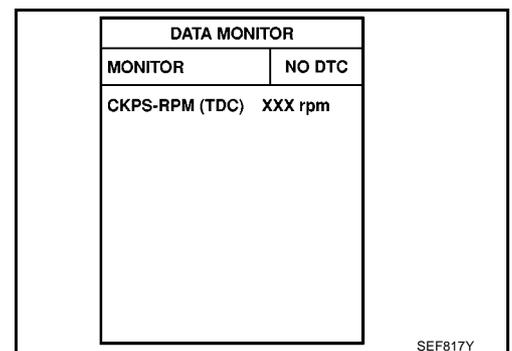
EBS01KKN

#### NOTE:

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

#### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-272, "Diagnostic Procedure"](#) .



#### ⊗ WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-272, "Diagnostic Procedure"](#) .

# DTC P1622 INJECTOR ADJUSTMENT VALUE

---

## Diagnostic Procedure

EBS01KKO

### 1. PERFORM INJECTOR ADJUSTMENT VALUE REGISTRATION

---

Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

>> INSPECTION END

# DTC P1623 INJECTOR ADJUSTMENT VALUE

## DTC P1623 INJECTOR ADJUSTMENT VALUE

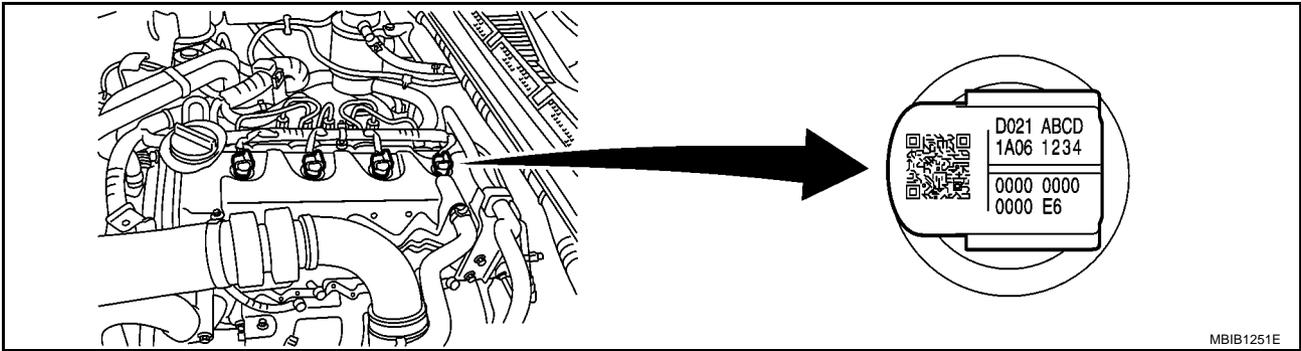
PFP:23710

### Description

EBS01KKP

Injector adjustment value indicates manufacturing tolerance and the value is printed on the top of fuel injector. The injector adjustment value which is correctly stored in ECM is needed for precise fuel injection control. A performance of emission control and a drivability may effect when there is a mismatch between the following two values.

- The injector adjustment value stored in ECM
- The injector adjustment value of the fuel injector which is installed on the vehicle



Example: Injector adjustment value = D021ABCD1A061234000000000000E6

### On Board Diagnosis Logic

EBS01KKQ

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1623 1623	Injector adjustment value data error	ECM detects the abnormal value of injector adjustment value.	<ul style="list-style-type: none"> <li>• CONSULT-II communication status (The status of CONSULT-II communication becomes improper during Injector Adjustment Value Registration.)</li> <li>• ECM</li> </ul>

#### NOTE:

This DTC is not detected when injector adjustment value (not correct but existent) is stored in ECM.

### DTC Confirmation Procedure

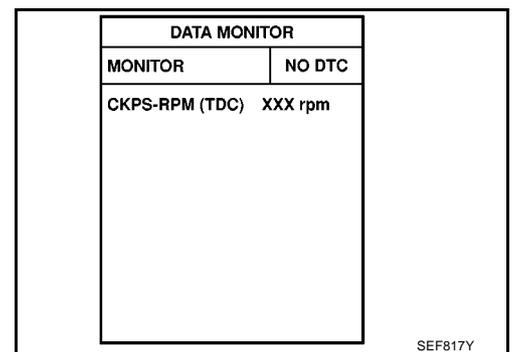
EBS01KKR

#### NOTE:

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-274, "Diagnostic Procedure"](#) .



#### WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.

# DTC P1623 INJECTOR ADJUSTMENT VALUE

4. If DTC is detected, go to [EC-274, "Diagnostic Procedure"](#) .

## Diagnostic Procedure

EBS01KKS

### 1. CHECK INJECTOR ADJUSTMENT VALUE

1. Turn ignition switch ON.
2. Select "ENTER INJECTOR CALIB DATA" in "WORK SUPPORT" mode with CONSULT-II.
3. Check injector adjustment values displayed on CONSULT-II screen.

**The value displayed on CONSULT-II screen should be same as injector adjustment value printed on each fuel injector.**

ENTER INJCTR CALIB DATA	
SET VALUE	
CYL1	D0002A1933140E00 000000000000CA
CYL2	D0000B0032ECF600 000000000000F3
CYL3	D0D9EC00F0ECE000 00000000000017
CYL4	D0D5F3F1F3E9EA00 000000000000F7
CYL1	CYL2
CYL3	CYL4
END	START

MBIB1255E

OK or NG

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

### 2. PERFORM INJECTOR ADJUSTMENT VALUE REGISTRATION

Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

#### NOTE:

When two or more injector adjustment value are improper, it is useful to perform "INJ ADJ VAL CLR" in "WORK SUPPORT" mode with CONSULT-II. And then perform Injector Adjustment Value Registration.

>> GO TO 3.

### 3. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-II

1. Select "SELF DIAG RESULTS" mode with CONSULT-II.
2. Touch "ERASE".
3. Perform [EC-273, "DTC Confirmation Procedure"](#) , again.
4. Is DTC P1623 displayed again?

#### Without CONSULT-II

1. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
2. Perform [EC-273, "DTC Confirmation Procedure"](#) , again.
3. Is DTC 1623 displayed again?

Yes or No

- Yes >> GO TO 4.  
No >> **INSPECTION END**

### 4. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to [BL-172, "ECM Re-communicating Function"](#) .
3. Perform Fuel Pump Learning Value Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .
4. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

>> **INSPECTION END**

# DTC P2135 APP SENSOR

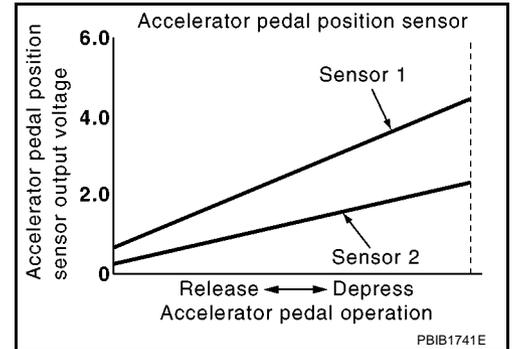
## DTC P2135 APP SENSOR

PFP:18002

### Description

EBS01KKT

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

EBS01KKU

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL POS SEN*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.65 - 0.87V
		Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.28 - 0.48V
		Accelerator pedal: Fully depressed	More than 2.0V

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

### ECM Terminals and Reference Value

EBS01KKV

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

#### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	W	Accelerator pedal position sensor 1 power supply	[Ignition switch ON]	Approximately 5.3V
83	R	Accelerator pedal position sensor 1	[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully released	0.95 - 1.17V
			[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 4.6V
84	B	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	W	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5.3V

# DTC P2135 APP SENSOR

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	R	Accelerator pedal position sensor 2	[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully released	0.58 - 0.78V
			[Ignition switch ON] ● Engine: Stopped ● Accelerator pedal: Fully depressed	More than 2.3V
92	B	Accelerator pedal position sensor 2 ground	[Ignition switch ON]	Approximately 0.3V

## On Board Diagnosis Logic

EBS01KKW

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

### NOTE:

- If DTC P2135 is displayed with DTC P0642 or P0643, first perform the trouble diagnosis for DTC P0642 or P0643. Refer to [EC-222, "DTC P0642, P0643 SENSOR POWER SUPPLY"](#) .
- If DTC P2135 is displayed with DTC P0652 or P0653, first perform the trouble diagnosis for DTC P0652 or P0653. Refer to [EC-227, "DTC P0652, P0653 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	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.	<ul style="list-style-type: none"> <li>● Harness or connectors (The APP sensor circuit is open or shorted.)</li> <li>● Accelerator pedal position sensor</li> </ul>

## DTC Confirmation Procedure

EBS01KKX

### NOTE:

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-278, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### WITHOUT CONSULT-II

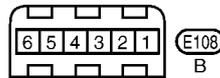
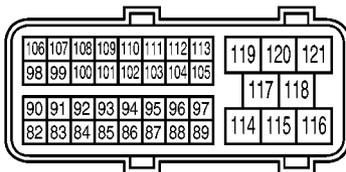
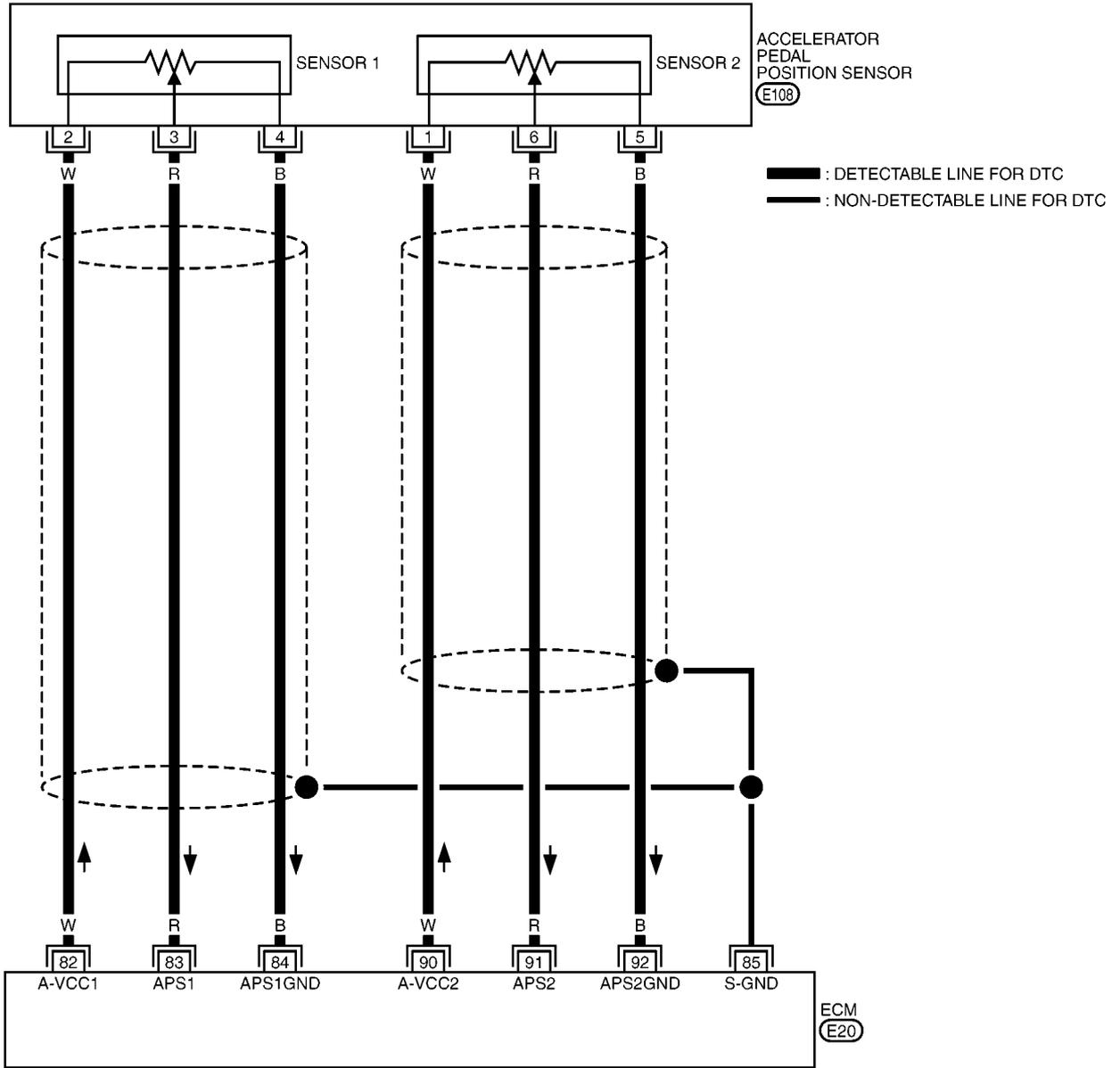
1. Turn ignition switch ON and wait at least 5 seconds.
2. Depress accelerator pedal slowly spending 5 seconds, and then release it slowly spending 5 seconds.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to [EC-278, "Diagnostic Procedure"](#) .

# DTC P2135 APP SENSOR

## Wiring Diagram

EBS01KKY

EC-APPS3-01



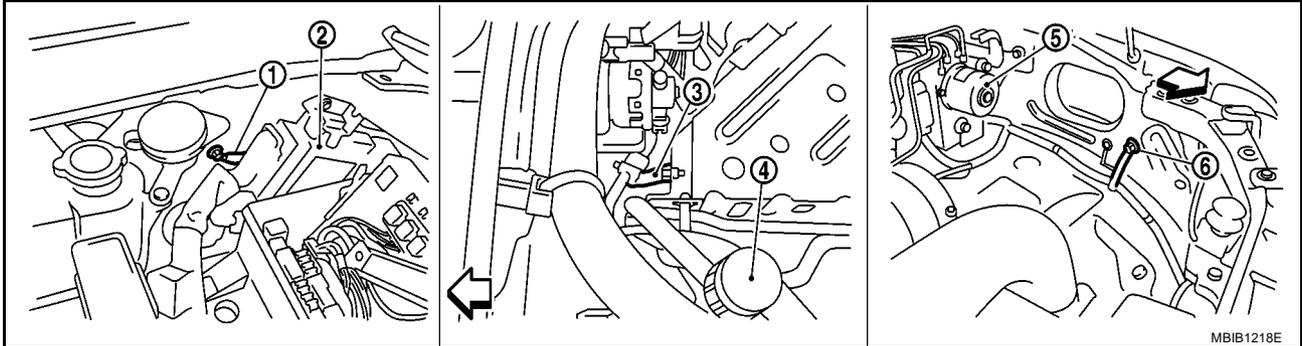
# DTC P2135 APP SENSOR

EBS01KKZ

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

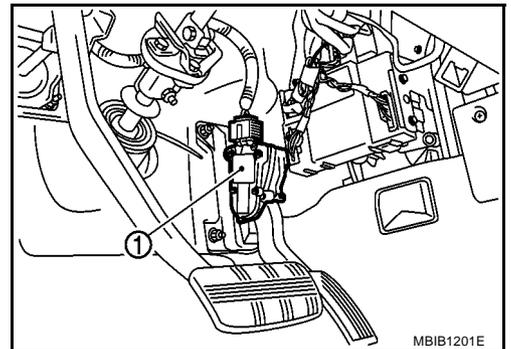
- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

#### 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 (1) harness connector.
2. Turn ignition switch ON.

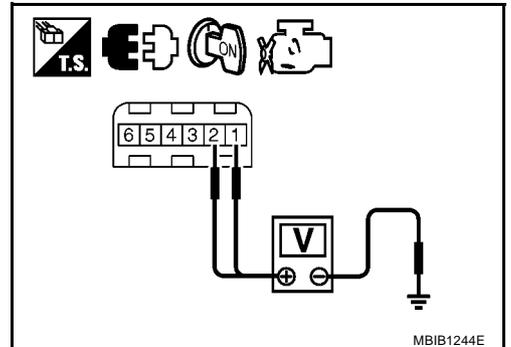


3. Check voltage between APP sensor terminals 1, 2 and ground with CONSULT-II or tester.

**Voltage: Approximately 5.3V**

#### OK or NG

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



# DTC P2135 APP SENSOR

## 3. 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 4.

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

## 4. 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 5.

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

## 5. CHECK APP SENSOR

Refer to [EC-279, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace accelerator pedal assembly.

## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

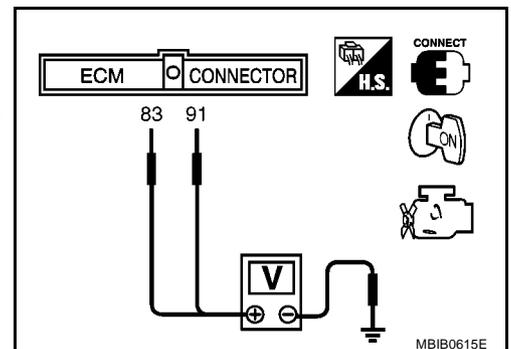
>> **INSPECTION END**

### Component Inspection ACCELERATOR PEDAL POSITION SENSOR

EBS01KL0

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 ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Accelerator pedal position sensor 1)	Fully released	0.95 - 1.17V
	Fully depressed	More than 4.6V
91 (Accelerator pedal position sensor 2)	Fully released	0.58 - 0.78V
	Fully depressed	More than 2.3V



4. If NG, replace accelerator pedal assembly.

## DTC P2135 APP SENSOR

---

### Removal and Installation ACCELERATOR PEDAL

EBS01KL1

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

# DTC P2146, P2149 FUEL INJECTOR POWER SUPPLY

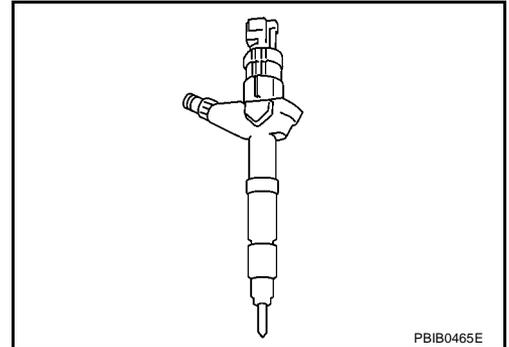
## DTC P2146, P2149 FUEL INJECTOR POWER SUPPLY

PF16600

### Component Description

EBS01KL2

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 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.



### CONSULT-II Reference Value in Data Monitor Mode

EBS01KL3

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	<ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul>	No load	0.50 - 0.70 msec
	<ul style="list-style-type: none"> <li>Shift lever: P or N (A/T), Neutral (M/T)</li> <li>Idle speed</li> </ul>	Blower fan switch: ON Rear window defogger switch: ON	0.50 - 0.80 msec

### ECM Terminals and Reference Value

EBS01KL4

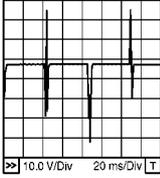
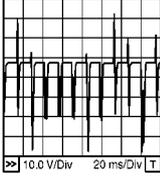
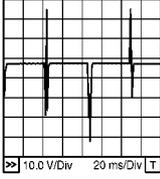
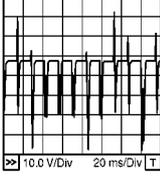
Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

#### 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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
4	V	Fuel injector power supply (For cylinder No. 1 and 4) Fuel injector power supply (For cylinder No. 2 and 3)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★ MBIB1295E
5	G		<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0V ★ MBIB1296E

# DTC P2146, P2149 FUEL INJECTOR POWER SUPPLY

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
21 22 23 24	G P W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★  <div style="text-align: right; font-size: small;">MBIB1297E</div>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0V ★  <div style="text-align: right; font-size: small;">MBIB1298E</div>
40 41 42 43	W GR W B	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★  <div style="text-align: right; font-size: small;">MBIB1297E</div>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0V ★  <div style="text-align: right; font-size: small;">MBIB1298E</div>

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

## On Board Diagnosis Logic

EBS01KL5

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2146 2146	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.	<ul style="list-style-type: none"> <li>● Harness or connectors (The fuel injector circuit is open.)</li> </ul>
P2149 2149	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 P2146, P2149 FUEL INJECTOR POWER SUPPLY

EBS01KL6

## DTC Confirmation Procedure

### NOTE:

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

### TESTING CONDITION

Before performing the following procedure, confirm the ambient temperature is more than -20°C (-4°F).

#### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If DTC is detected, go to [EC-285, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

#### ⊗ WITHOUT CONSULT-II

1. Start engine and let it idle for at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-285, "Diagnostic Procedure"](#) .

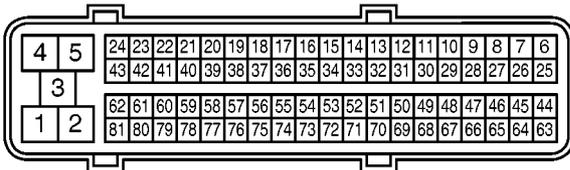
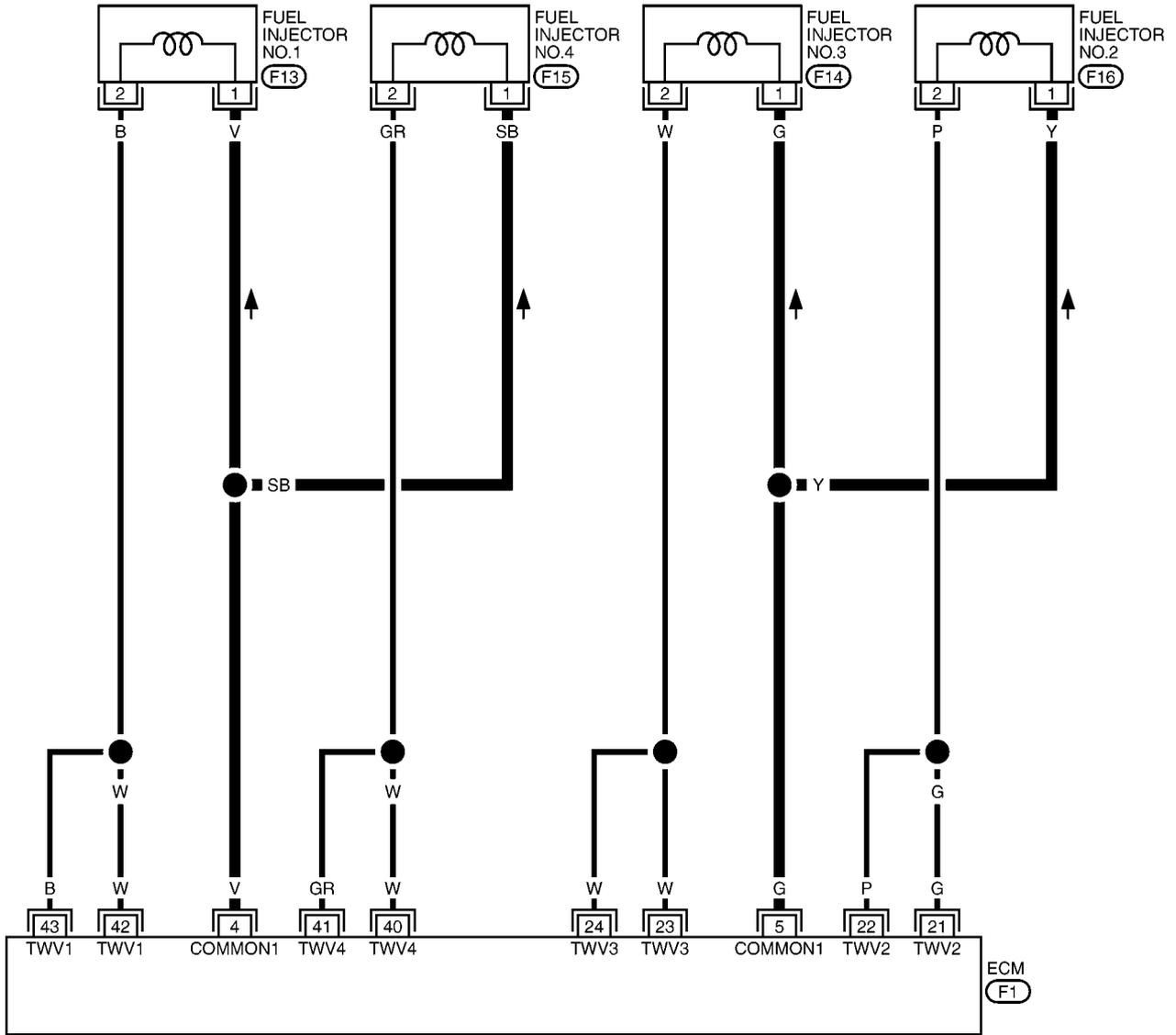
# DTC P2146, P2149 FUEL INJECTOR POWER SUPPLY

EBS01KL7

## Wiring Diagram

### EC-INJ/PW-01

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



MBWA1055E

# DTC P2146, P2149 FUEL INJECTOR POWER SUPPLY

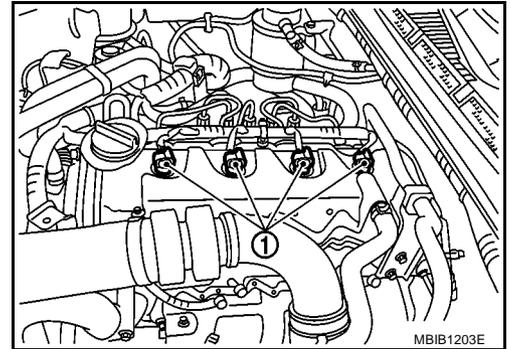
EBS01KL8

## Diagnostic Procedure

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

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect fuel injector (1) 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	1	No.1
5	1	No.2
5	1	No.3
4	1	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-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

# DTC P2147, P2148 FUEL INJECTOR CIRCUIT

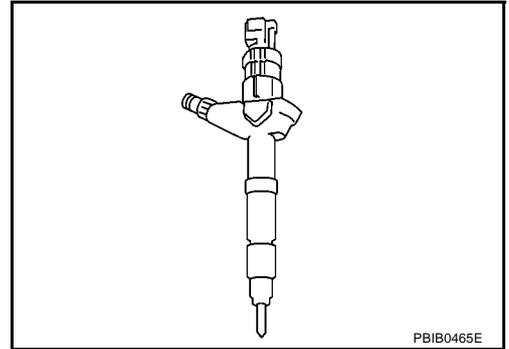
PF16600

## DTC P2147, P2148 FUEL INJECTOR CIRCUIT

### Component Description

EBS01KL9

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 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.



### CONSULT-II Reference Value in Data Monitor Mode

EBS01KLA

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID	<ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul>	No load	0.50 - 0.70 msec
	<ul style="list-style-type: none"> <li>Shift lever: P or N (A/T), Neutral (M/T)</li> <li>Idle speed</li> </ul>	Blower fan switch: ON Rear window defogger switch: ON	0.50 - 0.80 msec

### ECM Terminals and Reference Value

EBS01KLB

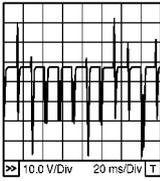
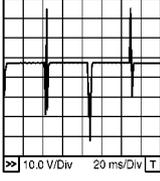
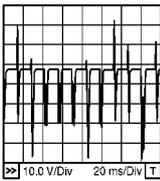
Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

#### 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.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
4	V	Fuel injector power supply (For cylinder No. 1 and 4) Fuel injector power supply (For cylinder No. 2 and 3)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★ MBIB1295E
5	G		<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0V ★ MBIB1296E
21 22 23 24	G P W W	Fuel injector No. 2 Fuel injector No. 2 Fuel injector No. 3 Fuel injector No. 3	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	Approximately 7.5V ★ MBIB1297E

# DTC P2147, P2148 FUEL INJECTOR CIRCUIT

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 8.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB1298E</p>
40 41 42 43	W GR W B	Fuel injector No. 4 Fuel injector No. 4 Fuel injector No. 1 Fuel injector No. 1	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> <p><b>NOTE:</b> The pulse cycle changes depending on rpm at idle</p>	<p>Approximately 7.5V ★</p>  <p style="text-align: right; font-size: small;">MBIB1297E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	<p>Approximately 8.0V ★</p>  <p style="text-align: right; font-size: small;">MBIB1298E</p>

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

## On Board Diagnosis Logic

EBS01KLC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2147 2147	Fuel injector circuit low input	ECM detects the fuel injector circuit is shorted to ground.	<ul style="list-style-type: none"> <li>● Harness or connectors (The fuel injector circuit is shorted.)</li> </ul>
P2148 2148	Fuel injector circuit high input	ECM detects the fuel injector circuit is shorted to power.	

# DTC P2147, P2148 FUEL INJECTOR CIRCUIT

EBS01KLD

## DTC Confirmation Procedure

### NOTE:

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

### ④ WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If DTC is detected, go to [EC-290, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
CKPS-RPM (TDC)	XXX rpm

SEF817Y

### ⊗ WITHOUT CONSULT-II

1. Start engine and let it idle for at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-290, "Diagnostic Procedure"](#) .

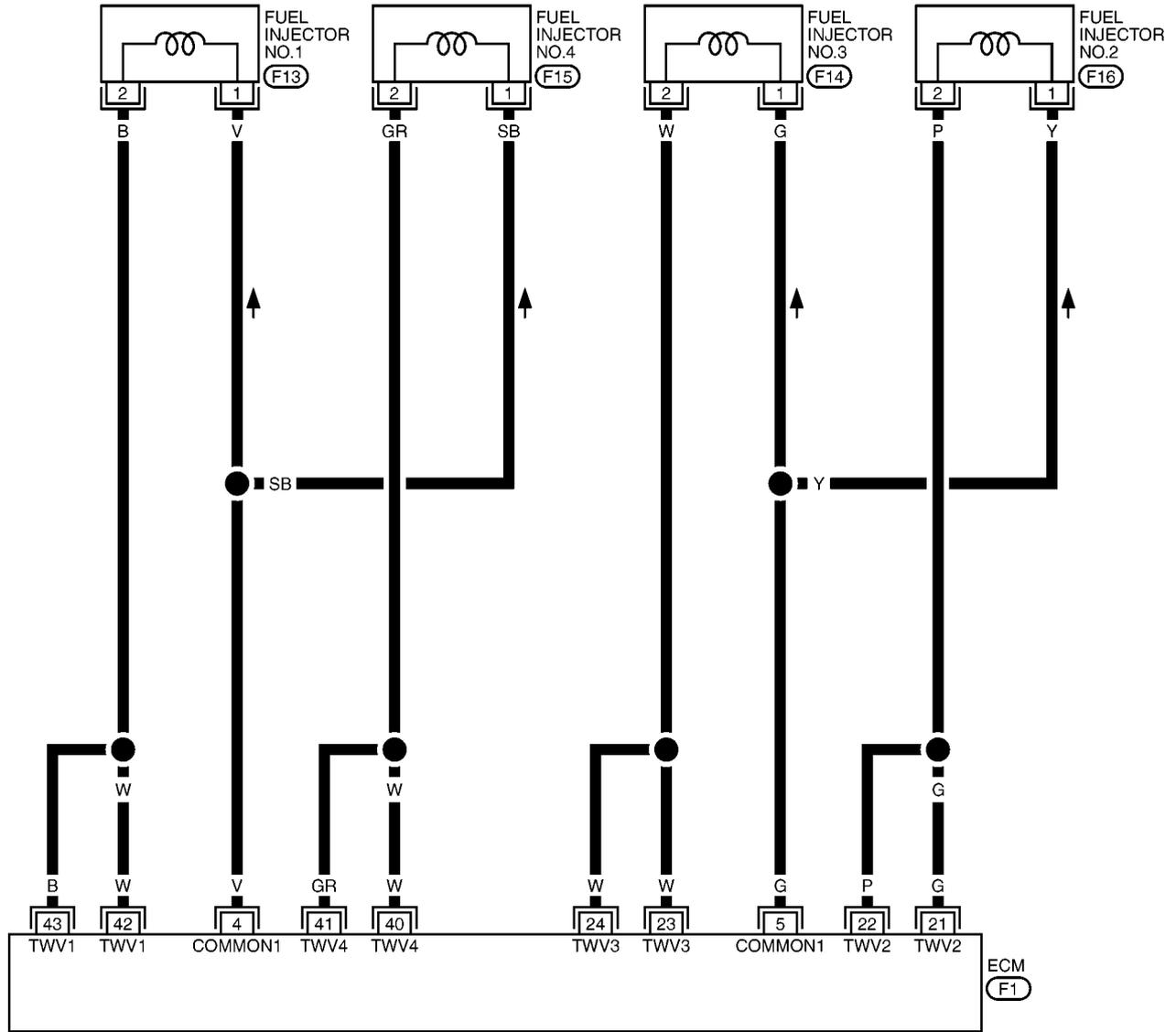
# DTC P2147, P2148 FUEL INJECTOR CIRCUIT

## Wiring Diagram

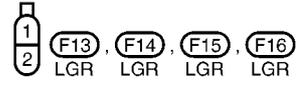
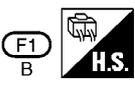
EBS01KLE

### EC-INJECT-01

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



4	5	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6
		43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
3		62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
1	2	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63



MBWA1042E

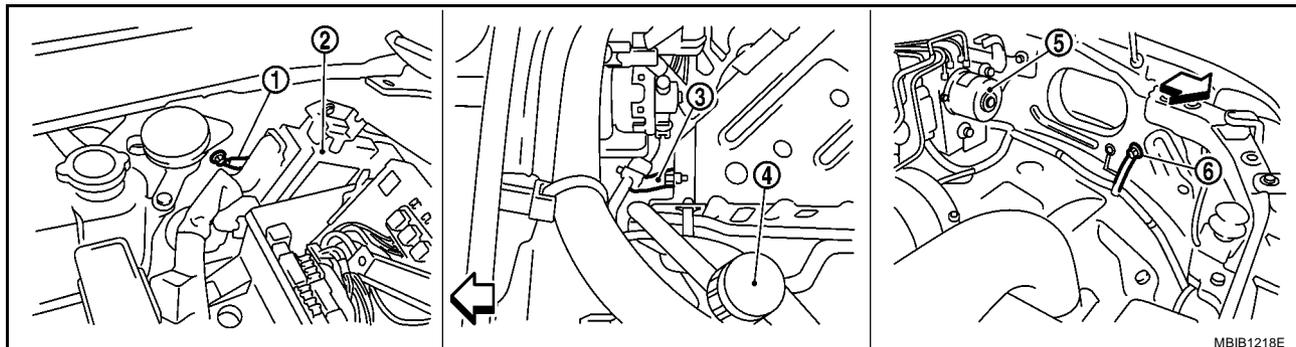
# DTC P2147, P2148 FUEL INJECTOR CIRCUIT

EBS01KLF

## Diagnostic Procedure

### 1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#).



← : Vehicle front

1. Body ground E21

2. ECM

3. Body ground E41

4. A/C high-pressure service valve

5. ABS actuator and electric unit  
(control unit)

6. Body ground E61

#### OK or NG

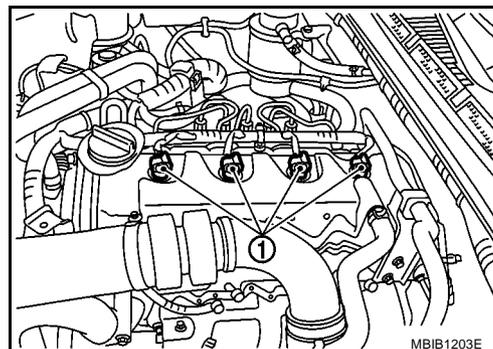
OK >> GO TO 2.

NG >> Repair or replace ground connections.

## DTC P2147, P2148 FUEL INJECTOR CIRCUIT

### 2. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Disconnect fuel injector (1) 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	1	42, 43	Should not exist
		4	Should exist
	2	42,43	Should exist
		4	Should not exist
No.2	1	21, 22	Should not exist
		5	Should exist
	2	21, 22	Should exist
		5	Should not exist
No.3	1	23, 24	Should not exist
		5	Should exist
	2	23, 24	Should exist
		5	Should not exist
No.4	1	40, 41	Should not exist
		4	Should exist
	2	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-292, "Component Inspection"](#) .

OK or NG

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

### 4. REPLACE FUEL INJECTOR

1. Replace fuel injector of malfunctioning cylinder.
2. Perform Injector Adjustment Value Registration.  
Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

>> INSPECTION END

### 5. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## DTC P2147, P2148 FUEL INJECTOR CIRCUIT

### Component Inspection

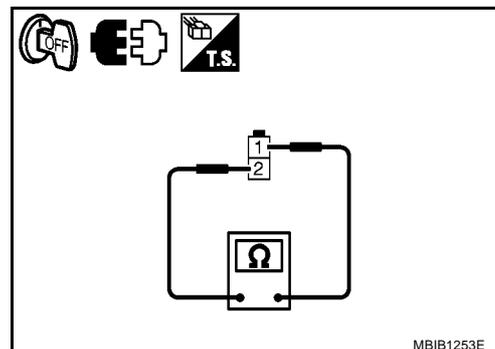
#### FUEL INJECTOR

EBS01KLG

1. Disconnect fuel injector harness connector.
2. Check resistance between terminals as shown in the figure.

**Resistance: 0.2 - 0.8Ω [at 10 - 60°C (50 - 140°F)]**

3. If NG, replace fuel injector.



### Removal and Installation

#### FUEL INJECTOR

EBS01KLH

Refer to [EM-44, "INJECTION TUBE AND FUEL INJECTOR"](#) .

# DTC P2228, P2229 BARO SENSOR

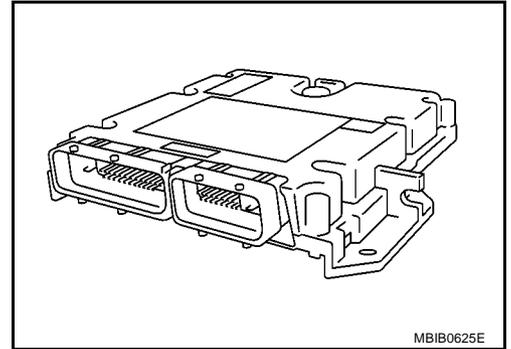
## DTC P2228, P2229 BARO SENSOR

PF2P:23731

### Description

EBS01KLI

The barometric pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the microcomputer.



EBS01KLJ

### On Board Diagnosis Logic

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2228 2228	Barometric pressure sensor circuit low input	An excessively low voltage from the barometric pressure sensor (built-into ECM) is sent to ECM.	● ECM
P2229 2228	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

EBS01KLL

#### NOTE:

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-294, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

#### ⓧ WITHOUT CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to [EC-294, "Diagnostic Procedure"](#) .

# DTC P2228, P2229 BARO SENSOR

EBS01KLL

## Diagnostic Procedure

### 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-293, "DTC Confirmation Procedure"](#) , again.
5. Is DTC P2228 or P2229 displayed again?

#### Without CONSULT-II

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to [EC-27](#) .
3. Perform [EC-293, "DTC Confirmation Procedure"](#) , again.
4. Is DTC 2228 or 2229 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 [BL-172, "ECM Re-communicating Function"](#) .
3. Perform Fuel Pump Learning Valve Clearing. Refer to [EC-24, "Fuel Pump Learning Value Clearing"](#) .
4. Perform Injector Adjustment Value Registration. Refer to [EC-25, "Injector Adjustment Value Registration"](#) .

>> **INSPECTION END**

# GLOW CONTROL SYSTEM

## GLOW CONTROL SYSTEM

PFP:25230

### Description SYSTEM DESCRIPTION

EBS01KLM

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor	Engine speed	Glow control	Glow lamp*
Engine coolant temperature sensor	Engine coolant temperature		Glow relay Glow plugs

\*: The output signal is sent from the ECM through CAN communication line.

When engine coolant temperature is more than approximately 80°C (176°F), the glow relay turns off.  
When engine coolant temperature is lower than approximately 80°C (176°F):

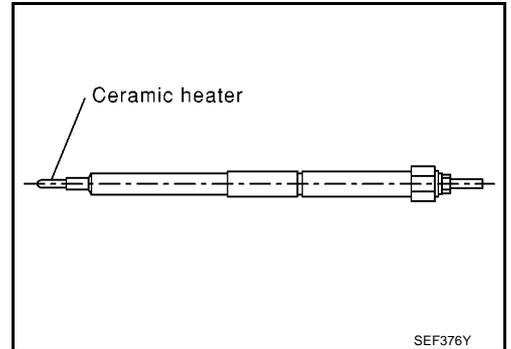
- Ignition switch ON  
After ignition switch has turned to ON, the glow relay turns ON for a certain period of time in relation to engine coolant temperature, allowing current to flow through glow plug.
- Cranking  
The glow relay turns ON, allowing current to flow through glow plug.
- Starting  
After 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.

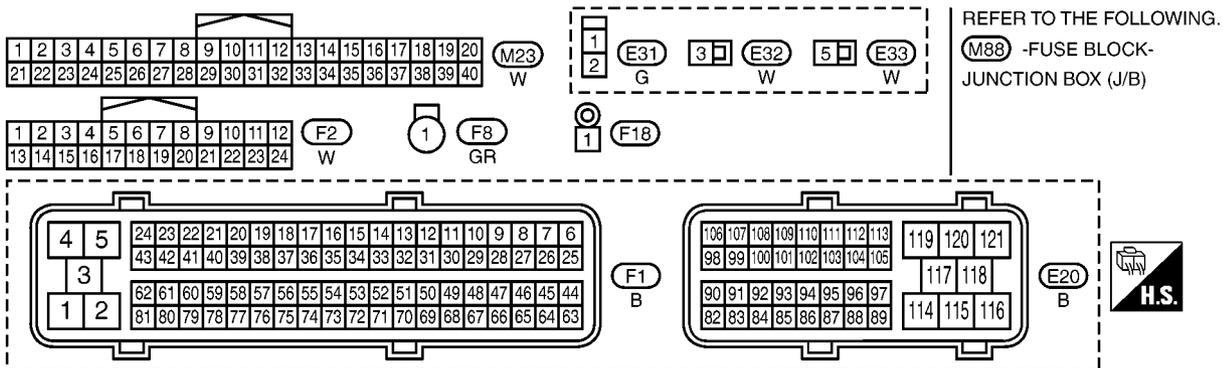
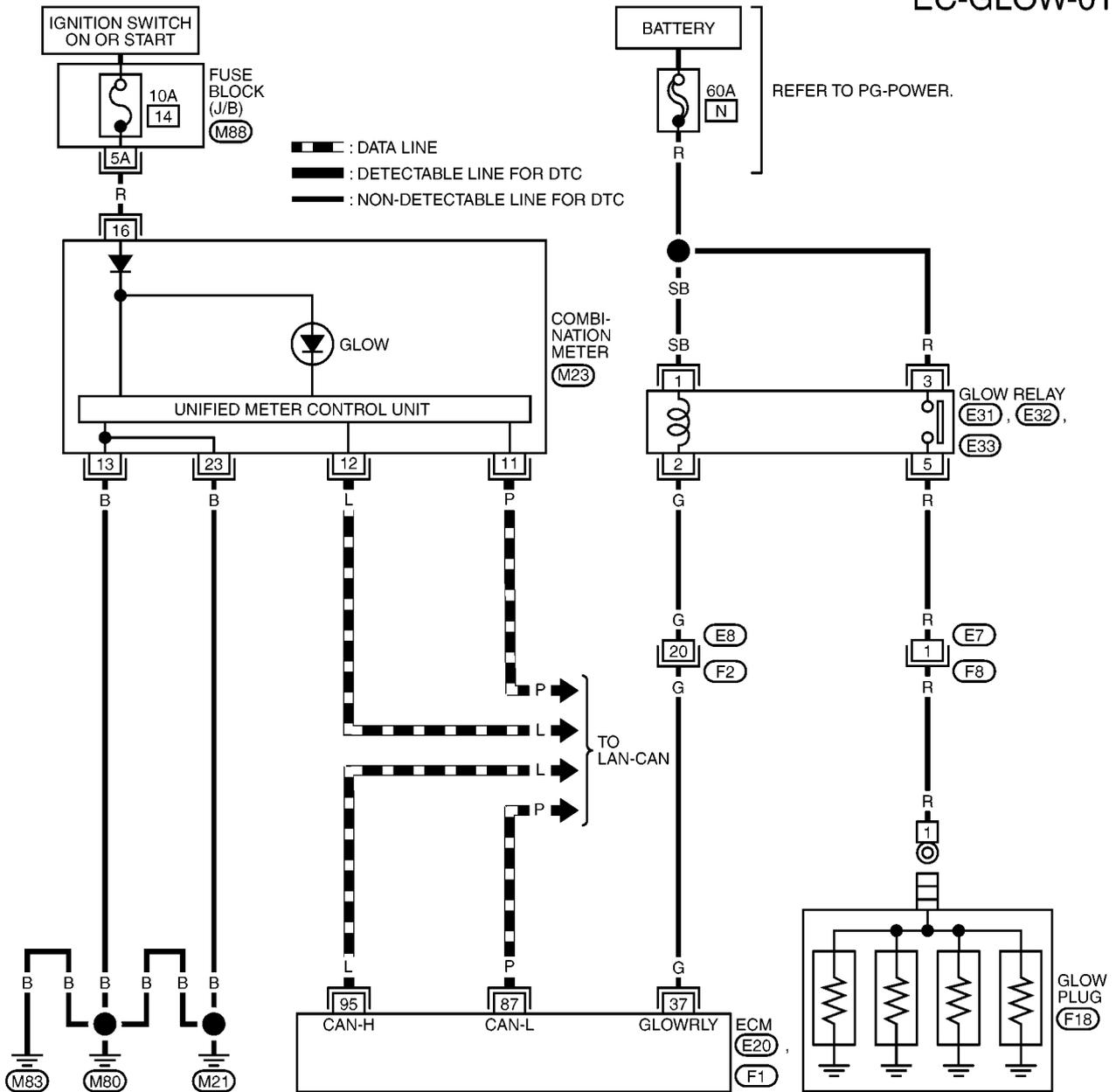


# GLOW CONTROL SYSTEM

## Wiring Diagram

EBS01KLN

EC-GLOW-01



MBWA1329E

# GLOW CONTROL SYSTEM

EBS01KLO

## Diagnostic Procedure

### 1. INSPECTION START

Check fuel level, fuel supplying system, starter motor, etc.

OK or NG

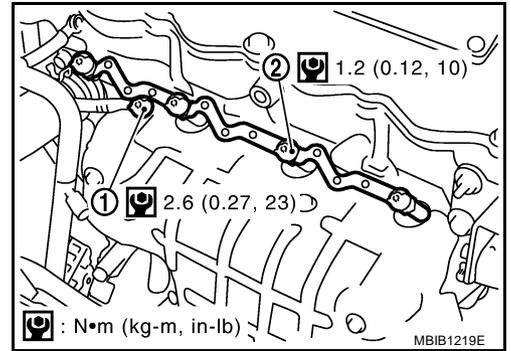
- OK >> GO TO 2.
- NG >> Correct.

### 2. CHECK INSTALLATION

Check that glow plug nut (1) and all glow plug connecting plate nuts (2) are installed properly.

OK or NG

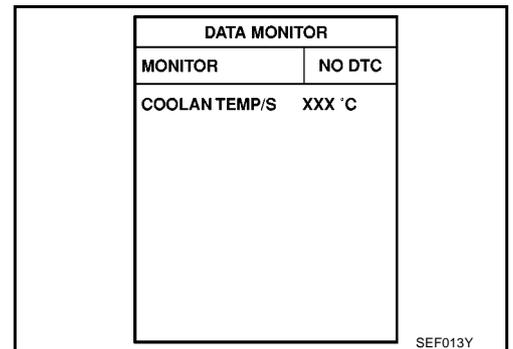
- OK >> GO TO 3.
- NG >> Install properly.



### 3. CHECK GLOW INDICATOR LAMP OPERATION

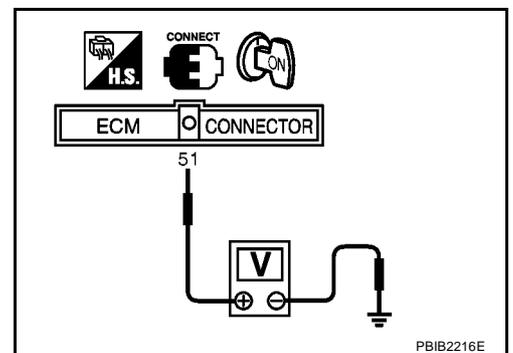
#### Ⓟ With CONSULT-II

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. Set the tester probe between ECM terminal 51 (engine coolant temperature sensor signal) and ground.
2. Confirm that the voltage indicates above 1.53V. If it indicates 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

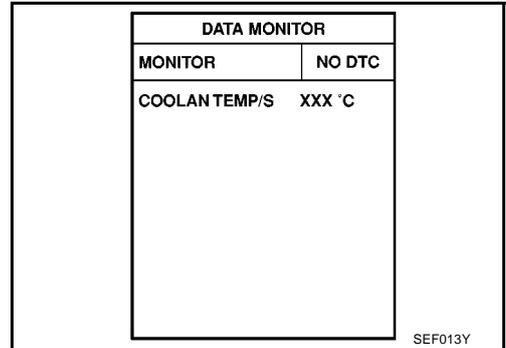
- OK >> GO TO 4.
- NG >> GO TO 5.

# GLOW CONTROL SYSTEM

## 4. CHECK GLOW CONTROL SYSTEM OVERALL FUNCTION

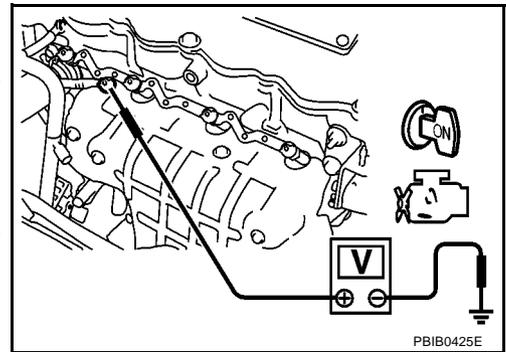
### With CONSULT-II

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.



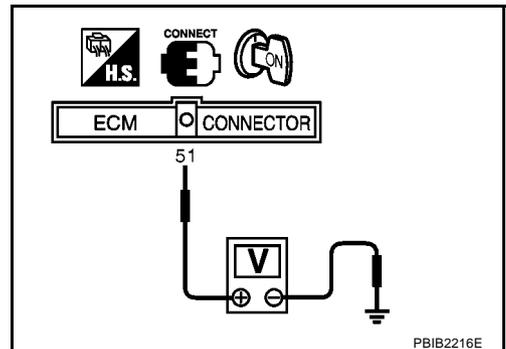
6. Check the voltage between glow plug and engine body under the following conditions.

Conditions	Voltage
For 20 seconds after turning ignition switch ON	Battery voltage
More than 20 seconds after turning ignition switch ON	Approx. 0V



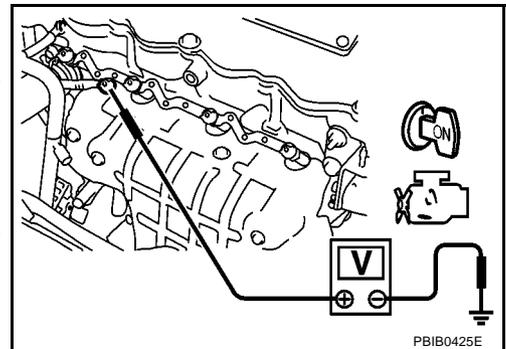
### Without CONSULT-II

1. Set the tester probe between ECM terminal 51 (engine coolant temperature sensor signal) and ground.
2. Confirm that the voltage indicates approximately 3.62V. 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.

# GLOW CONTROL SYSTEM

## 5. CHECK DTC

Check that DTC U1000 is not displayed.

Yes or No

- Yes >> Perform trouble diagnoses for DTC U1000, refer to [EC-79, "DTC U1000 CAN COMMUNICATION LINE"](#).
- No >> GO TO 6.

## 6. CHECK COMBINATON METER OPERATION

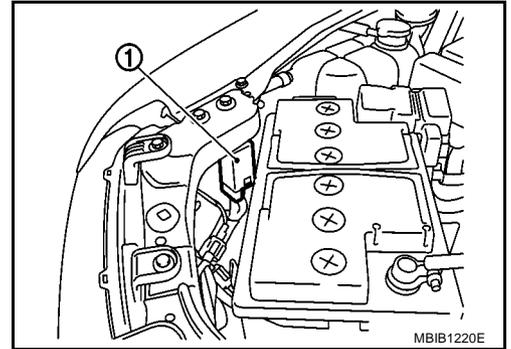
Does combination meter operate normally?

Yes or No

- Yes >> GO TO 14.
- No >> Check combination meter circuit. Refer to [DI-4, "COMBINATION METERS"](#).

## 7. CHECK GLOW RELAY POWER SUPPLY CIRCUIT

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

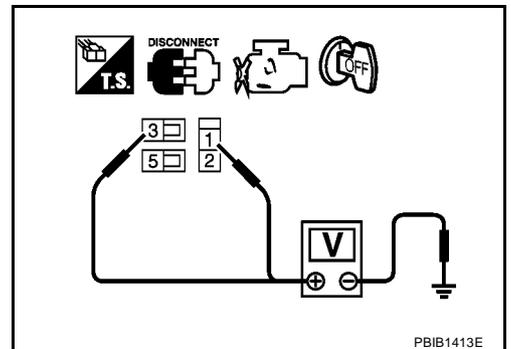


3. Check voltage between glow relay terminals 1, 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

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



## 8. DETECT MALFUNCTIONING PART

Check the following.

- 60A fusible link
- Harness for open or short between glow relay and battery

>> Repair harness or connectors.

# GLOW CONTROL SYSTEM

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## 9. CHECK GLOW RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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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 E8, F2
- 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

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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 13.  
NG >> GO TO 12.

---

## 12. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E7, F8
- Harness for open or short between glow relay and glow plug

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

---

## 13. CHECK GLOW RELAY

---

Refer to [EC-301, "Component Inspection"](#) .

OK or NG

OK >> GO TO 14.  
NG >> Replace glow relay.

---

## 14. CHECK GLOW PLUG

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Refer to [EC-301, "Component Inspection"](#) .

OK or NG

OK >> GO TO 15.  
NG >> Replace glow plug.

# GLOW CONTROL SYSTEM

## 15. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

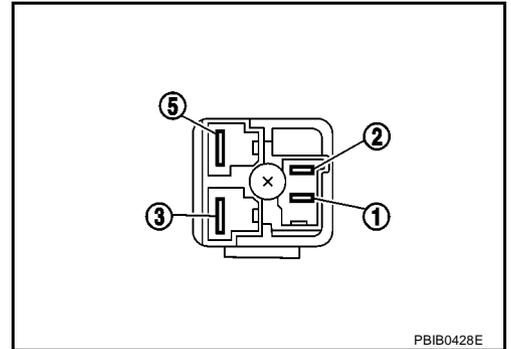
### Component Inspection GLOW RELAY

EBS01KLP

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.



### GLOW PLUG

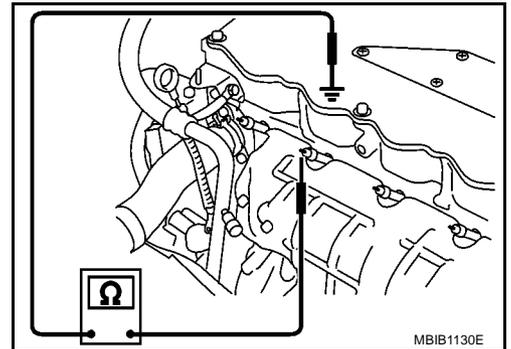
1. Remove glow plug connecting plate.
2. Check glow plug resistance.

**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)



### Removal and Installation GLOW PLUG

EBS01KLP

Refer to [EM-41, "GLOW PLUG"](#) .

# EGR VOLUME CONTROL SYSTEM

## EGR VOLUME CONTROL SYSTEM

PFP:14710

### Description SYSTEM DESCRIPTION

EBS01KLR

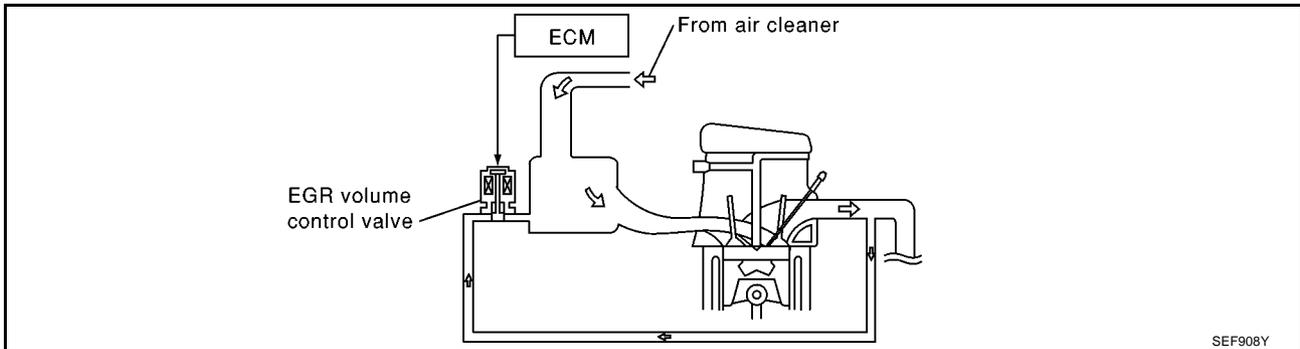
Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor	Engine speed	EGR volume control	EGR volume control valve
Vehicle speed sensor*	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Accelerator pedal position sensor	Accelerator 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.

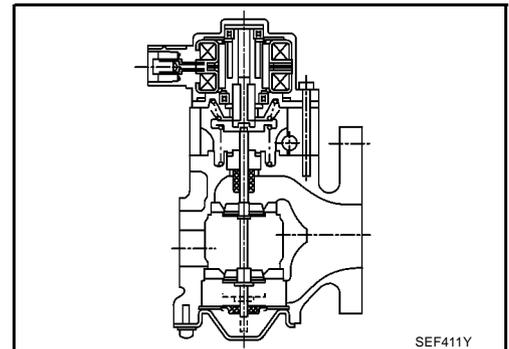
- Engine stopped
- Engine starting
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Accelerator pedal fully depressed



### 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.



# EGR VOLUME CONTROL SYSTEM

## CONSULT-II Reference Value in Data Monitor Mode

EBS01KLS

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR VOL CON/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: P or N (A/T), Neutral (M/T)</li> <li>● No load</li> </ul>	After 1 minute at idle	More than 10 steps
		Revvng engine from idle to 3,200 rpm	0 step

## ECM Terminals and Reference Value

EBS01KLT

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

### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25 26 27 28	Y O GR V	EGR volume control valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	0.1 - 14V (Voltage signals of each ECM terminals differ according to the control position of EGR volume control valve.)
105 113	BR BR	ECM relay (self shut-off)	<b>[Ignition switch ON]</b> <b>[Ignition switch OFF]</b> <ul style="list-style-type: none"> <li>● For a few seconds after turning ignition switch OFF</li> </ul>	Approximately 1.0V
			<b>[Ignition switch OFF]</b> <ul style="list-style-type: none"> <li>● More than a few seconds passed after turning ignition switch OFF</li> </ul>	BATTERY VOLTAGE (11 - 14V)
119 120	R G	Power supply for ECM	<b>[Ignition switch ON]</b>	BATTERY VOLTAGE (11 - 14V)

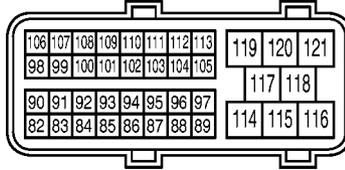
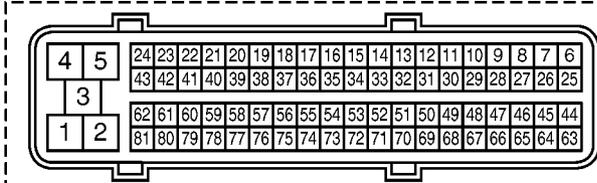
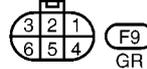
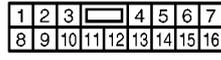
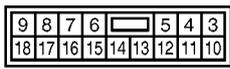
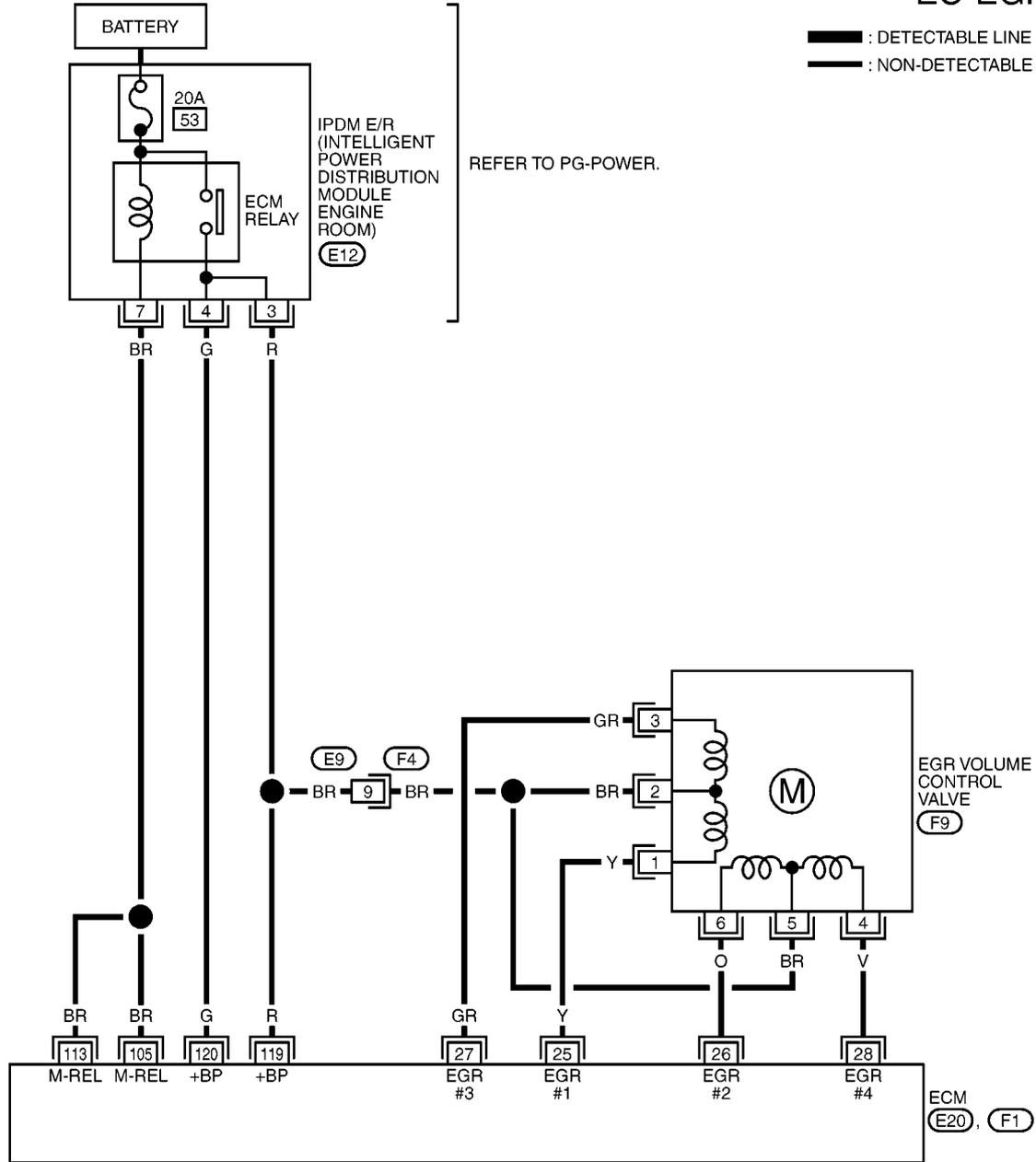
# EGR VOLUME CONTROL SYSTEM

EBS01KLU

## Wiring Diagram

### EC-EGRVLV-01

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



MBWA1057E

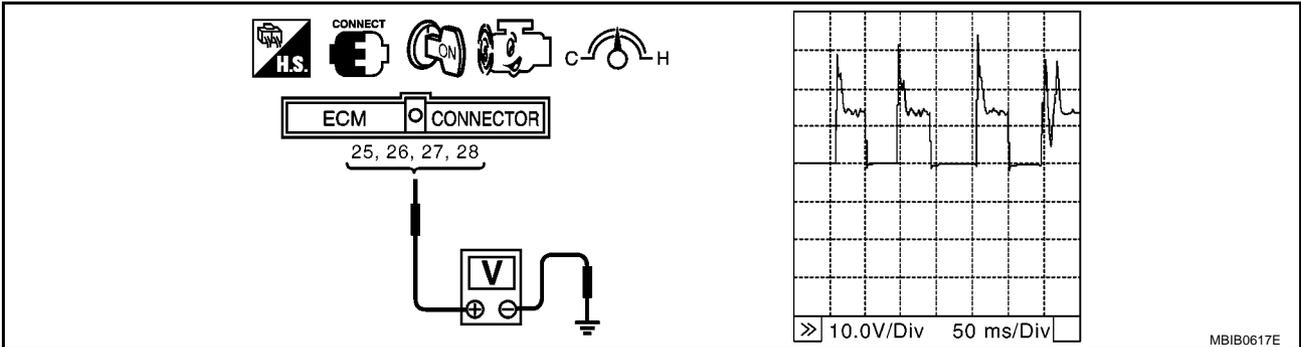
# EGR VOLUME CONTROL SYSTEM

EBS01KLV

## Diagnostic Procedure

### 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.



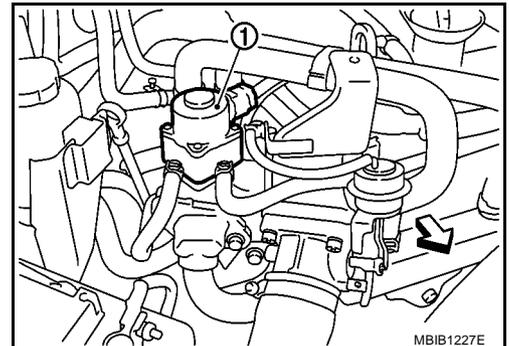
The pulse signal as shown in the figure should appear.

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 2.

### 2. CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EGR volume control valve (1) harness connector.
  - ↶: Vehicle front
3. Turn ignition switch ON.

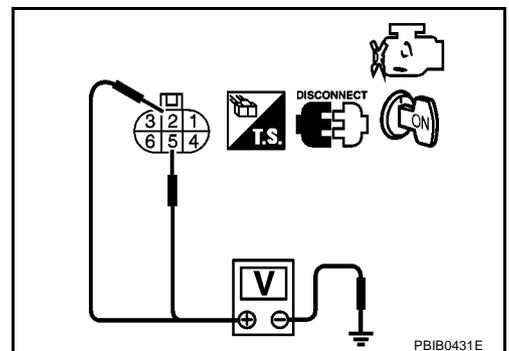


4. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

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



# EGR VOLUME CONTROL SYSTEM

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## 3. DETECT MALFUNCTIONING PART

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Check the following.

- Harness connectors E9, F4
- Harness for open and short between ECM and EGR volume control valve
- Harness for open and short between IPDM E/R and EGR volume control valve

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

---

## 4. 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 5.

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

---

## 5. CHECK EGR VOLUME CONTROL VALVE

---

Refer to [EC-307, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace EGR volume control valve.

---

## 6. CHECK EGR PASSAGE

---

Check the following for clogging and cracks.

- EGR tube
- EGR cooler (A/T models)

OK or NG

OK >> GO TO 7.

NG >> Repair or replace EGR passage.

---

## 7. CHECK INTERMITTENT INCIDENT

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Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

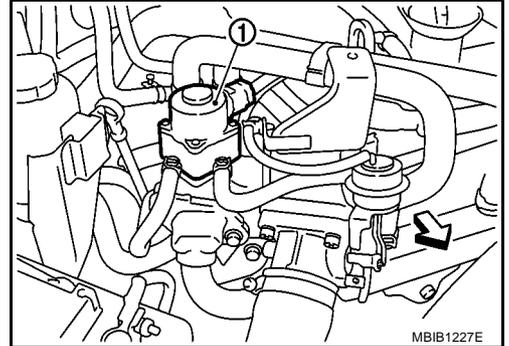
# EGR VOLUME CONTROL SYSTEM

EBS01KLW

## Component Inspection EGR VOLUME CONTROL VALVE

① With CONSULT-II

1. Disconnect EGR volume control valve (1) harness connector.
  - ↶ : Vehicle front

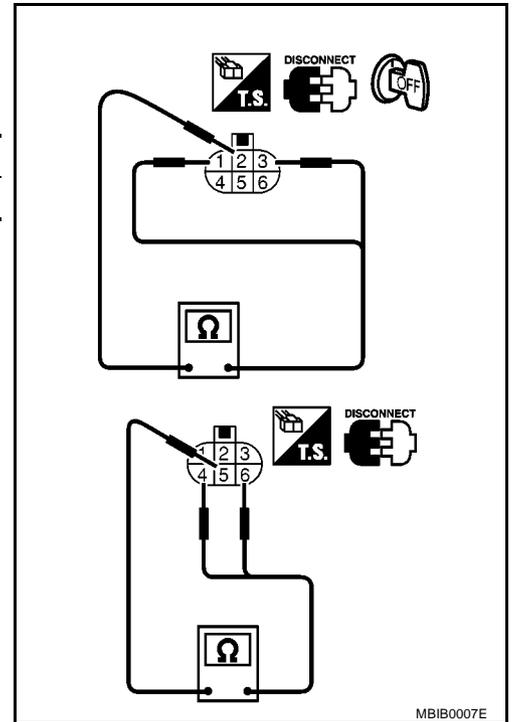


2. Check resistance between the following terminals.
  - terminal 2 and terminals 1, 3
  - terminal 5 and terminals 4, 6

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

SEF819Y

If NG, replace the EGR volume control valve.

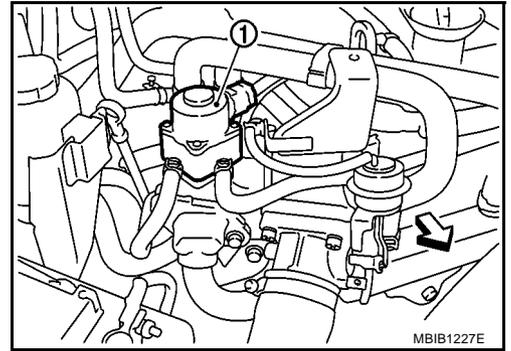
**NOTE:**

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

# EGR VOLUME CONTROL SYSTEM

## ⊗ Without CONSULT-II

1. Disconnect EGR volume control valve (1) harness connector.
  - ←: Vehicle front

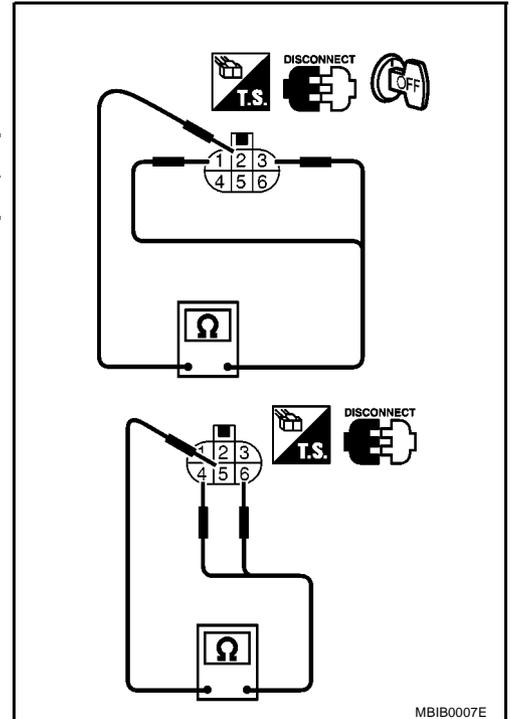


2. Check resistance between the following terminals.
  - terminal 2 and terminals 1, 3
  - terminal 5 and terminals 4, 6

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

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

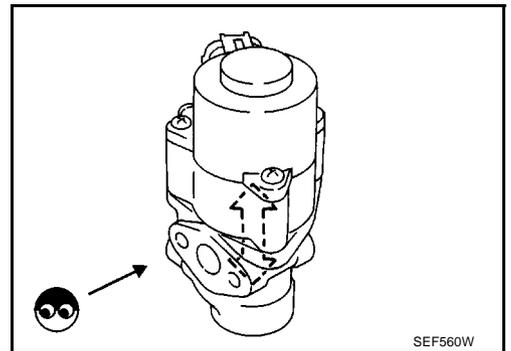
3. Remove EGR volume control valve from cylinder head.
4. Reconnect EGR volume control valve harness connector.
5. Turn ignition switch ON and OFF



6. Check that EGR volume control valve shaft moves smoothly 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

Refer to [EM-20, "INTAKE MANIFOLD"](#) .

EBS01KLX

# TC BOOST CONTROL SOLENOID VALVE

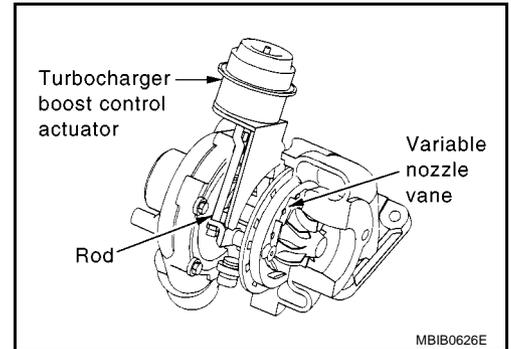
## TC BOOST CONTROL SOLENOID VALVE

PFP:14956

### Description

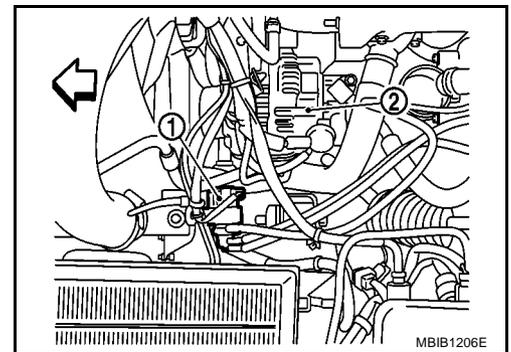
EBS01KLY

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 (1) is moved by ON/OFF pulse from the ECM. The longer the ON pulse, the charge air pressure rises.

- ←: Vehicle front
- Alternator (2)



# TC BOOST CONTROL SOLENOID VALVE

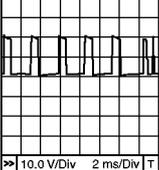
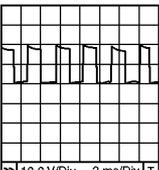
EBS01KM0

## ECM Terminals and Reference Value

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
6	BR	Turbocharger boost control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 6.3V ★  <small>MBIB0889E</small>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed: 2,000 rpm</li> </ul>	Approximately 8.6V ★  <small>MBIB0890E</small>
105 113	BR BR	ECM relay (self shut-off)	<b>[Ignition switch ON]</b> <b>[Ignition switch OFF]</b> <ul style="list-style-type: none"> <li>● For a few seconds after turning ignition switch OFF</li> </ul>	Approximately 1.0V
			<b>[Ignition switch OFF]</b> <ul style="list-style-type: none"> <li>● More than a few seconds after turning ignition switch OFF</li> </ul>	BATTERY VOLTAGE (11 - 14V)
119 120	R G	Power supply for ECM	<b>[Ignition switch ON]</b>	BATTERY VOLTAGE (11 - 14V)

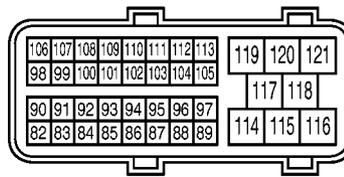
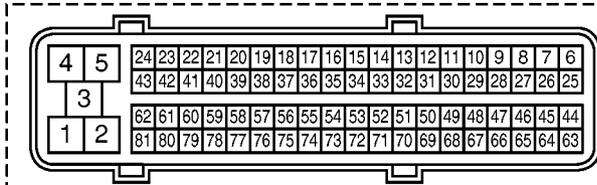
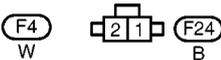
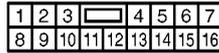
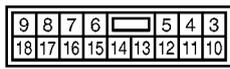
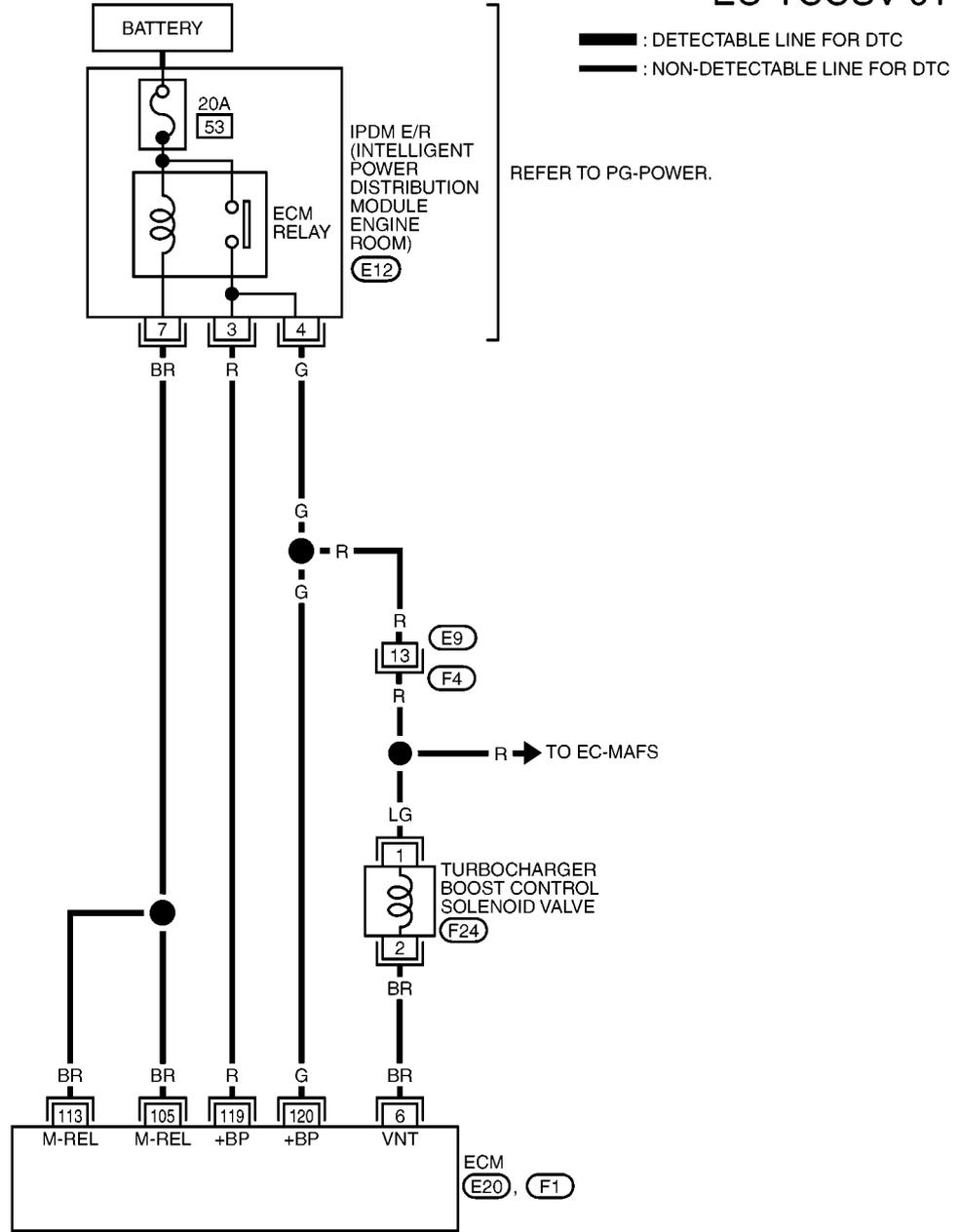
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

# TC BOOST CONTROL SOLENOID VALVE

## Wiring Diagram

EBS01KM1

### EC-TCCSV-01



MBWA1058E

# TC BOOST CONTROL SOLENOID VALVE

EBS01KM2

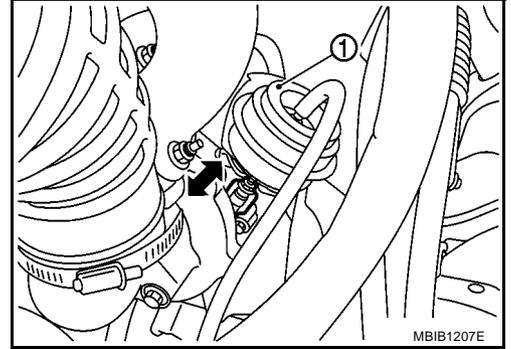
## Diagnostic Procedure

### 1. CHECK OVERALL FUNCTION

1. Start engine and let it idle.
2. Make sure that turbocharger control actuator (1) rod moves slightly when engine is started.

OK or NG

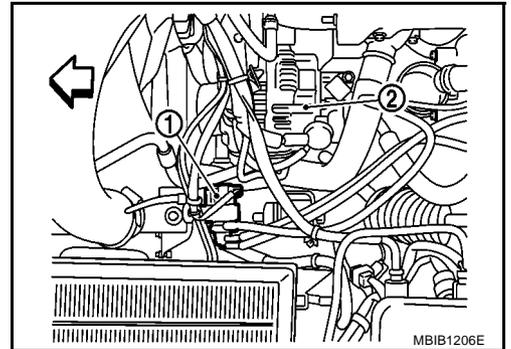
- OK >> **INSPECTION END**  
NG >> GO TO 2.



MBIB1207E

### 2. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect turbocharger boost control solenoid valve (1) harness connector.
  - ←: Vehicle front
  - Alternator (2)
3. Turn ignition switch ON.



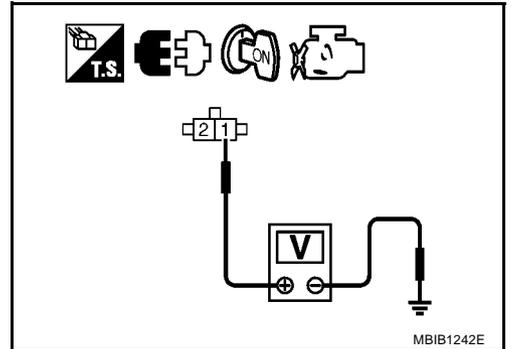
MBIB1206E

4. Check voltage between turbocharger boost control solenoid valve terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

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



MBIB1242E

### 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F4
- Harness for open or short between ECM and turbocharger boost control solenoid valve
- Harness for open or short between IPDM E/R and turbocharger boost control solenoid valve

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

# TC BOOST CONTROL SOLENOID VALVE

## 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 2. Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 5.

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

## 5. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE

Refer to [EC-313, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace turbocharger boost control solenoid valve.

## 6. CHECK INTERMITTENT INCIDENT

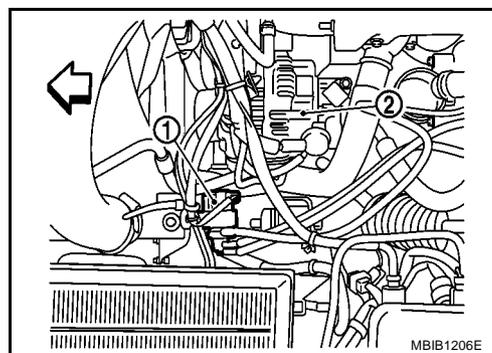
Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

### Component Inspection TURBOCHARGER BOOST CONTROL SOLENOID VALVE

EBS01KM3

1. Disconnect turbocharger boost control solenoid valve (1) harness connector.
  - ⇐: Vehicle front
  - Alternator (2)

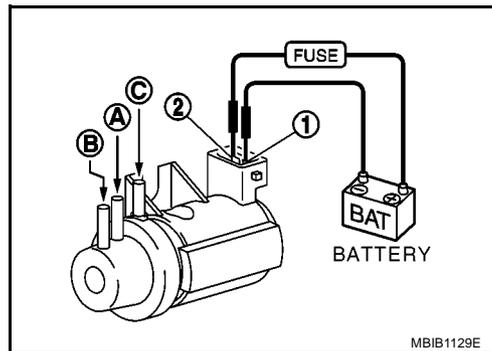


2. Apply 12V direct current between turbocharger boost control solenoid valve terminals.
3. Check air passage continuity of turbocharger boost control solenoid valve under the following conditions.

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 TURBOCHARGER BOOST CONTROL SOLENOID VALVE

EBS01KM4

Refer to [EM-18, "CHARGE AIR COOLER"](#) .

# INTAKE AIR CONTROL VALVE CONTROL SOLENOID VALVE

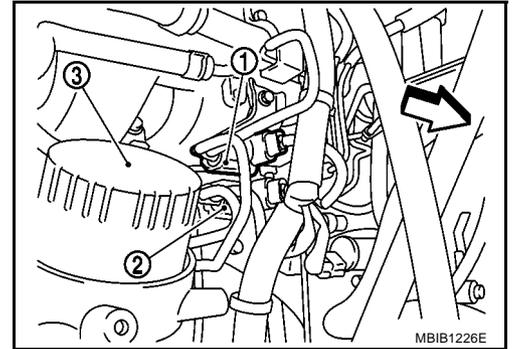
## INTAKE AIR CONTROL VALVE CONTROL SOLENOID VALVE

PFP:16188

### Description

EBS01KM5

Vibration when stopping the engine can be controlled by cutting intake air right before the fuel is cut. The intake air control valve control solenoid valve (1) controls the ON-OFF load of the intake air control valve actuator. As a result, the intake air control valve control solenoid valve will be turned ON when the ignition switch is turned OFF with the engine running and when the engine stalls. After the engine has stopped, the intake air control valve control solenoid valve will return to fully open.



- ⇄: Vehicle front
- Electronic controlled engine mount control solenoid valve (2)
- Oil filter (3)

### ECM Terminals and Reference Value

EBS01KM6

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.**

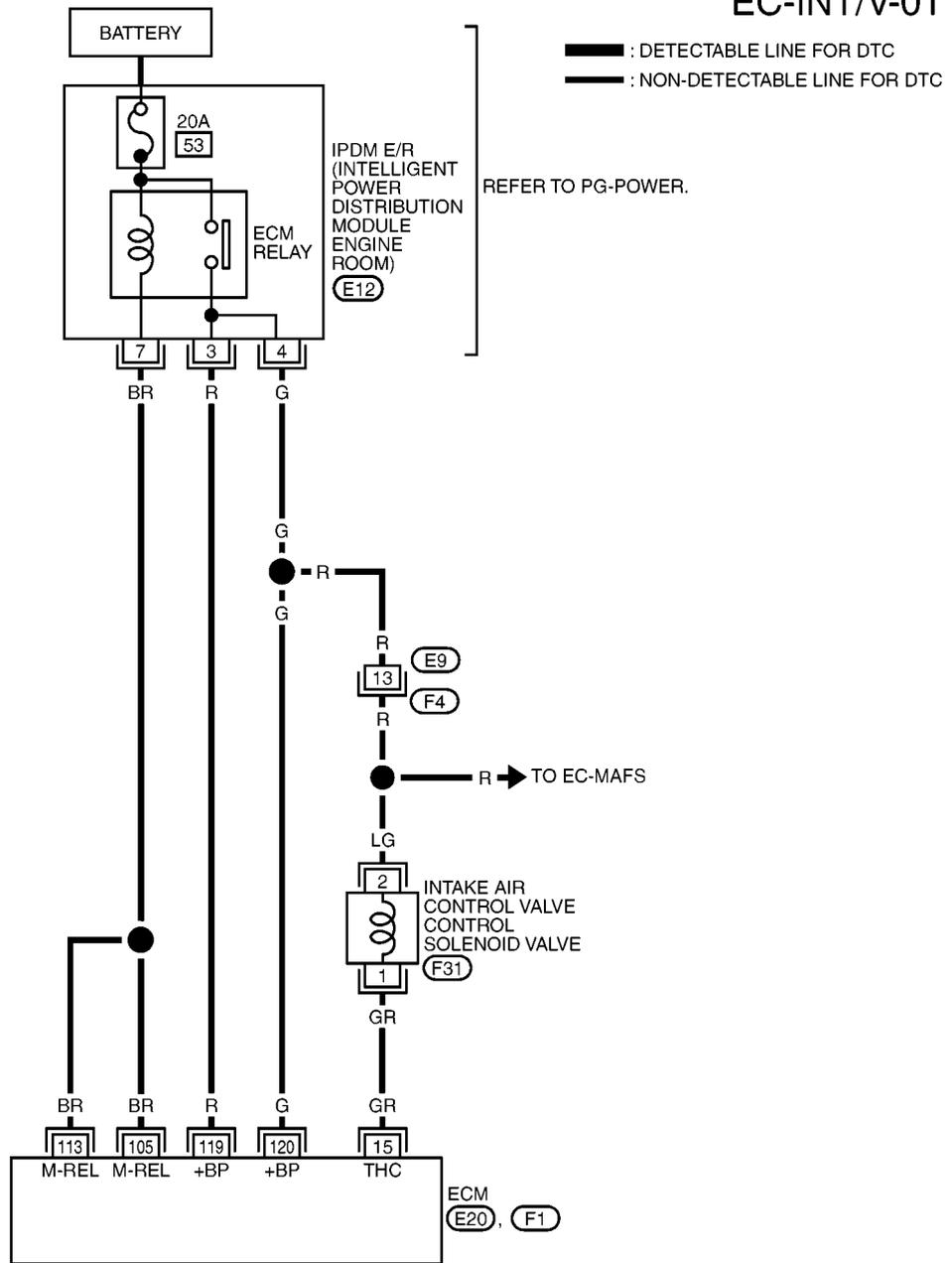
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
15	GR	Intake air control valve control solenoid valve	[Engine is running]	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] [Ignition switch OFF]	Approximately 0.3V
105 113	BR BR	ECM relay (self shut-off)	[Ignition switch OFF]	Approximately 1.0V
			[Ignition switch OFF]	BATTERY VOLTAGE (11 - 14V)
119 120	R G	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14V)

# INTAKE AIR CONTROL VALVE CONTROL SOLENOID VALVE

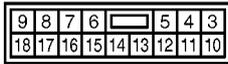
## Wiring Diagram

EBS01KM7

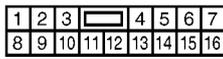
### EC-INT/V-01



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



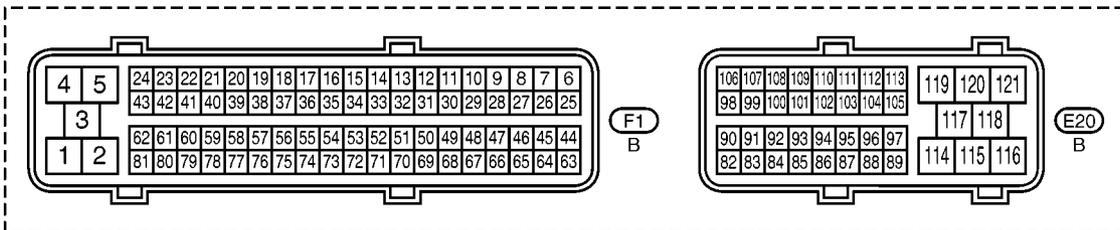
(E12)  
W



(F4)  
W



(F31)  
B



(F1)  
B

(E20)  
B



MBWA1066E

# INTAKE AIR CONTROL VALVE CONTROL SOLENOID VALVE

EBS01KM8

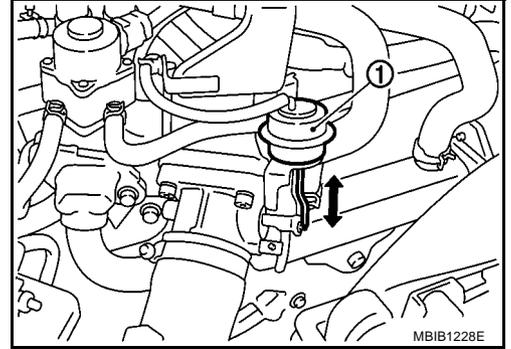
## Diagnostic Procedure

### 1. CHECK OVERALL FUNCTION

1. Start engine and let it idle.
2. Make sure that intake air control valve actuator (1) rod moves when turning ignition switch OFF.

OK or NG

- OK >> **INSPECTION END**  
NG >> GO TO 2.



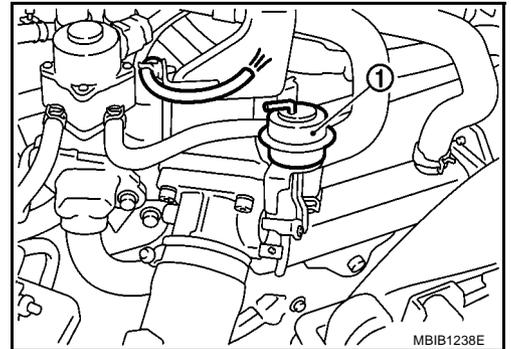
### 2. CHECK VACUUM SOURCE

1. Turn ignition switch OFF.
2. Disconnect vacuum hose connected to intake air control valve actuator (1).
3. Start engine and let it idle.
4. Check vacuum hose for vacuum existence under the following conditions.

CONDITIONS	vacuum
For a few seconds after turning ignition switch OFF	should exist
Except above	should not exist

OK or NG

- OK >> GO TO 9.  
NG >> GO TO 3.

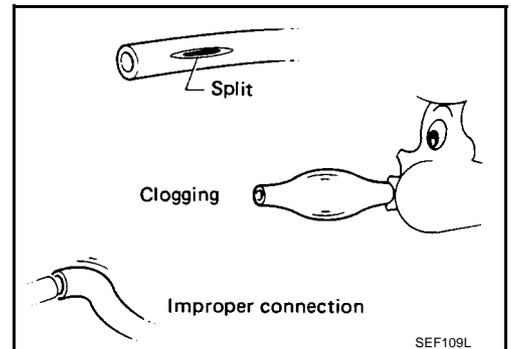


### 3. CHECK VACUUM HOSE

1. Turn ignition switch OFF.
2. Check vacuum hoses and vacuum gallery for clogging, cracks or improper connection.  
Refer to [EC-16, "Vacuum Hose Drawing"](#).

OK or NG

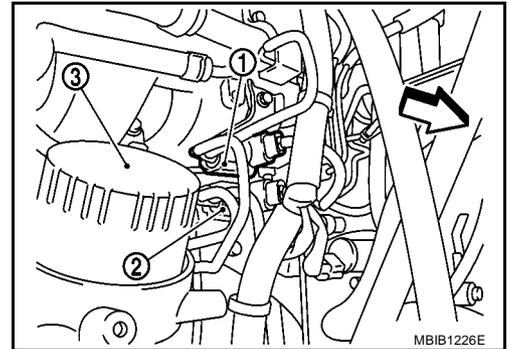
- OK >> GO TO 4.  
NG >> Repair or replace vacuum hoses and vacuum gallery.



# INTAKE AIR CONTROL VALVE CONTROL SOLENOID VALVE

## 4. CHECK INTAKE AIR CONTROL VALVE CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake air control valve control solenoid valve (1) harness connector.
  - ↔: Vehicle front
  - Electronic controlled engine mount control solenoid valve (2)
  - Oil filter (3)
3. Turn ignition switch ON.

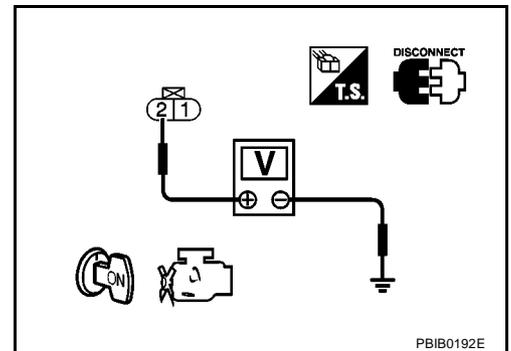


4. Check voltage between intake air control valve control solenoid valve terminal 2 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

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



## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F4
- Harness for open or short between IPDM E/R and intake air control valve control solenoid valve
- Harness for open or short between ECM and intake air control valve control solenoid valve

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

## 6. CHECK INTAKE AIR CONTROL VALVE 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 15 and intake air control valve 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 7.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK INTAKE AIR CONTROL VALVE CONTROL SOLENOID VALVE

Refer to [EC-318, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace intake air control valve control solenoid valve.

# INTAKE AIR CONTROL VALVE CONTROL SOLENOID VALVE

## 8. CHECK VACUUM PUMP

Refer to [EM-42, "VACUUM PUMP"](#) .

OK or NG

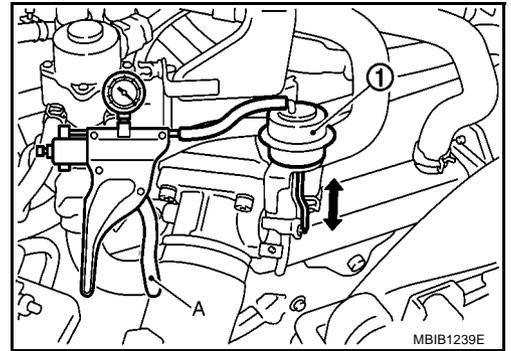
- OK >> GO TO 9.
- NG >> Replace vacuum pump assembly.

## 9. CHECK INTAKE AIR CONTROL VALVE ACTUATOR

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

OK or NG

- OK >> GO TO 10.
- NG >> Replace intake air control valve actuator.



## 10. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

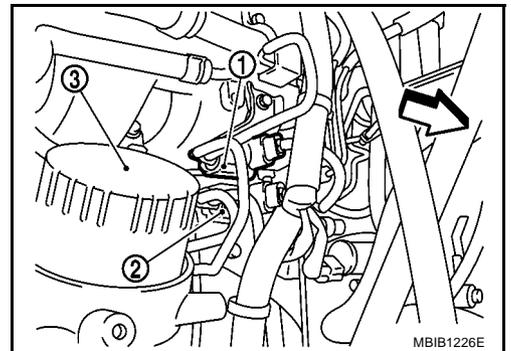
>> INSPECTION END

### Component Inspection

#### INTAKE AIR CONTROL VALVE CONTROL SOLENOID VALVE

EBS01KM9

1. Disconnect intake air control valve control solenoid valve (1) harness connector.
  - : Vehicle front
  - Electronic controlled engine mount control solenoid valve (2)
  - Oil filter (3)
2. Apply 12V direct current between turbocharger boost control solenoid valve terminals.

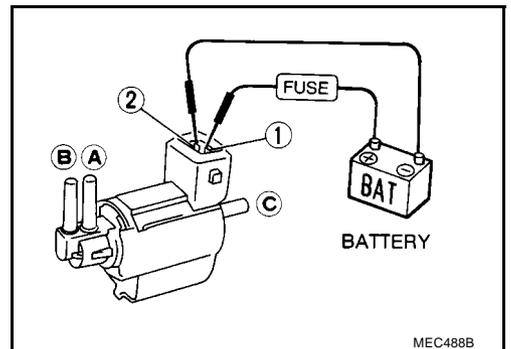


3. Check air passage continuity of intake air control valve control solenoid valve under the following conditions.

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 intake air control valve control solenoid valve.



# HEAT UP SWITCH

## HEAT UP SWITCH

PF2:27666

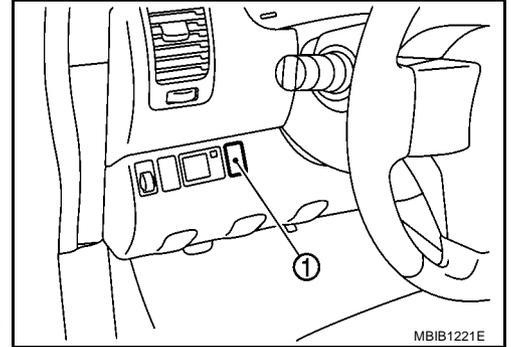
### Description

EBS01KMA

The heat up switch (1) is located on the lower side of the instrument panel. This switch is used to speed up the heater's operation when the engine is cold. When the ECM received the heat up switch ON signal, the ECM increases the engine idle speed to 1,400 rpm to warm up engine quickly.

This system works when all conditions listed below are met.

Heat up switch	ON
Shift lever	P or N (A/T), Neutral (M/T)
Accelerator pedal	Fully released



MBIB1221E

### CONSULT-II Reference Value in Data Monitor Mode

EBS01KMB

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
WARM UP SW	● Ignition switch: ON	Heat up switch: OFF	OFF
		Heat up switch: ON	ON

### ECM Terminals and Reference Value

EBS01KMC

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

#### CAUTION:

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

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	Y	Heat up switch	[Ignition switch ON] ● Heat up switch: OFF	Approximately 0.3V
			[Ignition switch ON] ● Heat up switch: ON	BATTERY VOLTAGE (11 - 14V)

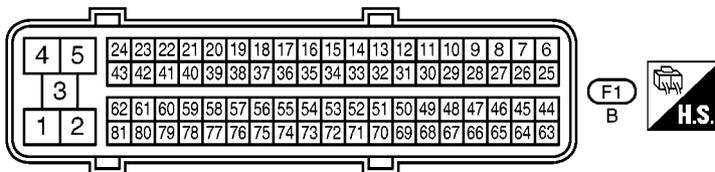
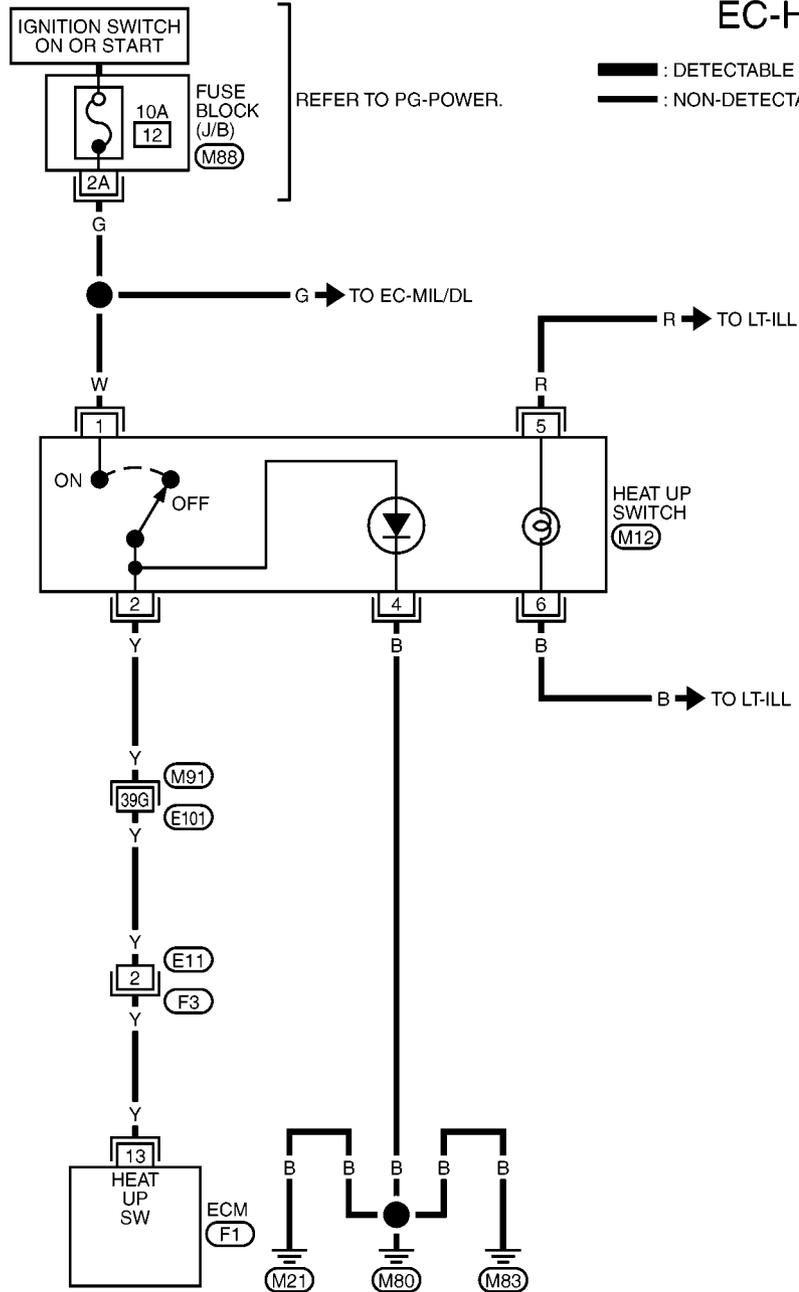
# HEAT UP SWITCH

## Wiring Diagram

EBS01KMD

### EC-HEATUP-01

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



REFER TO THE FOLLOWING.

- (M91) -SUPER MULTIPLE JUNCTION (SMJ)
- (M88) -FUSE BLOCK-JUNCTION BOX (J/B)

# HEAT UP SWITCH

EBS01KME

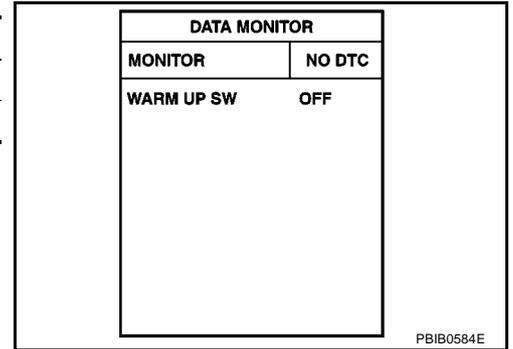
## Diagnostic Procedure

### 1. CHECK OVERALL FUNCTION-I

#### ① With CONSULT-II

1. Turn ignition switch ON.
2. Check "WARM UP SW" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

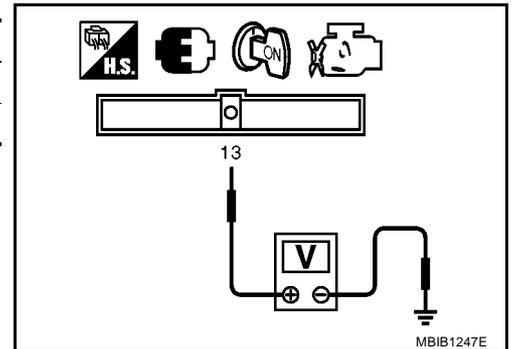
CONDITION	WARM UP SW
Heat up switch: OFF	OFF
Heat up switch: ON	ON



#### ② Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 13 and ground under the following conditions.

CONDITION	VOLTAGE
Heat up switch: OFF	Approximately 0V
Heat up switch: ON	Battery voltage



#### OK or NG

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

### 2. CHECK OVERALL FUNCTION-II

Check indicator in the heat up switch under the following condition.

CONDITION	INDICATION
Heat up switch: OFF	OFF
Heat up switch: ON	ON

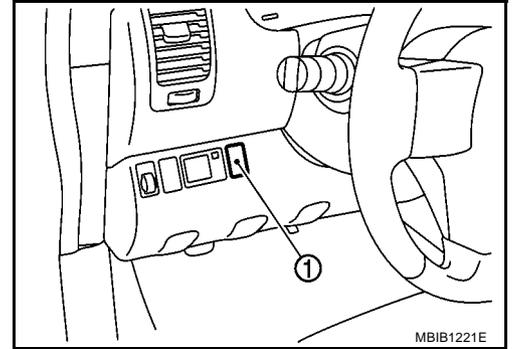
#### OK or NG

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

# HEAT UP SWITCH

## 3. CHECK HEAT UP SWITCH POWER SUPPLY CIRCUIT

1. Turn heat up switch OFF.
2. Turn ignition switch OFF.
3. Disconnect heat up switch (1) harness connector.
4. Turn ignition switch ON.

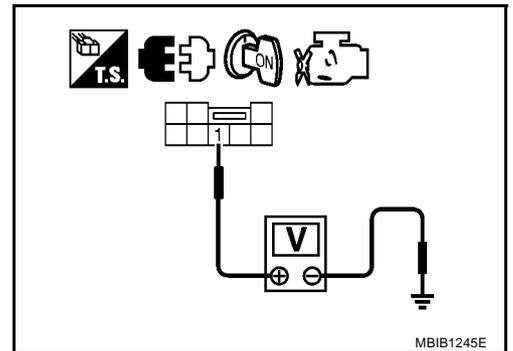


5. Check voltage between heat up switch terminal 1 and ground with CONSULT -II or tester.

**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 M88
- 10A fuse
- Harness for open or short between heat up switch and fuse

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

## 5. CHECK HEAT UP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 13 and heat up switch terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 6.

# HEAT UP SWITCH

---

## 6. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M91, E101
- Harness connectors E11, F3
- Harness for open or short between ECM and heat up switch

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

---

## 7. CHECK HEAT UP SWITCH INDICATOR GROUND CIRCUIT FOR OPEN AND SHORT

---

1. Check harness continuity between heat up switch terminal 4 and ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to power.

OK or NG

OK >> GO TO 8.

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

---

## 8. CHECK HEAT UP SWITCH

---

Refer to [EC-324, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace heat up switch.

---

## 9. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

A

EC

C

D

E

F

G

H

I

J

K

L

M

# HEAT UP SWITCH

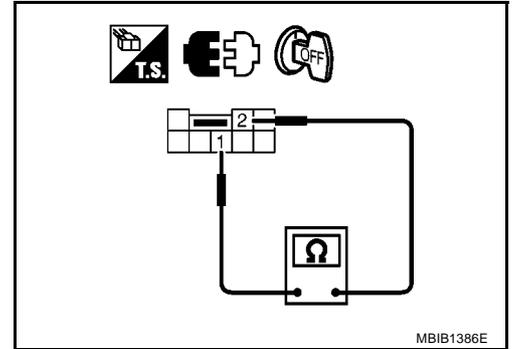
EBS01KMF

## Component Inspection HEAT UP SWITCH

1. Turn ignition switch OFF.
2. Disconnect heat up switch harness connector.
3. Check continuity between heat up switch terminals 1 and 2 under the following conditions.

CONDITION	CONTINUITY
Heat up switch: OFF	Should not exist
Heat up switch: ON	Should exist

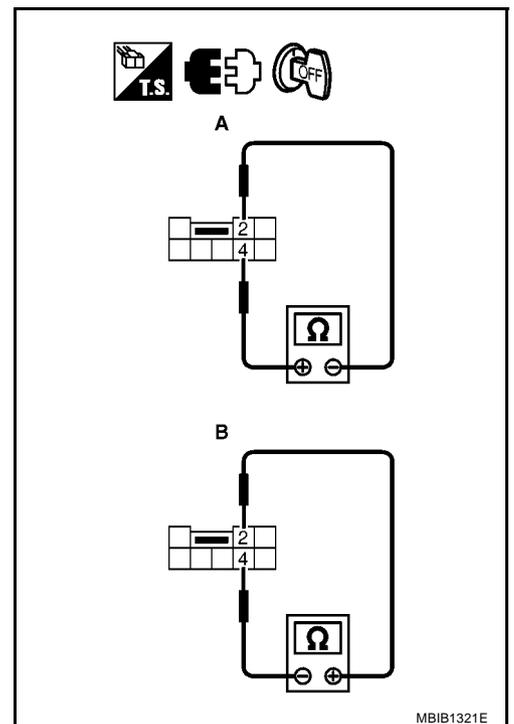
4. If NG, replace heat up switch.  
If OK, go to following step.



5. Check continuity between heat up switch terminals 2 and 4 under the following conditions.

CONDITION	CONTINUITY
A	Should exist
B	Should not exist

6. If NG, replace heat up switch.



# REFRIGERANT PRESSURE SENSOR

PFP:92136

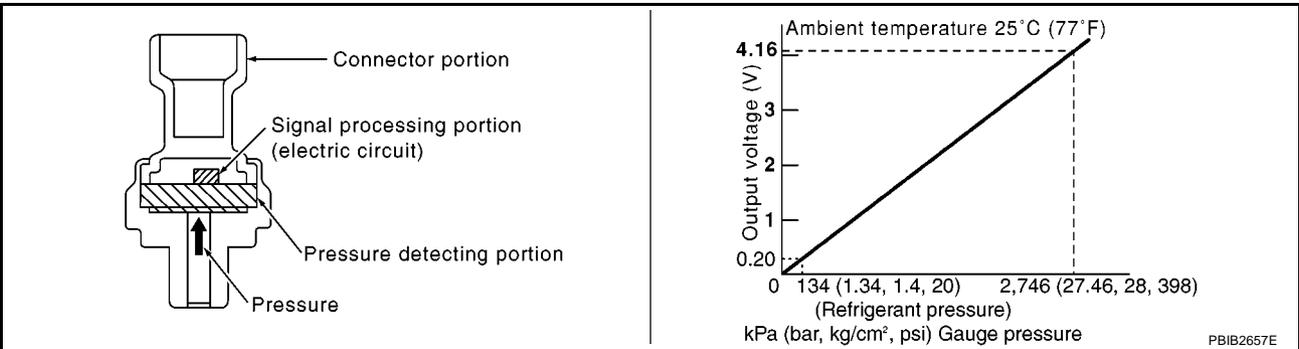
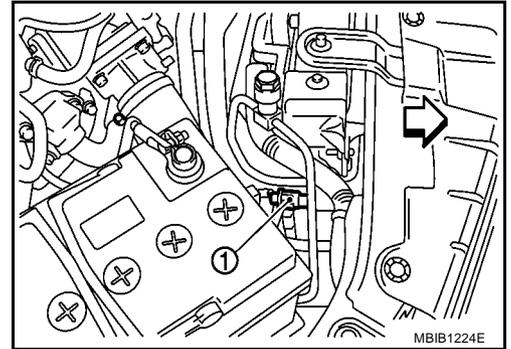
## REFRIGERANT PRESSURE SENSOR

### Component Description

The refrigerant pressure sensor (1) is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

-  Vehicle front

EBS01KMG



### ECM Terminals and Reference Value

EBS01KMH

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.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
53	W	Refrigerant pressure sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Both A/C switch and blower switch: ON (Compressor operates)</li> </ul>	1.0 - 4.0V
64	V	Sensor power supply (Refrigerant pressure sensor)	<b>[Ignition switch ON]</b>	Approximately 5.3V
72	BR	Refrigerant pressure sensor ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Idle speed</li> </ul>	Approximately 0.3V

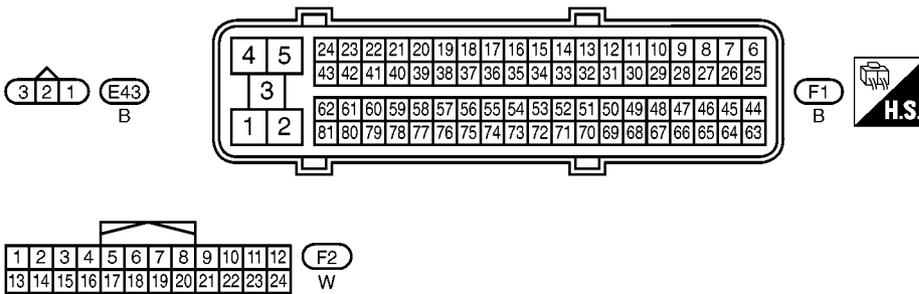
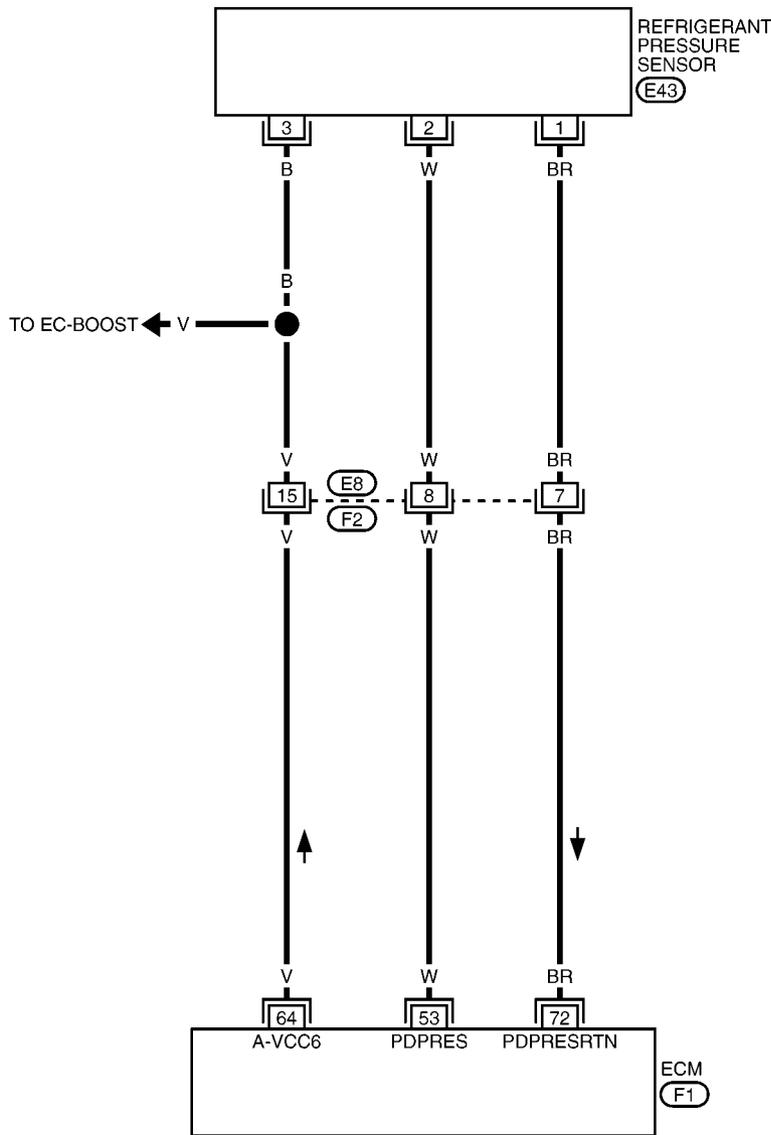
# REFRIGERANT PRESSURE SENSOR

## Wiring Diagram

EBS01KMI

### EC-RP/SEN-01

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



MBWA1064E

# REFRIGERANT PRESSURE SENSOR

EBS01KMJ

## Diagnostic Procedure

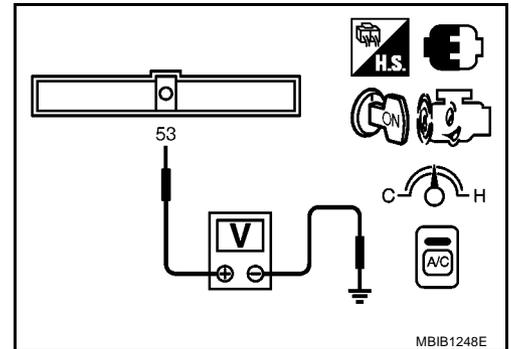
### 1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower switch ON.
3. Check voltage between ECM terminal 53 and ground with CONSULT-II or tester.

**Voltage: 1.0 - 4.0V**

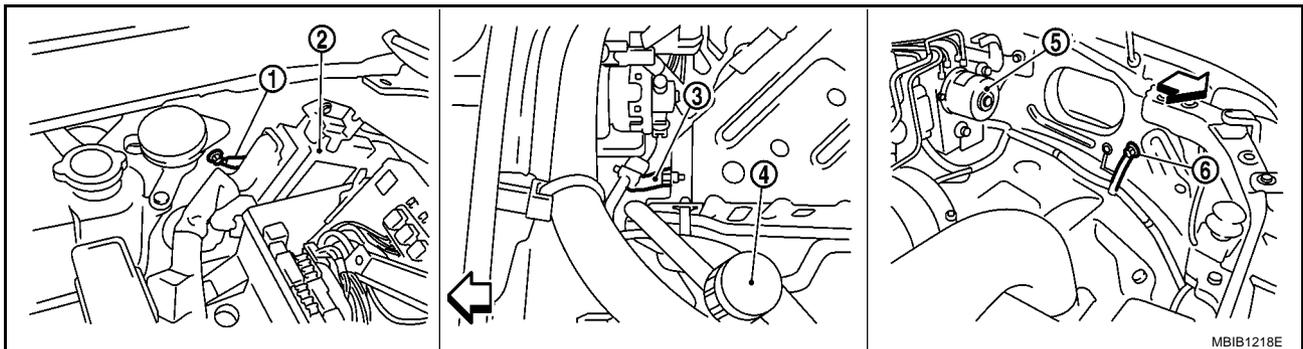
OK or NG

- OK >> **INSPECTION END**  
NG >> GO TO 2.



### 2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.  
Refer to [EC-78, "Ground Inspection"](#) .



← : Vehicle front

- |                                    |  |                    |
|------------------------------------|--|--------------------|
| 1. Body ground E21                 | 2. ECM   | 3. Body ground E41 |
| 4. A/C high-pressure service valve | 5. ABS actuator and electric unit (control unit) | 6. Body ground E61 |

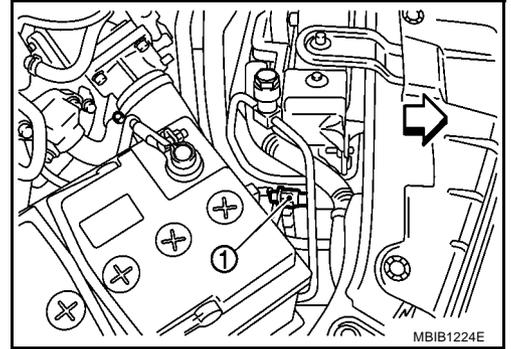
OK or NG

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

# REFRIGERANT PRESSURE SENSOR

## 3. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor (1) harness connector.
  - ⇐: Vehicle front
2. Turn ignition switch ON.

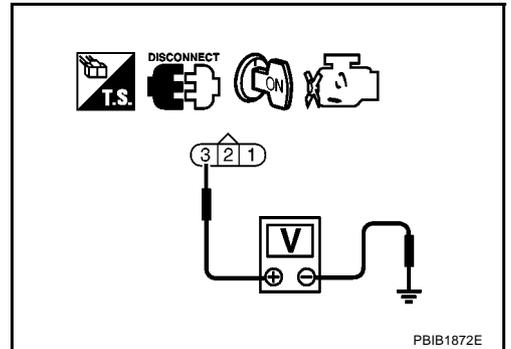


3. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5.3V**

OK or NG

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



## 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F2
- Harness for open or short between ECM and refrigerant pressure sensor

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

## 5. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between refrigerant pressure sensor terminal 1 and ECM terminal 72. Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

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

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F2
- Harness for open or short between ECM and refrigerant pressure sensor

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

# REFRIGERANT PRESSURE SENSOR

---

## 7. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Check harness continuity between ECM terminal 53 and refrigerant 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 9.
- NG >> GO TO 8.

---

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E8, F2
- Harness for open or short between ECM and refrigerant pressure sensor

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

---

## 9. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace refrigerant pressure sensor.
- NG >> Repair or replace.

### Removal and Installation REFRIGERANT PRESSURE SENSOR

EBS01KMK

Refer to [MTC-127, "Removal and Installation for Refrigerant Pressure Sensor"](#) .

# BRAKE SWITCH

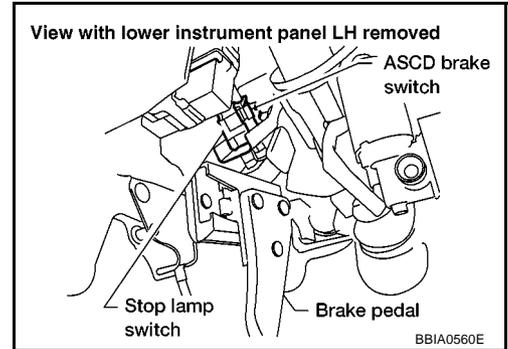
PFP:25230

## BRAKE SWITCH

### Description STOP LAMP SWITCH

EBS01KML

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.



### ASC D BRAKE SWITCH (MODELS WITH ASC D)

When depress on the brake pedal, ASC D 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-355, "AUTOMATIC SPEED CONTROL DEVICE \(ASC D\)"](#) for the ASC D function.

### CONSULT-II Reference Value in Data Monitor Mode

EBS01KMM

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 (ASC D brake switch)	● Ignition switch: ON	● Brake pedal: Fully released (A/T) ● Clutch pedal and brake pedal: Fully released (M/T)	OFF
		● Brake pedal: Slightly depressed (A/T) ● Clutch pedal and/or brake pedal: Slightly depressed (M/T)	ON

### ECM Terminals and Reference Value

EBS01KMN

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

#### CAUTION:

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

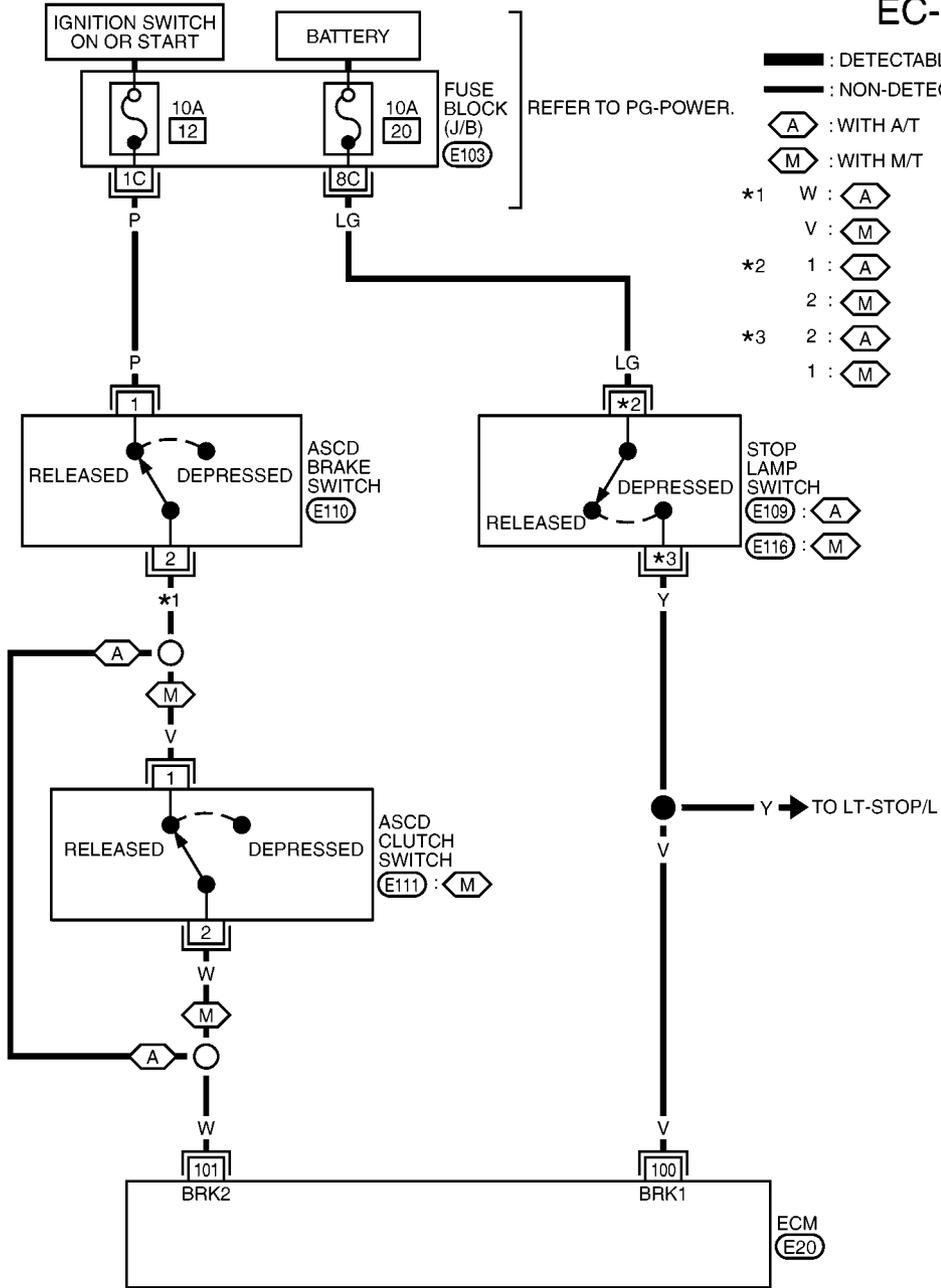
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage and Pulse Signal)
100	V	Stop lamp switch	[Ignition switch OFF] ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch OFF] ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
101	W	ASC D brake switch	[Ignition switch ON] ● Brake pedal: Fully released (A/T) ● Clutch pedal and brake pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON] ● Brake pedal: Slightly depressed (A/T) ● Clutch pedal and/or brake pedal: Slightly depressed (M/T)	Approximately 0V

# BRAKE SWITCH

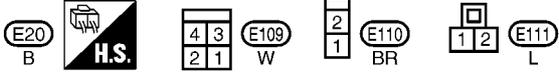
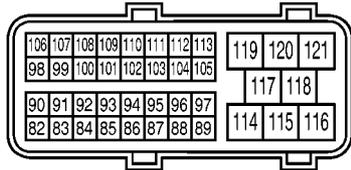
## Wiring Diagram

EBS01KMO

### EC-ASCBOF-01



- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ⬡ : WITH A/T
- ⬢ : WITH M/T
- \*1 W : ⬡
- V : ⬢
- \*2 1 : ⬡
- 2 : ⬢
- \*3 2 : ⬡
- 1 : ⬢



REFER TO THE FOLLOWING.  
 (E103) - FUSE BLOCK-JUNCTION BOX (J/B)



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

# BRAKE SWITCH

EBS01KMP

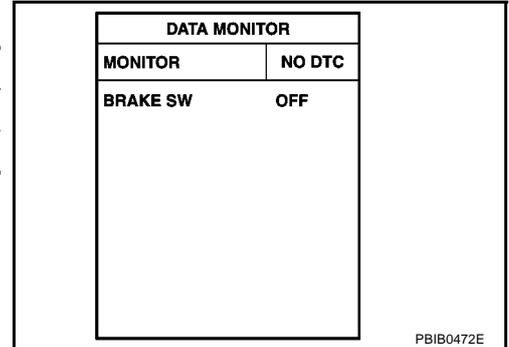
## Diagnostic Procedure A/T MODELS

### 1. CHECK OVERALL FUNCTION-I

#### ④ 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
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON



#### ⊗ Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 100 and ground under the following conditions.

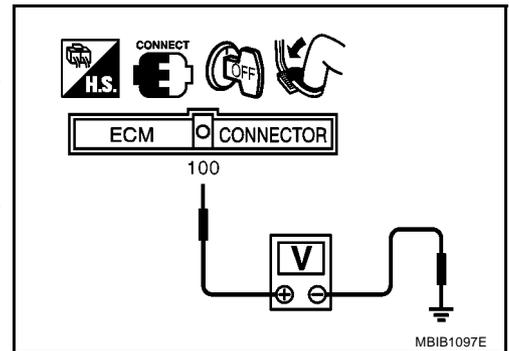
CONDITION	VOLTAGE
Brake pedal: Fully released	Approximately 0V
Brake pedal: Slightly depressed	Battery voltage

#### OK or NG

OK (Models with ASCD)>>GO TO 2.

OK (Models without ASCD)>>**INSPECTION END**

NG >> GO TO 3.



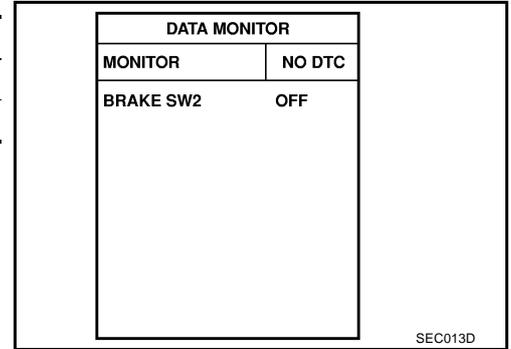
# BRAKE SWITCH

## 2. CHECK OVERALL FUNCTION-II

### With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

CONDITION	INDICATION
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON



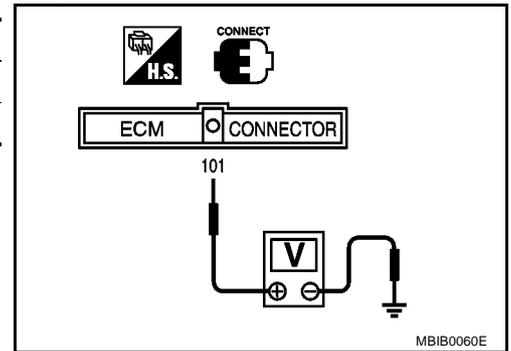
### Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
Brake pedal: Fully released	Battery voltage
Brake pedal: Slightly depressed	Approximately 0V

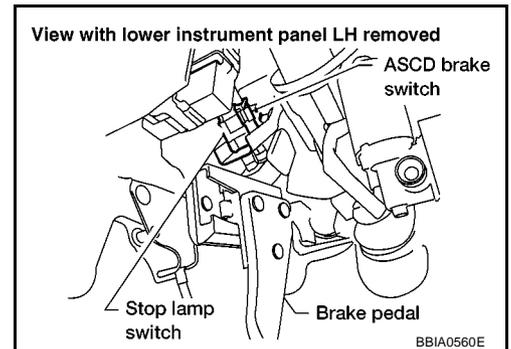
OK or NG

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



## 3. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

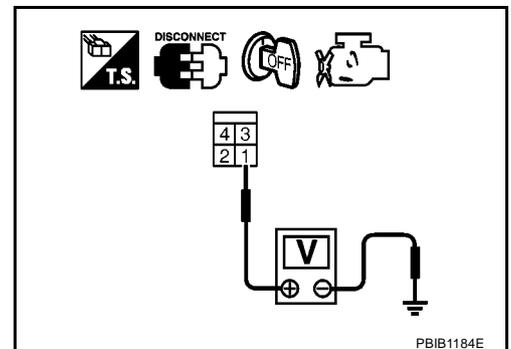


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

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



# BRAKE SWITCH

## 4. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between stop lamp switch and battery

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

## 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 6.

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

## 6. CHECK STOP LAMP SWITCH

Refer to [EC-341, "Component Inspection"](#).

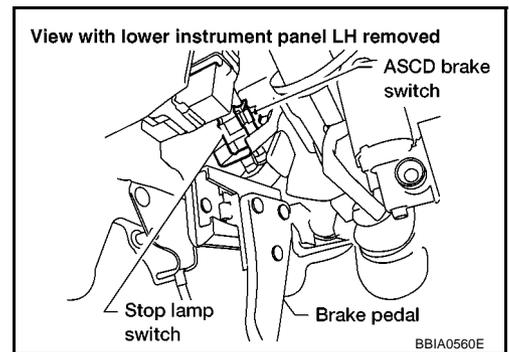
OK or NG

OK >> GO TO 11.

NG >> Replace stop lamp switch.

## 7. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.



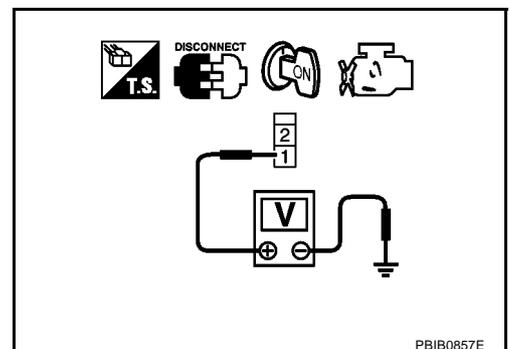
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.



# BRAKE SWITCH

---

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

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

---

## 9. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and ASCD brake 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 10.

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

---

## 10. CHECK ASCD BRAKE SWITCH

---

Refer to [EC-341, "Component Inspection"](#)

OK or NG

OK >> GO TO 11.

NG >> Replace ASCD brake switch.

---

## 11. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

A

EC

C

D

E

F

G

H

I

J

K

L

M

# BRAKE SWITCH

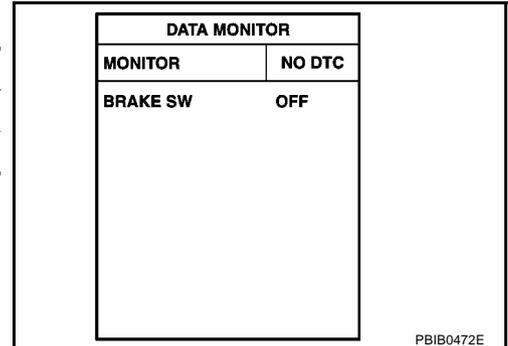
## M/T MODELS

### 1. CHECK OVERALL FUNCTION-I

#### ② 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.

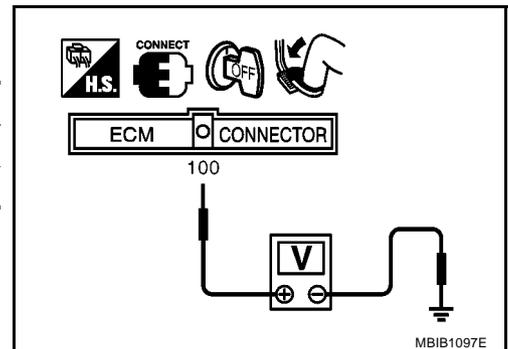
CONDITION	INDICATION
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON



#### ⊗ Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 100 and ground under the following conditions.

CONDITION	VOLTAGE
Brake pedal: Fully released	Approximately 0V
Brake pedal: Slightly depressed	Battery voltage



#### OK or NG

- OK (Models with ASCD) >> GO TO 2.
- OK (Models without ASCD) >> **INSPECTION END**
- NG >> GO TO 3.

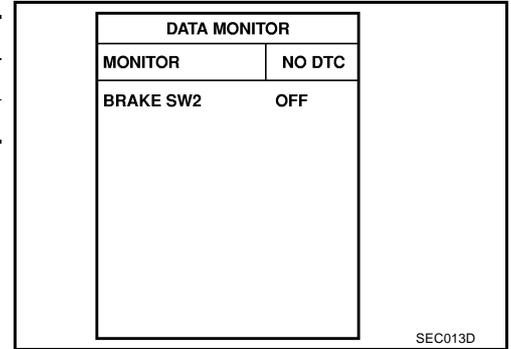
# BRAKE SWITCH

## 2. CHECK OVERALL FUNCTION-II

### With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

CONDITION	INDICATION
Clutch pedal and brake pedal: Fully released	OFF
Clutch pedal and/or brake pedal: Slightly depressed	ON



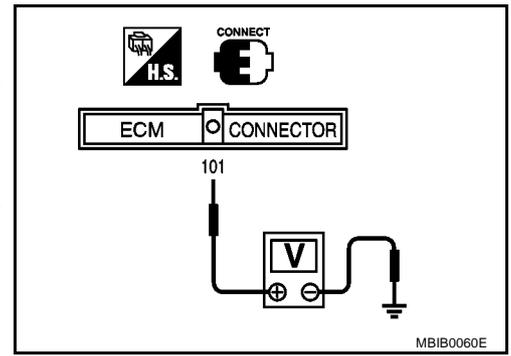
### Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
Clutch pedal and brake pedal: Fully released	Battery voltage
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0V

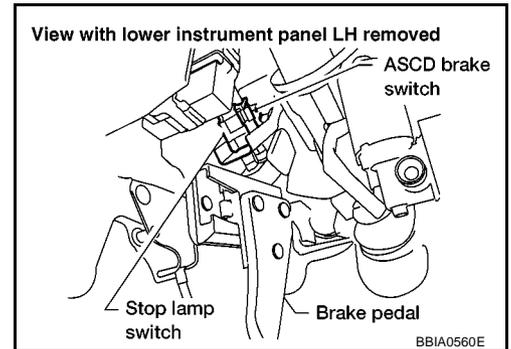
OK or NG

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



## 3. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

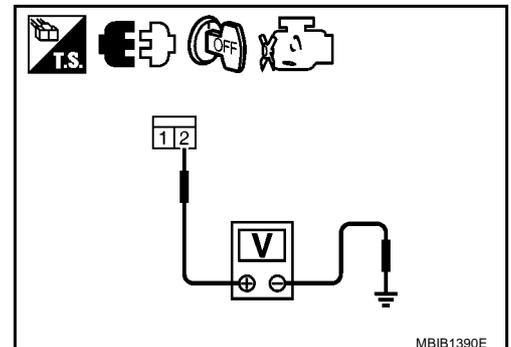


3. Check voltage between stop lamp switch terminal 2 and ground with CONSULT -II or tester.

**Voltage: Battery voltage**

OK or NG

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



# BRAKE SWITCH

## 4. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between stop lamp switch and battery

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

## 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 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 6.

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

## 6. CHECK STOP LAMP SWITCH

Refer to [EC-341, "Component Inspection"](#).

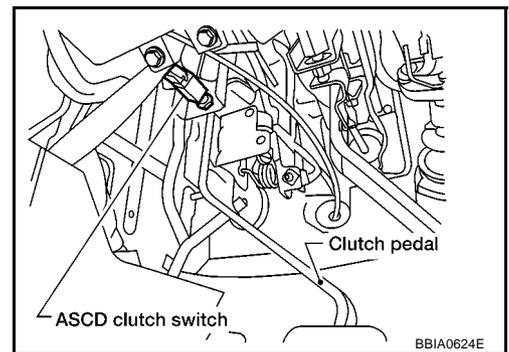
OK or NG

OK >> GO TO 14.

NG >> Replace stop lamp switch.

## 7. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.



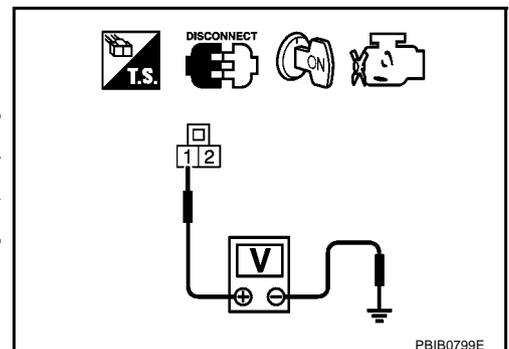
4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
Brake pedal: Fully released	Battery voltage
Brake pedal: Slightly depressed	Approx. 0V

OK or NG

OK >> GO TO 12.

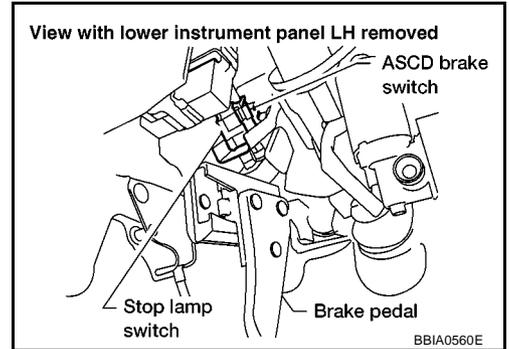
NG >> GO TO 8.



# BRAKE SWITCH

## 8. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.

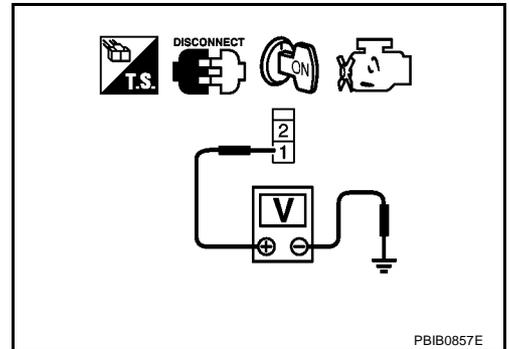


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

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



## 9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

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

## 10. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD brake clutch 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 11.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 11. CHECK ASCD BRAKE SWITCH

Refer to [EC-341, "Component Inspection"](#).

OK or NG

- OK >> GO TO 14.  
NG >> Replace ASCD brake switch.

# BRAKE SWITCH

---

## 12. 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 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

OK >> GO TO 13.

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

---

## 13. CHECK ASCD CLUTCH SWITCH

---

Refer to [EC-341, "Component Inspection"](#) .

OK or NG

OK >> GO TO 14.

NG >> Replace ASCD clutch switch.

---

## 14. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

# BRAKE SWITCH

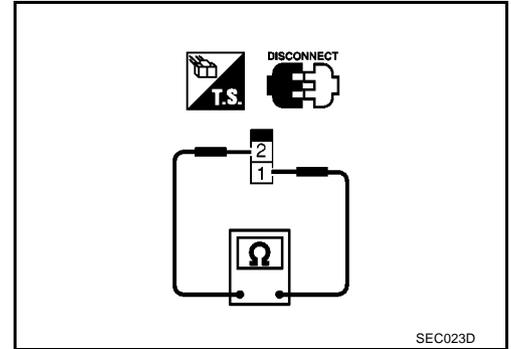
EBS01KMQ

## Component Inspection ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released	Should exist
Brake pedal: Slightly depressed	Should not exist

If NG, adjust ASCD brake switch installation, refer to [BR-6](#), "[BRAKE PEDAL](#)", and perform step 3 again.

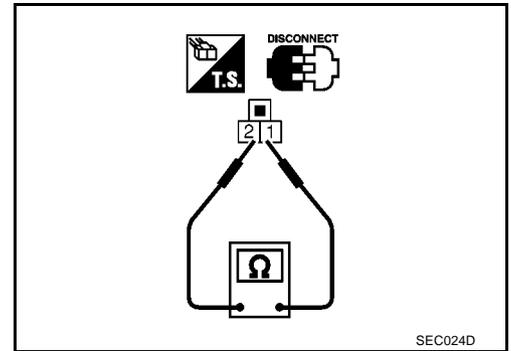


## ASCD CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

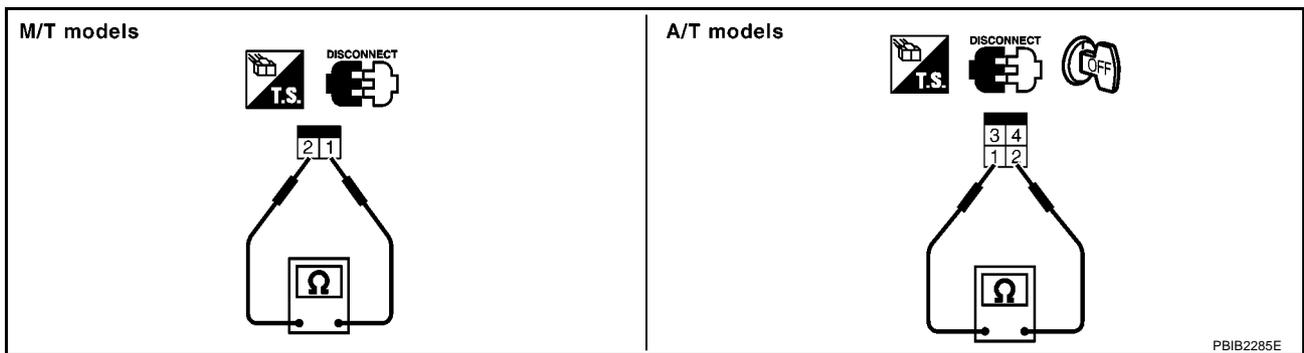
Condition	Continuity
Clutch pedal: Fully released	Should exist
Clutch pedal: Slightly depressed	Should not exist

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), "[CLUTCH PEDAL](#)", and perform step 3 again.



## STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released	Should not exist
Brake pedal: Slightly depressed	Should exist

If NG, adjust stop lamp switch installation, refer to [BR-6](#), "[BRAKE PEDAL](#)", and perform step 3 again.

# PNP SWITCH

## PNP SWITCH

PFP:32006

### Description

EBS01KMR

When the gear position is in P or N (A/T), Neutral (M/T), 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

EBS01KMS

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T), Neutral (M/T)	ON
		Shift lever: Except above	OFF

### ECM Terminals and Reference Value

EBS01KMT

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

#### CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
110	G (A/T) O (M/T)	Park/Neutral position switch	[Ignition switch ON] ● Shift lever: P or N (A/T), Neutral (M/T)	Approximately 0V
			[Ignition switch ON] ● Shift lever: Except above	BATTERY VOLTAGE (11 - 14V)



# PNP SWITCH

EBS01KMV

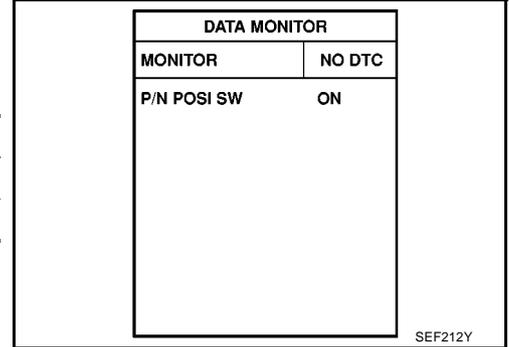
## Diagnostic Procedure A/T MODELS

### 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
P or N	ON
Except above	OFF



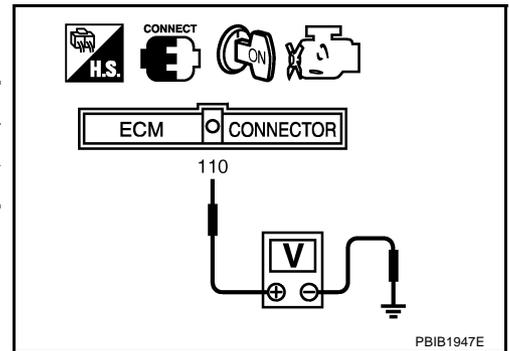
#### ⓧ Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 110 and ground under the following conditions.

Shift lever position	Voltage
P or N	Approximately 0V
Except above	Battery voltage

#### OK or NG

- OK >> **INSPECTION END**  
NG >> GO TO 2.



### 2. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [AT-34, "TROUBLE DIAGNOSIS"](#).

#### OK or NG

- OK >> GO TO 3.  
NG >> Perform trouble shooting relevant to DTC indicated.

### 3. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect combination meter harness connector.
4. Check harness continuity between ECM terminal 110 and combination meter terminal 7.  
Refer to Wiring Diagram.

**Continuity should exist.**

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

#### OK or NG

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

# PNP SWITCH

## 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E101, M91
- Harness for open or short between ECM and combination meter

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

## 5. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

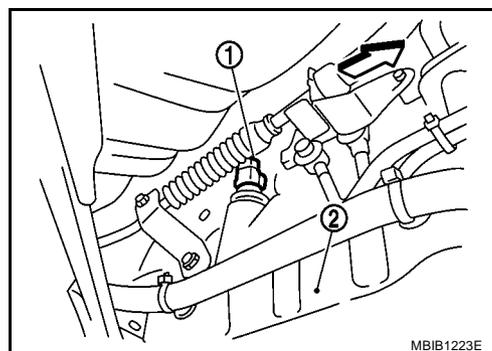
1. Disconnect A/T assembly harness connector (1).
  - Illustration shows the view from under the vehicle
  - ↶ : Vehicle front
  - A/T oil pan (2)
2. Check harness continuity between A/T assembly terminal 9 and combination meter terminal 17.  
Refer to Wiring Diagram.

**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 M91, E101
- Harness connectors E8, F2
- Harness for open or short between A/T assembly and combination meter.

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

## 7. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-III

1. Check harness continuity between A/T assembly terminal 9 and TCM terminal 8.  
Refer to [AT-94, "DTC P0615 START SIGNAL CIRCUIT"](#) .

**Continuity should exist.**

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

OK or NG

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

## 8. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Repair or replace.

## 9. REPLACE COMBINATION METER

Refer to [DI-4, "COMBINATION METERS"](#) .

>> INSPECTION END

# PNP SWITCH

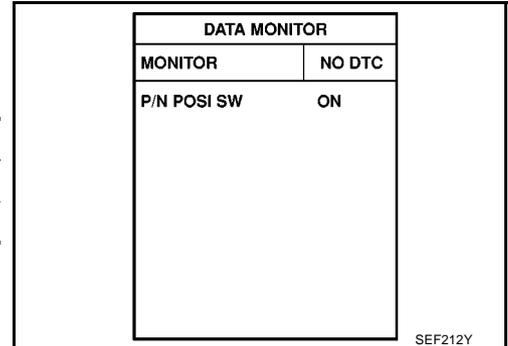
## M/T MODELS

### 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.

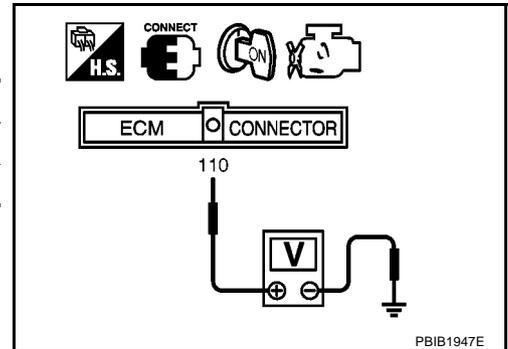
Shift lever position	P/N POSI SW
Neutral	ON
Except above	OFF



#### ⊗ 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	Approximately 0V
Except above	Battery voltage



#### OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 2.

### 2. CHECK PNP SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

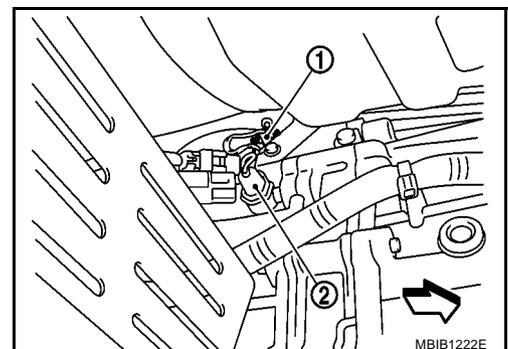
1. Turn ignition switch OFF.
2. Disconnect park/neutral position (PNP) switch (1) harness connector.
  - Illustration shows the view from under the vehicle
  - ⇐: Vehicle front
  - Back-up lamp switch (2)
3. Check harness continuity between PNP switch terminal 2 and ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

#### OK or NG

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



# PNP SWITCH

---

## 3. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E8, F2
- Harness for open or short between ECM and PNP switch

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

---

## 4. 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 6.
- NG >> GO TO 5.

---

## 5. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E8, F2
- Harness for open or short between ECM and PNP switch

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

---

## 6. CHECK PARK/NEUTRAL POSITION SWITCH

---

Refer to [MT-12, "POSITION SWITCH"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace park/neutral position switch.

---

## 7. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# START SIGNAL

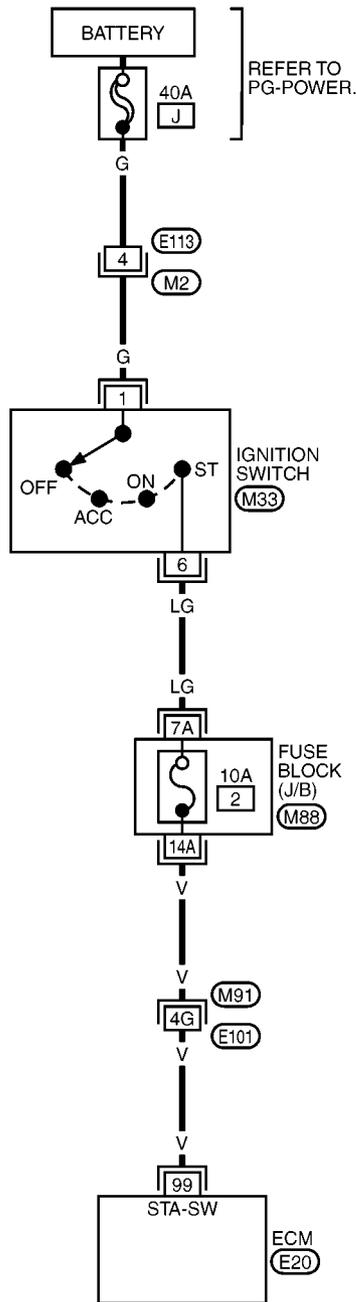
PFP:48750

EBS01KMW

## EC-S/SIG-01

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

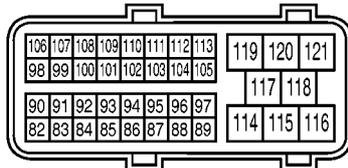
### START SIGNAL Wiring Diagram



M2  
W



M33  
W



E20  
B



REFER TO THE FOLLOWING.

(M88) - FUSE BLOCK-  
JUNCTION BOX (J/B)

(M91) - SUPER MULTIPLE  
JUNCTION (SMJ)

# START SIGNAL

## Diagnostic Procedure

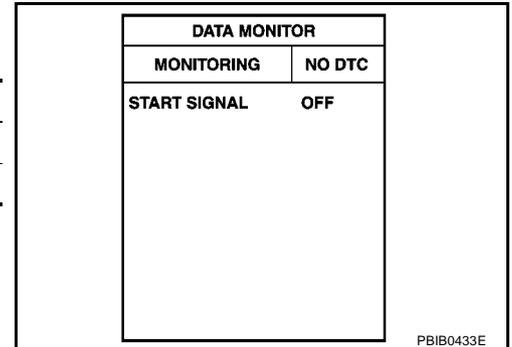
EBS01KMX

### 1. CHECK START SIGNAL OVERALL FUNCTION

#### With CONSULT-II

- Turn ignition switch ON.
- Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

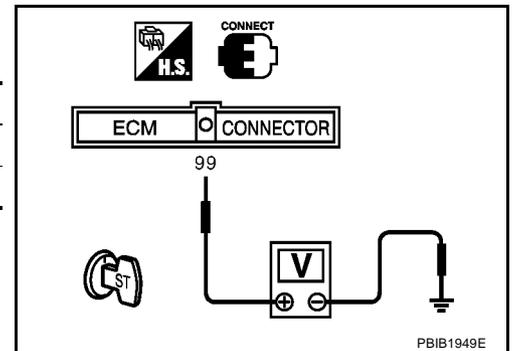
Condition	START SIGNAL
Ignition switch ON	OFF
Ignition switch START	ON



#### 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

- Turn ignition switch OFF.
- Disconnect ECM harness connector and ignition switch harness connector.
- Check harness continuity between ECM terminal 99 and ignition switch terminal 6. Refer to Wiring Diagram.

**Continuity should exist.**

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

#### OK or NG

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

### 3. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector M88
- Harness connectors M91, E101
- 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.

## START SIGNAL

---

### 4. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

# ASCD INDICATOR

## ASCD INDICATOR

PPF:24814

A

### Component Description

EBS01KMY

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE indicator illuminates when MAIN switch on ASCD steering switch is turned ON to indicate that ASCD system is ready for operation.

SET indicator illuminates when following conditions are met.

- CRUISE indicator is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator remains lit during ASCD control.

Refer to [EC-355, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.

EC

C

D

E

F

G

H

I

J

K

L

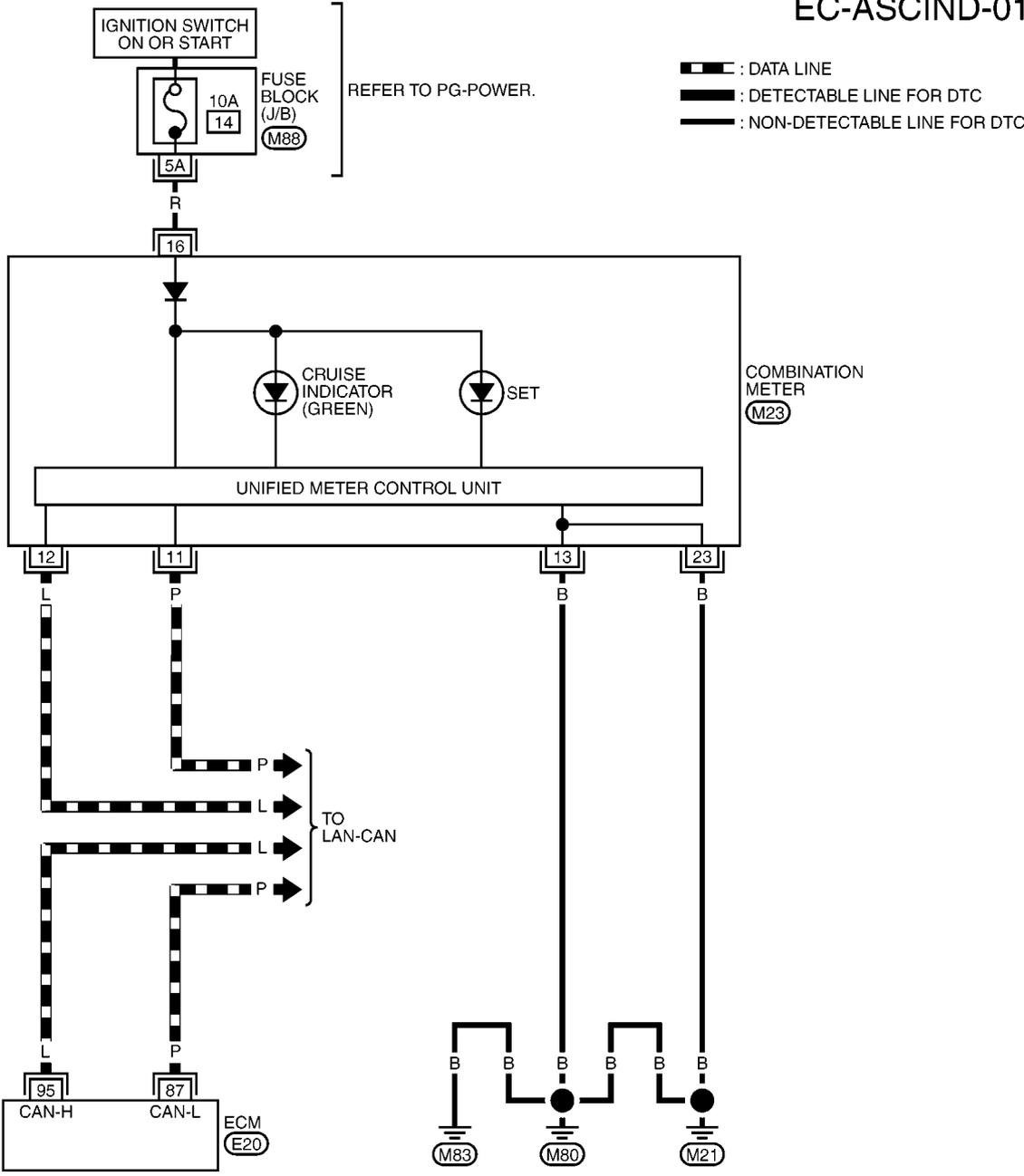
M

# ASC D INDICATOR

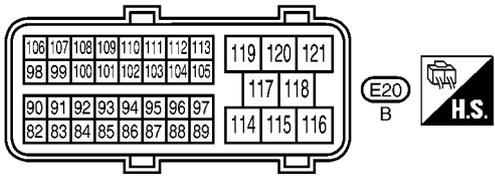
EBS01KMZ

## Wiring Diagram

### EC-ASCIND-01



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	M23 W
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	



REFER TO THE FOLLOWING.

M88 - FUSE BLOCK-JUNCTION BOX (J/B)

MBWA1330E

# ASCD INDICATOR

## Diagnostic Procedure

EBS01KN0

### 1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	● MAIN switch: Pressed at the first time → at the 2nd time	ON → OFF
SET LAMP	● MAIN switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 185 km/h (115 MPH)	● ASCD: Operating	ON
		● ASCD: Not operating	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-79, "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"](#).

### 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-70, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> **INSPECTION END**

# MI & DATA LINK CONNECTORS

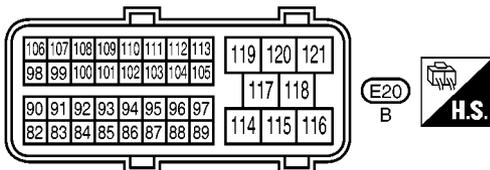
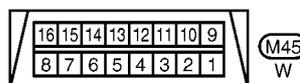
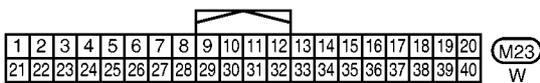
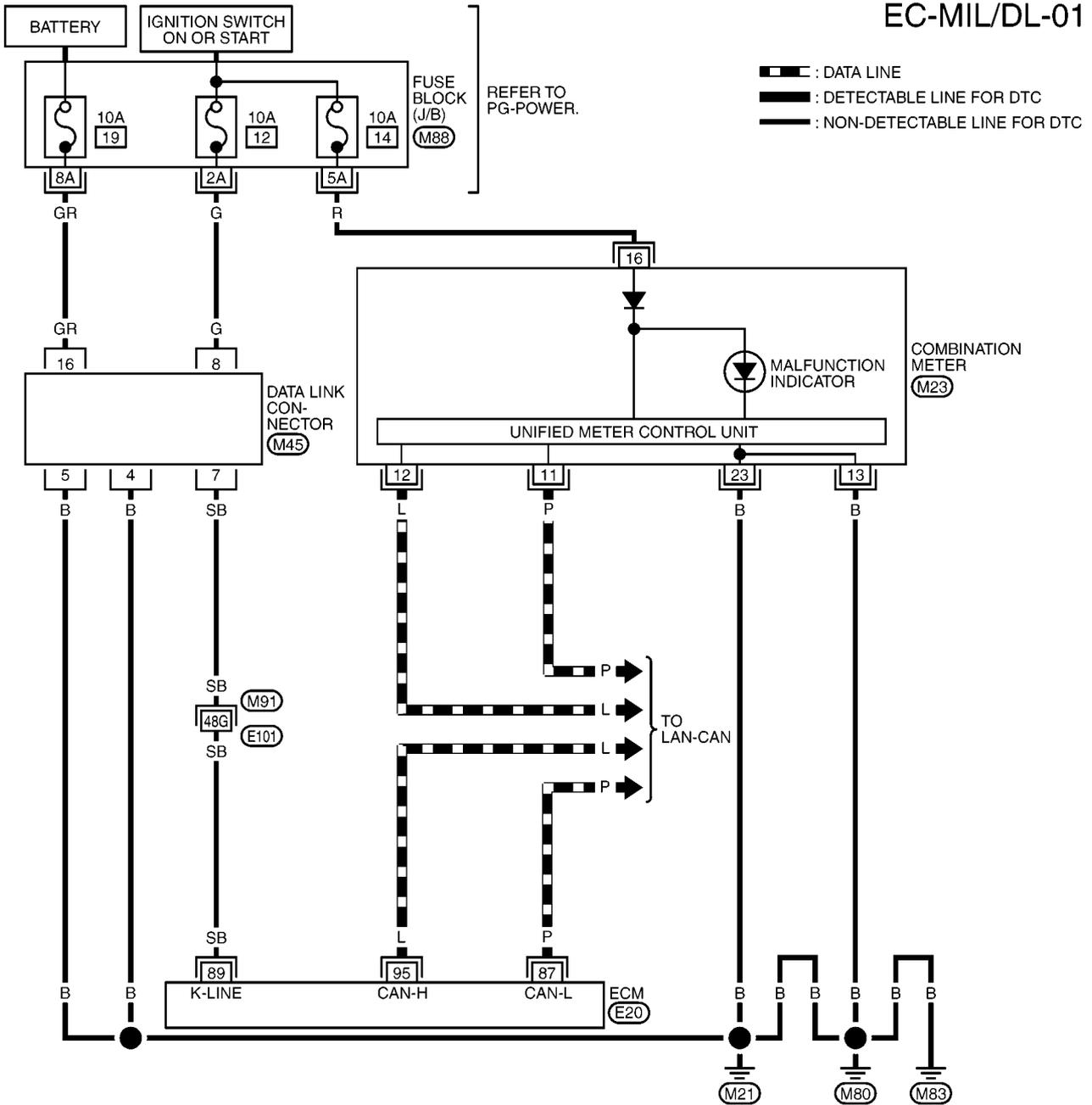
PFP:24814

## MI & DATA LINK CONNECTORS

EBS01KN1

### Wiring Diagram

### EC-MIL/DL-01



REFER TO THE FOLLOWING.

- (M88) - FUSE BLOCK-JUNCTION BOX (J/B)
- (M91) - SUPER MULTIPLE JUNCTION (SMJ)

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

## AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PFP:18930

### System Description INPUT/OUTPUT SIGNAL CHART

EBS01KN2

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 (M/T)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/Neutral position (PNP) switch	Gear position		
Combination meter*	Vehicle speed		
TCM*	Powertrain revolution		

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

### BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 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 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/COST switch. (Then SET indicator in combination meter illuminates.)

### ACCEL OPERATION

If the RESUME/ACCELERATE switch is depressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.

And then ASCD will keep the new set speed.

### CANCEL OPERATION

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

- CANCEL switch is 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 (M/T models)
- Selector lever is changed to N, P, R position (A/T models)
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed

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

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

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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- Brake pedal is released
- Clutch pedal is released (M/T models)
- Selector lever is in other than P and N positions (A/T models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 185 km/h (115 MPH)

## Component Description

### ASCD STEERING SWITCH

Refer to [EC-206](#) .

### ASCD BRAKE SWITCH

Refer to [EC-189](#) and [EC-330](#) .

### ASCD CLUTCH SWITCH

Refer to [EC-189](#) and [EC-330](#) .

### STOP LAMP SWITCH

Refer to [EC-189](#) and [EC-330](#) .

### ASCD INDICATOR

Refer to [EC-351](#) .

EBS01KN3

# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

PPF:00100

### General Specifications

EBS01KN4

Target idle speed	A/T	No load* (in P or N position)	750±25 rpm
	M/T	No load* (in Neutral position)	
Air conditioner: ON	A/T	In P or N position	750 rpm or more
	M/T	In Neutral position	800 rpm or more
Maximum engine speed			4,900 rpm

\*: Under the following conditions:

- Heat up switch: OFF
- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

### Mass Air Flow Sensor

EBS01KN5

Supply voltage	Battery voltage (11 - 14V)
Ignition switch ON (Engine stopped.)	Approx. 0.4V
Idle (Engine is warmed up to normal operating temperature.)	1.3 - 1.7V *

\*: Engine is warmed up to normal operating temperature and running under no load.

### Intake Air Temperature Sensor

EBS01KN6

Temperature °C (°F)	Resistance kΩ
25 (77)	1.800 - 2.200
80 (176)	0.283 - 0.359

### Engine Coolant Temperature Sensor

EBS01KN7

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

EBS01KN8

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

### Fuel Injector

EBS01KN9

Resistance [at 10 - 60°C (50 - 140°F)]	0.2 - 0.8Ω
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### Glow Plug

EBS01KNA

Resistance [at 25°C (77°F)]	Approximately 0.8Ω
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### EGR Volume Control Valve

EBS01KNB

Resistance [at 25°C (77°F)]	13 - 17Ω
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### Crankshaft Position Sensor

EBS01KNC

Refer to [EC-164, "Component Inspection"](#) .

### Camshaft Position Sensor

EBS01KND

Refer to [EC-175, "Component Inspection"](#) .

# SERVICE DATA AND SPECIFICATIONS (SDS)

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## Fuel Pump

EBS01KNE

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Resistance [at 10 - 60°C (50 - 140°F)]
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1.5 - 3.0Ω
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