# SECTION ECEC ENGINE CONTROL SYSTEM o

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## PRECAUTION PRECAUTIONS

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

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SR 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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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 SR section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

#### WARNING:

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery or batteries, and wait at least three minutes before performing any service.

On Board Diagnostic (OBD) System of Engine and CVT

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

#### CAUTION:

- Always to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to illuminate.
- Always to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to illuminate due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to <u>PG-10, "Harness Con-</u> <u>nector"</u>.
- Always route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to illuminate due to the short circuit.
- Always to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to illuminate due to the malfunction of the EVAP system or fuel injection system, etc.
- Always to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.
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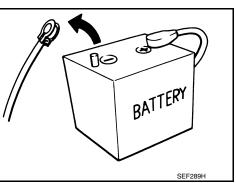
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#### PRECAUTIONS

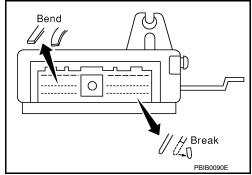
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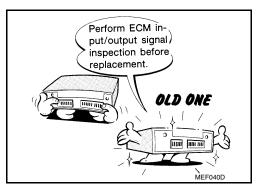
#### **General Precautions**

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



- Never disassemble ECM.
- If a battery cable is disconnected, the memory will return to the ECM value. The ECM will now start to self-control at its initial value. Thus, engine operation can vary slightly in this case. However, this is not an indication of a malfunction. Never replace parts because of a slight variation.
- If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- **Test values**
- · When connecting or disconnecting pin connectors into or from ECM, never damage pin terminals (bends or break). Check that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- Securely connect ECM harness connectors. A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform ECM Terminals and Reference Value inspection and check ECM functions properly. Refer to EC-84, "Reference Value".
- Handle mass air flow sensor carefully to avoid damage.
- Never clean mass air flow sensor with any type of detergent.
- Never disassemble electric throttle control actuator.
- · Even a slight leakage in the air intake system can cause serious incidents.
- Never shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).





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#### PRECAUTIONS

#### < PRECAUTION >

#### [VQ35DE]

- After performing each TROUBLE DIAGNOSIS, perform DTC **Confirmation Procedure or Component Function Check.** А The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed. EC SAT652J D 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 Е Battery damage the ECM power transistor. voltage F Ð Harness connector Short for solenoid valve ECM Н NG Solenoid valve OK Circuit tester Ī SEF348N Κ · B1 indicates bank 1, B2 indicates bank 2 as shown in the fig-Cylinder number and Bank layout Bank 1 L Never operate fuel pump when there is no fuel in lines. Bank 2 • Tighten fuel hose clamps to the specified torque. 6 Μ 4 Front Ν Crankshaft pulley SEC893C Ο
  - Ρ

ure.

#### PRECAUTIONS

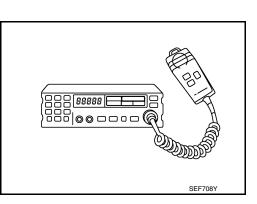
#### < PRECAUTION >

- Never depress accelerator pedal when starting.
- Immediately after starting, never rev up engine unnecessarily.
- Never rev up engine just prior to shutdown.

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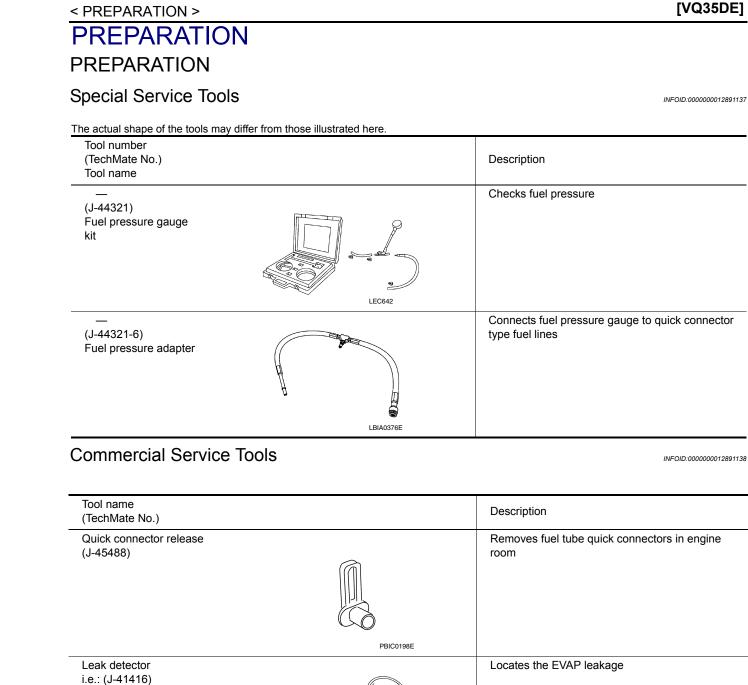
[VQ35DE]

- 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.
- Never let them run parallel for a long distance.
- Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
- Be sure to ground the radio to vehicle body.



EVAP service port adapter

i.e.: (J-41413-OBD)



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port

S-NT703

S-NT704

Applies positive pressure through EVAP service

#### PREPARATION

#### < PREPARATION >

Tool name (TechMate No.)		Description
Fuel filler cap adapter i.e.: (J-42909)		Checks fuel tank vacuum relief valve opening pressure
	ALBIA1353ZZ	
Socket wrench ( — )	19 mm (0.75 in) 32 mm (1.26 in) S-NT705	Removes and installs engine coolant temperature sensor. Refer to <u>CO-23, "Exploded View"</u> .

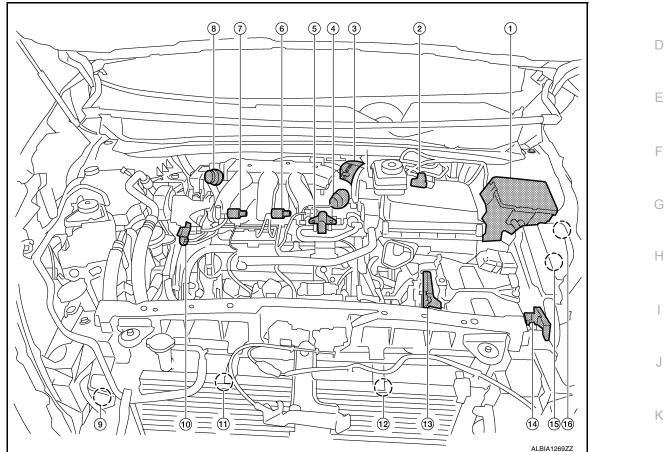
# < SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION **COMPONENT PARTS** 

ENGINE CONTROL SYSTEM

**ENGINE CONTROL SYSTEM : Component Parts Location** 

**ENGINE ROOM** 



No.	Component	Function
1	IPDM E/R	IPDM E/R activates the internal control circuit to perform the relay ON-OFF control according to the input signals from various sensors and the request signals received from control units via CAN communication. Refer to <u>PCS-5, "Component Parts Location"</u> for detailed installation location.
2	Mass air flow sensor (with intake air temperature sensor)	EC-28, "Mass Air Flow Sensor (With Intake Air Temperature Sen- sor)"
3	Electric throttle control actuator	EC-21. "Electric Throttle Control Actuator"
4	Power valve actuator 2	EC-29, "Power Valve Actuator 1 and 2"
5	EVAP canister purge volume control solenoid valve	EC-24, "EVAP Canister Purge Volume Control Solenoid Valve"
6	VIAS control solenoid valve 2	EC-29, "VIAS Control Solenoid Valve 1 and 2"
$\bigcirc$	VIAS control solenoid valve 1	EC-29, "VIAS Control Solenoid Valve 1 and 2"
8	Power valve actuator 1	EC-29, "Power Valve Actuator 1 and 2"
9	Refrigerant pressure sensor	EC-29. "Refrigerant Pressure Sensor" Refer to <u>HAC-6. "Component Parts Location"</u> for detailed installa- tion location.

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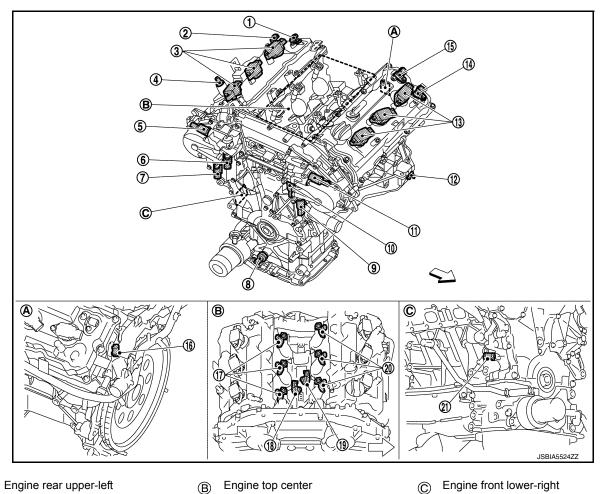
J

#### < SYSTEM DESCRIPTION >

No.	Component	Function
10	Electronic controlled engine mount control solenoid valve	EC-22, "Electronic Controlled Engine Mount"
11	Cooling fan motor-2	EC-20, "Cooling Fan Motor"
12	Cooling fan motor-1	EC-20, "Cooling Fan Motor"
(13)	ECM	EC-21, "ECM"
14	Battery current sensor (with battery temperature sensor)*	-
(15)	Cooling fan relay-2	
16	Cooling fan relay-3	

\*: Not used for engine control system.

#### ENGINE



Engine rear upper-left A

No.	Component	Function
1	Camshaft position sensor (PHASE) (bank 1)	EC-20, "Camshaft Position Sensor (PHASE)"
2	Exhaust valve timing control position sensor (bank 1)	EC-27, "Exhaust Valve Timing Control Position Sensor"
3	Ignition coil (with power transistor) (bank 1)	EC-26, "Ignition Coil (With Power Transistor)"
4	PCV valve	EC-30, "Positive Crankcase Ventilation (PCV)"
5	Intake valve timing intermediate lock control solenoid valve (bank 1)	EC-27, "Intake Valve Timing Intermediate Lock Control Solenoid Valve"

Engine top center

B

Revision: December 2015

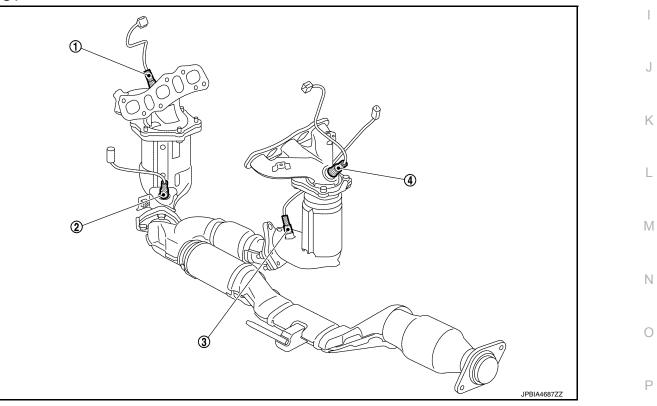
EC-16

#### < SYSTEM DESCRIPTION >

#### [VQ35DE]

No.	Component	Function	٨
6	Intake valve timing control solenoid valve (bank 1)	EC-26, "Intake Valve Timing Control Solenoid Valve"	A
7	Exhaust valve timing control solenoid valve (bank 1)	EC-27, "Exhaust Valve Timing Control Solenoid Valve"	
8	Engine oil pressure sensor	EC-23, "Engine Oil Pressure Sensor"	EC
9	Exhaust valve timing control solenoid valve (bank 2)	EC-27, "Exhaust Valve Timing Control Solenoid Valve"	
10	Intake valve timing control solenoid valve (bank 2)	EC-26, "Intake Valve Timing Control Solenoid Valve"	С
(1)	Intake valve timing intermediate lock control solenoid valve (bank 2)	EC-27, "Intake Valve Timing Intermediate Lock Control Solenoid Valve"	
(12)	Crankshaft position sensor (POS)	EC-21, "Crankshaft Position Sensor (POS)"	D
(13)	Ignition coil (with power transistor) (bank 2)	EC-26, "Ignition Coil (With Power Transistor)"	
14)	Exhaust valve timing control position sensor (bank 2)	EC-27, "Exhaust Valve Timing Control Position Sensor"	Е
(15)	Camshaft position sensor (PHASE) (bank 2)	EC-20, "Camshaft Position Sensor (PHASE)"	
(16)	Engine coolant temperature sensor	EC-22, "Engine Coolant Temperature Sensor"	F
17	Fuel injector (bank 1)	EC-24, "Fuel Injector"	
(18)	Knock sensor (bank 1)	EC-27, "Knock Sensor"	
(19)	Knock sensor (bank 2)	EC-27, "Knock Sensor"	G
20	Fuel injector (bank 2)	EC-24, "Fuel Injector"	
21	Engine oil temperature sensor	EC-23, "Engine Oil Temperature Sensor"	Н

#### EXHAUST

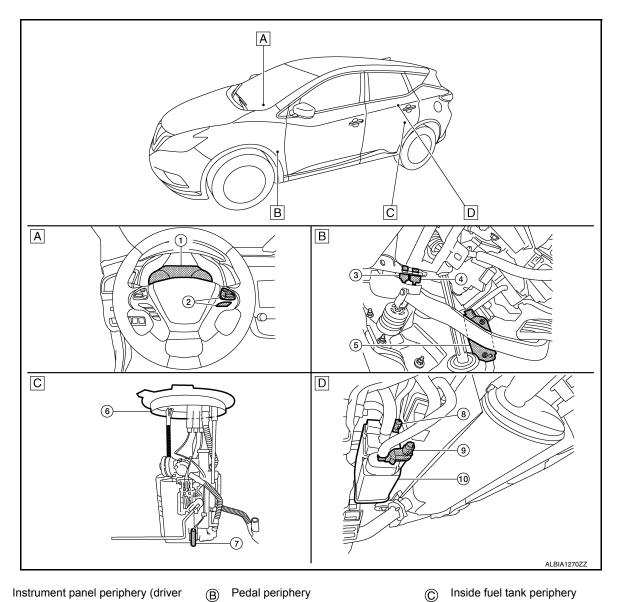


No.	Component	Function
1	Air fuel ratio (A/F) sensor 1 (bank 2)	EC-19, "Air Fuel Ratio (A/F) Sensor 1"
2	Heated oxygen sensor 2 (bank 2)	EC-25. "Heated Oxygen Sensor 2"

#### < SYSTEM DESCRIPTION >

No.	Component	Function
3	Heated oxygen sensor 2 (bank 1)	EC-25, "Heated Oxygen Sensor 2"
4	Air fuel ratio (A/F) sensor 1 (bank 1)	EC-19, "Air Fuel Ratio (A/F) Sensor 1"

#### BODY



- B Pedal periphery Instrument panel periphery (driver A side)
- Behind fuel tank periphery  $\bigcirc$

No.	Component		Function
		Malfunction indicator lamp (MIL)	EC-28, "Malfunction Indicator Lamp (MIL)"
1	Combination meter	Information display	The operation mode of the ASCD is indicated on the information display in the combination meter. ECM transmits the status signal to the combination meter via CAN communication according to ASCD operation.
2	ASCD steering switch		EC-20, "ASCD Steering Switch"
3	Stop lamp switch		EC-29, "Stop Lamp Switch & Brake Pedal Position Switch"

#### < SYSTEM DESCRIPTION >

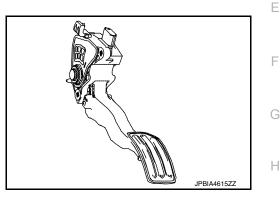
[VQ35DE]

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No.	Component	Function	_
4	Brake pedal position switch	EC-29, "Stop Lamp Switch & Brake Pedal Position Switch"	A
5	Accelerator pedal position sensor	EC-19, "Accelerator Pedal Position Sensor"	_
6	Fuel level sensor unit and fuel pump (with fuel tank temper- ature sensor)	EC-24. "Fuel Level Sensor Unit and Fuel Pump (With Fuel Tank Temperature Sensor)"	EC
$\bigcirc$	Fuel tank temperature sensor	Refer to <u>FL-5, "Exploded View"</u> for detailed installation location.	
8	EVAP control system pressure sensor	EC-24, "EVAP Control System Pressure Sensor"	C
9	EVAP canister vent control valve	EC-24, "EVAP Canister Vent Control Valve"	_
10	EVAP canister	EC-23. "EVAP Canister"	D

#### Accelerator Pedal Position Sensor

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



Accelerator pedal position sensor

Accelerator pedal operation

Sensor 1

Sensor 2

Depress

Accelerator pedal position sensor output voltage 0 0 0 0 0 0 0

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

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

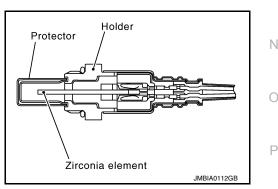
#### Air Fuel Ratio (A/F) Sensor 1

#### DESCRIPTION

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range.

The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Release 🗲

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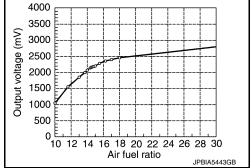
#### < SYSTEM DESCRIPTION >

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

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#### A/F SENSOR 1 HEATER

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

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

#### ASCD Steering Switch

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

#### Camshaft Position Sensor (PHASE)

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

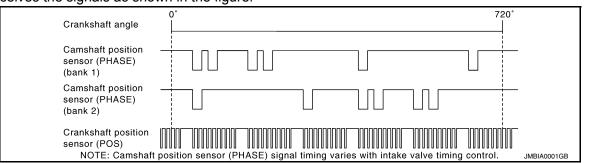
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

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

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

Due to the changing magnetic field, the voltage from the sensor changes. ECM receives the signals as shown in the figure.



#### Cooling Fan Motor

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 4-step control [HIGH/MIDDLE/LOW/OFF]. Cooling fan operates at each speed when the current flows in the cooling fan motor. Refer to EC-41, "COOLING FAN CONTROL : System Description" for cooling fan operation.

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< SYSTEM DESCRIPTION >

#### Crankshaft Position Sensor (POS)

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

The sensor consists of a permanent magnet and Hall IC.

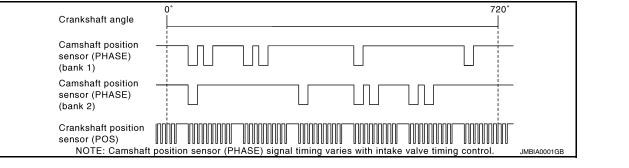
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

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

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

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.



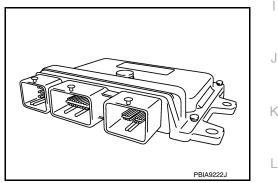
#### ECM

OUTLINE

• ECM (Engine Control Module) controls the engine.

Electric Throttle Control Actuator

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



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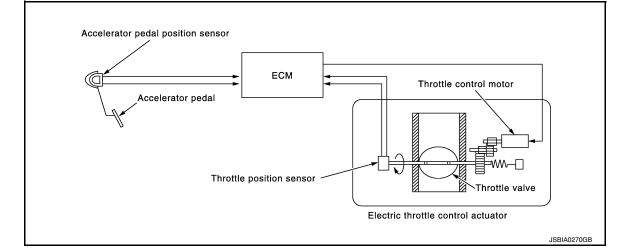
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#### < SYSTEM DESCRIPTION >

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



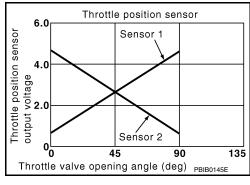
#### THROTTLE CONTROL MOTOR

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

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

#### THROTTLE POSITION SENSOR

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



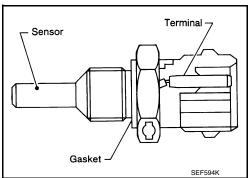
#### **Electronic Controlled Engine Mount**

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

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

#### Engine Coolant Temperature Sensor

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



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#### < SYSTEM DESCRIPTION >

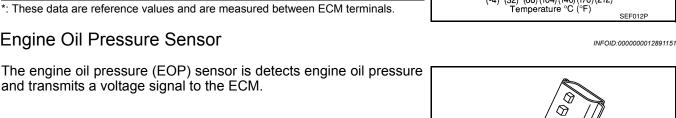
#### <Reference data>

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

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

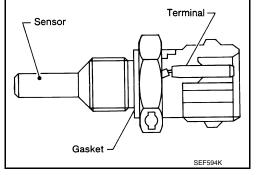
#### Engine Oil Pressure Sensor

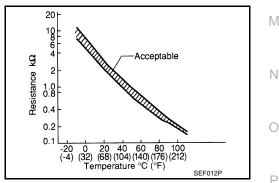
and transmits a voltage signal to the ECM.



**Engine Oil Temperature Sensor** 

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





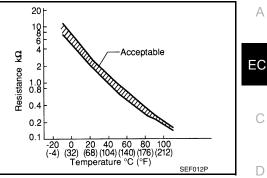
<Reference data>

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

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

#### **EVAP** Canister

The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank. For details, refer to EC-45, "EVAPORATIVE EMISSION SYSTEM : System Description".



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#### < SYSTEM DESCRIPTION >

#### EVAP Canister Purge Volume Control Solenoid Valve

The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

#### EVAP Canister Vent Control Valve

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

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

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

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

#### EVAP Control System Pressure Sensor

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

#### Fuel Injector

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

Fuel Level Sensor Unit and Fuel Pump (With Fuel Tank Temperature Sensor)

**EC-24** 

2016 Murano NAM

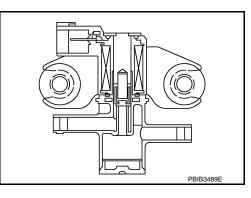
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#### FUEL PUMP

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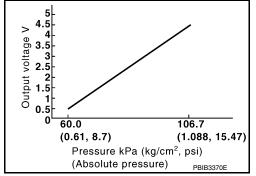
Coil

Canister side

Spring

Plungér

Valve





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To atmosphere

#### < SYSTEM DESCRIPTION >

The ECM activates the fuel pump for 1 second after the ignition switch is turned ON to improve engine start ability. If the ECM receives an engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It sends the control signal to the fuel pump control module, which in turn controls the fuel pump.

Condition	Fuel pump operation	0
Ignition switch is turned to ON.	Operates for 1 second.	
Engine running and cranking	Operates.	Г
When engine is stopped	Stops in 1.5 seconds.	
Except as shown above	Stops.	
		E

#### FUEL LEVEL SENSOR

The fuel level sensor is mounted in the fuel level sensor unit.

The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line.

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

20

10 8 6

1.0

0.4 0.2 0.1

Resistance kΩ

#### FUEL TANK TEMPERATURE SENSOR

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

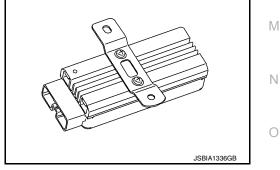
#### <Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

\*: These data are reference values and are measured between ECM terminals 95 (Fuel tank temperature sensor) and ground.

#### Fuel Pump Control Module (FPCM)

When driving conditions demand a decrease in fuel supply, the fuel pump control module (FPCM) reduces the supply voltage to the fuel pump. When driving conditions demand an increase in fuel supply (during engine start, low engine coolant temperature or high load), the supply voltage to the fuel pump is increased.



Acceptable

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

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Heated Oxygen Sensor 2

#### DESCRIPTION

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#### < SYSTEM DESCRIPTION >

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

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

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

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

#### HEATED OXYGEN SENSOR 2 HEATER

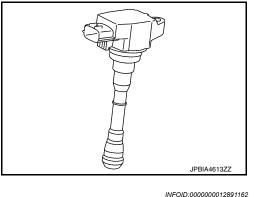
Heated oxygen sensor 2 heater is integrated in the sensor.

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

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

#### Ignition Coil (With Power Transistor)

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



#### Intake Valve Timing Control Solenoid Valve

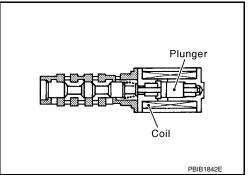
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

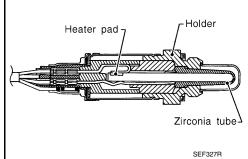
The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.

The longer pulse width advances valve angle.

The shorter pulse width retards valve angle.

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





#### < SYSTEM DESCRIPTION >

#### Intake Valve Timing Intermediate Lock Control Solenoid Valve

Intake valve timing intermediate lock control solenoid valve is activated by ON/OFF signals from the ECM.

The intake valve timing intermediate lock control solenoid valve opens/closes the path of oil pressure acting on the lock pin in the camshaft sprocket (INT).

- When the solenoid valve becomes ON, oil pressure to the lock pin is drained to perform intermediate lock.
- When the solenoid valve becomes OFF, oil pressure is acted on the lock pin to release the intermediate lock.

#### Exhaust Valve Timing Control Position Sensor

Exhaust valve timing control position sensor detects the protrusion of the signal plate installed to the exhaust camshaft front end.

This sensor signal is used for sensing a position of the exhaust camshaft.

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.

#### Exhaust Valve Timing Control Solenoid Valve

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

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

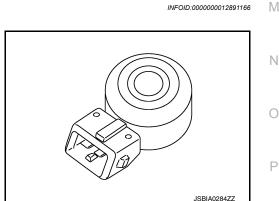
The longer pulse width retards valve angle.

The shorter pulse width advances valve angle.

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

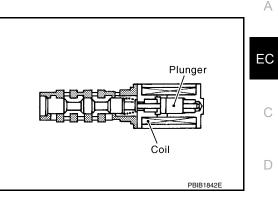


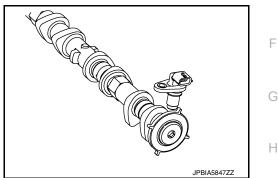
The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



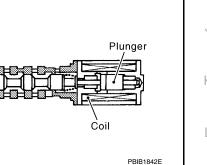
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# [VQ35DE]

tion Indicator Lamp (MIL)".

system malfunction.

meter.

Malfunction Indicator Lamp (MIL)

engine running. This is a bulb check.

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

#### MASS AIR FLOW SENSOR

The mass air flow sensor ① is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the heater in sensing element to a certain amount.

The temperature distribution around the heater changes according to the increase in intake air volume. The change is detected by a thermistor and the air volume data is sent to ECM by the MAF sensor.

#### INTAKE AIR TEMPERATURE SENSOR

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

The temperature sensing unit uses a thermistor which is sensitive to the change in temperature.

#### <Reference data>

Intake air temperature [°C (°F)]	Voltage <sup>*</sup> (V)
25 (77)	1.9 – 2.1
80 (176)	3.2 – 3.4

\*: These data are reference values on the diagnosis tool.

#### Oil Pressure Warning Lamp

Oil pressure warning lamp is located on the combination meter. It indicates the low pressure of the engine oil and the malfunction of the engine oil pressure system.

Combination meter turns the oil pressure warning lamp ON/OFF according to the oil pressure warning lamp signal received from ECM via CAN communication.

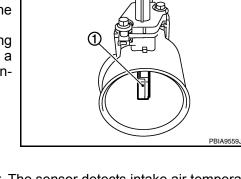
For details, refer to <u>EC-49</u>, "ENGINE PROTECTION CONTROL AT LOW ENGINE OIL PRESSURE : System Description".

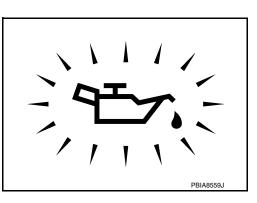
Malfunction Indicator lamp (MIL) is located on the combination

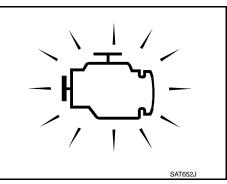
MIL will illuminate when the ignition switch is turned ON without the

When the engine is started, MIL should turn OFF. If the MIL remains illuminated, the on board diagnostic system has detected an engine

For details, refer to EC-67, "DIAGNOSIS DESCRIPTION : Malfunc-







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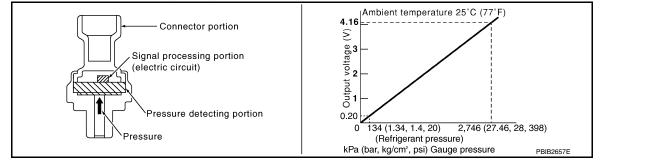
#### Power Valve Actuator 1 and 2

< SYSTEM DESCRIPTION >

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

#### **Refrigerant Pressure Sensor**

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



#### Stop Lamp Switch & Brake Pedal Position Switch

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

Brake pedal	Brake pedal position switch	Stop lamp switch
Released	ON	OFF
Depressed	OFF	ON

#### VIAS Control Solenoid Valve 1 and 2

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

**EC-29** 

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#### [VQ35DE]

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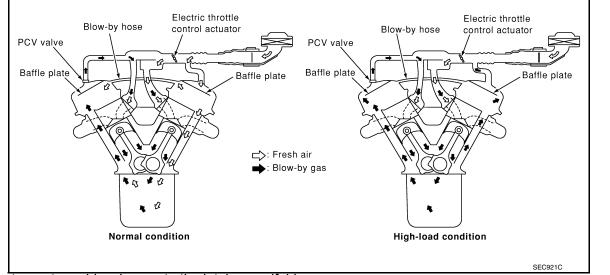
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#### < SYSTEM DESCRIPTION >

#### STRUCTURE AND OPERATION

Positive Crankcase Ventilation (PCV)



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

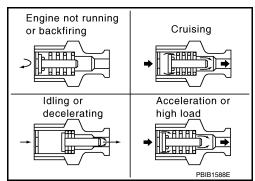
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

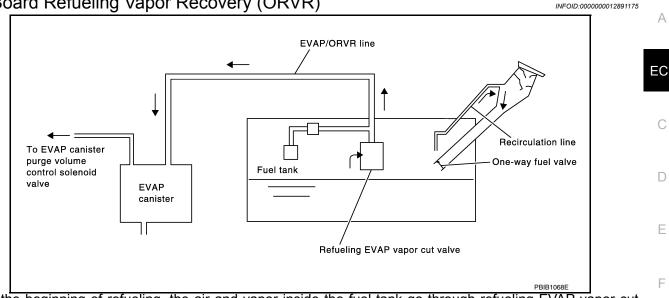
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



#### STRUCTURE AND OPERATION

#### < SYSTEM DESCRIPTION >

#### On Board Refueling Vapor Recovery (ORVR)



From the beginning of refueling, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve and EVAP/ORVR line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving. Н

#### WARNING:

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

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

#### CAUTION:

- Before removing fuel line parts, carry out the following procedures:
- Put drained fuel in an explosion-proof container and put lid on securely. - Release fuel pressure from fuel line. Refer to EC-162, "Work Procedure".
- Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Never kink or twist hose and tube when they are installed.
- Never tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leakage at connections.
- Never attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.
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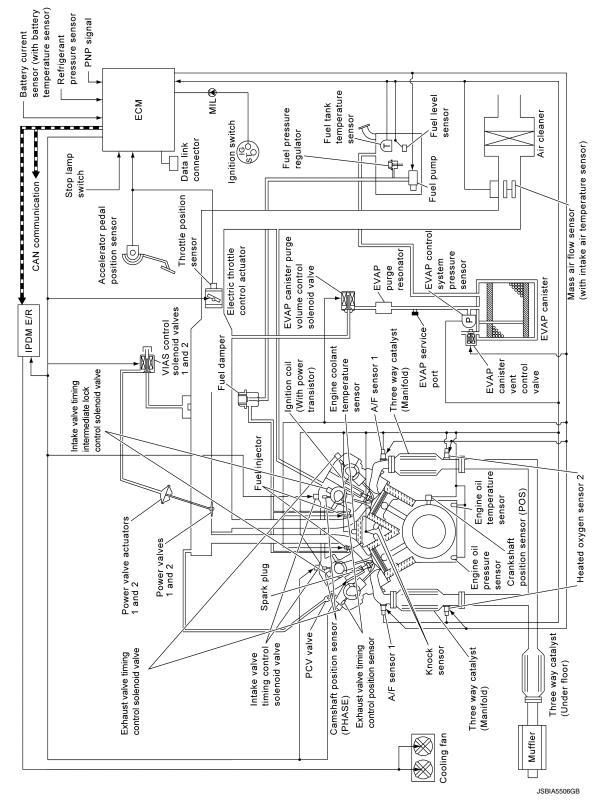
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# SYSTEM ENGINE CONTROL SYSTEM

ENGINE CONTROL SYSTEM : System Description

INFOID:000000012891176

#### SYSTEM DIAGRAM



SYSTEM DESCRIPTION

#### < SYSTEM DESCRIPTION >

ECM controls the engine by various functions.

Function	Reference
Multiport fuel injection system	EC-36. "MULTIPORT FUEL INJECTION SYSTEM : System De- scription"
Electric ignition system	EC-38. "ELECTRIC IGNITION SYSTEM : System Description"
Air conditioning cut control	EC-39, "AIR CONDITIONING CUT CONTROL : System Descrip- tion"
Automatic speed control device (ASCD)	EC-40, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : Sys- tem Description"
Cooling fan control	EC-41, "COOLING FAN CONTROL : System Description"
Electronic controlled engine mount	EC-42. "ELECTRONIC CONTROLLED ENGINE MOUNT : Sys- tem Description"
Evaporative emission system	EC-45. "EVAPORATIVE EMISSION SYSTEM : System Descrip- tion"
Throttle control	EC-46, "THROTTLE CONTROL : System Description"
Intake valve timing control	EC-46, "INTAKE VALVE TIMING CONTROL : System Description"
Exhaust valve timing control	EC-49. "EXHAUST VALVE TIMING CONTROL : System Descrip- tion"
Engine protection control at low engine oil pressure	EC-49. "ENGINE PROTECTION CONTROL AT LOW ENGINE OIL PRESSURE : System Description"
Fuel filler cap warning system	EC-50, "FUEL FILLER CAP WARNING SYSTEM : System De- scription"
Variable induction air system	EC-53, "VARIABLE INDUCTION AIR SYSTEM : System Descrip- tion"
Integrated control of engine, CVT, and ABS	EC-55, "INTEGRATED CONTROL OF ENGINE, CVT, AND ABS : System Description"
CAN communication	EC-55, "CAN COMMUNICATION : System Description"
Fuel pump control module (FPCM)	EC-56, "FUEL PUMP CONTROL MODULE (FPCM) : System De- scription"

#### **ENGINE CONTROL SYSTEM : Fail-safe**

Κ INFOID:000000013492757

DTC No.	Detected items	Engine operating condition in fail-safe mode	
U0101	CAN communication line	ECM operates active grille shutter to fully-open position.	
U0284	Active grille shutter	ECM operates active grille shutter to fully-open position.	
U1040	Engine communication line	ECM operates active grille shutter to fully-open position.	
P0011 P0021	Intake valve timing control	<ul> <li>The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.</li> <li>ECM activates the IVT intermediate lock control solenoid valve to bring the cam sprocket into an intermediate lock condition.</li> </ul>	
P0014 P0024	Exhaust valve timing con- trol	The signal is not energized to the exhaust valve timing control solenoid valve and the valve control does not function.	
P0101 P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	

[VQ35DE]

#### < SYSTEM DESCRIPTION >

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0117 P0118	Engine coolant tempera- ture sensor circuit	Engine coolant temperature will be CONSULT displays the engine coo	determined by ECM based on the following condition lant temperature decided by ECM.
		Condition	Engine coolant temperature decided (CONSULT display)
		Just as ignition switch is turned ON or START	40°C (104°F)
		Approx 4 minutes or more after en- gine starting	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	order for the idle position to be with The ECM regulates the opening sp condition. Therefore, the acceleration will be p	eed of the throttle valve to be slower than the normal poor.
P0196 P0197 P0198	Engine oil temperature sensor	Intake valve timing control does not function.	
P0500	Vehicle speed sensor	The cooling fan operates (Highest) while engine is running.	
P0524	Engine oil pressure	<ul> <li>ECM illuminates oil pressure warning lamp on the combination meter.</li> <li>Engine speed will not rise more than 4,000 rpm due to the fuel cut.</li> <li>Fail-safe is canceled when ignition switch OFF → ON.</li> </ul>	
P052A P052B P052C P052D	Intake valve timing inter- mediate lock control	_	
P059F	Active grille shutter	<ul> <li>When a voltage and temperature related malfunction is detected, the active grille shutter stops at the position of detection.</li> <li>Except for the above case, operates the active grille shutter to fully opened position.</li> </ul>	
P0603 P0607	ECM	Engine torque may be limited.	
P0604	ECM	<ul> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>ASCD operation may be deactivated.</li> </ul>	
P0605 P0606 P060B	ECM	<ul> <li>NOTE:</li> <li>Fail-safe may not occur depending on malfunction type.</li> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>ASCD operation may be deactivated.</li> </ul>	

#### < SYSTEM DESCRIPTION >

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P060A	ECM	<ul> <li>NOTE:</li> <li>Fail-safe may not occur depending on malfunction type.</li> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>Engine torque may be limited.</li> <li>ASCD operation may be deactivated.</li> </ul>	
P0643	Sensor power supply	<ul> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> </ul>	
P1805	Brake switch	ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.	
		Vehicle condition	Driving condition
		When engine is idling	Normal
		When accelerating	Poor acceleration
P2100 P2103	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	
P2101	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	
P2118	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.	
P2119	Electric throttle control ac- tuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.	
		(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.	
		(When ECM detects the throttle valve is stuck open:) While the vehicle is being driven, it slows down gradually because of fuel cut. After the vehicle stops, the engine stalls. The engine can restart in the N or P position, and engine speed will not exceed 1,000 rpm or more.	
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.	

MULTIPORT FUEL INJECTION SYSTEM

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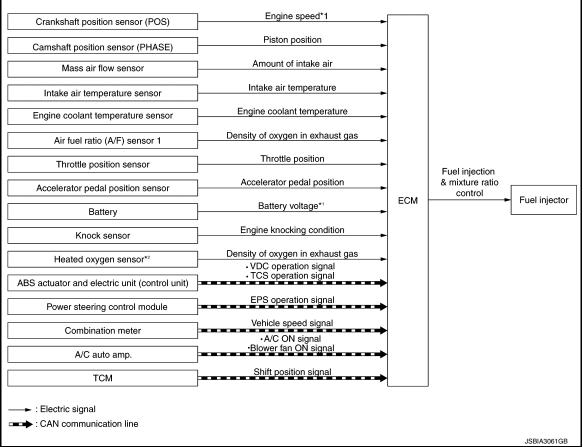
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#### < SYSTEM DESCRIPTION > MULTIPORT FUEL INJECTION SYSTEM : System Description

#### INFOID:000000012891178

IVQ35DE

#### SYSTEM DIAGRAM



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

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

#### SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from the crankshaft position sensor (POS), camshaft position sensor (PHASE) and the mass air flow sensor.

#### VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

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

#### <Fuel increase>

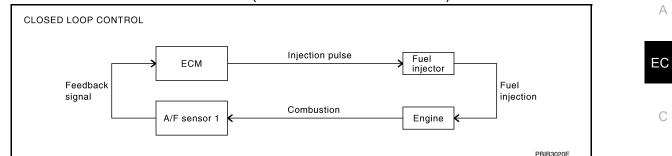
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever position is changed from N to D
- High-load, high-speed operation

#### <Fuel decrease>

- During deceleration
- During high engine speed operation

### < SYSTEM DESCRIPTION >

### MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air-fuel mixture ratio for drive ability and emission control. The three way catalyst (manifold) can better reduce CO, HC and NOx emissions. This system uses A/F sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about A/F sensor 1, refer to <u>EC-19</u>, "Air Fuel Ratio (A/F) Sensor 1". This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of A/F sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

Open Loop Control

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

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

#### MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from A/F sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) and characteristic changes during operation (i.e., fuel injector clogging) directly affect mixture ratio.

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

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

"Short-term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from A/F sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in N fuel volume if it is lean.

"Long-term fuel trim" is overall fuel compensation carried out over time to compensate for continual deviation of the "short-term fuel trim" from the central value. Continual deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

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### < SYSTEM DESCRIPTION >

#### FUEL INJECTION TIMING

<ul> <li>Sequential multiport fuel injection system</li> </ul>	<ul> <li>Simultaneous multiport fuel injection system</li> </ul>
o. 1 cylinder	
o. 2 cylinder — I	No. 2 cylinder
o. 3 cylinder —————————————————————	No. 3 cylinder
o. 4 cylinder L	No. 4 cylinder
p. 5 cylinder ————————————————————————————————————	No. 5 cylinder – L
o. 6 cylinder	No. 6 cylinder – I Legender – I Legender

Two types of systems are used.

Sequential Multiport Fuel Injection System

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

Simultaneous Multiport Fuel Injection System Fuel is injected simultaneously into all six cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM. The six injectors will then receive the signals 2 times for each engine cycle.

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

#### FUEL SHUT-OFF

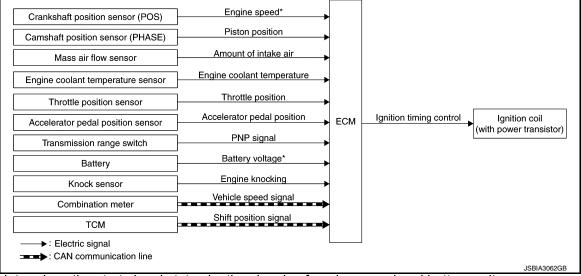
Fuel to each cylinder is cut off during deceleration, operation of the engine at excessively high speeds or operation of the vehicle at excessively high speeds.

# ELECTRIC IGNITION SYSTEM

# **ELECTRIC IGNITION SYSTEM : System Description**

INFOID:000000012891179

### SYSTEM DIAGRAM



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

#### SYSTEM DESCRIPTION

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

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

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

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

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

### < SYSTEM DESCRIPTION >

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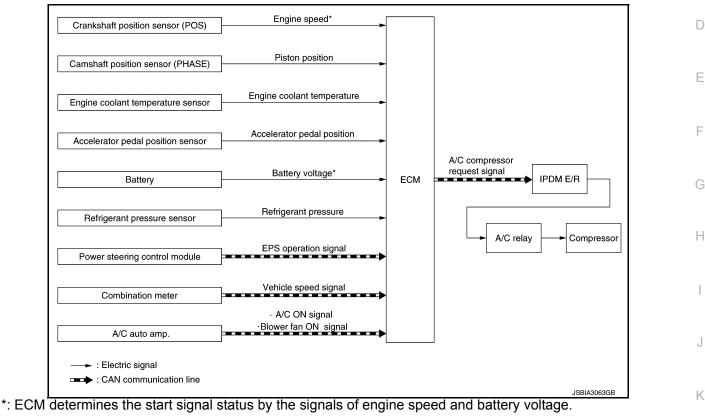
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#### • During acceleration

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



#### SYSTEM DIAGRAM



#### SYSTEM DESCRIPTION

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

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

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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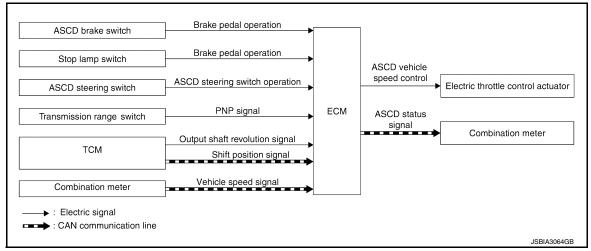
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#### < SYSTEM DESCRIPTION >

# AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description

INFOID:000000012891181

#### SYSTEM DIAGRAM



#### BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

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

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

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

#### NOTE:

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

#### SET OPERATION

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

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

#### ACCELERATE OPERATION

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

#### CANCEL OPERATION

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

- CANCEL switch is pressed.
- More than 2 switches at ASCD steering switch are pressed at the same time. (Set speed will be cleared.)
- Brake pedal is depressed.
- Selector lever is in the N, P, and R positions.
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed.
- TCS system is operated.

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

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

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

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

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

#### COAST OPERATION

#### < SYSTEM DESCRIPTION >

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

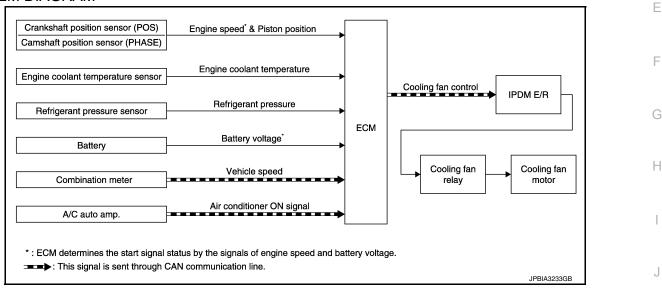
#### RESUME OPERATION

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

- Brake pedal is released
- Selector lever is in the P and N positions
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH) COOLING FAN CONTROL

# COOLING FAN CONTROL : System Description

#### SYSTEM DIAGRAM



#### SYSTEM DESCRIPTION

ECM controls cooling fan speed corresponding to vehicle speed, engine coolant temperature, refrigerant pressure, air conditioner ON signal. Then control system has 4-step control [HIGH/MIDDLE/LOW/OFF].

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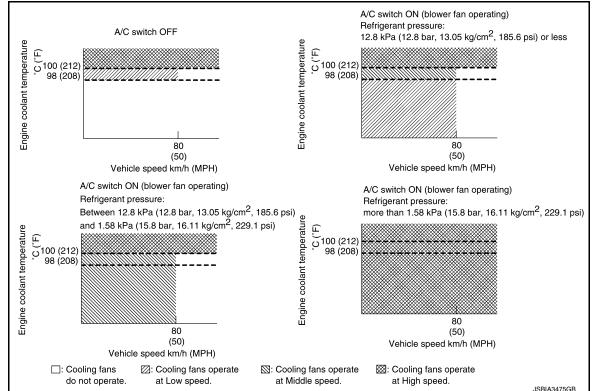
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### < SYSTEM DESCRIPTION >

#### Cooling Fan Operation



#### Cooling Fan Relay Operation

The ECM controls cooling fan relays through CAN communication line.

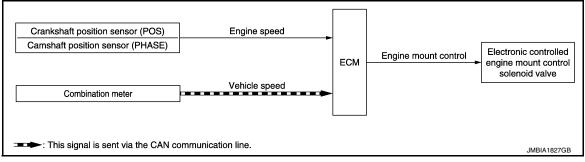
Cooling fan speed	Cooling fan relay				
	1	2	3		
Stop (OFF)	OFF	OFF	OFF		
Low (LOW)	ON	OFF	OFF		
Middle (MID)	OFF	ON	OFF		
High (HI)	OFF	ON	ON		

# ELECTRONIC CONTROLLED ENGINE MOUNT

ELECTRONIC CONTROLLED ENGINE MOUNT : System Description

INFOID:000000012891183

### SYSTEM DIAGRAM



#### SYSTEM DESCRIPTION

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

#### < SYSTEM DESCRIPTION >

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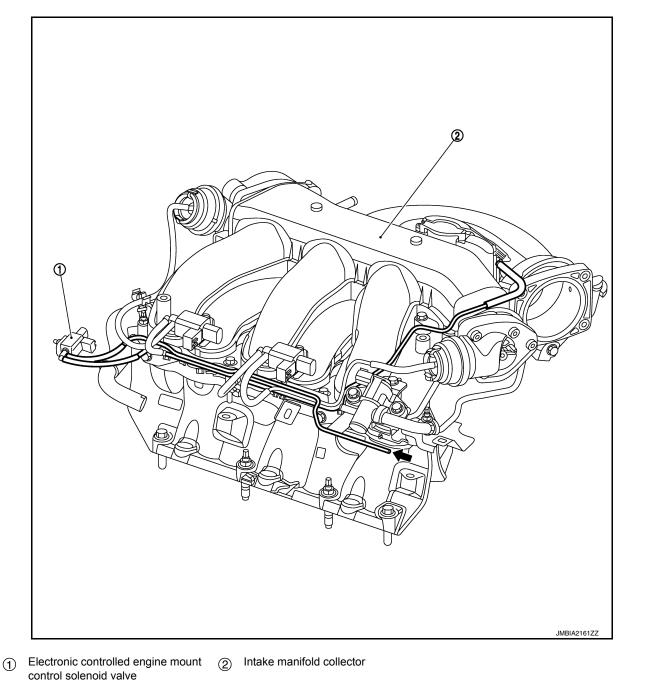
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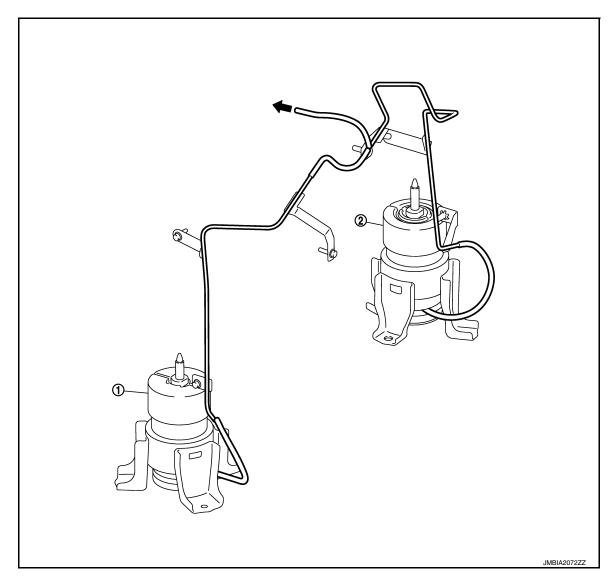
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Soft	
Hard	<b>F</b> 0
-	

### ELECTRONIC CONTROLLED ENGINE MOUNT LINE DRAWING



: From next figure



(1) Front electronic controlled engine mount (2) Rear electronic controlled engine mount

To previous figure

### NOTE:

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

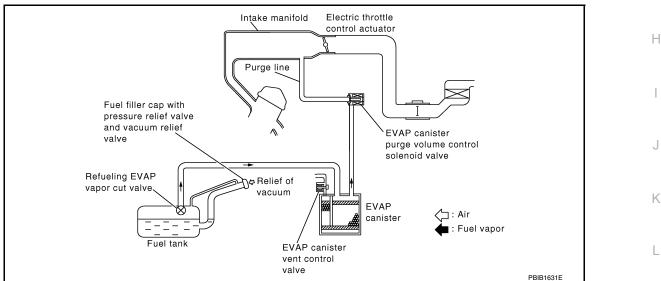
#### < SYSTEM DESCRIPTION >

# **EVAPORATIVE EMISSION SYSTEM : System Description**

#### SYSTEM DIAGRAM

Crankshaft position sensor	Engine speed <sup>*</sup> & Piston position				
Camshaft position sensor					
Mass air flow sensor	Amount of intake air				
Engine coolant temperature sensor	Engine coolant temperature				
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas				
Throttle position sensor	Throttle position		ECM	EVAP canister purge flow control	EVAP canister purge volume
Accelerator pedal position sensor	Accelerator pedal position				control solenoid valve
Battery	Battery voltage*				
Fuel tank temperature sensor	Fuel temperature in fuel tank				
EVAP control system pressure sensor	Pressure in purge line				
Combination meter	Vehicle speed	→			
* : ECM determines the start signal status by	the signals of engine speed and battery vol	Itage.			
This signal is sent via the CAN com	munication line.				JSBIA0371GB

#### SYSTEM DESCRIPTION



The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.

The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

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

# THROTTLE CONTROL

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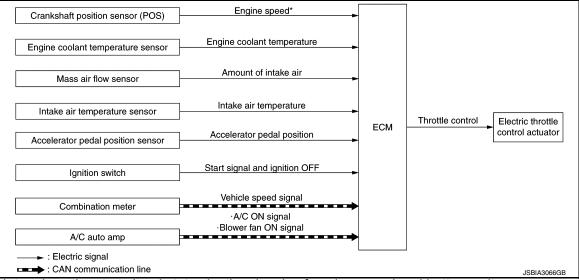
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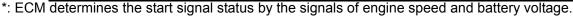
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#### < SYSTEM DESCRIPTION >

# THROTTLE CONTROL : System Description

#### SYSTEM DIAGRAM





#### SYSTEM DESCRIPTION

ECM calculates the value of signal transmitted from the accelerator pedal and activates the throttle valve by transmitting a control signal to the electric throttle control actuator. This allows the optimum throttle angle and improves drivability and fuel consumption. In addition, ECM learns the fully closed position every time when the ignition switch is turned OFF to improve the accuracy in throttle valve position.

When a malfunction occurs in the throttle control system, the throttle valve is closed by the return spring and maintains the minimum engine speed by holding a slightly opened condition which is close to the fully opened condition. This allows the securing of brake system, power steering system, and electric system and the ensuring of the safety.

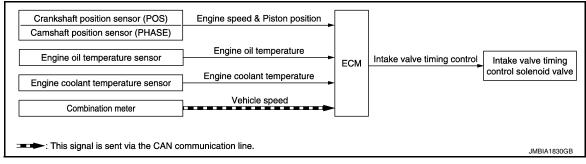
# INTAKE VALVE TIMING CONTROL

### INTAKE VALVE TIMING CONTROL : System Description

INFOID:000000012891186

### INTAKE VALVE TIMING CONTROL

#### System Diagram

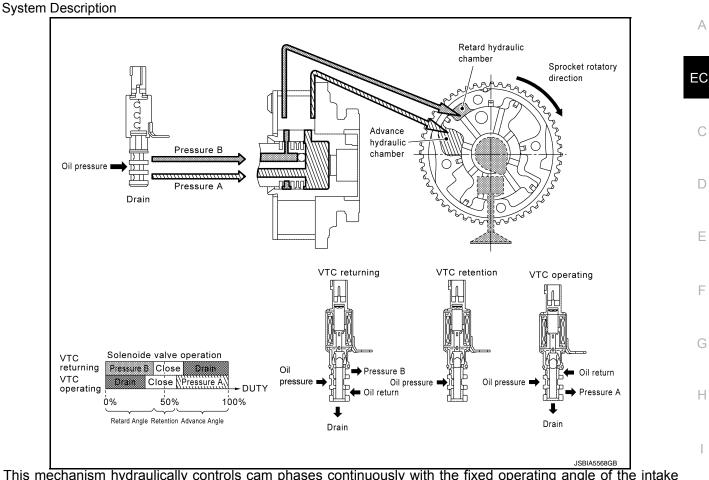


### < SYSTEM DESCRIPTION >

### [VQ35DE]

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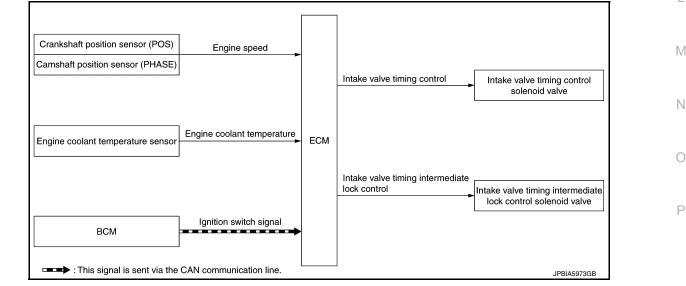


This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing (IVT) control sole-noid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

### INTAKE VALVE TIMING INTERMEDIATE LOCK CONTROL

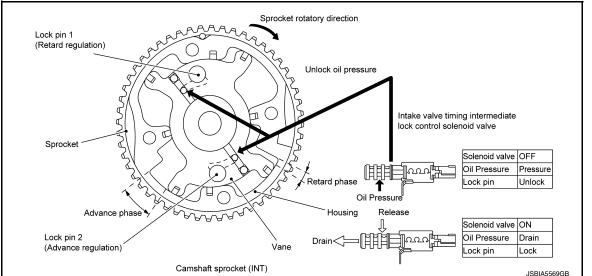
System Diagram



System Description

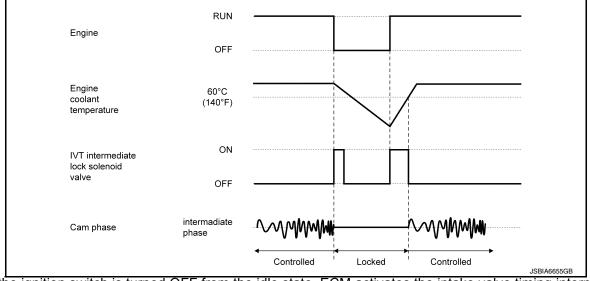
#### < SYSTEM DESCRIPTION >

The intake valve timing intermediate lock control improves the cleaning ability of exhaust gas at cold starting by fixing the camshaft sprocket (INT) with two lock pins and bringing the cam phase into intermediate phase.



Cam phase is fixed at the intermediate phase by two lock pins in the camshaft sprocket (INT). ECM controls the intermediate phase lock by opening/closing the intake valve timing intermediate lock control solenoid valve to control oil pressure acting on the lock pin and locking/unlocking the lock pin.

Lock/Unlock Activation



When the ignition switch is turned OFF from the idle state, ECM activates the intake valve timing intermediate lock control solenoid valve to drain oil pressure. Accordingly, the lock pin is activated by the spring, and the cam phase is fixed at the intermediate position.

When starting the engine by cold start, ECM activates the solenoid valve to maintain the condition that the cam phase is fixed at the intermediate position.

When the engine coolant temperature exceeds 60°C (140°F), ECM turns OFF the solenoid valve and starts normal intake valve timing control.

EXHAUST VALVE TIMING CONTROL

#### < SYSTEM DESCRIPTION >

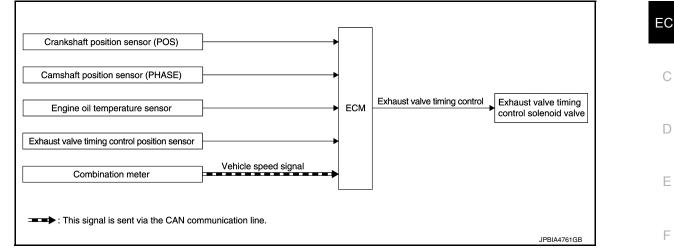
# EXHAUST VALVE TIMING CONTROL : System Description

INFOID:000000012891187

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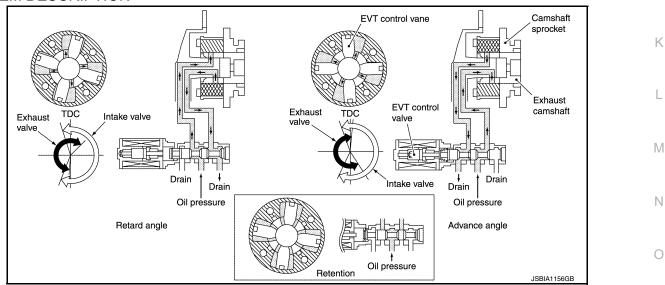
SYSTEM DIAGRAM



#### INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM		ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed and nicton position			
Camshaft position sensor (PHASE)		Engine speed and piston position		
Engine oil temperature sensor	Engine oil temperature		Exhaust valve	Exhaust valve timing control
Exhaust valve timing control position sensor	Exhaust valve timing signal		timing control	solenoid valve
Combination meter	CAN commu- nication	Vehicle speed signal		

#### SYSTEM DESCRIPTION



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

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine oil temperature. Then, the ECM sends ON/OFF pulse duty signals to the exhaust valve timing (EVT) control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the exhaust valve to increase engine torque and output in a range of high engine speed.

ENGINE PROTECTION CONTROL AT LOW ENGINE OIL PRESSURE

ENGINE PROTECTION CONTROL AT LOW ENGINE OIL PRESSURE : System De-

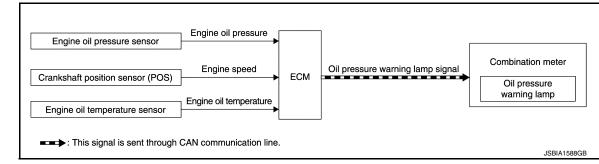
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### < SYSTEM DESCRIPTION >

#### scription

INFOID:000000012891188

#### SYSTEM DIAGRAM



### SYSTEM DESCRIPTION

- The engine protection control at low engine oil pressure warns the driver of a decrease in engine oil pressure by the oil pressure warning lamp before the engine becomes damaged.
- When detecting a decrease in engine oil pressure at an engine speed less than 1,000 rpm, ECM transmits an oil pressure warning lamp signal to the combination meter. The combination meter turns ON the oil pressure warning lamp, according to the signal.
- When detecting a decrease in engine oil pressure at an engine speed 1,000 rpm or more, ECM transmits an oil pressure warning lamp signal to the combination meter.

The combination meter turns ON the oil pressure warning lamp, according to the signals. When detecting a decrease in engine oil pressure, ECM cuts fuel if the engine speed exceeds the specified value.

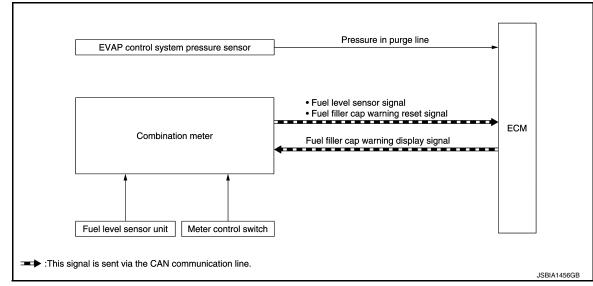
Decrease in engine oil pressure	Engine speed	Combination meter	Fuel cut
		Oil pressure warning lamp	
Detection	Less than 1,000 rpm	ON*	NO
	1,000 rpm or more	ON	YES

\*: When detecting a normal engine oil pressure, ECM turns OFF the oil pressure warning lamp. FUEL FILLER CAP WARNING SYSTEM

# FUEL FILLER CAP WARNING SYSTEM : System Description

INFOID:000000012891189

### SYSTEM DIAGRAM



### SYSTEM DESCRIPTION

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

ECM judges a refueled state, based on a fuel level signal transmitted from the combination meter.

Revision: December 2015

#### < SYSTEM DESCRIPTION >

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

#### **CAUTION:**

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

**Reset Operation** 

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

#### NOTE:

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

# WARNING/INDICATOR/CHIME LIST

# WARNING/INDICATOR/CHIME LIST : Warning lamps/Indicator lamps

Name	Arrangement/Function	Н
Malfunction indicator lamp (MIL)	Regarding the function. Refer to <u>EC-67</u> , "DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)".	

# WARNING/INDICATOR/CHIME LIST : Warning/Indicator (On Information Display)

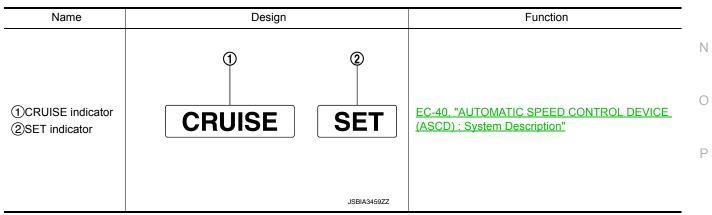
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#### WARNING

Name	Arrangement/Function	К
Engine oil pressure warning	Regarding the function. Refer to <u>EC-51, "WARNING/INDICATOR/CHIME LIST : En-</u> gine Oil Pressure Warning".	
Fuel filler cap warning	Regarding the function. Refer to <u>EC-53</u> , "WARNING/INDICATOR/CHIME LIST : Fuel <u>Filler Cap Warning</u> ".	L

### INDICATOR/INFORMATION



# WARNING/INDICATOR/CHIME LIST : Engine Oil Pressure Warning

INFOID:000000012891192

### DESIGN/PURPOSE

Revision: December 2015

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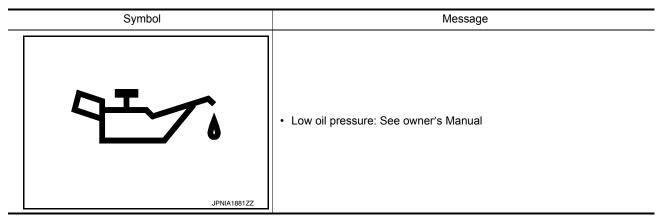
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#### < SYSTEM DESCRIPTION >



# BULB CHECK

Not applicable

# OPERATION AT COMBINATION METER CAN COMMUNICATION CUT-OFF OR UNUSUAL SIGNAL

For the operation for CAN communications blackout or abnormal signal reception, refer to MWI-28, "Fail-safe".

### SYSTEM DIAGRAM

Engine oil pressure sensor	Engine oil pressure signal	ECM	Engine oil pressure warning signal	Combination meter Oil pressure warning
■■■> : CAN comm	nunication line			JSBIA3494GB

### SIGNAL PATH

ECM calculates an engine oil pressure according to a signal transmitted from the engine oil pressure sensor. After engine running when the engine oil pressure is low and at least 5 seconds, ECM transmits the engine oil pressure warning signal to combination meter via CAN communication. Then the engine oil pressure warning displays.

#### LIGHTING CONDITION

When all of the following conditions for at least 5 seconds are satisfied:

- Ignition switch: ON
- Engine oil pressure is less than specified value.
- Engine speed is more than 500 rpm.

#### SHUTOFF CONDITION

When any of the following conditions is satisfied:

- Ignition switch: OFF
- Engine oil pressure is the specified value or more.
- Engine speed is less than 500 rpm.

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# < SYSTEM DESCRIPTION >

### [VQ35DE]

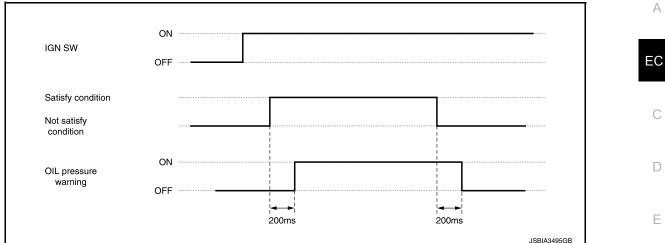
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INFOID:000000012891194

#### **TIMING CHART**



# WARNING/INDICATOR/CHIME LIST : Fuel Filler Cap Warning

### DESIGN/PURPOSE

Warn the driver that the fuel filler cap is left opened.

Symbol	Message	
	Loose Fuel Cap	H
		J
JSBIA3176GB		K

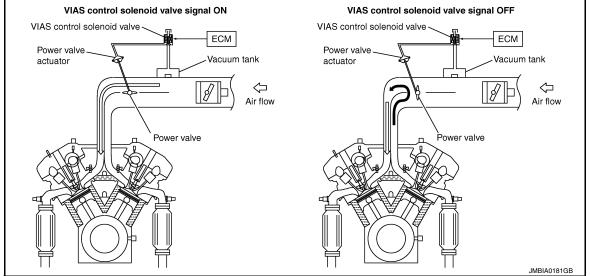
For detailes, refer to <u>EC-50, "FUEL FILLER CAP WARNING SYSTEM : System Description"</u>. VARIABLE INDUCTION AIR SYSTEM

# VARIABLE INDUCTION AIR SYSTEM : System Description

SYSTEM DIAGRAM

Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* ►			
Mass air flow sensor	Amount of intake air			Ν
Engine coolant temperature sensor	Engine coolant temperature	ECM	VIAS control	C
Throttle position sensor	Throttle position		VIAS control solenoid valve 1 and 2	_ P
Accelerator pedal position sensor	Accelerator pedal position			
Battery	Battery voltage* ►			
* : ECM determines the start signal sta	tus by the signals of engine spe	ed and b	pattery voltage. JMBIA1831GB	

#### SYSTEM DESCRIPTION

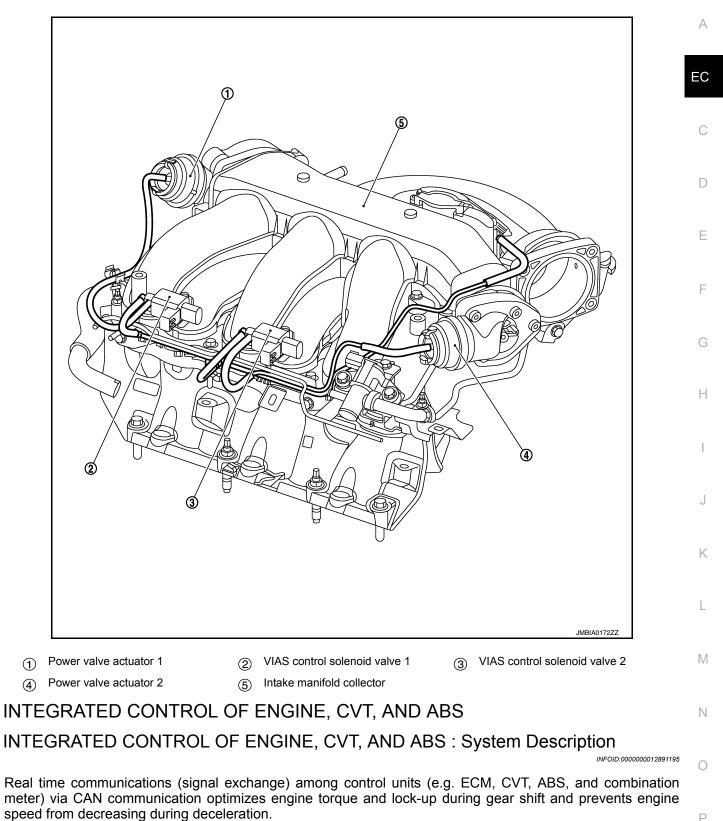


In the medium speed range, the ECM sends the ON signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore closes the power valve. Under this condition, the pressure waves of the exhaust stroke do not disturb the pressure waves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

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

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

#### VACUUM HOSE DRAWING



# CAN COMMUNICATION

CAN COMMUNICATION : System Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other



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#### < SYSTEM DESCRIPTION >

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.

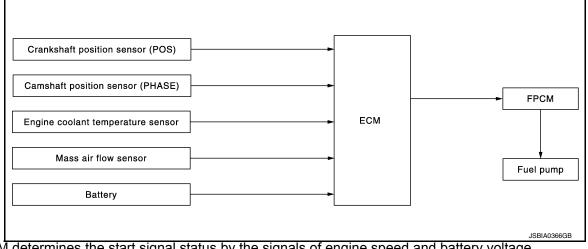
Refer to <u>LAN-37</u>, "CAN COMMUNICATION SYSTEM : CAN Communication Signal Chart", about CAN communication for detail.

# FUEL PUMP CONTROL MODULE (FPCM)

# FUEL PUMP CONTROL MODULE (FPCM) : System Description

INFOID:000000012891197

#### SYSTEM DIAGRAM



\*1: ECM determines the start signal status by the signals of engine speed and battery voltage. \*2: This sensor is not used to control the engine system under normal conditions.

#### **INPUT/OUTPUT SIGNAL CHART**

Sensor	Input signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS)	<ul> <li>Engine speed*</li> </ul>			
Camshaft position sensor (PHASE)		Fuel pump control	FPCM ↓	
Engine coolant temperature sensor	Engine coolant temperature			
Mass air flow sensor	Amount of intake air	_	Fuel pump	
Battery	Battery voltage*	_		

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

#### SYSTEM DESCRIPTION

The fuel pump control module (FPCM) controls the discharging volume of the fuel pump by the FPCM control signals (Low/Mid/High) depending on driving conditions.

Conditions	Amount of fuel flow	Supplied voltage
For 1 second after turning ignition switch ON	Low	Approximately 8.5 V
<ul> <li>Engine cranking</li> <li>Engine coolant temperature is below 10°C (50°F)</li> <li>Engine is running under high load and high speed conditions</li> </ul>	High	Battery voltage 12 V
Except the above	Mid	Approximately 10 V

# **OPERATION**

#### < SYSTEM DESCRIPTION >

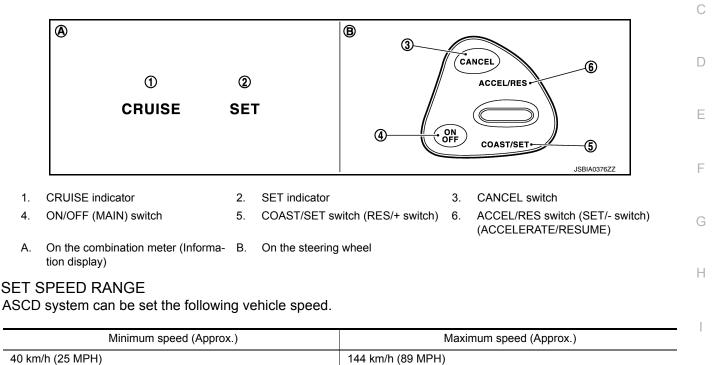
#### [VQ35DE]

# OPERATION

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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

#### SWITCHES AND INDICATORS



#### SWITCH OPERATION

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

#### CANCEL OPERATION

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

- CANCEL switch is pressed
- ON/OFF (MAIN) switch pressed (Set speed is cleared)
- More than 2 switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- · Brake pedal is depressed
- Selector lever position is changed to N, P or R
- · Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated

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

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

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

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

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# **OPERATION**

#### < SYSTEM DESCRIPTION >

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.

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

#### < SYSTEM DESCRIPTION >

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

### **Diagnosis Description**

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

### GST (Generic Scan Tool)

When GST is connected with a data link connector equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests. Refer to <u>EC-59</u>, "Diagnostic Description".

#### NOTE:

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

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< SYSTEM DESCRIPTION >

### DIAGNOSIS SYSTEM (ECM) DIAGNOSIS DESCRIPTION

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

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

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

×: Applicable —: Not applicable

		М	IL		D	тс	1st trip DTC		
ltems	1st	t trip	2nc	l trip	1st trip	2nd trip	1st trip	2nd trip display- ing	
	Blinking	Illuminat- ed	Blinking	Illuminat- ed	displaying	displaying	displaying		
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0308 is being detected	×	_	_	_	_	_	×	_	
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0308 is being detected	_	_	×	_	_	×	_	_	
One trip detection diagnoses (Re- fer to <u>EC-105, "DTC Index"</u> .)	_	×	_	_	×	_	_	_	
Except above	_	_	_	×	—	×	×	_	

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

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### DTC AND 1ST TRIP DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not recur, the 1st trip DTC will not be displayed.

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

For malfunctions in which 1st trip DTCs are displayed, refer to <u>EC-105, "DTC Index"</u>. These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT.

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

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to <u>EC-144</u>, "Work Flow". Then perform DTC Confirmation Procedure or Component Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

#### FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, absolute throttle position, base fuel schedule and intake air temperature at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT or GST. The 1st trip freeze frame data can only be displayed on the CONSULT screen.

#### < SYSTEM DESCRIPTION >

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

Priority		Items	
1	Freeze frame data	Misfire — DTC: P0300 – P0308 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175	
2	-	Except the above items	
3	1st trip freeze frame	data	

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

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased.

### **DIAGNOSIS DESCRIPTION : Counter System**

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

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on.
- The MIL will turn OFF after the vehicle is driven 3 times (driving pattern B) with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CON-SULT will count the number of times the vehicle is driven.
- The 1st trip DTC is not displayed when the self-diagnosis results in OK for the 2nd trip.

#### COUNTER SYSTEM CHART

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

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

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

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

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

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

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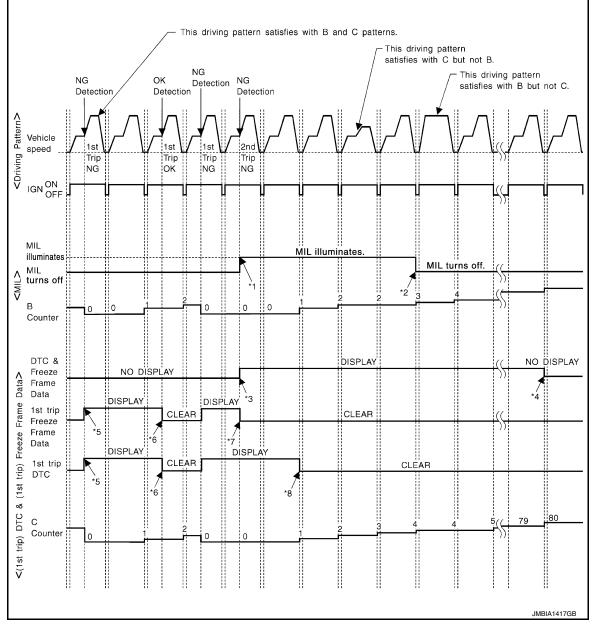
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#### < SYSTEM DESCRIPTION >



- \*1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- \*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- \*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

- \*2: MIL will turn OFF after vehicle is driv- \*3: When the same malfunction is deen 3 times (pattern B) without any malfunctions.
- \*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.
- \*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.
- tected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.
- \*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

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

#### **Driving Pattern B** Refer to EC-64, "DIAGNOSIS DESCRIPTION : Driving Pattern".

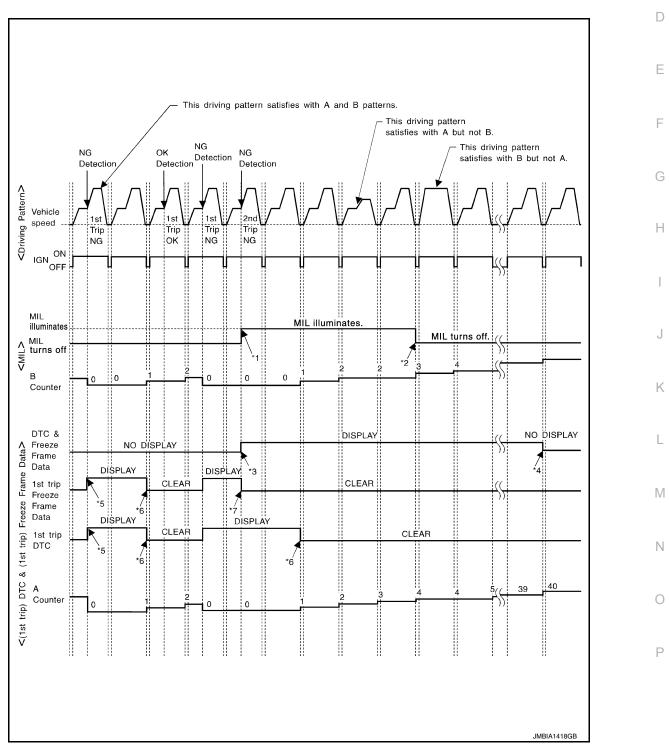
< SYSTEM DESCRIPTION >

#### Driving Pattern C Refer to EC-64, "DIAGNOSIS DESCRIPTION : Driving Pattern". Example: If the stored freeze frame data is as per the following: EC

Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F) To be satisfied with driving pattern C, the vehicle should run under the following conditions:

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

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



С

#### < SYSTEM DESCRIPTION >

- \*1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- \*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- \*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

- \*2: MIL will turn OFF after vehicle is driv- \*3: When the same malfunction is deen 3 times (pattern B) without any malfunctions.
- \*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.
- tected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.
- \*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

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

Driving Pattern A

Refer to EC-64, "DIAGNOSIS DESCRIPTION : Driving Pattern".

**Driving Pattern B** Refer to EC-64, "DIAGNOSIS DESCRIPTION : Driving Pattern".

DIAGNOSIS DESCRIPTION : Driving Pattern

#### CAUTION:

#### Always drive at a safe speed.

#### DRIVING PATTERN A

Driving pattern A means a trip satisfying the following conditions.

- Engine speed reaches 400 rpm or more.
- Engine coolant temperature rises by 20°C (36°F) or more after starting the engine.
- Engine coolant temperature reaches 70°C (158°F) or more.
- The ignition switch is turned from ON to OFF.

#### NOTE:

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

#### DRIVING PATTERN B

Driving pattern B means a trip satisfying the following conditions.

- Engine speed reaches 400 rpm or more.
- Engine coolant temperature reaches 70°C (158°F) or more.
- Vehicle speed of 70 120 km/h (44 75 MPH) is maintained for 60 seconds or more under the control of closed loop.
- Vehicle speed of 30 60 km/h (19 37 MPH) is maintained for 10 seconds or more under the control of closed loop.
- Under the closed loop control condition, the following state reaches 12 seconds or more in total: Vehicle speed of 4 km/h (2 MPH) or less with idling condition.
- The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or more in total.
- · A lapse of 22 minutes or more after engine start.
- NOTE:
- Drive the vehicle at a constant velocity.
- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern Β.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern B.

**EC-64** 

#### **DRIVING PATTERN C**

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

# DIAGNOSIS SYSTEM (ECM)

INFOID:000000012891204

IVQ35DE1

#### 2016 Murano NAM

### < SYSTEM DESCRIPTION >

[VQ35DE]

Calculated load value: (Calculated load value in the freeze frame data) $x (1\pm0.1)$ [%] Engine coolant temperature condition:	А
• When the freeze frame data shows lower than 70°C (158°F), engine coolant temperature should be lower	A
<ul> <li>than 70°C (158°F).</li> <li>When the freeze frame data shows higher than or equal to 70°C (158°F), engine coolant temperature should be higher than or equal to 70°C (158°F).</li> </ul>	EC
<ul> <li>NOTE:</li> <li>When the same malfunction is detected regardless of the above vehicle conditions, reset the counter of driving pattern C.</li> </ul>	С
• When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving	0
<ul> <li>pattern C.</li> <li>The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.</li> </ul>	D
DRIVING PATTERN D	
<ul> <li>Driving pattern D means a trip satisfying the following conditions.</li> <li>The state of driving at 40 km/h (25 MPH) reaches 300 seconds or more in total.</li> <li>Idle speed lasts 30 seconds or more.</li> </ul>	E
• A lapse of 600 seconds or more after engine start. NOTE:	F
• When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern	
<ul> <li>D.</li> <li>When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern D.</li> </ul>	G
DIAGNOSIS DESCRIPTION : System Readiness Test (SRT) Code	Н
System Readiness Test (SRT) code is specified in Service \$01 of SAE J1979/ISO 15031-5. As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and com- ponents. Completion must be verified in order for the emissions inspection to proceed. If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating "INCMP", use	
the information in this Service Manual to set the SRT to "CMPLT". In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate "CMPLT" for each application system. Once set as "CMPLT", the SRT status remains "CMPLT" until the self-diagnosis memory is erased.	J
Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate "INCMP" for these items. <b>NOTE:</b>	К
The SRT will also indicate "INCMP" if the self-diagnosis memory is erased for any reason or if the ECM mem- ory power supply is interrupted for several hours.	L
If, during the state emissions inspection, the SRT indicates "CMPLT" for all test items, the inspector will con- tinue with the emissions test. However, if the SRT indicates "INCMP" for one or more of the SRT items the vehicle is returned to the customer untested.	Μ
<b>NOTE:</b> If permanent DTC is stored or MIL illuminates during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates "CMPLT" for all test items. Therefore, it is important to check SRT ("CMPLT"), DTC (No DTCs) and permanent DTC (NO permanent DTCs) before the inspection.	Ν
SRT SET TIMING SRT is set as "CMPLT" after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.	0
	Ρ

#### < SYSTEM DESCRIPTION >

Self-diagnosis result		Example						
		Diagnosis	$\begin{array}{rcl} \mbox{Ignition cycle} \\ \leftarrow \mbox{ON} \rightarrow & \mbox{OFF} & \leftarrow \mbox{ON} \rightarrow & \mbox{OFF} \rightarrow $					
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)		
		P0402	OK (1)	— (1)	— (1)	OK (2)		
		P1402	OK (1)	OK (2)	— (2)	— (2)		
		SRT of EGR	"CMPLT"	"CMPLT"	"CMPLT"	"CMPLT"		
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)		
		P0402	— (0)	— (0)	OK (1)	— (1)		
		P1402	OK (1)	OK (2)	— (2)	— (2)		
		SRT of EGR	"INCMP"	"INCMP"	"CMPLT"	"CMPLT"		
NG exists	Case 3	P0400	OK	ОК	—	_		
		P0402		—	—	_		
		P1402	NG	_	NG	NG (Consecutive NG)		
		(1st trip) DTC	1st trip DTC	_	1st trip DTC	DTC (= MIL ON)		
		SRT of EGR	"INCMP"	"INCMP"	"INCMP"	"CMPLT"		

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

-: Self-diagnosis is not carried out.

When all SRT related self-diagnoses show OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT".  $\rightarrow$  Case 1 above

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

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

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is the number one (1) for each self-diagnosis (Case 1 & 2) or the number two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis results.
- During SRT driving pattern, the 1st trip DTC (NG) is detected prior to "CMPLT" of SRT and the self-diagnosis memory must be erased from the ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate "INCMP". NOTE:

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

DIAGNOSIS DESCRIPTION : Permanent Diagnostic Trouble Code (Permanent DTC)

INFOID:000000012891206

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

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

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

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

#### NOTE:

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

#### < SYSTEM DESCRIPTION >

#### PERMANENT DTC SET TIMING

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

# DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)

 When detecting a DTC that affects exhaust gas, the exhaust emission-related control module transmits a malfunction indicator lamp signal to ECM via CAN communication line. ECM prioritizes (MIL: ON/blink) the signal received from the exhaust emission-related control module and the ECM-stored DTC that affects exhaust gas and transmits a malfunction indicator lamp signal to the combination meter via CAN communication line.

The combination meter turns ON or blinks the MIL, according to the signal transmitted from ECM, and alerts the driver of malfunction detection.

- · Control modules that a DTC of MIL ON/Blink is stored (Control module varies among DTCs.):
- ECM

- TCM

- 1. The MIL illuminates when ignition switch is turned ON (engine is not running). NOTE:
- Check the MIL circuit if MIL does not illuminate. Refer to EC-551, "Component Function Check". When the engine is started, the MIL should go off.

NOTE:

If MIL remains ON or continues blinking, a DTC(s) that affects exhaust gas is detected. In this case, Selfdiagnosis is required for performing inspection and repair.

### On Board Diagnosis Function

#### ON BOARD DIAGNOSIS ITEM

The on board diagnostic system has the following functions.

Diagnostic test mode	Function						
Bulb check	MIL can be checked.						
SRT status	ECM can read if SRT codes are set.						
Malfunction warning	If ECM detects a malfunction, it illuminates or blinks MIL to inform the driver that a malfunction has been detected.						
Self-diagnostic results	DTCs or 1st trip DTCs stored in ECM can be read.						
Accelerator pedal released po- sition learning	ECM can learn the accelerator pedal released position. Refer to EC-152. "Description".						
Throttle valve closed position learning	ECM can learn the throttle valve closed position. Refer to EC-153, "Description".						
Idle air volume learning	ECM can learn the idle air volume. Refer to EC-154, "Description".						
Mixture ratio self-learning value clear	Mixture ratio self-learning value can be erased. Refer to EC-156, "Description".						

#### BULB CHECK MODE

#### Description

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

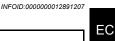
#### **Operation Procedure**

- Turn ignition switch ON. 1.
- 2. The MIL on the instrument panel should stay ON. If it remains OFF, check MIL circuit. Refer to EC-551, "Diagnosis Procedure".

#### SRT STATUS MODE

Description





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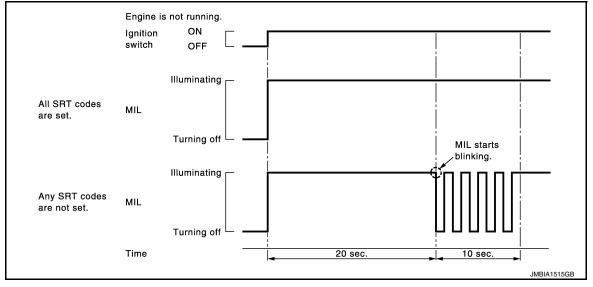
SAT652J

#### < SYSTEM DESCRIPTION >

This function allows to read if ECM has completed the self-diagnoses of major emission control systems and components. For SRT, refer to <u>EC-65, "DIAGNOSIS DESCRIPTION : System Readiness Test (SRT) Code"</u>.

**Operation Procedure** 

- 1. Turn ignition switch ON and wait 20 seconds.
- 2. SRT status is indicated as shown blow.
  - · ECM continues to illuminate MIL if all SRT codes are set.
  - ECM blinks MIL for about 10 seconds if all SRT codes are not set.



### MALFUNCTION WARNING MODE

#### Description

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

**Operation Procedure** 

- 1. Turn ignition switch ON.
- Check that MIL illuminates. If it remains OFF, check MIL circuit. Refer to <u>EC-551, "Diagnosis Procedure"</u>.
- 3. Start engine and let it idle.
  - For two trip detection logic diagnoses, ECM turns on MIL when it detects the same malfunction twice in the two consecutive driving cycles.
  - For 1st trip detection logic diagnoses, ECM turns on MIL when it detects a malfunction in one driving cycle.
  - ECM blinks MIL when it detects a malfunction that may damage the three way catalyst (misfire).

#### SELF-DIAGNOSTIC RESULTS MODE

#### Description

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

How to Set Self-diagnostic Results Mode

#### NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- After ignition switch is turned off, ECM is always released from the "self-diagnostic results" mode.
- 1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
- 2. Repeat the following procedure quickly five times within 5 seconds.
  - Fully depress the accelerator pedal.
  - Fully release the accelerator pedal.



#### < SYSTEM DESCRIPTION >

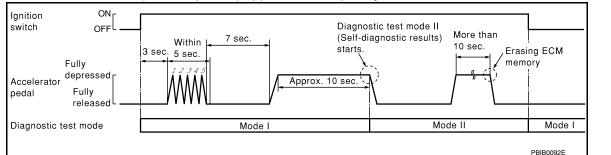
- [VQ35DE]
- 3. Wait 7 seconds, fully depress the accelerator pedal and keep it depressed for approx. 10 seconds until the MIL starts blinking.

#### NOTE:

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

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

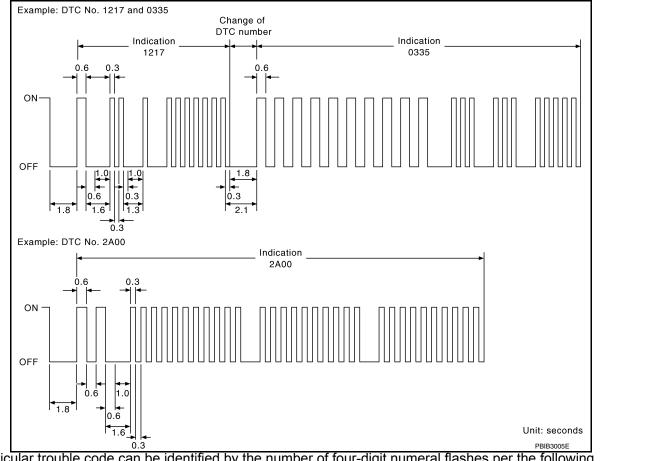
Wait until the same DTC (or 1st trip DTC) appears to completely confirm all DTCs.



#### How to Read Self-diagnostic Results

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

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



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

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

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#### < SYSTEM DESCRIPTION >

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

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

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

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. Refer to <u>EC-105</u>, "<u>DTC Index</u>".

How to Erase Self-diagnostic Results

By performing this procedure, ECM memory is erased and the following diagnostic information is erased as well.

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

#### NOTE:

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

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

# **CONSULT** Function

INFOID:000000012891209

### FUNCTION

Diagnostic test mode	Function
Self Diagnostic Result	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data Monitor	Input/Output data in the ECM can be read.
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the in- dications on the CONSULT unit.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
ECU Identification	ECM part number can be read.
DTC Work Support	The status of system monitoring tests and the self-diagnosis status/results can be confirmed.

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

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

SELF DIAGNOSTIC RESULT MODE

Self Diagnostic Item Regarding items of DTC and 1st trip DTC, refer to EC-105, "DTC Index".

How to Read DTC and 1st Trip DTC

#### < SYSTEM DESCRIPTION >

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

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

#### NOTE:

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

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description					
DIAG TROUBLE CODE [PXXXX]	The engine control component part/control system has a trouble code that is displayed as PXXXX. (Refer to EC-105. "DTC Index".)					
FUEL SYS-B1	"Fuel injection system status" at the moment a malfunction is detected is displayed.					
FUEL SYS-B2	<ul> <li>One of the following mode is displayed.</li> <li>Mode2: Open loop due to detected system malfunction</li> <li>Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment)</li> <li>Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control</li> <li>Mode5: Open loop - has not yet satisfied condition to go to closed loop</li> </ul>					
COMBUST CONDITION	These items are displayed but are not applicable to this model.					
CAL/LD VALUE [%]	The calculated load value at the moment a malfunction is detected is displayed.					
COOLANT TEMP [°C] or [°F]	The engine coolant temperature at the moment a malfunction is detected is displayed.					
L-FUEL TRM-B1 [%]	"Long-term fuel trim" at the moment a malfunction is detected is displayed.					
L-FUEL TRM-B2 [%]	<ul> <li>The long-term fuel trim indicates much more gradual feedback compensation to the base fuel sched- ule than short-term fuel trim.</li> </ul>					
S-FUEL TRM-B1 [%]	"Short-term fuel trim" at the moment a malfunction is detected is displayed.					
S-FUEL TRM-B2 [%]	The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.					
ENGINE SPEED [rpm]	The engine speed at the moment a malfunction is detected is displayed.					
VEHICL SPEED [km/h] or [mph]	The vehicle speed at the moment a malfunction is detected is displayed.					
INT MANI PRES [kPa]	These items are displayed but are not applicable to this model.					
ABSOL TH·P/S [%]	The throttle valve opening angle at the moment a malfunction is detected is displayed.					
B/FUEL SCHDL [msec]	The base fuel schedule at the moment a malfunction is detected is displayed.					
INT/A TEMP SE [°C] or [°F] The intake air temperature at the moment a malfunction is detected is displayed.						

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

#### DATA MONITOR MODE

#### NOTE:

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

Monitored Item

For reference values of the following items, refer to EC-84, "Reference Value".

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[VQ35DE]

#### < SYSTEM DESCRIPTION >

[VQ35DE]

×: Applicable

			or Item ection		
Monitored item	Unit	ECU IN- PUT SIG- NALS	MAIN- SIG- NALS	Description	Remarks
ENG SPEED	rpm	×	×	Indicates the engine speed comput- ed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	<ul> <li>Accuracy becomes poor if engine speed drops below the idle rpm.</li> <li>If the signal is interrupted while the en- gine is running, an abnormal value may be indicated.</li> </ul>
B/FUEL SCHDL	ms	×	×	"Base fuel schedule" indicates the fuel injection pulse width pro- grammed into ECM, prior to any learned on board correction.	<ul> <li>When engine is running, specification range is indicated in "SPEC".</li> </ul>
A/F ALPHA-B1	%		×		• When the engine is stopped, a certain
A/F ALPHA-B2	%		×	The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	<ul> <li>value is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> <li>When engine is running, specification range is indicated in "SPEC".</li> </ul>
COOLANT TEMP/S	°C or °F	×	×	The engine coolant temperature (de- termined by the signal voltage of the engine coolant temperature sensor) is displayed.	When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine cool- ant temperature determined by the ECM is displayed.
A/F SEN1 (B1)	V	×	×	The A/F signal computed from the input signal of the air fuel ratio (A/F) sensor 1 is displayed.	
HO2S2 (B1)	V	×	×	The signal voltage of the heated ox-	
HO2S2 (B2)	V	×	×	ygen sensor 2 is displayed.	
HO2S2 MNTR(B1)	RICH/ LEAN		×	Display of heated oxygen sensor 2 signal:	
HO2S2 MNTR(B2)	RICH/ LEAN		×	<ul> <li>RICH: means the amount of oxy- gen after three way catalyst is rel- atively small.</li> <li>LEAN: means the amount of oxy- gen after three way catalyst is rel- atively large.</li> </ul>	When the engine is stopped, a certain value is indicated.
VHCL SPEED SE	km/h or mph	×	×	The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
BATTERY VOLT	V	×	×	The power supply voltage of ECM is displayed.	
ACCEL SEN 1	V	×	×	The accelerator pedal position sen-	ACCEL SEN 2 signal is converted by
ACCEL SEN 2	V	×		sor signal voltage is displayed.	ECM internally. Thus, it differs from ECM terminal voltage signal.
TP SEN 1-B1	V	×	×	The throttle position sensor signal	TP SEN 2-B1 signal is converted by ECM
TP SEN 2-B1	V	×	×	voltage is displayed.	internally. Thus, it differs from ECM ter- minal voltage signal.
FUEL T/TMP SE	°C or °F	×		The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.	
EVAP SYS PRES	V	×		The signal voltage of EVAP control system pressure sensor is displayed.	

#### < SYSTEM DESCRIPTION >

#### [VQ35DE]

			or Item ection		
Monitored item	Unit	ECU IN- PUT SIG- NALS	MAIN- SIG- NALS	Description	Remarks
FUEL LEVEL SE	V	×		The signal voltage of the fuel level sensor is displayed.	
START SIGNAL	On/Off	×	×	Indicates start signal status [On/Off] computed by the ECM according to the signals of engine speed and battery voltage.	After starting the engine, [Off] is dis- played regardless of the starter signal.
CLSD THL POS	On/Off	×	×	Indicates idle position [On/Off] com- puted by ECM according to the ac- celerator pedal position sensor signal.	
AIR COND SIG	On/Off	×	×	Indicates [On/Off] condition of the air conditioner switch as determined by the air conditioner signal.	
PW/ST SIGNAL	On/Off	×	×	[On/Off] condition of the power steering system (determined by the signal voltage of the power steering pressure sensor) is indicated.	
LOAD SIGNAL	On/Off	×	×	<ul> <li>Indicates [On/Off] condition from the electrical load signal.</li> <li>On: Rear window defogger switch is ON and/or lighting switch is in 2nd position.</li> <li>Off: Both rear window defogger switch and lighting switch are OFF.</li> </ul>	
IGNITION SW	On/Off	×	×	Indicates [On/Off] condition from ig- nition switch signal.	
HEATER FAN SW	On/Off	×		Indicates [On/Off] condition from the heater fan switch signal.	
BRAKE SW	On/Off	×		Indicates [On/Off] condition from the stop lamp switch signal.	
INJ PULSE-B1	msec		×	Indicates the actual fuel injection	When the engine is stopped, a certain
INJ PULSE-B2	msec			pulse width compensated by ECM according to the input signals.	computed value is indicated.
IGN TIMING	BTDC		×	Indicates the ignition timing comput- ed by ECM according to the input signals.	When the engine is stopped, a certain value is indicated.
CAL/LD VALUE	%			"Calculated load value" indicates the value of the current air flow divided by peak air flow.	
MASS AIRFLOW	g/s			Indicates the mass air flow comput- ed by ECM according to the signal voltage of the mass air flow sensor.	
PURG VOL C/V	%			<ul> <li>Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input sig- nals.</li> <li>The opening becomes larger as the value increases.</li> </ul>	
INT/V TIM (B1)	°CA	×		Indicates [°CA] of intake camshaft	
INT/V TIM (B2)	°CA	×	×	advance angle.	

Revision: December 2015

2016 Murano NAM

#### < SYSTEM DESCRIPTION >

			or Item ection		
Monitored item	Unit	ECU IN- PUT SIG- NALS	MAIN- SIG- NALS	Description	Remarks
INT/V SOL(B1)	%		×	<ul> <li>The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated.</li> </ul>	
INT/V SOL(B2)	%		×	<ul> <li>The advance angle becomes larger as the value increases.</li> </ul>	
VIAS S/V-1	On/Off		×	<ul> <li>The control condition of the VIAS control solenoid valve 1 (determined by ECM according to the input signals) is indicated.</li> <li>On: VIAS control solenoid valve 1 is operating.</li> <li>Off: VIAS control solenoid valve 1 is not operating.</li> </ul>	
AIR COND RLY	On/Off		×	The air conditioner relay control con- dition (determined by ECM accord- ing to the input signals) is indicated.	
ENGINE MOUNT	IDLE/ TRVL			<ul> <li>The control condition of the electronic controlled engine mount (determined by ECM according to the input signals) is indicated.</li> <li>IDLE: Engine speed is below 950 rpm</li> <li>TRVL: Engine speed is above 950 rpm</li> </ul>	
FUEL PUMP RLY	On/Off		×	Indicates the fuel pump relay control condition determined by ECM ac- cording to the input signals.	
FPCM	Hi/Mid/ Low/Off			The control condition of the fuel pump control module (FPCM) (de- termined by ECM according to the input signals) is indicated.	
VENT CONT/V	On/Off			The control condition of the EVAP canister vent control valve (deter- mined by ECM according to the in- put signals) is indicated. • On: Closed • Off: Open	
THRTL RELAY	On/Off		×	Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
A/F S1 HTR(B2)	%		×	<ul> <li>Air fuel ratio (A/F) sensor 1 heater control value computed by ECM according to the input signals.</li> <li>The current flow to the heater becomes larger as the value increases.</li> </ul>	
HO2S2 HTR (B1)	On/Off			Indicates [On/Off] condition of heat- ed oxygen sensor 2 heater deter-	
HO2S2 HTR (B2)	On/Off			mined by ECM according to the input signals.	

#### < SYSTEM DESCRIPTION >

			or Item ection			A
Monitored item	Unit	ECU IN- PUT SIG- NALS	MAIN- SIG- NALS	Description	Remarks	EC
I/P PULLY SPD	rpm	×		Indicates the engine speed comput- ed from the input speed sensor sig- nal.		С
VEHICLE SPEED	km/h or mph	×		The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.		D
IDL A/V LEARN	Yet/CM- PLT			<ul> <li>Displays the condition of idle air volume learning</li> <li>Yet: Idle Air Volume Learning has not been performed yet.</li> <li>CMPLT: Idle Air Volume Learning has already been performed successfully.</li> </ul>		E
TRVL AFTER MIL	km or mile			Distance traveled while MIL is activated.		G
ENG OIL TEMP	°C or °F	×		The engine oil temperature (deter- mined by the signal voltage of the engine oil temperature sensor) is displayed.		Н
A/F S1 HTR(B1)	%		×	<ul> <li>Air fuel ratio (A/F) sensor 1 heater control value computed by ECM according to the input signals.</li> <li>The current flow to the heater be- comes larger as the value increas- es.</li> </ul>		I .I
VHCL SPEED SE	km/h or mph			The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.		0
SET VHCL SPD	km/h or mph	×		<ul> <li>The preset vehicle speed is dis- played.</li> </ul>		K
MAIN SW	On/Off	×		Indicates [On/Off] condition from MAIN switch signal.		L
CANCEL SW	On/Off	×		Indicates [On/Off] condition from CANCEL switch signal.		
RESUME/ACC SW	On/Off	×		Indicates [On/Off] condition from RESUME/ACCELERATE switch sig- nal.		M
SET SW	On/Off	×		Indicates [On/Off] condition from SET/COAST switch signal.		Ν
BRAKE SW1	On/Off	×		Indicates [On/Off] condition from Brake pedal position switch signal or ASCD clutch switch.		0
BRAKE SW2	On/Off	×		Indicates [On/Off] condition of stop lamp switch signal.		Р
VHCL SPD CUT	Non/CUT			<ul> <li>Indicates the vehicle cruise condition.</li> <li>NON: Vehicle speed is maintained at the ASCD set speed.</li> <li>CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.</li> </ul>		

#### < SYSTEM DESCRIPTION >

			or Item ection		
Monitored item	Unit	ECU IN- PUT SIG- NALS	MAIN- SIG- NALS	Description	Remarks
LO SPEED CUT	Non/CUT			<ul> <li>Indicates the vehicle cruise condition.</li> <li>NON: Vehicle speed is maintained at the ASCD set speed.</li> <li>CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off.</li> </ul>	
AT OD MONITOR	On/Off			<ul> <li>Indicates [On/Off] condition of CVT O/D according to the input signal from the TCM.</li> </ul>	
AT OD CANCEL	On/Off			<ul> <li>Indicates [On/Off] condition of CVT O/D cancel request signal.</li> </ul>	
CRUISE LAMP	On/Off			Indicates [On/Off] condition of CRUISE lamp determined by the ECM according to the input signals.	
SET LAMP	On/Off			<ul> <li>Indicates [On/Off] condition of SET lamp determined by the ECM according to the input signals.</li> </ul>	
VIAS S/V-2	On/Off			<ul> <li>The control condition of the VIAS control solenoid valve 2 (determined by ECM according to the input signals) is indicated.</li> <li>On: VIAS control solenoid valve 2 is operating.</li> <li>Off: VIAS control solenoid valve 2 is not operating.</li> </ul>	
COOLING FAN	HI/MID/ LOW/ OFF			<ul> <li>The control condition of the cooling fan (determined by ECM according to the input signals) is indicated.</li> <li>HI: High speed operation</li> <li>MID: Middle speed operation</li> <li>LOW: Low speed operation</li> <li>OFF: Stop</li> </ul>	
A/GRLL SHTTR CAL- IBRATION	INCMP/ CMPLT			<ul> <li>Indicates initial position learning status of active grille shutter.</li> <li>CMPLT: The leaning is complete.</li> <li>INCOMP: The learning is incomplete.</li> </ul>	
A/GRLL SHTTR CIR- CUIT DIAG	OK/NG			<ul> <li>Indicates the diagnosis result of active grille shutter circuit.</li> <li>OK: Normal.</li> <li>NG: Malfunction detected.</li> </ul>	
A/GRLL SHTTR TEMP DIAG	OK/NG			<ul> <li>Indicates the diagnosis result of active grille shutter actuator tem- perature status.</li> <li>OK: Normal</li> <li>NG: Abnormal temperature de- tected.</li> </ul>	
A/GRLL SHTTR VOLT DIAG <sup>*</sup>	OK/NG			<ul> <li>Indicates the diagnosis result of active grille shutter voltage status.</li> <li>OK: Normal</li> <li>NG: Abnormal voltage detected.</li> </ul>	

#### < SYSTEM DESCRIPTION >

			or Item ection			А
Monitored item	Unit	ECU IN- PUT SIG- NALS	MAIN- SIG- NALS	Description	Remarks	EC
A/GRLL SHTTR OVER RUN	OK/NG			<ul> <li>Indicates active grille shutter moves beyond normal moving lim- it.</li> <li>OK: Normal</li> <li>NG: Malfunction detected.</li> </ul>		C
A/GRLL SHTTR STUCK	OK/NG			<ul> <li>Indicates the diagnosis result of active grille shutter stuck or the operation range less than normal.</li> <li>OK: Normal</li> <li>NG: Malfunction detected.</li> </ul>		E
A/GRLL SHTTR CAL- IB DIAG	OK/NG			<ul> <li>Indicates the diagnosis result of initial position learning of active grille shutter.</li> <li>OK: Normal</li> <li>NG: Deficiency detected.</li> </ul>		F
A/F ADJ-B1				Indicates the correction of a factor		G
A/F ADJ-B2	_			stored in ECM. The factor is calcu- lated from the difference between the target air-fuel ratio stored in ECM and the air-fuel ratio calculated from A/F sensor 1 signal.		Η
P/N POSI SW	On/Off	×	×	Indicates [On/Off] condition from the park/neutral position (PNP) signal.		
INT/A TEMP SE	°C or °F	×	×	The intake air temperature (deter- mined by the signal voltage of the in- take air temperature sensor) is indicated.		J
AC PRESS SEN	V	×		The signal voltage from the refriger- ant pressure sensor is displayed.		K
A/F SEN1 (B2)	V	×	×	The A/F signal computed from the input signal of the air fuel ratio (A/F) sensor 1 is displayed.		L
EVAP LEAK DIAG	Yet/CM- PLT			<ul> <li>Indicates the condition of EVAP leak diagnosis.</li> <li>YET: EVAP leak diagnosis has not been performed yet.</li> <li>CMPLT: EVAP leak diagnosis has been performed successfully.</li> </ul>		M
EVAP DIAG READY	On/Off			<ul> <li>Indicates the ready condition of EVAP leak diagnosis.</li> <li>On: Diagnosis has been ready condition.</li> <li>Off: Diagnosis has not been ready condition.</li> </ul>		N
BAT TEMP SEN	V	×		The signal voltage from the battery temperature sensor is displayed.		Р
THRTL STK CNT B1*						

#### < SYSTEM DESCRIPTION >

			or Item ection		
Monitored item	Unit	ECU IN- PUT SIG- NALS	MAIN- SIG- NALS	Description	Remarks
A/GRLL SHTTR PO- SITION	F/CLOSE MOVING F/OPEN UNIDTF			<ul> <li>Indicates the status of active grille shutter.</li> <li>F/CLOSE: Active grille shutter is fully closed.</li> <li>MOVING: Active grille shutter is in motion.</li> <li>F/OPEN: Active grille shutter is fully opened.</li> <li>UNIDTF: Unable to specify the shutter position.</li> </ul>	
HO2 S2 DIAG1(B2)	INCMP/ CMPLT			<ul> <li>Indicates DTC P0139 self-diagnosis (delayed response) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG1(B2)	INCMP/ CMPLT			<ul> <li>Indicates DTC P015C or P015D self-diagnosis condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG1(B1)	INCMP/ CMPLT			<ul> <li>Indicates DTC P015A or P015B self- diagnosis condition.</li> <li>INCMP: Self-diagnosis is incom- plete.</li> <li>CMPLT: Self-diagnosis is com- plete.</li> </ul>	
A/F SEN1 DIAG2(B2)	INCMP/ CMPLT			<ul> <li>Indicates DTC P014E or P014F self- diagnosis condition.</li> <li>INCMP: Self-diagnosis is incom- plete.</li> <li>CMPLT: Self-diagnosis is com- plete.</li> </ul>	
A/F SEN1 DIAG2(B1)	INCMP/ CMPLT			<ul> <li>Indicates DTC P014C or P014Dself- diagnosis condition.</li> <li>INCMP: Self-diagnosis is incom- plete.</li> <li>CMPLT: Self-diagnosis is com- plete.</li> </ul>	
A/F SEN1 DIAG3(B2)	ABSNT/ PRSNT			<ul> <li>Indicates DTC P014E, P014F, P015C or P015D self-diagnosis con- dition.</li> <li>ABSNT: The vehicle condition is not within the diagnosis range.</li> <li>PRSNT: The vehicle condition is within the diagnosis range.</li> </ul>	
A/F SEN1 DIAG3(B1)	ABSNT/ PRSNT			<ul> <li>Indicates DTC P014C, P014D, P015A or P015B self-diagnosis con- dition.</li> <li>ABSNT: The vehicle condition is not within the diagnosis range.</li> <li>PRSNT: The vehicle condition is within the diagnosis range.</li> </ul>	

#### < SYSTEM DESCRIPTION >

			or Item ection			А
Monitored item	Unit	ECU IN- PUT SIG- NALS	MAIN- SIG- NALS	Description	Remarks	EC
HO2 S2 DIAG2(B2)	INCMP/ CMPLT			<ul> <li>Indicates DTC P0139 self-diagnosis (slow response) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>		C
HO2 S2 DIAG2(B1)	INCMP/ CMPLT			<ul> <li>Indicates DTC P0139 self-diagnosis (slow response) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>		E
EOP SENSOR	mV	×		The signal voltage of EOP sensor is displayed.		
HO2 S2 DIAG1(B1)	INCMP/ CMPLT			<ul> <li>Indicates DTC P0139 self-diagnosis (delayed response) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>		G
MASS AIR FLOW SENSOR (Hz)	Hz	×		The signal frequency of the mass air flow sensor is displayed.		I
EXH/V TIM B1	°CA	×	×	Indicates [°CA] of exhaust camshaft		
EXH/V TIM B2	°CA	×	×	advance angle.		
VTC DTY EX B1	%			—		J
VTC DTY EX B2	%					
A/F-S ATMSPHRC CRCT B1				Displays a determined value of at- mospheric correction factor neces- sary for correcting an A/F sensor signal input to ECM. The signal used for the correction is an A/F sensor signal transmitted while driving un- der atmospheric pressure.		K
A/F-S ATMSPHRC CRCT B2	_			Displays a determined value of at- mospheric correction factor neces- sary for correcting an A/F sensor signal input to ECM. The signal used for the correction is an A/F sensor signal transmitted while driving un- der atmospheric pressure.		M
A/F-S ATMSPHRC CRCT UP B1	count			Displays the number of updates of the A/F sensor atmospheric correction factor.		0
A/F-S ATMSPHRC CRCT UP B2	count			Displays the number of updates of the A/F sensor atmospheric correc- tion factor.		Ρ
SYSTEM 1 DIAGNO- SIS A B2	INCMP/ CMPLT			<ul> <li>Indicates DTC P219B self-diagno- sis condition.</li> <li>INCMP: Self-diagnosis is incom- plete.</li> <li>CMPLT: Self-diagnosis is com- plete.</li> </ul>		

#### < SYSTEM DESCRIPTION >

		-		or Item ection			
Monitored item	Unit	ECU IN- PUT SIG- NALS	MAIN- SIG- NALS	Description	Remarks		
SYSTEM 1 DIAGNO- SIS A B1	INCMP/ CMPLT			<ul> <li>Indicates DTC P219A self-diagno- sis condition.</li> <li>INCMP: Self-diagnosis is incom- plete.</li> <li>CMPLT: Self-diagnosis is com- plete.</li> </ul>			
SYSTEM 1 DIAGNO- SIS B B2	ABSNT/ PRSNT			<ul> <li>Indicates DTC P219B self-diagno- sis condition.</li> <li>ABSNT: Self-diagnosis standby</li> <li>PRSNT: Under self-diagnosis</li> </ul>			
SYSTEM 1 DIAGNO- SIS B B1	ABSNT/ PRSNT			<ul> <li>Indicates DTC P219A self-diagno- sis condition.</li> <li>ABSNT: Self-diagnosis standby</li> <li>PRSNT: Under self-diagnosis</li> </ul>			

\*: The item is indicated, but not used

#### NOTE:

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

#### WORK SUPPORT MODE

Work Item

WORK ITEM	CONDITION	USAGE
IDLE AIR VOL LEARN	The idle air volume that keeps the engine within the specified range is memorized in ECM.	When learning the idle air volume
EVAP SYSTEM CLOSE	<ul> <li>Close the EVAP canister vent control valve in order to make EVAP system close under the following conditions.</li> <li>Ignition switch ON</li> <li>Engine not running</li> <li>Ambient temperature is above 0°C (32°F).</li> <li>No vacuum and no high pressure in EVAP system</li> <li>Fuel tank temperature is more than 0°C (32°F).</li> <li>Within 10 minutes after starting "EVAP SYSTEM CLOSE"</li> <li>When trying to execute "EVAP SYSTEM CLOSE" under the condition except above, CONSULT will discontinue it and display appropriate instruction.</li> <li>NOTE:</li> <li>When starting engine, CONSULT may display "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", even in using charged battery.</li> </ul>	When detecting EVAP vapor leakage in the EVAP system
FUEL PRESSURE RE- LEASE	Fuel pump will stop by touching "START" during idling. crank a few times after engine stalls.	When releasing fuel pressure from fuel line
SELF-LEARNING CONT	The coefficient of self-learning control mixture ratio re- turns to the original coefficient.	When clearing mixture ratio self-learning value
TARGET IGN TIM ADJ*	Idle condition	When adjusting target ignition timing
TARGET IDLE RPM ADJ*	Idle condition	When setting target idle speed
VIN REGISTRATION	In this mode, VIN is registered in ECM	When registering VIN in ECM
CLSD THL POS LEARN	Ignition on and engine stopped.	When learning the throttle valve closed position

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#### [VQ35DE]

WORK ITEM	CONDITION	USAGE	٨
SAVING DATA FOR RE- PLC CPU	In this mode, save data that is in ECM.	When ECM is replaced.	A
WRITING DATA FOR RE- PLC CPU	In this mode, write data stored by "SAVE DATA FOR CPU REPLC" in work support mode to ECM.	When ECM is replaced.	EC

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

#### ACTIVE TEST MODE

#### Test Item

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
FUEL INJEC- TION	<ul> <li>Engine: Return to the original non-standard condition</li> <li>Change the amount of fuel injec- tion using CONSULT.</li> </ul>	If malfunctioning symptom disap- pears, see CHECK ITEM.	<ul> <li>Harness and connectors</li> <li>Fuel injector</li> <li>Air fuel ratio (A/F) sensor 1</li> </ul>
ENG COOLANT TEMP	<ul> <li>Engine: Return to the original non-standard condition</li> <li>Change the engine coolant tem- perature using CONSULT.</li> </ul>	If malfunctioning symptom disappears, see CHECK ITEM.	<ul> <li>Harness and connectors</li> <li>Engine coolant temperature sensor</li> <li>Fuel injector</li> </ul>
PURG VOL CONT/V	<ul> <li>Engine: After warming up, run engine at 1,500 rpm.</li> <li>Change the EVAP canister purge volume control solenoid valve opening percent using CON-SULT.</li> </ul>	Engine speed changes according to the opening percent.	<ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>
FUEL/T TEMP SEN	Change the fuel tank temperature	using CONSULT.	
INT V/T ASSIGN ANGLE	<ul> <li>Engine: Return to the original non-standard condition</li> <li>Change intake valve timing using CONSULT.</li> </ul>	If malfunctioning symptom disap- pears, see CHECK ITEM.	<ul> <li>Harness and connectors</li> <li>Intake valve timing control solenoid valve</li> </ul>
EXH V/T ASSIGN ANGLE	<ul> <li>Engine: Return to the original non-standard condition</li> <li>Change exhaust valve timing us- ing CONSULT.</li> </ul>	If malfunctioning symptom disap- pears, see CHECK ITEM.	<ul> <li>Harness and connectors</li> <li>Exhaust valve timing control sole- noid valve</li> </ul>
COOLING FAN*	<ul> <li>Ignition switch: ON</li> <li>Turn the cooling fan "HI", "MID", "LOW" and "OFF" using CON- SULT.</li> </ul>	Cooling fan moves and stops.	<ul> <li>Harness and connectors</li> <li>Cooling fan motor</li> <li>IPDM E/R</li> </ul>
FPCM	<ul> <li>Engine: Return to the original trouble condition</li> <li>Select "LOW", "MID" and "HI" with CONSULT.</li> </ul>	Fuel pump speed changes or stops.	<ul><li>Harness and connectors</li><li>Fuel pump control module (FPCM)</li></ul>
VIAS S/V-1	<ul> <li>Ignition switch: ON</li> <li>Turn solenoid valve "ON" and "OFF" using CONSULT and listen to operating sound.</li> </ul>	Solenoid valve makes the operating sound.	<ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>
ENGINE MOUNTING	<ul> <li>Ignition switch: ON</li> <li>Turn electronic controlled engine mount "IDLE" and "TRVL" with CONSULT.</li> </ul>	Electronic controlled engine mount makes the operating sound.	<ul><li>Harness and connectors</li><li>Electronic controlled engine mount</li></ul>
VIAS S/V-2	<ul> <li>Ignition switch: ON</li> <li>Turn solenoid valve "ON" and "OFF" using CONSULT and listen to operating sound.</li> </ul>	Solenoid valve makes the operating sound.	<ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>

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#### [VQ35DE]

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
ACTIVE GRILLE SHUTTER	<ul> <li>NOTE: Initial position learning is required every time when the ignition switch is turned OFF.</li> <li>1. Engine: Idle speed</li> <li>2. Touch "CALIBRTN" to perform initial position learning.</li> <li>3. Touch "OPEN" or "CLOSE" to operate active grille shutter.</li> </ul>	Active grille shutter fully opens or fully closes.	<ul> <li>Harness or connector</li> <li>Active grille shutter actuator</li> <li>Active grille shutter</li> </ul>
Ignition Tim- Ing	<ul> <li>Engine: Return to the original non-standard condition</li> <li>Timing light: Set</li> <li>Retard the ignition timing using CONSULT.</li> </ul>	If malfunctioning symptom disappears, see CHECK ITEM.	Perform Idle Air Volume Learning.
POWER BAL- ANCE	<ul> <li>Engine: After warming up, idle the engine.</li> <li>A/C switch OFF</li> <li>Selector lever: P or N position</li> <li>Cut off each injector signal one at a time using CONSULT.</li> </ul>	Engine runs rough or stops.	<ul> <li>Harness and connectors</li> <li>Compression</li> <li>Fuel injector</li> <li>Power transistor</li> <li>Spark plug</li> <li>Ignition coil</li> </ul>
VENT CON- TROL/V	<ul> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn solenoid valve "ON" and "OFF" with the CONSULT and listen to operating sound.</li> </ul>	Solenoid valve makes an operating sound.	<ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>

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

## DTC WORK SUPPORT MODE

Test item

Test mode	Test item	Corresponding DTC No.	Reference page
	A/F SEN1(B1) P1276	P0130	<u>EC-252</u>
	A/F SEN1(B2) P1286	P0150	<u>EC-252</u>
A/F SEN1	A/F SENSOR1(B1) P014C, P014D	P014C, P014D	<u>EC-285</u>
A/F SENT	A/F SENSOR1(B2) P014E, P014F	P014E, P014F	<u>EC-285</u>
	A/F SENSOR1(B1) P015A, P015B	P015A, P015B	<u>EC-285</u>
	A/F SENSOR1(B2) P015C, P015D	P015C, P015D	<u>EC-285</u>
EVAPORATIVE SYSTEM	PURG FLOW P0441	P0441	<u>EC-344</u>
EVAPORATIVE STSTEIN	PURG VOL CN/V P1444	P0443	<u>EC-350</u>
	HO2S2(B1) P1146	P0138	<u>EC-268</u>
	HO2S2(B1) P1147	P0137	<u>EC-262</u>
40282	HO2S2(B1) P0139	P0139	<u>EC-276</u>
HO2S2	HO2S2(B2) P1166	P0158	<u>EC-268</u>
	HO2S2(B2) P1167	P0157	<u>EC-262</u>
	HO2S2(B2) P0159	P0159	<u>EC-276</u>

#### SRT & P-DTC MODE

#### SRT STATUS Mode

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

#### PERMANENT DTC STATUS Mode

How to display permanent DTC status

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

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[VQ35DE]

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

2.

Select "PERMANENT DTC STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT. 5. NOTE:

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

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

CAUTION: Turn ignition switch from C status screen.	N to OFF twice to update the information	ation on the	
PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D	<u> </u>
XXXX	INCMP	INCMP	
xxxx	CMPLT	INCMP	
xxxx	INCMP	CMPLT	
xxxx	CMPLT	INCMP	
XXXX	INCMP	INCMP	
XXXX	INCMP	INCMP	

NOTE:

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

SRT WORK SUPPORT Mode

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

PERMANENT DTC WORK SUPPORT Mode

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

#### NOTE:

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

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# ECU DIAGNOSIS INFORMATION

**Reference Value** 

INFOID:000000012891210

[VQ35DE]

#### VALUES ON THE DIAGNOSIS TOOL

#### NOTE:

- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.
- Numerical values in the following table are reference values.
- These values are input/output values that ECM receives/transmits and may differ from actual operations. Example:

The ignition timing shown by the timing light may differ from the ignition timing displayed on the data monitor. This occurs because the timing light shows a value calculated by ECM according to signals received from the cam shaft position sensor and other sensors related to ignition timing.

For outlines of following items, refer to EC-70. "CONSULT Function".

Monitor Item	C	Condition	Values/Status		
ENG SPEED	Run engine and compare CONSUL	Almost the same speed as the tachometer indication.			
MAS AIR FLOW SENSOR (Hz)	See EC-176, "Description".				
B/FUEL SCHDL	See EC-176, "Description".				
A/F ALPHA-B1	See EC-176, "Description".				
A/F ALPHA-B2	See EC-176, "Description".				
COOLANT TEMP/S	Engine: After warming up		More than 70°C (158°F)		
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V		
HO2S2 (B1)	<ul> <li>Revving engine from idle to 3,000 rp met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betwe idle for 1 minute under no load</li> </ul>	0 - 0.3 V ↔ Approx. 0.6 - 1.0 V			
HO2S2 (B2)	<ul> <li>Revving engine from idle to 3,000 rp met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betwe idle for 1 minute under no load</li> </ul>	0 - 0.3 V ←→ Approx. 0.6 - 1.0 V			
HO2S2 MNTR(B1)	<ul> <li>Revving engine from idle to 3,000 rp met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betwe idle for 1 minute under no load</li> </ul>	$LEAN \longleftrightarrow RICH$			
HO2S2 MNTR(B2)	<ul> <li>Revving engine from idle to 3,000 rp met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betwe idle for 1 minute under no load</li> </ul>	$LEAN \longleftrightarrow RICH$			
VHCL SPEED SE	Turn drive wheels and compare CO tion.	Almost the same speed as speedometer indication			
BATTERY VOLT	Ignition switch: ON (Engine stopped	11 - 14 V			
	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0 V		
ACCEL SEN 1	(Engine stopped)	Accelerator pedal: Fully depressed	4.2 - 4.8 V		
	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0 V		
ACCEL SEN 2*1	(Engine stopped)	Accelerator pedal: Fully depressed	4.2 - 4.8 V		

#### < ECU DIAGNOSIS INFORMATION >

#### [VQ35DE]

Monitor Item	(	Condition	Values/Status	•
	Ignition switch: ON	Accelerator pedal: Fully released	More than 0.36 V	A
TP SEN 1-B1	<ul><li>(Engine stopped)</li><li>Selector lever: D position</li></ul>	Accelerator pedal: Fully depressed	Less than 4.75 V	-
	Ignition switch: ON	Accelerator pedal: Fully released	More than 0.36 V	EC
TP SEN 2-B1* <sup>1</sup>	<ul><li>(Engine stopped)</li><li>Selector lever: D position</li></ul>	Accelerator pedal: Fully depressed	Less than 4.75 V	-
FUEL T/TMP SE	Ignition switch: ON		Indicates fuel tank tempera- ture	С
EVAP SYS PRES	Ignition switch: ON		Approx. 1.8 - 4.8 V	-
FUEL LEVEL SE	Ignition switch: ON		Depending on fuel level of fuel tank	D
START SIGNAL	Ignition switch: $ON \rightarrow START \rightarrow ON$	١	$Off\toOn\toOff$	-
CLSD THL POS	Ignition switch: ON	Accelerator pedal: Fully released	On	E
CLOD THE POS	(Engine stopped)	Accelerator pedal: Slightly depressed	Off	-
	Engine: After worming up idle the	Air conditioner switch: OFF	Off	F
AIR COND SIG	Engine: After warming up, idle the engine	Air conditioner switch: ON (Compressor operates.)	On	
PW/ST SIGNAL	Engine: After warming up, idle the	Steering wheel: Not being turned	Off	G
FW/ST SIGNAL	engine	Steering wheel: Being turned	On	
		Rear window defogger switch: ON	_	-
LOAD SIGNAL	Ignition quitch: ON	and/or Lighting switch: 2nd position	On	Н
LOAD SIGNAL	Ignition switch: ON	Rear window defogger switch and lighting switch: OFF	Off	-
IGNITION SW	Ignition switch: $ON \rightarrow OFF \rightarrow ON$		$On \rightarrow Off \rightarrow On$	_
	Engine: After warming up, idle the	Heater fan switch: ON	On	-
HEATER FAN SW	engine	Heater fan switch: OFF	Off	J
		Brake pedal: Fully released	Off	-
BRAKE SW	Ignition switch: ON	Brake pedal: Slightly depressed	On	- 
	Engine: After warming up	Idle	2.0 - 3.0 msec	- K
INJ PULSE-B1	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	1.9 - 2.9 msec	L
	Engine: After warming up	Idle	2.0 - 3.0 msec	-
INJ PULSE-B2	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	1.9 - 2.9 msec	M
	Engine: After warming up	Idle	7 - 17°BTDC	-
IGN TIMING	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	25 - 45°BTDC	N
	Engine: After warming up	Idle	5 - 35%	-
CAL/LD VALUE	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,500 rpm	5 - 35%	0
	Engine: After warming up	Idle	2.0 - 6.0 g/s	D
MASS AIRFLOW	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,500 rpm	7.0 - 20.0 g/s	_ P
PURG VOL C/V	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> </ul>	Idle (Accelerator pedal: Not depressed even slightly, after engine starting.)	0%	_
	No load	2,000 rpm	—	_

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#### < ECU DIAGNOSIS INFORMATION >

Monitor Item	(	Condition	Values/Status
INT/V TIM (B1)	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Selector lever: P or N position     Air conditioner switch: OFF     2,000 rpm	
	Engine: After warming up	Idle	–5 - 5°CA
INT/V TIM (B2)	<ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>	2,000 rpm	Approx. 0 - 30°CA
	Engine: After warming up	Idle	0 - 2%
INT/V SOL(B1)	<ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>	2,000 rpm	Approx. 0 - 50%
	Engine: After warming up	Idle	0 - 2%
INT/V SOL(B2)	<ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>	2,000 rpm	Approx. 0 - 50%
VIAS S/V-1	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	When revving engine up to 5,000 rpm quickly	$Off \to On \to Off$
	Engine: After warming up, idle the	Air conditioner switch: OFF	Off
AIR COND RLY	engine	Air conditioner switch: ON (Compressor operates)	On
		Below 950 rpm	IDLE
ENGINE MOUNT	Engine: After warming up	Above 950 rpm	TRVL
FUEL PUMP RLY	For 1 second after turning ignition     Engine running or cranking	switch: ON	On
	Except above		Off
	Ignition switch: OFF	Off	
	<ul><li>For 1 seconds after turning ignitio</li><li>Engine: Idle speed</li></ul>	Low	
FPCM	<ul> <li>Engine: Cranking</li> <li>Engine coolant temperature: More than 10°C (50°)</li> <li>Engine: Above 4000 rpm</li> </ul>		Mid
	Engine: Cranking		Hi
VENT CONT/V	Ignition switch: ON		Off
THRTL RELAY	Ignition switch: ON		On
A/F S1 HTR(B2)	Engine: After warming up, idle the e (More than 140 seconds after starting)		4 - 100%
HO2S2 HTR (B1)	<ul> <li>Engine speed: Below 3,600 rpm after</li> <li>Engine: After warming up</li> <li>Keeping the engine speed betwee idle for 1 minute under no load</li> </ul>	er the following conditions are met. en 3,500 and 4,000 rpm for 1 minute and at	On
	Engine speed: Above 3,600 rpm		Off
HO2S2 HTR (B2)	<ul> <li>Engine speed: Below 3,600 rpm after</li> <li>Engine: After warming up</li> <li>Keeping the engine speed betwee idle for 1 minute under no load</li> </ul>	On	
	Engine speed: Above 3,600 rpm		Off
I/P PULLY SPD	Vehicle speed: More than 20 km/h (	12 MPH)	Almost the same speed as the tachometer indication
VEHICLE SPEED	Turn drive wheels and compare CO tion.	NSULT value with the speedometer indica-	Almost the same speed as the speedometer indication

#### < ECU DIAGNOSIS INFORMATION >

Monitor Item	С	Condition	Values/Status
IDL A/V LEARN	Engine: Pupping	Idle air volume learning has not been per- formed yet.	Yet
IDL A/V LEARN	Engine: Running	Idle air volume learning has already been performed successfully.	CMPLT
TRVL AFTER MIL	Ignition switch: ON	Vehicle has traveled after MIL has illumi- nated.	0 - 65,535 km (0 - 40,723 miles)
ENG OIL TEMP	Engine: After warming up		More than 70°C (158°F)
A/F S1 HTR(B1)	Engine: After warming up, idle the el (More than 140 seconds after startin		4 - 100%
VHCL SPEED SE	Turn drive wheels and compare COI tion.	NSULT value with the speedometer indica-	Almost the same speed as the speedometer indication
SET VHCL SPD	Engine: Running	ASCD: Operating	The preset vehicle speed is displayed
	Ignition quitch: ON	MAIN switch: Pressed	On
MAIN SW	Ignition switch: ON	MAIN switch: Released	Off
	Institute quitable ON	CANCEL switch: Pressed	On
CANCEL SW	Ignition switch: ON	CANCEL switch: Released	Off
		RESUME/ACCELERATE switch: Pressed	On
RESUME/ACC SW	Ignition switch: ON	RESUME/ACCELERATE switch: Re- leased	Off
	Ignition switch: ON	SET/COAST switch: Pressed	On
SET SW		SET/COAST switch: Released	Off
BRAKE SW1		Brake pedal: Fully released	On
(Brake pedal posi- tion switch)	Ignition switch: ON Brake pedal: Slightly depressed		Off
BRAKE SW2	Ignition switch: ON	Brake pedal: Fully released	Off
(Stop lamp switch)		Brake pedal: Slightly depressed	On
VHCL SPD CUT	Ignition switch: ON		Non
LO SPEED CUT	Ignition switch: ON		Non
AT OD MONITOR	Ignition switch: ON		Off
AT OD CANCEL	Ignition switch: ON		Off
CRUISE LAMP	Ignition switch: ON	MAIN switch: Pressed at the 1st time $\rightarrow$ at the 2nd time	$On \rightarrow Off$
	MAIN switch: ON	ASCD: Operating	On
SET LAMP	When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Not operating	Off
VIAS S/V-2	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	he: After warming up ctor lever: P or N position When revving engine up to 5,000 rpm ponditioner switch: OFF quickly	
		Engine coolant temperature: 97°C (206°F) or less	OFF
	Engine: After warming up, idle the angine	Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F)	LOW
COOLING FAN	<ul><li>engine</li><li>Air conditioner switch: OFF</li></ul>	Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F)	MID
		Engine coolant temperature: 105°C (221°F) or more	Н

#### < ECU DIAGNOSIS INFORMATION >

Monitor Item	(	Condition	Values/Status
A/GRLL SHTTR	<ul> <li>Turn ignition switch OFF→ ON</li> <li>Drive the vehicle at a speed more than 6 km/h (4 MPH) for the first time.</li> </ul>		CMPLT
CALIBRATION	<ul> <li>Turn ignition switch OFF → ON.</li> <li>When the vehicle speed does not</li> </ul>	reach 6 km/h (4 MPH).	INCMP
A/GRLL SHTTR	Malfunction of active grill shutter	power supply is detected.	NG
CIRCUIT DIAG	Malfunction of active grill shutter	power supply is not detected.	ОК
A/GRLL SHTTR	Abnormal temperature of active g	rill shutter actuator is detected.	NG
TEMP DIAG	Abnormal temperature of active g	rill shutter actuator is not detected.	ОК
A/GRLL SHTTR	Abnormal voltage of active grill sh	nutter circuit is detected.	NG
VOLT DIAG <sup>*3</sup>	Abnormal voltage of active grill sh	nutter circuit is not detected.	ОК
A/GRLL SHTTR	Active grill shutter does not stop	vithin normal moving limit.	NG
OVERRUN	Active grill shutter stops within no	rmal moving limit	ОК
A/GRLL SHTTR	Detecting the active grille shutter mal.	stuck or the operation range less than nor-	NG
STUCK	Not detecting the active grille shu normal.	tter stuck or the operation range less than	ОК
A/GRLL SHTTR	Malfunction of active grill shutter	nitial position learning is detected.	NG
CALIB DIAG	Malfunction of active grill shutter	nitial position learning is not detected.	OK
A/F ADJ-B1	Engine: Running		-0.330 - 0.330
A/F ADJ-B2	Engine: Running		-0.330 - 0.330
P/N POSI SW	Ignition quitch: ON	Selector lever: P or N position	On
F/IN F031 3W	Ignition switch: ON	Selector lever: Except above position	Off
INT/A TEMP SE	Ignition switch: ON		Indicates intake air tempera- ture
AC PRESS SEN	<ul><li>Engine: Idle</li><li>Both A/C switch and blower fan s</li></ul>	witch: ON (Compressor operates)	1.0 - 4.0 V
A/F SEN1 (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
EVAP LEAK DIAG	Ignition switch: ON		Indicates the condition of EVAP leak diagnosis.
EVAP DIAG READY	Ignition switch: ON		Indicates the ready condition of EVAP leak diagnosis.
BAT TEMP SEN	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	Approx. 0.68 V
THRTL STK CNT B1 <sup>*3</sup>	_		_
A/GRLL SHTTR PO-	<ul><li>Engine RPM: idle speed.</li><li>Vehicle speed: 0 km/h (0 MPH).</li></ul>		F/OPEN
SITION	Vehicle speed: 30 km/h (19 MPH (Comply the condition of active gi	F/OPEN →MOVING→F/ CLOSE	
	DTC P0159 self-diagnosis (delayed	response) has not been performed yet.	INCMP
HO2 S2 DIAG1(B2)	DTC P0159 self-diagnosis (delayed response) has already been performed successfully.		CMPLT
A/F SEN1 DIAG1	DTC P015C and P015D self-diagno	sis is incomplete.	INCMP
(B2)	DTC P015C and P015D self-diagno	sis is complete.	CMPLT
A/F SEN1 DIAG1	DTC P015A and P015B self-diagno	sis is incomplete.	INCMP
(B1)	DTC P015A and P015B self-diagno	sis is complete.	CMPLT

#### < ECU DIAGNOSIS INFORMATION >

#### [VQ35DE]

Monitor Item		Condition	Values/Status
A/F SEN1 DIAG2	DTC P014E and P014F self-diagno	osis is incomplete.	INCMP
(B2)	DTC P014E and P014F self-diagno	osis is complete.	CMPLT
A/F SEN1 DIAG2	DTC P014C and P014D self-diagno	osis is incomplete.	INCMP
(B1)	DTC P014C and P014D self-diagno	osis is complete.	CMPLT
A/F SEN1 DIAG3	The vehicle condition is not within t P015C or P015D.	he diagnosis range of DTC P014E, P014F,	ABSNT
(B2)	The vehicle condition is within the operation of P015C or P015D.	diagnosis range of DTC P014E, P014F,	PRSNT
A/F SEN1 DIAG3	The vehicle condition is not within t P015A or P015B.	he diagnosis range of DTC P014C, P014D,	ABSNT
(B1)	The vehicle condition is within the or P015A or P015B.	diagnosis range of DTC P014C, P014D,	PRSNT
	DTC P0159 self-diagnosis (slow re	sponse) has not been performed yet.	INCMP
HO2 S2 DIAG2(B2)	DTC P0159 self-diagnosis (slow re cessfully.	sponse) has already been performed suc-	CMPLT
	DTC P0139 self-diagnosis (slow re	sponse) has not been performed yet.	INCMP
HO2 S2 DIAG2(B1)	DTC P0139 self-diagnosis (slow re cessfully.	sponse) has already been performed suc-	CMPLT
	Engine: After warming up	Idle	Approx. 1,450 mV
EOP SENSOR	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	Approx. 2,850 mV
	DTC P0139 self-diagnosis (delayed	d response) has not been performed yet.	INCMP
HO2 S2 DIAG1(B1)	DTC P0139 self-diagnosis (delayed cessfully.	I response) has already been performed suc-	CMPLT
	Engine: After warming up	Idle	–5 - 5°CA
EXT/V TIM B1	<ul> <li>Selector lever: N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Around 2,500 rpm while the engine speed is rising	Approx. 0 - 30°CA
	Engine: After warming up     Idle	Idle	–5 - 5°CA
EXT/V TIM B2	<ul> <li>Selector lever: N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Around 2,500 rpm while the engine speed is rising	Approx. 0 - 30°CA
	Engine: After warming up	Idle	0 - 2%
VTC DTY EX B1	<ul> <li>Selector lever: N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Around 2,500 rpm while the engine speed is rising	Approx. 0 - 70%
	Engine: After warming up	Idle	0 - 2%
VTC DTY EX B2	<ul> <li>Selector lever: N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Around 2,500 rpm while the engine speed is rising	Approx. 0 - 70%
A/F-S ATMSPHRC CRCT B1	Engine: After warming up, idle the	engine	Varies depending on vehicle environment.
A/F-S ATMSPHRC CRCT B2	Engine: After warming up, idle the	engine	Varies depending on vehicle environment.
A/F-S ATMSPHRC CRCT UP B1	Engine: Running		Varies depending on the number of updates.
A/F-S ATMSPHRC CRCT UP B2	Engine: Running		Varies depending on the number of updates.
SYSTEM 1 DIAG-	DTC P219A self-diagnosis is incom	nplete.	INCMP
NOSIS A B1	DTC P219A self-diagnosis is comp	lete.	CMPLT
SYSTEM 1 DIAG-	DTC P219B self-diagnosis is incom	iplete.	INCMP
NOSIS A B2	DTC P219B self-diagnosis is comp	lete.	CMPLT

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#### < ECU DIAGNOSIS INFORMATION >

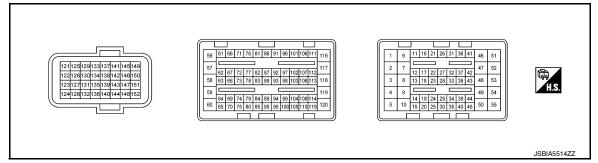
Monitor Item	Condition	Values/Status
SYSTEM 1 DIAG- NOSIS B B1	DTC P219A self-diagnosis is on standby.	ABSENT
	DTC P219A self-diagnosis is under diagnosis.	PRSENT
SYSTEM 1 DIAG- NOSIS B B2	DTC P219B self-diagnosis is on standby.	ABSENT
	DTC P219B self-diagnosis is under diagnosis.	PRSENT

\*1: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

\*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to <u>PG-103, "How to</u> <u>Handle Battery"</u>.

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

#### **TERMINAL LAYOUT**



#### PHYSICAL VALUES

#### NOTE:

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

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

Termina	al No.	Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
1 (G)	152 (B)	Throttle control motor (Close)	Output	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	0 - 14 V★ 500µSec/div 
2 (R)	152 (B)	Throttle control motor power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
3	152	Throttle control motor (Open)	0.tot	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>	0 - 14 V★ 500µSec/div 
(W)	(B)	Throttle control motor (Open)	Output	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	0 - 14 V★ 500µSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ 5V/div JMBIA0032GB
4 (GR)	_	Sensor ground [Knock sensor (bank 1), Knock sensor (bank 2)]	_	_	
5 (B)	4 (GR)	Knock sensor (bank 1)	Input	[Engine is running] Idle speed	2.5 V* <sup>1</sup>
6 (BR)	152 (B)	A/F sensor 1 heater (bank 1)	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed (More than 140 seconds after starting engine)</li> </ul>	2.9 - 8.8 V★ 50mSec/div 
7 (SB)	152 (B)	Heated oxygen sensor 2 heat- er (bank 1)	Output	<ul> <li>[Engine is running]</li> <li>Engine speed: Below 3,600 rpm after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	10 V★ 50mSec/div F F F F F F F F F F F F F F F F F F F
				<ul> <li>[Ignition switch: ON] Engine stopped</li> <li>[Engine is running] Engine speed: Above 3,600 rpm</li> </ul>	BATTERY VOLTAGE (11 - 14 V)
8 (G)	152 (B)	Throttle control motor relay	Output	[Ignition switch: $ON \rightarrow OFF$ ]	0 - 1.0 V → BATTERY VOLTAGE (11 - 14 V) → 0 V
(0)				[Ignition switch: ON]	0 - 1.0 V
9 (W)	4 (GR)	Knock sensor (bank 2)	Input	[Engine is running] Idle speed	2.5 V* <sup>1</sup>
10 (B)	_	ECM ground	_		_

#### < ECU DIAGNOSIS INFORMATION >

Termin	Terminal No. Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)
11 (Y) 12 (L) 16 (SB)	152	Fuel injector No. 5 Fuel injector No. 4 Fuel injector No. 2		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div € 10V/div JMBIA0048GB
17 (BR) 21 (V) 22 (W)	(B)	Fuel injector No. 1 Fuel injector No. 6 Fuel injector No. 3	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div 10V/div JMBIA0047GB
13 (G)	15 (B)	Engine oil temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine oil temperature.
14 (W)	18 (Y)	Engine oil pressure sensor	Input	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> </ul> [Engine is running] <ul> <li>Warm-up condition</li> <li>Engine speed is 2,000 rpm</li> </ul>	1.3 V★ 5mSec/div 2V/div JPBIA3359ZZ 2.7 V★ 5mSec/div 2V/div JPBIA3360ZZ
15 (B)		Sensor ground (Engine oil temperature sen- sor, engine oil pressure sen- sor)		_	
18 (Y)	15 (B) 25 (V)	Sensor power supply (Engine oil pressure sensor) Sensor power supply (Refrigerant pressure sensor)		[Ignition switch: ON]	5 V
19 (W)	152 (B)	Fuel pump relay	Output	<ul> <li>[Ignition switch: ON]</li> <li>For 1 second after turning ignition switch ON</li> <li>[Engine is running]</li> </ul>	0 - 1.0 V
20 (LG)	25 (V)	Refrigerant pressure sensor	Input	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Both A/C switch and blower fan motor switch: ON (Com- pressor operates)</li> </ul>	1.0 - 4.0 V



#### < ECU DIAGNOSIS INFORMATION >

#### [VQ35DE]

Termin	al No.	Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)	A
25 (V)	_	Sensor ground (Refrigerant pressure sensor)	_	_	_	EC
28 (LG)	40 (BR)	Sensor power supply [Exhaust valve timing control position sensor (bank 1), ex- haust valve timing control po- sition sensor (bank 2), crankshaft position sensor (POS), mass air flow sensor]	Input	[Engine is running]	5 V	C
31 (BR)	35 (B)	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine coolant temperature.	E
32 (W)	152 (B)	Heated oxygen sensor 2 (bank 2)	Input	<ul> <li>[Engine is running]</li> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	0 - 1.0 V	F
34 (V)	40 (BR)	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with intake air temperature.	Η
35 (B)	_	Sensor ground (Heated oxygen sensor 2, en- gine coolant temperature sen- sor)	_	_	_	I
36	40	Crankshaft position sensor	Inout	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes depending on rpm at idle</li> </ul>	4.0 - 5.0 V★ 1mSec/div ↓ ↓ ↓ ↓ 2V/div JMBIA0041GB	J K L
(GR)	(BR)	(POS)	Input	[Engine is running] Engine speed: 2,000 rpm	4.0 - 5.0 V★ 1mSec/div € 2V/div JMBIA0042GB	M

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#### < ECU DIAGNOSIS INFORMATION >

 Terminal No.		Description			Value
 +		Signal name	Input/ Output	Condition	(Approx.)
37 152 Exhaust valve timing control	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes depending on rpm at idle</li> </ul>	4.0 – 5.0 V★ 20mSec/div € 2V/div JMBIA0043GB			
(GR)	(B)	position sensor (bank 1)	[[	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	4.0 – 5.0 V★ 20mSec/div 20mSec/div 20mSec/div 20mSec/div 20mSec/div
	[Ignition switch: ON] • Engine stopped	3,720 Hz 2mSec/div			
38 (GR)	40 (BR) Mass air flow sensor Input	Mass air flow sensor	Input	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	4,100 – 4,700 Hz 2mSec/div
		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: idle to about 4,000 rpm</li> <li>NOTE:</li> <li>Check for linear frequency rise in response to engine being increased to about 4,000 rpm</li> </ul>	$4,100 - 4,700 \rightarrow 8000 \text{ Hz}$ $2mSec/div$		

#### < ECU DIAGNOSIS INFORMATION >

Termina	al No.	Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
39	152	Exhaust valve timing control	Input	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes depending on rpm at idle</li> </ul>	4.0 - 5.0 V★ 20mSec/div € 2V/div JMBIA0043GB
(GR)	(B)	position sensor (bank 2)	mput	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	4.0 - 5.0 V★ 20mSec/div € 2V/div JMBIA0044GB
40 (BR)		Sensor ground (Exhaust valve timing control position sensor (bank 1), ex- haust valve timing control po- sition sensor (bank 2), crankshaft position sensor (POS), mass air flow sensor)	_	_	_
41 (W)	152 (B)	Heated oxygen sensor 2 (bank 1)	Input	<ul> <li>[Engine is running]</li> <li>Revving engine from idle to</li> <li>3,000 rpm quickly after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	0 - 1.0 V
46 (BR)	152 (B)	A/F sensor 1 heater (bank 2)	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed (More than 140 seconds after starting engine)</li> </ul>	2.9 - 8.8 V★ 50mSec/div € 50/div JMBIA0030GB
47 (SB)	152 (B)	Heated oxygen sensor 2 heat- er (bank 2)	Output	<ul> <li>[Engine is running]</li> <li>Engine speed: Below 3,600 rpm after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed be- tween 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	10 V★ 50mSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
				<ul> <li>[Ignition switch: ON] Engine stopped</li> <li>[Engine is running] Engine speed: Above 3,600 rpm</li> </ul>	BATTERY VOLTAGE (11 - 14 V)

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
49	152	Electronic controlled engine		[Engine is running] Idle speed	0 - 1.0 V
(BR)	(B)	mount control solenoid valve	Output	[Engine is running] Engine speed: More than 950 rpm	BATTERY VOLTAGE (11 - 14 V)
51 (L)	152 (B)	Power supply for ECM (Valve)	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
54 152 EVAP canister purge volume	Output	<ul> <li>[Engine is running]</li> <li>Idle speed</li> <li>Accelerator pedal: Not depressed even slightly, after engine starting</li> </ul>	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div € 10V/div JMBIA0039GB		
(Y)	(B)	control solenoid valve	Output	[Engine is running] Engine speed: approximately 2,000 rpm (More than 100 sec- onds after starting engine)	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div € 10V/div JMBIA0040GB
55 (B)	_	ECM ground		_	_
58	152	Exhaust valve timing control	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	0 V
(SB)	(B)	solenoid valve (bank 1)	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000rpm</li></ul>	BATTERY VOLTAGE (11 – 14 V)
60	152	Exhaust valve timing control	Outrout	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	0 V
(BR)	(B)	solenoid valve (bank 2)	• Wa	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000rpm</li></ul>	BATTERY VOLTAGE (11 – 14 V)
66 (R)	152 (B)	A/F sensor 1 (bank 1)	Input	[Ignition switch: ON]	1.8 V
67 (G)	152 (B)	A/F sensor 1 (bank 1)	Input	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	2.2 V Output voltage varies with air fuel ratio.
70 (GR)	_	Shield		_	_

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)	A
71	152	Throttle position sensor 1	loput	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	More than 0.36 V	EC
(B)	(B)	Throttle position sensor 1	Input	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>	Less than 4.75 V	D
72	152	Throttle position sensor 2	Input	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	Less than 4.75 V	E
(W)	(B)		mput	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>	More than 0.36 V	F
75 (R)	_	Sensor ground (Throttle position sensor)		_	_	Н
76 (W)	152 (B)	A/F sensor 1 (bank 2)	Input	[Ignition switch: ON]	1.8 V	
77 (B)	152 (B)	A/F sensor 1 (bank 2)	Input	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	2.2 V Output voltage varies with air fuel ratio.	I
80 (GR)	_	Shield	_	_	—	J
83	152		lasut	[Ignition switch: ON] Selector lever: P or N position	BATTERY VOLTAGE (11 - 14 V)	K
(R)	(B)	PNP signal	Input	[Ignition switch: ON] Selector lever: Except above position	0 V	
84	90	Camshaft position sensor	Input	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes depending on rpm at idle</li> </ul>	3.0 - 5.0 V★ 20mSec/div € 2V/div JMBIA0045GB	M
(GR)	(LG)	(PHASE) (bank 1)		[Engine is running] Engine speed is 2,000 rpm	3.0 - 5.0 V★ 20mSec/div 20mSec/div 20mSec/div 20mSec/div	O P

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)	
86 (V)	152 (B)	ECM relay (Self shut-off)	Output	<ul> <li>[Engine is running]</li> <li>[Ignition switch: OFF]</li> <li>A few seconds after turning ignition switch OFF</li> </ul>	0 - 1.5 V	
(*)				[Ignition switch: OFF] More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)	
89	89 90 Camshaft position sensor	lagut	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes depending on rpm at idle</li> </ul>	3.0 - 5.0 V★ 20mSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ 20mSec/div		
(GR)	(LG)	(PHASE) (bank 2)		[Engine is running] Engine speed is 2,000 rpm	3.0 - 5.0 V★ 20mSec/div € 2V/div JMBIA0046GB	
90 (LG)	_	Sensor ground [Camshaft position sensor (PHASE) (bank 1), camshaft position sensor (PHASE) (bank 2)]	_	_	_	
92 (BR)	90 (LG)	Sensor power supply [Camshaft position sensor (PHASE) (bank 1), camshaft position sensor (PHASE) (bank 2)]	_	[Ignition switch: ON]	5 V	
98 (G)	75 (R)	Sensor power supply (Throttle position sensor)	_	[Ignition switch: ON]	5 V	
99 (L)	_	Engine communication line	Input/ Output	_	_	
				<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	BATTERY VOLTAGE (11 - 14 V)	
102 (W)	152 (B)	VIAS control solenoid valve 2	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>When revving engine up to 5,000 rpm quickly</li></ul>	BATTERY VOLTAGE (11 - 14 V) ↓ 0 - 1.0 V ↓ BATTERY VOLTAGE (11 - 14 V)	

#### < ECU DIAGNOSIS INFORMATION >

Terminal No.		Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)	
103 (P) 104 (V) 106		Ignition signal No. 3 Ignition signal No. 6 Ignition signal No. 2		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes depending on rpm at idle</li> </ul>	0 - 0.2 V★ 50mSec/div	
(R) 107 (LG) 113	152 (B)	Ignition signal No. 5	Output		2V/div JMBIA0035GB 0.1 - 0.4 V★ 50mSec/div	
(Y) 114 (SB)		Ignition signal No. 1 Ignition signal No. 4		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	2V/div JMBIA0036GB	
105 (B)	_	ECM ground	_	_		
				[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14 V)	
108 (BR)	152 (B)	VIAS control solenoid valve 1	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>When revving engine up to 5,000 rpm quickly</li></ul>	BATTERY VOLTAGE (11 - 14 V) ↓ 0 - 1.0 V ↓ BATTERY VOLTAGE (11 - 14 V)	
110 (B)		ECM ground		_	_	
116 (GR)	152 (B)	Power supply for ECM (Back- up)	Input	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)	
117	152	Intake valve timing control so-		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	0 V	
(BR)	(B)	lenoid valve (bank 1)	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>When revving engine up to 2,000rpm quickly</li></ul>	BATTERY VOLTAGE (11 - 14 V)	
		Intake valve timing intermedi-		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	0 V	
118 (LG)	152 (B)	ate lock control solenoid valve (bank 1)	Output	<ul> <li>[Engine is running]</li> <li>Cold condition [Engine cool- ant temperature: below 60°C (140°F)]</li> <li>Idle speed</li> </ul>	Battery voltage (11 - 14 V)	
119 152	Intake valve timing control so-		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	0 V		
(Y)	(B)	lenoid valve (bank 2)	Output	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>When revving engine up to 2,000rpm quickly</li></ul>	BATTERY VOLTAGE (11 - 14 V)

#### < ECU DIAGNOSIS INFORMATION >

#### [VQ35DE]

Termin	Terminal No. Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)
	• Warm		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	0 V	
120 (R)	152 (B)	ate lock control solenoid valve (bank 2)	Output	<ul> <li>[Engine is running]</li> <li>Cold condition [Engine cool- ant temperature: below 60°C (140°F)]</li> <li>Idle speed</li> </ul>	Battery voltage (11 - 14 V)
121 (W)	148 (Y)	EVAP control system pres- sure sensor	Input	[Ignition switch: ON]	1.8 - 4.8 V
123 (P)	_	CAN communication line (CAN-L)	Input/ Output	_	_
124 (L)	_	CAN communication line (CAN-H)	Input/ Output	_	_
125 (V)	148 (Y)	Sensor power supply (EVAP control system pres- sure sensor)	_	[Ignition switch: ON]	5 V
128 (BR)	148 (Y)	Fuel tank temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with fuel tank temperature.
130 (R)	152 (B)	Fuel pump control module (FPCM) check	Input	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	8 - 13.5 V
133	152			[Ignition switch: OFF]	0 V
(L)	(B)	Ignition switch	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
		ASCD steering switch		[Ignition switch: ON] ASCD steering switch: OFF	4 V
			Input	[Ignition switch: ON] MAIN switch: Pressed	0 V
				[Ignition switch: ON] CANCEL switch: Pressed	1 V
				[Ignition switch: ON] RESUME/ACCELERATE switch: Pressed	3 V
				[Ignition switch: ON] SET/COAST switch: Pressed	2 V
134 (G)	135 (R)			[Ignition switch: ON] MAIN (ON/OFF) switch: Pressed	5.0 V
				[Ignition switch: ON] CANCEL switch: Pressed	0.3 V
				[Ignition switch: ON] DISTANCE switch: Pressed	0.7 V
		ICC steering switch	Input	[Ignition switch: ON] SET/COAST switch: Pressed	1.3 V
				[Ignition switch: ON] RESUME/ACCELERATE switch: Pressed	2.4 V
				[Ignition switch: ON] All ICC steering switch: Re- leased	0 V

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#### < ECU DIAGNOSIS INFORMATION >

#### [VQ35DE]

Terminal No.		Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)	
135 (R)		Sensor ground (ASCD steering switch)	_	_	_	
				<ul><li>[Ignition switch: ON]</li><li>For 1 second after turning ignition switch ON</li></ul>	1.3 V	
136 (GR)	152 (B)	Fuel pump control module (FPCM)	Output	[When cranking engine]	4 V	
()	(-)			<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	2.7 V	
139	152	Stop lamp switch	loout	[Ignition switch: OFF] Brake pedal: Fully released	0 V	
(P)	(B)	Stop lamp switch	Input	[Ignition switch: OFF] Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)	
140	152	Brake pedal position switch	loout	[Ignition switch: ON] Brake pedal: Slightly depressed	0 V	
(LG)	(B)		Input	[Ignition switch: ON] Brake pedal: Fully released	BATTERY VOLTAGE (11 - 14 V)	
141 (Y)	152 (B)	EVAP canister vent control valve	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)	
142 (Y)	144 (G)	Sensor power supply (Accelerator pedal position sensor 2)	_	[Ignition switch: ON]	5 V	
143	144	Accelerator pedal position		Input	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully re- leased</li></ul>	0.25 - 0.50 V
(P)	(G)	sensor 2	input	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	2.0 - 2.5 V	
144 (G)	_	Sensor ground (Accelerator pedal position sensor 2)	_	_	_	
145 (LG)	152 (B)	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)	
146 (R)	151 (B)	Sensor power supply (Accelerator pedal position sensor 1)	_	[Ignition switch: ON]	5 V	
147 (B) 149 (B) 152 (B)	_	ECM ground	_	_	_	
148 (Y)	_	Sensor ground (EVAP control system pres- sure sensor, Fuel tank tem- perature sensor)	_	_	_	

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#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
150	151	Accelerator pedal position	Input	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully released</li></ul>	0.5 - 1.0 V
(W)	(B)	sensor 1	mput	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	4.2 - 4.8 V
151 (B)	_	Sensor ground (Accelerator pedal position sensor 1)	_	_	_

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

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

\*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to <u>PG-103, "How to</u> <u>Handle Battery"</u>.

## Fail-safe

INFOID:000000012891211

DTC No.	Detected items	Engine operating condition in fail-safe mode					
U0101	CAN communication line	ECM operates active grille shutter to fully-open position.					
U0284	Active grille shutter	ECM operates active grille shutter to	o fully-open position.				
U1040	Engine communication line	ECM operates active grille shutter to	o fully-open position.				
P0011 P0021	Intake valve timing control	<ul> <li>The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.</li> <li>ECM activates the IVT intermediate lock control solenoid valve to bring the cam sprocket into an intermediate lock condition.</li> </ul>					
P0014 P0024	Exhaust valve timing con- trol	The signal is not energized to the example control does not function.	xhaust valve timing control solenoid valve and the				
P0101 P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.					
P0117 P0118	Engine coolant tempera- ture sensor circuit	Engine coolant temperature will be determined by ECM based on the following condition CONSULT displays the engine coolant temperature decided by ECM.					
		Condition	Engine coolant temperature decided (CONSULT display)				
		Just as ignition switch is turned ON or START	40°C (104°F)				
		Approx 4 minutes or more after en- gine starting	80°C (176°F)				
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)				
		When the fail-safe system for engine fan operates while engine is running	e coolant temperature sensor is activated, the cooling g.				
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.					
P0196 P0197 P0198	Engine oil temperature sensor	Intake valve timing control does not function.					
P0500	Vehicle speed sensor	The cooling fan operates (Highest) while engine is running.					

## < ECU DIAGNOSIS INFORMATION >

DTC No.	Detected items	Engine opera	ating condition in fail-safe mode					
P0524	Engine oil pressure	<ul> <li>ECM illuminates oil pressure warning lamp on the combination meter.</li> <li>Engine speed will not rise more than 4,000 rpm due to the fuel cut.</li> <li>Fail-safe is canceled when ignition switch OFF → ON.</li> </ul>						
P052A P052B P052C P052D	Intake valve timing inter- mediate lock control		_					
P059F	Active grille shutter	ter stops at the position of detect	<ul> <li>When a voltage and temperature related malfunction is detected, the active grille shutter stops at the position of detection.</li> <li>Except for the above case, operates the active grille shutter to fully opened position.</li> </ul>					
P0603 P0607	ECM	Engine torque may be limited.	Engine torque may be limited.					
P0604	ECM	<ul> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>ASCD operation may be deactivated.</li> </ul>						
P0605 P0606 P060B	ECM	<ul> <li>NOTE:</li> <li>Fail-safe may not occur depending on malfunction type.</li> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>ASCD operation may be deactivated.</li> </ul>						
P060A	ECM	<ul> <li>NOTE:</li> <li>Fail-safe may not occur depending on malfunction type.</li> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>Engine torque may be limited.</li> <li>ASCD operation may be deactivated.</li> </ul>						
P0643	Sensor power supply	<ul> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> </ul>						
P1805	Brake switch	ECM controls the electric throttle co small range. Therefore, acceleration will be poo	ontrol actuator by regulating the throttle opening to a r.					
		Vehicle condition	Driving condition					
		When engine is idling	Normal					
		When accelerating	Poor acceleration					
P2100 P2103	Throttle control motor relay	ECM stops the electric throttle configuration fixed opening (approx. 5 degrees)	trol actuator control, throttle valve is maintained at a by the return spring.					
P2101	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.						
P2118	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.						

#### < ECU DIAGNOSIS INFORMATION >

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

## DTC Inspection Priority Chart

INFOID:000000012891212

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

Priority	Detected items (DTC)	Detected items (DTC)		
1	U0101, U1001	CAN communication line		
	P0101, P0102, P0103	Mass air flow sensor		
	P0111, P0112, P0113, P0127	Intake air temperature sensor		
	P0116, P0117, P0118, P0125	Engine coolant temperature sensor		
	P0122, P0123, P0222, P0223, P1225, P1226, P2135	Throttle position sensor		
	P0128	Thermostat function		
	P0181, P0182, P0183	Fuel tank temperature sensor		
	P0196, P0197, P0198	Engine oil temperature sensor		
	P0327, P0328, P0332, P0333	Knock sensor		
	P0335	Crankshaft position sensor (POS) Camshaft position sensor (PHASE) Fuel level sensor Vehicle speed sensor		
	P0340, P0345			
	P0460, P0461, P0462, P0463			
	P0500			
	P0520	EOP sensor		
	P0603, P0604, P0605, P0606, P0607, P060A, P060B, P062F, P2610	ECM		
	P0643	Sensor power supply		
	P0850	Transmission range switch		
	P1078, P1084	Exhaust valve timing control position sensor		
	P1220	Fuel pump control module (FPCM)		
	P1610 - P1615	NATS		
	P2122, P2123, P2127, P2128, P2138	Accelerator pedal position sensor		

#### < ECU DIAGNOSIS INFORMATION >

Priority	Detected items (DTC)	Detected items (DTC)	
2	P0030, P0031, P0032, P0036, P0051, P0052	Air fuel ratio (A/F) sensor 1 heater	
	P0037, P0038, P0057, P0058, P0141, P0161	Heated oxygen sensor 2 heater	
	P0075, P0081	Intake valve timing control solenoid valve/Intake valve timing intermediate lock control solenoid valve	
	P0078, P0084	Exhaust valve timing control solenoid valve	
	P0130, P0131, P0132, P014C, P014D, P014E, P014F, P0150, P0151, P0152, P015A, P015B, P015C, P015D, P2096, P2097, P2098, P2099	Air fuel ratio (A/F) sensor 1	
	P0137, P0138, P0139, P0157, P0158, P0159	Heated oxygen sensor 2	
	P0441	EVAP control system purge flow monitoring	
	P0443, P0444, P0445	EVAP canister purge volume control solenoid valve	
	P0447, P0448	EVAP canister vent control valve	
	P0451, P0452, P0453	EVAP control system pressure sensor	
	P059F, P159F	Active grille shutter	
	P1217	Engine over temperature (OVERHEAT)	
	P1800, P1801	VIAS control solenoid valve	
	P1805	Brake switch	
	P2100, P2103	Throttle control motor relay	
	P2101	Electric throttle control function	
	P2118	Exhaust valve timing control solenoid valveD14F, D15D,Air fuel ratio (A/F) sensor 1Heated oxygen sensor 2EVAP control system purge flow monitoringEVAP canister purge volume control solenoid valveEVAP canister vent control valveEVAP canister vent control valveEVAP control system pressure sensorActive grille shutterEngine over temperature (OVERHEAT)VIAS control solenoid valveBrake switchThrottle control motor relayElectric throttle control functionThrottle control motorIntake valve timing controlExhaust valve timing controlFuel injection system functionMisfireThree way catalyst functionEVAP control system (VERY SMALL LEAK)Idle speed control systemCold start controlEngine oil pressureClosed loop controlTCS communication lineASCD steering switch / ICC steering switchBrake pedal position switch	
3	P0011, P0021, P052A, P052B, P052C, P052D	Intake valve timing control	
	P0014, P0024	Exhaust valve timing control	
	P0171, P0172, P0174, P0175	Fuel injection system function	
	P0300 - P0306	Misfire	
	P0420, P0430	Three way catalyst function	
	P0456	EVAP control system (VERY SMALL LEAK)	
	P0506, P0507	Idle speed control system	
	P050A, P050E	Cold start control	
	P0524	Engine oil pressure	
	P1148, P1168	Closed loop control	
	P1212	TCS communication line	
	P1564	ASCD steering switch / ICC steering switch	
	P1572	Brake pedal position switch	
	P1574	ASCD vehicle speed sensor / ICC vehicle speed sensor	
	P1715	Primary speed sensor	
	P2119	Electric throttle control actuator	
	P219A, P219B	Air fuel ratio (A/F) sensor 1	

## DTC Index

INFOID:000000012891213

×:Applicable —: Not applicable P

DTC <sup>*1</sup>		Items	SRT			Permanent	Reference
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	(CONSULT screen terms)	code	Trip	MIL	DTC group <sup>*4</sup>	page
U0101	0101 <sup>*5</sup>	LOST COMM (TCM)	_	1	×	В	<u>EC-188</u>
U0284	0284	LOST COMM (A/GRLL SHT- TR MDL A)	_	2	×	В	<u>EC-189</u>

#### < ECU DIAGNOSIS INFORMATION >

DTC <sup>*1</sup>		Itoms	ODT	<b>CDT</b>		Permanent	Deference
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	Items (CONSULT screen terms)	SRT code	Trip	MIL	DTC group <sup>*4</sup>	Reference page
U1001	1001 <sup>*5</sup>	CAN COMM CIRCUIT	—	2 or 1	—	—	<u>EC-192</u>
U1040	1040 <sup>*5</sup>	ENG COMM CIRCUIT	_	2	_	_	<u>EC-193</u>
U1044	1044 <sup>*5</sup>	ENG COMM CIRCUIT		2			EC-195
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	_	_	Blinking <sup>*6</sup>	_	_
P0011	0011	INT/V TIM CONT-B1	×	2	×	В	<u>EC-197</u>
P0014	0014	EXH/V TIM CONT-B1		2	×	В	<u>EC-201</u>
P0021	0021	INT/V TIM CONT-B2	×	2	×	В	<u>EC-197</u>
P0024	0024	EXH/V TIM CONT-B2	_	2	×	В	EC-201
P0030	0030	A/F SEN1 HTR (B1)	_	2	×	В	EC-207
P0031	0031	A/F SEN1 HTR (B1)	_	2	×	В	EC-207
P0032	0032	A/F SEN1 HTR (B1)	_	2	×	В	EC-207
P0036	0036	A/F SEN1 HTR (B2)	_	2	×	В	EC-207
P0037	0037	HO2S2 HTR (B1)	_	2	×	В	<u>EC-210</u>
P0038	0038	HO2S2 HTR (B1)	_	2	×	В	EC-210
P0051	0051	A/F SEN1 HTR (B2)	_	2	×	В	EC-207
P0052	0052	A/F SEN1 HTR (B2)		2	×	В	EC-207
P0057	0057	HO2S2 HTR (B2)	_	2	×	В	<u>EC-210</u>
P0058	0058	HO2S2 HTR (B2)		2	×	В	<u>EC-210</u>
P0075	0075	INT/V TIM V/CIR-B1		2	×	В	<u>EC-213</u>
P0078	0078	EX V/T ACT/CIRC-B1		2	×	В	EC-213
P0081	0081	INT/V TIM V/CIR-B2	_	2	×	В	EC-213
P0084	0084	EX V/T ACT/CIRC-B2		2	×	В	EC-218
P0101	0101	MAF SEN/CIRCUIT-B1		2	×	В	EC-221
P0102	0102	MAF SEN/CIRCUIT-B1		1	×	В	<u>EC-226</u>
P0103	0103	MAF SEN/CIRCUIT-B1		1	×	В	EC-226
P0111	0111	IAT SENSOR 1 B1	_	2	×	A	EC-232
P0112	0112	IAT SEN/CIRCUIT-B1		2	×	В	<u>EC-234</u>
P0113	0113	IAT SEN/CIRCUIT-B1		2	×	В	EC-234
P0116	0116	ECT SEN/CIRC	_	2	×	A	EC-236
P0117	0117	ECT SEN/CIRC	_	1	×	В	EC-238
P0118	0118	ECT SEN/CIRC	_	1	×	В	EC-238
P0122	0122	TP SEN 2/CIRC-B1		1	×	В	EC-241
P0123	0123	TP SEN 2/CIRC-B1		1	×	В	EC-241
P0125	0125	ECT SENSOR	_	2	×	В	<u>EC-244</u>
P0127	0127	IAT SENSOR-B1		2	×	В	EC-247
P0128	0128	THERMSTAT FNCTN	_	2	×	A	<u>EC-249</u>
P0130	0130	A/F SENSOR1 (B1)	_	2	×	А	<u>EC-252</u>
P0131	0131	A/F SENSOR1 (B1)		2	×	В	EC-256
P0132	0132	A/F SENSOR1 (B1)		2	×	В	EC-259
P0137	0137	HO2S2 (B1)	×	2	×	A	EC-262
P0138	0138	HO2S2 (B1)	×	2	×	A	EC-268

#### < ECU DIAGNOSIS INFORMATION >

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DTC <sup>*1</sup>			0.57			Permanent		٨
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	Items (CONSULT screen terms)	SRT code	Trip	MIL	DTC group <sup>*4</sup>	Reference page	A
P0139	0139	HO2S2 (B1)	×	2	×	A	EC-276	EC
P0141	0141	HO2S2 HTR (B1)	_	2	×	В	<u>EC-282</u>	
P014C	014C	A/F SENSOR1 (B1)	×	2	×	A	<u>EC-285</u>	
P014D	014D	A/F SENSOR1 (B1)	×	2	×	A	<u>EC-285</u>	С
P014E	014E	A/F SENSOR1 (B2)	×	2	×	A	<u>EC-285</u>	
P014F	014F	A/F SENSOR1 (B2)	×	2	×	A	<u>EC-285</u>	D
P0150	0150	A/F SENSOR1 (B2)	_	2	×	A	<u>EC-252</u>	
P0151	0151	A/F SENSOR1 (B2)	_	2	×	В	<u>EC-256</u>	
P0152	0152	A/F SENSOR1 (B2)	_	2	×	В	<u>EC-259</u>	E
P0157	0157	HO2S2 (B2)	×	2	×	A	EC-262	
P0158	0158	HO2S2 (B2)	×	2	×	A	<u>EC-268</u>	F
P0159	0159	HO2S2 (B2)	×	2	×	A	<u>EC-276</u>	
P015A	015A	A/F SENSOR1 (B1)	×	2	×	A	<u>EC-285</u>	
P015B	015B	A/F SENSOR1 (B1)	×	2	×	A	<u>EC-285</u>	G
P015C	015C	A/F SENSOR1 (B2)	×	2	×	A	EC-285	
P015D	015D	A/F SENSOR1 (B2)	×	2	×	A	<u>EC-285</u>	
P0161	0161	HO2S2 HTR (B2)	_	2	×	В	<u>EC-282</u>	Н
P0171	0171	FUEL SYS-LEAN-B1	_	2	×	В	<u>EC-292</u>	
P0172	0172	FUEL SYS-RICH-B1	_	2	×	В	<u>EC-297</u>	
P0174	0174	FUEL SYS-LEAN-B2	_	2	×	В	<u>EC-292</u>	
P0175	0175	FUEL SYS-RICH-B2	_	2	×	В	<u>EC-297</u>	
P0181	0181	FTT SENSOR	_	2	×	A and B	<u>EC-302</u>	J
P0182	0182	FTT SEN/CIRCUIT	_	2	×	В	<u>EC-306</u>	
P0183	0183	FTT SEN/CIRCUIT	_	2	×	В	<u>EC-306</u>	K
P0196	0196	EOT SENSOR	_	2	×	A and B	<u>EC-309</u>	
P0197	0197	EOT SEN/CIRC	_	2	×	В	<u>EC-313</u>	
P0198	0198	EOT SEN/CIRC	_	2	×	В	<u>EC-313</u>	L
P0222	0222	TP SEN 1/CIRC-B1	_	1	×	В	EC-315	
P0223	0223	TP SEN 1/CIRC-B1	_	1	×	В	<u>EC-315</u>	M
P0300	0300	MULTI CYL MISFIRE	_	1 or 2	×	В	<u>EC-318</u>	IVI
P0301	0301	CYL 1 MISFIRE	_	1 or 2	×	В	<u>EC-318</u>	
P0302	0302	CYL 2 MISFIRE	_	1 or 2	×	В	<u>EC-318</u>	Ν
P0303	0303	CYL 3 MISFIRE	_	1 or 2	×	В	<u>EC-318</u>	
P0304	0304	CYL 4 MISFIRE	_	1 or 2	×	В	<u>EC-318</u>	0
P0305	0305	CYL 5 MISFIRE	_	1 or 2	×	В	<u>EC-318</u>	0
P0306	0306	CYL 6 MISFIRE	—	1 or 2	×	В	<u>EC-318</u>	
P0327	0327	KNOCK SEN/CIRC-B1	—	2	—	_	<u>EC-326</u>	Ρ
P0328	0328	KNOCK SEN/CIRC-B1	_	2	_	_	<u>EC-326</u>	
P0332	0332	KNOCK SEN/CIRC-B2	_	2	_	—	<u>EC-326</u>	
P0333	0333	KNOCK SEN/CIRC-B2	_	2	_	_	<u>EC-326</u>	
P0335	0335	CKP SEN/CIRCUIT	_	2	×	В	<u>EC-329</u>	
P0340	0340	CMP SEN/CIRC-B1	—	2	×	В	<u>EC-333</u>	

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#### < ECU DIAGNOSIS INFORMATION >

[VQ35DE]
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DTC	C <sup>*1</sup>	Items	SRT			Permanent	Reference
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	(CONSULT screen terms)	code	Trip	MIL	DTC group <sup>*4</sup>	page
P0345	0345	CMP SEN/CIRC-B2		2	×	В	EC-333
P0420	0420	TW CATALYST SYS-B1	×	2	×	А	<u>EC-338</u>
P0430	0430	TW CATALYST SYS-B2	×	2	×	А	<u>EC-338</u>
P0441	0441	EVAP PURG FLOW/MON	×	2	×	А	<u>EC-344</u>
P0443	0443	PURG VOLUME CONT/V	—	2	×	А	<u>EC-350</u>
P0444	0444	PURG VOLUME CONT/V	_	2	×	В	<u>EC-355</u>
P0445	0445	PURG VOLUME CONT/V	—	2	×	В	EC-355
P0447	0447	VENT CONTROL VALVE	—	2	×	В	EC-358
P0448	0448	VENT CONTROL VALVE	_	2	×	В	EC-362
P0451	0451	EVAP SYS PRES SEN		2	×	А	EC-366
P0452	0452	EVAP SYS PRES SEN	—	2	×	В	<u>EC-370</u>
P0453	0453	EVAP SYS PRES SEN	_	2	×	В	EC-373
P0456	0456	EVAP VERY SML LEAK	×*7	2	×	А	<u>EC-377</u>
P0460	0460	FUEL LEV SEN SLOSH		2	×	A	EC-383
P0461	0461	FUEL LEVEL SENSOR		2	×	В	EC-385
P0462	0462	FUEL LEVL SEN/CIRC		2	×	В	<u>EC-387</u>
P0463	0463	FUEL LEVL SEN/CIRC		2	×	В	<u>EC-387</u>
P0500	0500	VEH SPEED SEN/CIRC*8	_	2	×	В	EC-389
P0506	0506	ISC SYSTEM		2	×	В	EC-392
P0507	0507	ISC SYSTEM		2	×	В	EC-394
P050A	050A	COLD START CONTROL	_	2	×	A	EC-396
P050E	050E	COLD START CONTROL	_	2	×	А	EC-396
P0520	0520	EOP SENSOR/SWITCH	_	2	_	_	EC-399
P0524	0524	ENGINE OIL PRESSURE		1	_	_	EC-403
P052A	052A	CAMSHAFT POSITION TIM- ING B1	×	2	×	В	<u>EC-407</u>
P052B	052B	CAMSHAFT POSITION TIM- ING B1	×	2	×	В	<u>EC-407</u>
P052C	052C	CAMSHAFT POSITION TIM- ING B2	×	2	×	В	<u>EC-407</u>
P052D	052D	CAMSHAFT POSITION TIM- ING B2	×	2	×	В	<u>EC-407</u>
P059F	059F	ACTIVE GRILLE AIR SHUT- TER A	_	2	×	В	<u>EC-414</u>
P0603	0603	ECM BACK UP/CIRCUIT	—	2	× or —	В	<u>EC-417</u>
P0604	0604	ECM		1	×	В	<u>EC-419</u>
P0605	0605	ECM	—	1	×	В	<u>EC-421</u>
P0606	0606	CONTROL MODULE	—	1	× or —	В	<u>EC-423</u>
P0607	0607	ECM	—	1 or 2	× or —	В	<u>EC-425</u>
P060A	060A	CONTROL MODULE	—	1	×	В	<u>EC-426</u>
P060B	060B	CONTROL MODULE		1	×	В	<u>EC-428</u>
P062F	062F	CONTROL MODULE	—	1	×	В	<u>EC-417</u>
P0643	0643	SENSOR POWER/CIRC	—	1	×	В	<u>EC-430</u>
P0850	0850	P-N POS SW/CIRCUIT	—	2	×	В	<u>EC-433</u>

### < ECU DIAGNOSIS INFORMATION >

## [VQ35DE]

CONSULT (CONSULT screen terms) code Irip MIL DTC group*4	Reference	
GST*2	page	A
P1078         1078         EXH TIM SEN/CIRC-B1         —         2         ×         B	<u>EC-436</u>	EC
P1084         1084         EXH TIM SEN/CIRC-B2         —         2         ×         B	EC-436	
P1148         1148         CLOSED LOOP-B1         —         1         ×         A	<u>EC-440</u>	
P1168         1168         CLOSED LOOP-B2         —         1         ×         A	<u>EC-440</u>	С
P1212 1212 TCS/CIRC — 2 — —	<u>EC-441</u>	
P1217         1217         ENG OVER TEMP         —         1         ×         B	<u>EC-443</u>	D
P1220 1220 FPCM — 1 — B	EC-446	
P1225 1225 CTP LEARNING-B1 — 2 — —	EC-449	
P1226 1226 CTP LEARNING-B1 — 2 — —	<u>EC-451</u>	Е
P 1504   1504   ASCD SW I	<u>EC-453</u> (With ASCD) <u>EC-456</u> (With ICC)	F
P1568         1568         ICC COMMAND VALUE         —         1         —         #         #         # <td>EC-459</td> <td></td>	EC-459	
P1572 1572 ASCD BRAKE SW - 1	<u>EC-461</u> (With ASCD) <u>EC-467</u> (With ICC)	G
P1574 1574 ASCD VHL SPD SEN 1	<u>EC-473</u> (With ASCD) <u>EC-475</u> (With ICC)	
P159F     159F     ACTIVE GRILLE AIR SHUT- TER A      2	<u>EC-477</u>	
P1610         1610         LOCK MODE         —         2         —         —	<u>SEC-60</u>	J
P1611         1611         ID DISCORD, IMM-ECM         —         2         —         —	<u>SEC-61</u>	
P1612         1612         CHAIN OF ECM-IMMU         —         2         —         —	<u>SEC-63</u>	К
P1614         1614         CHAIN OF IMMU-KEY         —         2         —         —	<u>SEC-65</u>	IX.
P1715         1715         IN PULY SPEED         —         2         —         —	<u>EC-480</u>	
P1800         1800         VIAS S/V CIRC-B1         —         2         —         —	<u>EC-482</u>	L
P1801 1801 VIAS S/V CIRC-B2 — 2 — —	<u>EC-485</u>	
P1805         1805         BRAKE SW/CIRCUIT         —         2         —         —	<u>EC-488</u>	ъл
P2096         2096         POST CAT FUEL TRIM SYS B1         —         2         ×         A	<u>EC-491</u>	Μ
P2097         2097         POST CAT FUEL TRIM SYS B1         -         2         ×         A	<u>EC-491</u>	Ν
P2098 2098 POST CAT FUEL TRIM SYS – 2 × A	<u>EC-491</u>	
P2099 2099 POST CAT FUEL TRIM SYS – 2 × A	<u>EC-491</u>	0
P2100         2100         ETC MOT PWR-B1         —         1         ×         B	<u>EC-496</u>	
P2101         2101         ETC FNCTN/CIRC-B1         —         1         ×         B	<u>EC-498</u>	Ρ
P2103         2103         ETC MOT PWR-B1         —         1         ×         B	<u>EC-496</u>	
P2118         2118         ETC MOT-B1         —         1         ×         B	<u>EC-501</u>	
P2119         2119         ETC ACTR-B1         —         1         ×         B	EC-503	
P2122         2122         APP SEN 1/CIRC         —         1         ×         B	<u>EC-505</u>	
P2123         2123         APP SEN 1/CIRC         —         1         ×         B	<u>EC-505</u>	

Revision: December 2015

### < ECU DIAGNOSIS INFORMATION >

DT	C*1	Items	SRT			Permanent	Reference
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	(CONSULT screen terms)	code	Trip	MIL	DTC group <sup>*4</sup>	
P2127	2127	APP SEN 2/CIRC	—	1	×	В	<u>EC-508</u>
P2128	2128	APP SEN 2/CIRC	_	1	×	В	<u>EC-508</u>
P2135	2135	TP SENSOR-B1	_	1	×	В	<u>EC-512</u>
P2138	2138	APP SENSOR		1	×	В	<u>EC-515</u>
P219A	219A	AIR FUEL RATIO IMBAL- ANCE B1	_	2	×	А	<u>EC-519</u>
P219B	219B	AIR FUEL RATIO IMBAL- ANCE B2		2	×	А	<u>EC-519</u>
P2610	2610	ECM/PCM INTERNAL ENG OFF TIMER		2	×	A and B	<u>EC-525</u>

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

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

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

\*4: Refer to EC-170, "Description".

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

\*6: When the ECM is in the mode displays SRT status, MIL may blink. For the details, refer to "How to Display SRT Status".

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

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

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

# Test Value and Test Limit

INFOID:000000013492745

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

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

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

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

## < ECU DIAGNOSIS INFORMATION >

### [VQ35DE]

	OBD-			lii	e and Test mit display)	
Item	MID	Self-diagnostic test item	DTC	TID	Unitand Scaling ID	Description
			P0131	83H	0BH	Minimum sensor output voltage for test cycle
			P0131	84H	0BH	Maximum sensor output voltage for test cycle
			P0130	85H	0BH	Minimum sensor output voltage for test cycle
			P0130	86H	0BH	Maximum sensor output voltage for test cycle
			P0133	87H	04H	Response rate: Response ratio (lean to rich)
			P0133	88H	04H	Response rate: Response ratio (rich to lean)
			P2A00 or P2096	89H	84H	The amount of shift in air fuel ratio (too lean)
			P2A00 or P2097	8AH	84H	The amount of shift in air fuel ratio (too rich)
			P0130	8BH	0BH	Difference in sensor output voltage
			P0133	8CH	83H	Response gain at the limited frequency
HO2S	01H	Air fuel ratio (A/F) sensor 1 (Bank 1)	P014C	8DH	04H	O2 sensor slow response - Rich to lean bank 1 sensor 1
			P014C	8EH	04H	O2 sensor slow response - Rich to lean bank 1 sensor 1
			P014D	8FH	84H	O2 sensor slow response - Lean to rich bank 1 sensor 1
			P014D	90H	84H	O2 sensor slow response - Lean to rich bank 1 sensor 1
			P015A	91H	01H	O2 sensor delayed response - Rich to lean bank 1 sensor 1
			P015A	92H	01H	O2 sensor delayed response - Rich to lean bank 1 sensor 1
			P015B	93H	01H	O2 sensor delayed response - Lean to rich bank 1 sensor 1
			P015B	94H	01H	O2 sensor delayed response - Lean to rich bank 1 sensor 1
			P0133	95H	04H	Response rate: Response ratio (lean to rich)
			P0133	96H	84H	Response rate: Response ratio (rich to lean)

### < ECU DIAGNOSIS INFORMATION >

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

### < ECU DIAGNOSIS INFORMATION >

	OBD-			li	e and Test mit display)		А
Item	MID	Self-diagnostic test item	DTC	TID	Unit and Scaling ID	Description	EC
			P015D	94H	01H	O2 sensor delayed response - Lean to rich bank 2 sensor 1	С
	05H	Air fuel ratio (A/F) sensor 1 (Bank 2)	P0153	95H	04H	Response rate: Response ratio (lean to rich)	
			P0153	96H	84H	Response rate: Response ratio (rich to lean)	D
			P0158	07H	0CH	Minimum sensor output voltage for test cycle	E
	06H	Heated oxygen sensor 2	P0157	08H	0CH	Maximum sensor output voltage for test cycle	_
HO2S		(Bank 2)	P0158	80H	0CH	Sensor output voltage	F
			P0159	81H	0CH	Difference in sensor output voltage	
			P0159	82H	11H	Rear O2 sensor delay response diag- nosis	G
			P0163	07H	0CH	Minimum sensor output voltage for test cycle	
	07H	Heated oxygen sensor 3 (Bank2)	P0164	08H	0CH	Maximum sensor output voltage for test cycle	Н
			P0166	80H	0CH	Sensor output voltage	
			P0165	81H	0CH	Difference in sensor output voltage	
			P0420	80H	01H	O2 storage index	
	21H	Three way catalyst function	P0420	82H	01H	Switching time lag engine exhaust in- dex value	J
	2111	(Bank1)	P2423	83H	0CH	Difference in 3rd O2 sensor output voltage	
CATA-			P2423	84H	84H	O2 storage index in HC trap catalyst	K
LYST			P0430	80H	01H	O2 storage index	
	22H	Three way catalyst function	P0430	82H	01H	Switching time lag engine exhaust in- dex value	L
	2211	(Bank2)	P2424	83H	0CH	Difference in 3rd O2 sensor output voltage	M
			P2424	84H	84H	O2 storage index in HC trap catalyst	IVI
			P0400	80H	96H	Low flow faults: EGR temp change rate (short term)	N
			P0400	81H	96H	Low flow faults: EGR temp change rate (long term)	
EGR	21⊔		P0400	82H	96H	Low flow faults: Difference between max EGR temp and EGR temp under idling condition	0
SYSTEM	31H	EGR function	P0400	83H	96H	Low flow faults: Max EGR temp	
			P1402	84H	96H	High Flow Faults: EGR temp increase rate	P
			P0402	85H	FCH	EGR differential pressure high flow	-
			P0401	86H	37H	EGR differential pressure low flow	-
			P2457	87H	96H	EGR temperature	

### < ECU DIAGNOSIS INFORMATION >

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

### < ECU DIAGNOSIS INFORMATION >

## [VQ35DE]

Item	OBD-	Self-diagnostic test item	DTC	lii	e and Test mit display)	Description	А
liem	MID	Sell-diagnostic test item	bio	TID	Unitand Scaling ID	Description	EC
	41H	A/F sensor 1 heater (Bank 1)	Low Input: P0031 High Input: P0032	81H	0BH	Converted value of heater electric cur- rent to voltage	С
			P0030	83H	0BH	A/F sensor heater circuit malfunction	0
	42H	Heated oxygen sensor 2 heat- er (Bank 1)	Low Input: P0037 High Input: P0038	80H	0CH	Converted value of heater electric cur- rent to voltage	D
			P0141	81H	14H	Rear O2 sensor internal impedance	
O2 SEN- SOR	43H	Heated oxygen sensor 3 heat- er (Bank 1)	P0043	80H	0CH	Converted value of heater electric cur- rent to voltage	E
HEATER	45H	A/F sensor 1 heater (Bank 2)	Low Input: P0051 High Input: P0052	81H	0BH	Converted value of heater electric cur- rent to voltage	
			P0036	83H	0BH	A/F sensor heater circuit malfunction	F
	46H	Heated oxygen sensor 2 heat- er (Bank 2)	Low Input: P0057 High Input: P0058	80H	0CH	Converted value of heater electric cur- rent to voltage	
			P0161	81H	14CH	Rear O2 sensor internal impedance	G
	47H	Heated oxygen sensor 3 heat- er (Bank 2)	P0063	80H	0CH	Converted value of heater electric cur- rent to voltage	
			P0411	80H	01H	Secondary air injection system incor- rect flow detected	Η
			Bank1: P0491 Bank2: P0492	81H	01H	Secondary air injection system insufficient flow	
			P2445	82H	01H	Secondary air injection system pump stuck off	
SEC- OND- ARY AIR	71H	Secondary air system	P2448	83H	01H	Secondary air injection system high airflow	J
			Bank1: P2440 Bank2: P2442	84H	01H	Secondary air injection system switch- ing valve stuck open	K
			P2440	85H	01H	Secondary air injection system switch- ing valve stuck open	
			P2444	86H	01H	Secondary air injection system pump stuck on	L

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### < ECU DIAGNOSIS INFORMATION >

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Item	OBD- MID	Self-diagnostic test item	DTC	TID	Unitand Scaling ID	Description
			P0171 or P0172	80H	2FH	Long term fuel trim
			P0171 or P0172	81H	24H	The number of lambda control clamped
			P117A / P219A	82H	03H	Cylinder A/F imbalance monitoring
			P219C	83H	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #1 cylinder parameter
			P219D	84H	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #2 cylinder parameter
	81H	Fuel injection system function (Bank 1)	P219E	85H	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #3 cylinder parameter
			P219F	86H	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #4 cylinder parameter
FUEL			P21A0	87H	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #5 cylinder parameter
SYSTEM			P21A2	89H	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #7 cylinder parameter
			P0174 or P0175	80H	2FH	Long term fuel trim
			P0174 or P0175	81H	24H	The number of lambda control clamped
			P117B / P219B	82H	03H	Cylinder A/F imbalance monitoring
			P219D	84H	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #2 cylinder parameter
	82H	Fuel injection system function (Bank 2)	P219F	86H	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #4 cylinder parameter
			P21A1	88H	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #6 cylinder parameter
			P21A3	8AH	83H	Air-fuel ratio cylinder imbalance diag- nosis CPS (Crankshaft Position Sen- sor) method #8 cylinder parameter

## < ECU DIAGNOSIS INFORMATION >

### [VQ35DE]

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

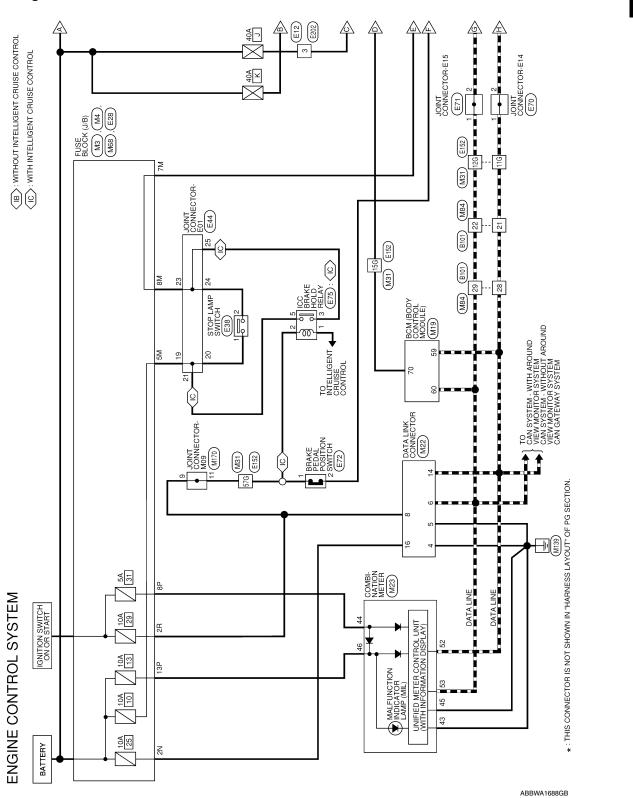
### < ECU DIAGNOSIS INFORMATION >

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

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# WIRING DIAGRAM ENGINE CONTROL SYSTEM

# Wiring Diagram



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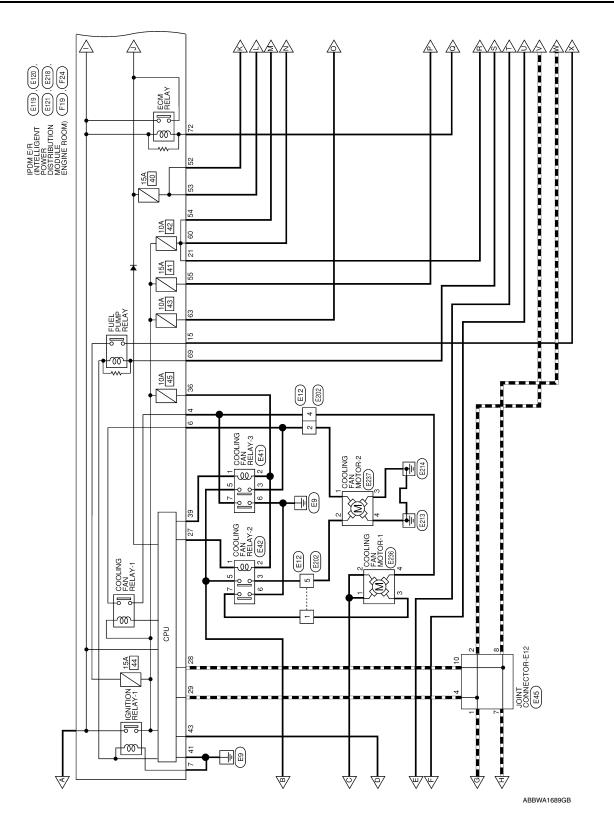
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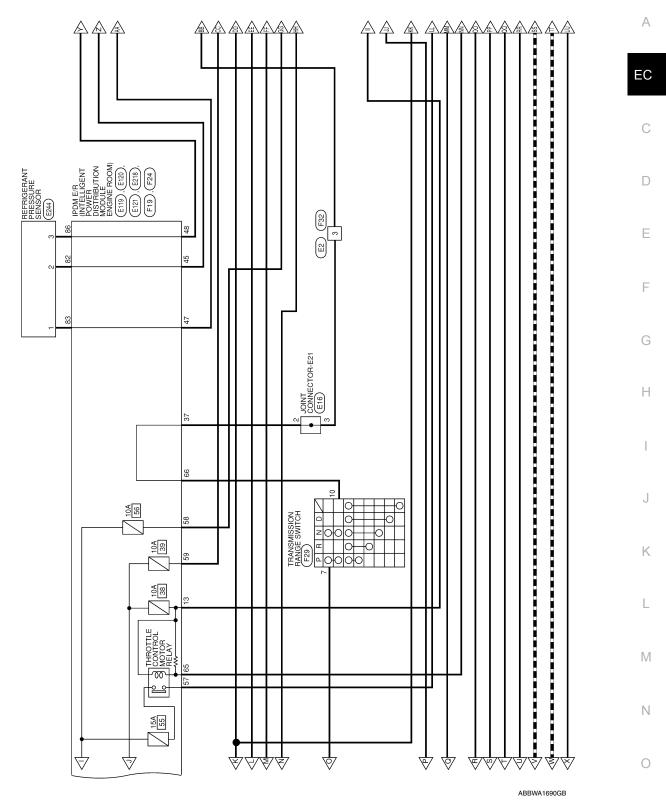
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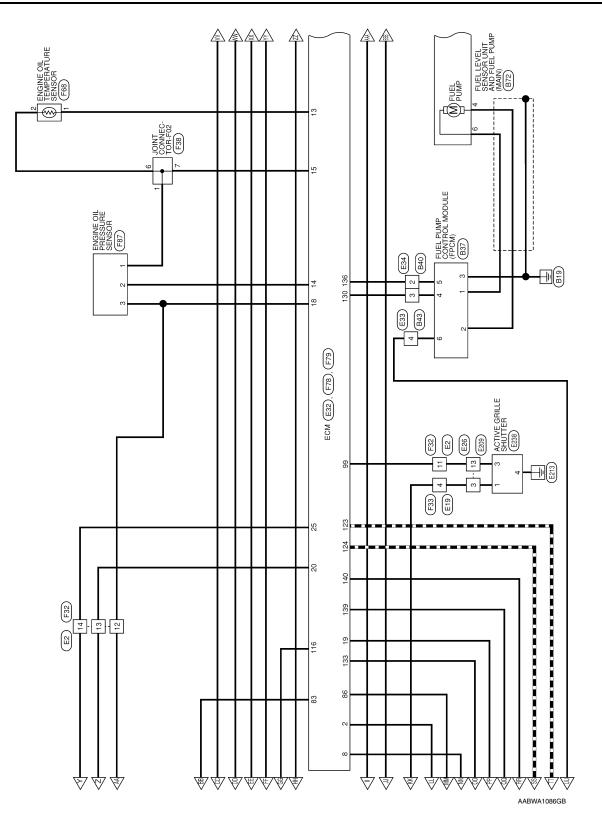
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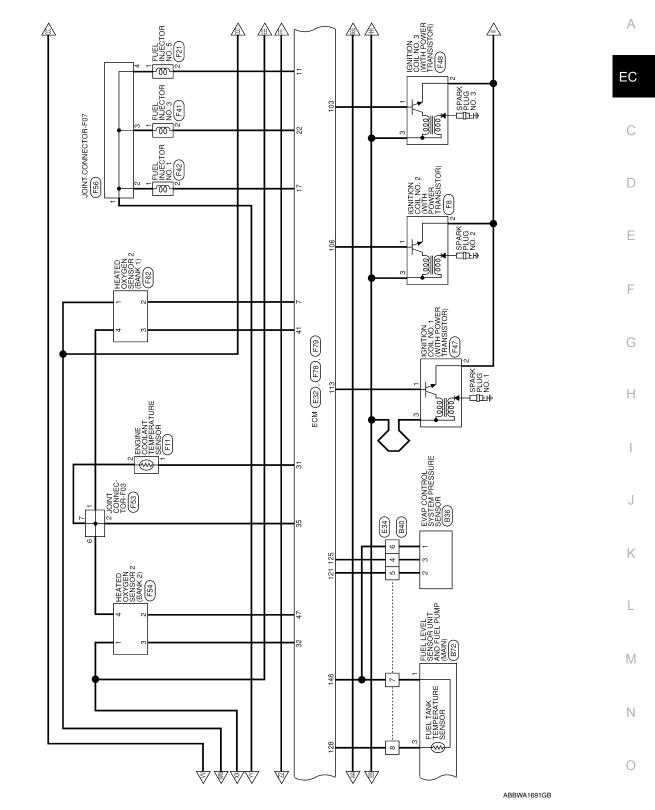
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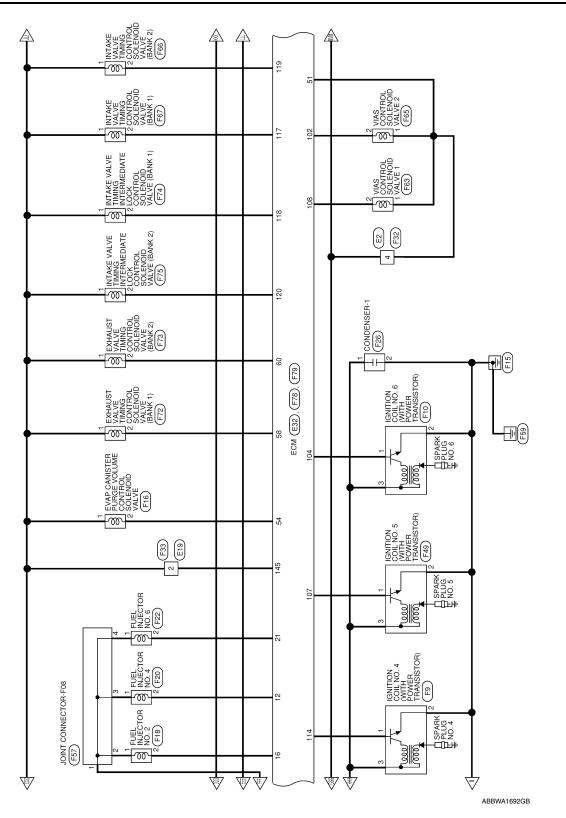
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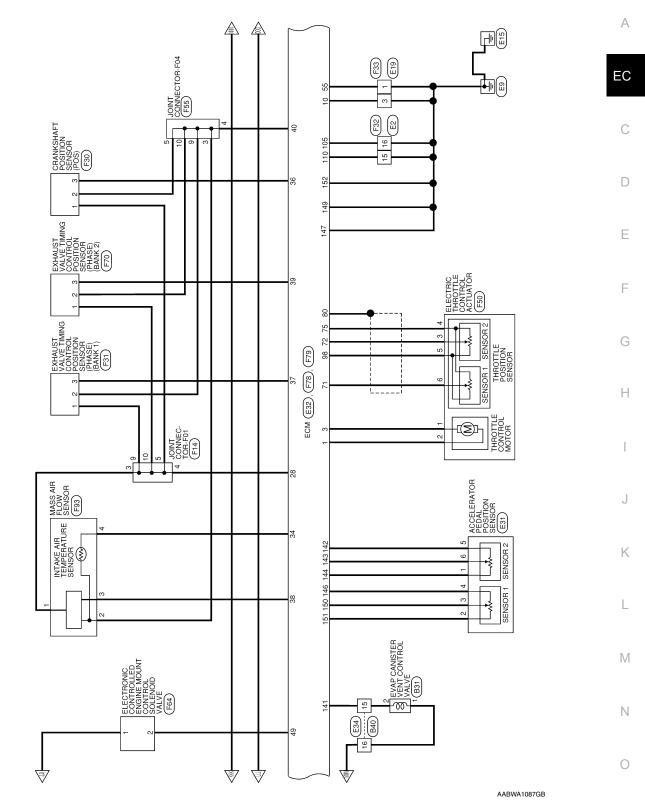


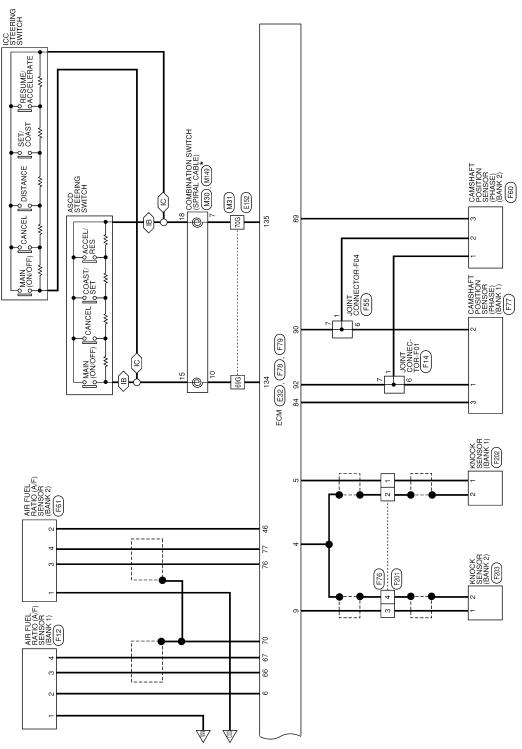
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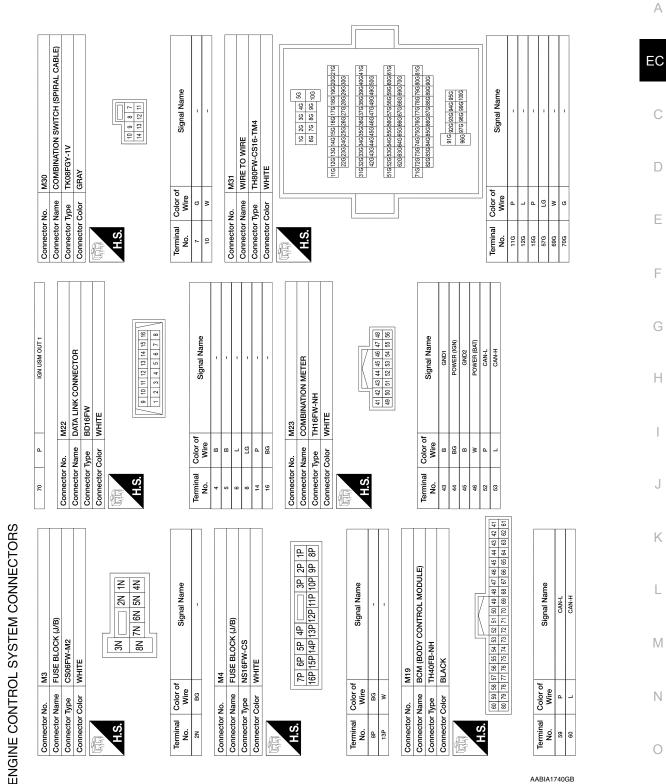
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### [VQ35DE]



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		or Type M06MW-LC	r Color WHITE				1 2 3		Color of Signal Name		-	BR	- -			or No. E16	or Name JOINT CONNECTOR-E21	r Type TK04FW-J	or Color WHITE					F	0	٥											
Connector No.	Connector Name	Connector Type	Connector Color	Æ		H.S.			Terminal		2	3	4	5		Connector No.	Connector Name	Connector Type	Connector Color	ų	H.S.				Terminal	Ño.	~ ~										
1		M170	JOINT CONNECTOR-M09	BJ30FW	WHIE		11 10 9 8 7 6 5 4 3 2 1	22 21 20 19 18 17 16 15 14 13 12	33         32         31         30         29         28         27         26         25         24         23		Signal Name	1	1		E2	WIRE TO WIRE	TH16MW-NH	WHITE			2 3 4 5 6 7	9 10 11 12 13 14 15 16		of Signal Name		1		1	1	1	1	1					
18 B		Connector No.	Connector Name	Connector Type	Connector Color		U L	2		Terminal Color of	-	6 FG	11 LG		Connector No.	Connector Name	Connector Type	Connector Color			Ч. С			al 0	>		- L		13 LG	14 V		16 LG					
	c	Con	Conr	Conr	LION	μ				Tern	Ż				Conn	Conn	Conn	Conn		KHKAN	Ĩ			Tern	z		.   -	[	[		-	-					
M68	FUSE BLOCK (J/B)	NS16FBR-CS	BROWN				/K 0K 0K 4K 3K 2K 1K 16R 15R 14R 13R 12R 11R 10R 9R 8R		F Signal Name	'		M84	WIRE TO WIRE	TH32EW_NH		WHILE			7	16         15         14         13         12         11         10         9         8         7         6         5         4         3         2         1           32         31         30         29         28         27         26         25         24         23         22         21         20         18         17		f Signal Name	1	1	Ţ	1		M149	COMBINATION SWITCH (SPIRAL CABLE)	TK08FGY	GRAY				22 21 20 19 18 17 16 15	f Signal Name	
							-14	<u>-</u> ]	Color of	P III										32		Color of Wire	٩	-	٩	-										Color of Wire	
Connector No.	Connector Name	Connector Type	Connector Color	Ŧ	1444	H.S.			Terminal	8		Connector No	Connector Name	Connector Two			ų		H.S.			Terminal No.	21	22	28	29		Connector No.	Connector Name	Connector Type	Connector Color		detter	H.S.		Terminal No.	:

**Revision: December 2015** 

< WIRING DIAGRAM >

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AABIA1741GB

E19	7M 8M	8 4		134	5 E	ASCD STEERING SWITCH SENSOR GROUND (ASCD STEERING SWITCH)
WIRE TO WIRE			-	136	GR	-
	Connector No.		E31	137	ı	I
	Connector Name		ACCELERATOR PEDAL POSTION SENSOR	138	ı 🗅	- ctobilameration
	Connector Type		RH06FB	140	. ŋ	BRAKE PEDAL POSITION SWITCH
	Connector Color		BLACK	141	۲	EVAP CANISTER VENT CONTROL VALVE
	E			142	>	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 2)
5 6 7 8				143	٩	ACCELERATOR PEDAL POSITION SENSOR 2
	Ч. С			144	g	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 2)
			((1 2 3 4 5 6))	145	ГG	POWER SUPPLY FOR ECM
Signal Name				146	н	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
				147	•	ECM GROUND
	Terminal	Color of Wire	Signal Name	149	- @	ECM GROUND
1	-	9		150	M	ACCELERATOR PEDAL POSITION SENSOR 1
ı.	. 8		-	151	в	SENSOR GROUND (ACCELERATOR PEDAL POSITION
		N	T	152	8	ECM GROUND
WIRF TO WIRF	4	œ	-	701	2	
	\$	>	1	Counter		200
	9	۵.	1	Connector No.		E33
				Connector Name		WIRE TO WIRE
	Connector No.		E32	Connector Type		NS08FW-CS
	Connector Name		ECM	Connector Color		WHITE
4 5 6 7	Connector Type		RH24FB-RZ8-L-LH	Æ		
10 11 12 13 14 15 16	Connector Color		BLACK			
-	E			0°11		3 2 1 8 7 6 5 4
Signal Name	H.S.		12112512913313/141145149 1221261301334138142146150 12212513413243343145156			
			124128132136140144148152	Torminol	Color of	
1	1			No.	Wire	Signal Name
	Terminal	Color of	Signal Name	4	>	1
FUSE BLOCK (J/B)	No.	Wire	0			
	121	>	EVAP CONTROL SYSTEM PRESSURE SENSOR			
	122					
	124		CAN-H			
	125	>	SENSOR POWER SUPPLY (EVAP CONTROL SYSTEM PRESSURE SENSOR)			
4M 3M 2M 1M	126	1	-			
RM 7M RM	127	1				
	128	H	FUEL IANK LEMPERALURE SENSOR			
	130	α	FUEL PLIMP CONTROL MODULI F CHECK			
	131		-			
Signal Name	132		I			
	133	-	IGNITION SWITCH			
1						

< WIRING DIAGRAM >

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	ne JOINT CONNECTOR-E01	e BJ30FW	or WHITE	11 10 9 8 7 6 5 4 3 2 1 22 21 20 19 18 17 16 15 14 13 12 33 32 31 30 29 28 27 26 25 24 23	Color of Signal Name Wire		- M	M					E45	+							Color of Signal Name Wire	-		-	- 4	-	-
Connector No.	Connector Name	Connector Type	Connector Color	<u>मिन</u> ] H.S.	Terminal Col No. M	19		21	23	24	25		Connector No.	Connector Name	Connector Type	Connector Color		E		Ъ.	Terminal Col No. W	-	2	4	7	80	10
E41	COOLING FAN RELAY-3	M06FBR-R-LC	BROWN		Signal Name	1	1	1	1	-	1		E42	COOLING FAN RELAY-2	M06FBR-R-LC	BROWN					Signal Name	1	1	1	1	1	
					Color of Wire	σ	×	œ	٢	8	Ч			+	-	1.					Color of Wire	BG	M	L	۲	8	>
Connector No.	Connector Name	Connector Type	Connector Color	品. H.S.	Terminal No.	-	2	8	5	9	7		Connector No.	Connector Name	Connector Type	Connector Color		Ē		Ň. L	Terminal No.	-	2	e	5	9	ŀ
E34	WIRE TO WIRE	TH16FW-NH	WHITE	8         7         6         5         4           15         14         12         14         10         9	Signal Name		1	1	-	-	1	-		1		E38	STOP LAMP SWITCH	M04FW-LC	WHITE				Signal Name	Olyna Marie	-	1	
	Connector Name W	Connector Type T	Connector Color M		Color of Wire	æ	ж	>	M	Y	٢	BR	7	-	ľ		Connector Name S	Connector Type N	Connector Color M				0	Wire	M	٩	
Connector No.	ector	lector	rector	H.S.	Terminal No.	5		4	5	9	7	8	15	16		Connector No.	nector	nector	nector	H.S.			Terminal	ю.	-	2	

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	E120	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)	M04FW-LC	WHITE					9 6			Signal Name	MOTOR FAN 1	F/L MOTOR FAN		101		IPDM E/K (INTELLIGENT POWEK DISTRIRITION MODILIE FNGINE ROOM)		WHITE				7 0 7 10 10 10 11	40 0 0 0 10 A1 42 45 42	QI /1 QI CI 71 71		f Signal Name	FCM VB	FUEL PUMP																	
Ero       Ommeter Name         Joint connector Reta       Ommeter Name         Luck						1 HAN	H.S.				$\vdash$				-					-		ff		H.S.					-		-																
F70       JOINT CONNECTOR-E14       OOMT CONNECTOR-E14         JOINT CONNECTOR-E14       OOMT CONNECTOR-E14       OOM CONNECTOR-E14         BLACK	1	E75	ICC BRAKE HOLD RELAY	MS02FL-M2-LC	BLUE			3		2 🛛 1						I	1		E119	IPDM E/R (INTELLIGENT POWER	DISTRIBUTION MODULE ENGINE ROOM)	TH32FW-NH	WHITE				2 20 21 22 23 24 23 20 21 20 29 30 31 32 33 34 5 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50				BCM IGNSW	MOTOR FAN RLY MID	CAN-L	CAN-H	START IG-E/R	CLUTCH I/L SW	MOTOR FAN RLY HI	S-GND	IGN SIGNAL	PD SENS SIG-E/R	PD SENS PWR-E/R	PD SENS GND-E/R					
e70       JOINT CONNECTOR-E14       BLACK       BLACK       0       0       1001       101       101       101       101       101       101       11       11       11       11       11       11       11       11       11       11       11       1		Connector No.	Connector Name	Connector Type	Connector Color	LT L		H.S.						$\left  \right $					Connector No.	Connector Name		Connector Type	Connector Color				2 2		-		21 L																
Connector No. Connector Name Connector Name Connector Name Connector Solor Nin 2 2 2 2 2 2 2 2 2 2 2 2 2		Connector Name JOINT CONNECTOR-E14		1		K		5 4 3 2						_								R		5 4 3 2				I	-	E72	BRAKE PEDAL POSITION							C	2	-			Signal Na	1			

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#### < WIRING DIAGRAM >

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	Connector Name COOLING FAN MOTOR-1				H.S.			Terminal Color of Signal Name No. Wire	1 BR -	+	 -	Connector No. E237	0		Connector Color GRAY		H.S.		4 3	F	Terminal Color of Signal Name No. Wire		2 L -	с.	4 B 1						
- - -	Connector No. E209	Connector Name WIRE TO WIRE	Connector Type NS16FW-CS	Connector Color WHITE		( [	/ 6 5 4 3 2 1 16 15 14 13 12 11 10 9 8		al 0	No. Wire	_	Connector No. E218	Connector Name IPDM E/R (INTELLIGENT POWER	Connector Type TH16FW-NH					82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97		lal C	No. Wire Jugitat Natile	×	IJ	86 B PD SENS GND-FEM						
E152					5G 4G 3G 2G 1G 000 8C 770 8C		216 206 196 186 176 166 156 146 136 126 116 306 296 286 276 266 256 246 236 226	416406396386376386356346336326316 506496486476466456446436426		010 090 090 091 090 091 091 091 091 091	810 800 790 780 770 760 750 740 730 720 710 900 890 880 870 860 856 846 830 820		95G 94G 93G 92G <sup>91G</sup>	100G 99G 98G 97G 96G		of Signal Name	-	1	1	-	-	E202	WIRE TO WIRE	M06FW-LC	WHITE		3 2 1	6 5 4		of Signal Name	1
Connector No.	Connector Name			E	H.S.						 					Terminal Color of No. Wire	11G P	12G L	15G L	 -	-	Connector No.	Connector Name	Connector Type	Connector Color	(FG)	0.1		-	Terminal Color of No. Wire	н В

< WIRING DIAGRAM >

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Connector No. F11	e	Connector Type E02FGY-RS	Connector Color GRAY	H.S.		Terminal Color of Signal Name No.		ctor No. F12		Connector Type HHU4FUGY-P Connector Color GRAY		⊂ × Col	4		A EC C D E
	2 BB		Connector No. F9 Connector Name IGNITION COIL NO. 4 (WITH POWER	TRANSISTOR) Connector Type E03FGY-RS Connector Color GRAY				Terminal Color of Signal Name No.	1 SB	3 W	Connector No.         F10           Connector Name         IGNITION COIL NO. 6 (WITH POWER TRANSISTOR)           Connector Type         E03FGV-RS           Connector Color         GRAY	H.S.	Terminal No.     Color of Wire     Signal Name       1     v     -       2     B     -       3     w     -		, G H J
Connector No. E238		Connector Type RH04FB Connector Color BI ACK		S	4 3 2 1	of Signa	- Bry	etor No E244		Connector Type RK03FB Connector Color BLACK		Terminal No.     Color of No.     Signal Name       No.     Wire     Signal Name       1     G     -       2     W     -       3     B     -	Connector No. F8 Connector Name IGNITION COIL NO. 2 (WITH POWER Connector Type E03FGY-RS Connector Type E03FGY-RS Connector Color GRAY	Terminal Color of Signal Name No.	K L M N

< WIRING DIAGRAM >

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3 <u>6</u> <u>8</u> <u>1</u> <u>1</u>		Connector Name WIRE TO WIRE		HC	14 13 12 11 10		Terminal Color of					> 0	2 <u>e</u>		Connector No. F33	Connector Type NS08FBR-CS		H.S.	7 6	> > -		Terminal Color of Signal Name			8						
	Connector Type YDX06FB-HS4 Connector Color BLACK	1			Terminal Color of	-	1 L	5	Connector No. F30	e	Connector Color BLACK			H.S.	((1   2   3))	1	Terminal Color of Signal Name	 2 BR -		Connector No. F31	e	Connector Tune RH03ER		1		/  -		Terminal Color of Signal Name No. Wire	- TG		
F24 Con IPDM E/R (INTELLIGENT POWER Con DISTRIBILITION MODILIE ENGINE POOM		WHITE		62 63 64 65 66 67 es en 71 73 73 73	Ter	Signal Name				FPR	F26 Con	CONDENSER-1	M02FW-GY-LC	WHITE			Ter		Signal Name		Con		Con					Ter	-		
Connector No. F: Connector Name IF		Connector Color M	H.S.			Terminal Color of		65 G		69 S	Connector No. F:	Connector Name C	Connector Type M	Connector Color M	LU LU	0.1		Torminal Calar of			2 8										

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# ENGINE CONTROL SYSTEM

#### < WIRING DIAGRAM >

Connector No. F49	e					H.S.		-11	F	Terminal Color of Signal Name No.	+		3 W -			Connector Name ELECTRIC THROTTLE CONTROL	Connector Type RH06FB	1.		H.C.			al	No. Wire		M	 σ σ σ	-			
8	F47				GRAY	-			-11			Wire Signal Name	-			F48	1		E03FGY-RS			1 2 3			re Signal Name						
2	Connector No	Connector Name		Connector Type	Connector Color	(Line of the second sec	5 H				al		-	× •	_	Connector No	Connector Name		Connector Type	<u> </u>	H.S.			Terminal	No. Wire						
Connector No. F38			Connector Color BLACK			H.S.			Terminal Color of Sinnal Name	Wire		) œ	-	Connector No. F41	Connector Name FUEL INJECTOR NO. 3	Connector Type HS02FGYF	Connector Color GRAY					Terminal Color of Signal Name		2 W –		Connector No. F42			H.S.	Terminal Color of Signal Name No.	+

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F57	JOINT CONNECTOR-F08	I KU4FW-J WHITE			Signal Name		1 1	1			CAMSHAFT FOSHION SENSOR (FIRSE) (BANK 2)	RH03FB	BLACK					Signal Name	1	1 1		
		Connector lype I Connector Color V		H.S.	Terminal Color of No. Wire		2 LG 3 LG						Connector Color E		H.S.			No. Wire		2 Ltd		
F55	JOINT CONNECTOR-F04	RHIUFB BLACK	[		of Signal Name		1 1	1	1	-	1		JOINT CONNECTOR-F07	IK04FW-J WHITF						of Signal Name		
		Connector Type Connector Color		HS	Terminal Color of No.		3 BH		9 FG		10 BR			Connector Type Connector Color		H.S.				Terminal Color of No. Wire		
	JOINT CONNECTOR-F03		[		Signal Name	1	1 1	-			REALED UXTGEN SENSUR 2 (BANN 2) RH04FDGY-P			R	1 2 3 4		Signal Name	,	Т	1 1		
		Connector Type RH1UFB Connector Color BLACK		H.S.	Terminal Color of No.		2 B B				Connector Type RH04FDGY-P		UP I	H.S.		/	Terminal Color of			4 0 8 0	_	

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# ENGINE CONTROL SYSTEM

### < WIRING DIAGRAM >

2 W -		Connector No.	Connector Name INTAKE VALVE TIMING CONTROL SCI ENOID VALVE (RANK 2)	Connector Type E02FG-RS-LGY	Connector Color GRAY		SH SH	Name		Terminal	No. Wire Jughan wante		LLED ENGINE	ENUID VALVE Connector No. F67	he	SOLENOID VALVE (BANK 1)	Connector Type E02FG-RS-LGY Connector Color GRAV		HS.			Terminal Color of	No.	L	OID VALVE 2 BR					
F63	VIAS CONTROL SOLENOID VALVE 1	E02FB-RS	BLACK			R.		Signal Name	'	1		F64	ELECTRONIC CONTROLLED ENGINE		E02FBR-RS				-			1	1	F65	VIAS CONTROL SOLENOID VALVE 2	E02FB-RS	BLACK		1 2	
Connector No.	Connector Name					H.S.		Terminal Color of		2 BR		Connector No.	e		Connector Type		EB	H.S.		Terminal Color of	-		N N	Connector No.	e			H.S.		
F61	AIR FUEL RATIO (A/F)SENSOR 1 (BANK 2)	RH04FDGY-P	GRAY			$\nabla$	1 2 3 4	f Signal Name		1	-	1			HEATED OXYGEN SENSOR 2 (BANK 1)		GHAY		1234		If Signal Name		1 1	1	1					
Connector No.	he					H.S.		Terminal Color of		2 BR		4 B			Connector Name	Т	Connector Color		H.S.		al	No. Wire		+	4 B					

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75	INTAKE VALVE TIMING INTERMEDIATE LOCK CONTROL SOLENOID VALVE (BANK		EUZFG-KS-LGY GRAY					Signal Name	-		F76 Wide to Wide	RS04FL-B	BLUE				Signal Name	1						EC C D
Connector No. F	Connector Name IN		Connector Type E Connector Color G		H.S.		F	Terminal Color of No. Wire	 	_	Connector No. F		Connector Color B	H.S.			Terminal Color of			4 SHIELD				E
1		F73	EXHAUST VALVE TIMING CONTROL SOLENOID VALVE (BANK 2)	E02FG-RS-LGY GPAV					signal Name		1	F74	IN IAKE VALVE I IMING IN I EHMEDIALE LOCK CONTROL SOLENOID VALVE (BANK 1)	E02FG-RS-LGY GRAY		Ŕ	1 2		Signal Name					F G H
		Connector No.	Connector Name	Connector Type	LT L	H.S.			Terminal Color of	+	N N	Connector No.	Connector Name	Connector Type Connector Color	ЦЦ ЦЦ	H.S.			Terminal Color of					J
F68	ENGINE OIL TEMPERATURE SENSOR	GRAY			1		f Signal Name		-	F70 EXHALIST VALVE TIMING CONTROL	POSITION SENSOR (PHASE) (BANK 2)	RH03FB BLACK		11/ -	1 2 3	-	f Signal Name	1 1	I	F72 EXHAUST VALVE TIMING CONTROL SOLENOID VALVE (BANK 1) E02FG-RS-LGY	GRAV		Signal Name	K L M
	Connector Name E			НС	Ď		Terminal Color of No. Wire	- s	-	Connector No. F		Connector Type H Connector Color E	UU UU	H.S.		F	Terminal Color of No. Wire	2 BR	GH GH		Connector Color G	H.S.	No. Wire	N

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#### < WIRING DIAGRAM >

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< WIRING DIAGRAM >

FUEL INJECTOR NO. 1 SENSOR POWER SUPPLY (ENGINE OIL PRESSURE	SENSÓRJ	FUEL PUMP RELAY	REFRIGERANT PRESSURE SENSOR	FUEL INJECTOR NO. 6	FUEL INJECTOR NO. 3	1	1	SENSOR GROUND (REFRIGERANT PRESSURE SENSOR)	1	1	SENSOR POWER SUPPLY	1	1	ENGINE COOLANT TEMPERATURE SENSOR	HEATED OXYGEN SENSOR 2 (BANK 2)	1	INTAKE AIR TEMPERATURE SENSOR	SENSOR GROUND (HEATED OXYGEN SENSOR 2)	CRANKSHAFT POSITION SENSOR (POS)	EXHAUST CAMSHAFT POSITION SENSOR (PHASE) (BANK 1)	MASS AIR FLOW SENSOR	EXHAUST CAMSHAFT POSITION SENSOR (PHASE) (BANK 2)	SENSOR GROUND	HEATED OXYGEN SENSOR 2 (BANK 1)	1	1	I	I	A/F SENSOR 1 HEATER (BANK 2)	HEATED OXYGEN SENSOR 2 HEATER (BANK 2)	-	ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE	1	POWER SUPPLY (VALVE)	1	1	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ECM GROUND	

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F77	CAMSHAFT POSITION SENSOR (PHASE) (BANK 1)	RH03FB	BLACK		Signal Name	I	Т	I	F78	ECM	MAB35FB-MEB20-LH	BLACK	1 6 11 16 21 26 31 36 41 46 51	2         7         12         17         22         35         37         42         47         52           3         8         13         18         23         38         43         48         53	9 14 19 24 29 34 39 44 49 10 15 20 25 30 35 40 46 50	Signal Name	THROTTI E CONTROL MOTOR (CLOSE)	THROTTLE CONTROL MOTOR POWER SUPPLY	THROTTLE CONTROL MOTOR (OPEN)	KNOCK SENSOR [KNOCK SENSOR (BANK 1), KNOCK SENSOR (BANK 2)]	KNOCK SENSOR (BANK 1)	A/F SENSOR 1 HEATER (BANK 1)	HEATED OXYGEN SENSOR 2 (BANK 1) THROTTI E CONTROL MOTOR BELAY	KNOCK SENSOR (BANK 2)	ECM GROUND	FUEL INJECTOR NO. 5	FUEL INJECTOR NO. 4	ENGINE OIL TEMPERATURE SENSOR ENGINE OIL PRESSI IRE SENSOR	SENSOR GROUND (ENGINE OIL PRESSURE SENSOR, ENGINE OIL TEMPERATURE SENSOR)	FUEL INJECTOR NO. 2
No.		Type F			Color of Wire	BB	ГG	GR	No.	+	Type					Color of	o nice	æ	M	ß	•	æ	8 4	>	8	>	-	ຫ ≩	: œ	SB
Connector I	Connector Name	Connector <sup>-</sup>	Connector Color	E E E E E	Terminal No.	-	2	9	Connector 1	Connector Name	Connector -		E E E	þ		Terminal	- NO.	5	3	4	5	9	× ۵	6	10	Ħ	12	13	15	16

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3 4		Connector No. Connector Name	Connector Type	Connector Color	Ó	L C C C C C C C C C C C C C C C C C C C		Ъ.К.				ŀ	Terminal C	-	- 2	e	4		Connector No.	Connector Name	Connector Type	Connector Color		1999	H.S.				ŀ	al	. No.	- ~												
SENSOR GHOUND [INIARE CAMSHAFT   POSITION SENSOR (PHASE) (BANK 1), INTAKE CAMSHAFT POSITION SENSOR (PHASE) (BANK 2)]	1	SENSOR POWER SUPPLY [INTAKE CAMSHAFT POSITION SENSOR (PHASE) (BANK 1), INTAKE CAMSHAFT POSITION SENSOR (PHASE) (BANK 2)]	1	1		1	1	SENSOR POWER SUPPLY (THROTTLE POSITION SENSOR)	ENGINE COMMUNICATION LINE	1	1	VIAS CONTROL SOLENOID VAVLE 2	IGNITION SIGNAL NO. 3		IGNITION SIGNAL NO. 2	IGNITION SIGNAL NO. 5	VIAS CONTROL SOLENOID VAVLE 1	1	ECM GROUND	1		IGNITION SIGNAL NO. 4	1	POWER SUPPLY FOR ECM (BACK-UP)	INTAKE VALVE TIMING CONTROL SOLENOID VALVE (BANK 1)	INTAKE VALVE TIMING INTERMEDIATE LOCK	CONTROL SOLENOID VALVE (BANK 1)	INTARE VALVE TIMING CONTROL SULENVID VALVE (BANK 2)	INTAKE VALVE TIMING INTERMEDIATE LOCK CONTROL SOLENOID VALVE (BANK ?)	CONTRACT SOLENOID VALVE (DAVIN 2)	E87	FUGINE OIL PRESSURE SENSOR	RH03FB	BLACK				′	$(1 \ 2 \ 3)$				Signal Name	
3	1	В	1	1	•	ı	1	σ	_	1		M	•	> 0		ГG	ВВ	ı	8		• >	- 8		GR	BR	ГG	>	-	œ			+										Color of	Wire	٥
06	91	92	93	94	95	96	97	86	66	100	101	102	103	104	106	107	108	109	110	111	211	114	115	116	117	118	¢.	2	120		Connector No	Connector Name	Connector Type	Connector Color		E C C C C C C C C C C C C C C C C C C C	SH	5				Terminal	No.	-
F79 FCM	MARSER-MERID-I H			56 61 66 71 76 81 86 91 96 101 106 111 16		<sup>37</sup> 62 67 72 77 82 87 92 97 102 107 112 <sup>117</sup>	58 63 68 73 78 83 88 93 98 103 108 113 118	59	64 69 74 79 84 89 94 99 104109114 65 70 75 80 85 90 95 100105110115			Signal Name			EXHAUST VALVE TIMING CONTROL SOLENOID VALVE	(BANK 1)	- EXHALIST VALVE TIMING CONTROL SOLENCID VALVE	(BANK 2)	I	I	Т	1 1	A/F SENSOR 1 (BANK 1)	A/F SENSOR 1 (BANK 1)	1	- SHIELD	THROTTLE POSITION SENSOR 1	THROTTLE POSITION SENSOR 2	-	-	SENSOR GROUND (THROTTLE POSITION SENSOR)	A/F SFNSOR 1 (BANK 2)		-	SHIELD (ELECTRIC THROTTLE CONTROL ACTUATOR)		- PNP SIGNAL	INTAKE CAMSHAFT POSITION SENSOR (PHASE)	(BANK 1)	1	ECM RELAY (SELF SHUT-OFF)		INTAKE CAMSHAFT POSITION SENSOR (PHASE) (BANK 2)	
Connector No. F			L								] لا 	Color of			SB		, a	i	1		1		8	>	ı	، B	5 a	>	1	1	ш 3	:		1	SHIELD		· œ	GR		1	>		GR	
to t		i ģ	-		υ. Γ						ſ	Terminal								ſ							2 12		73		75			79										



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**Revision: December 2015** 

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Connector No.	SURE Connector Name WIRE TO WIRE	Connector Type TH16MW-NH	Connector Color WHITE		HT.S. 9 10 11 12 13 14 16 16	Terminal Color of Signal Name No. Write	2 GR -	3 R	4 R -	5 GR/Y –	9		8 LW			Connector No. B43	Connector Name WIRE TO WIRE	Connector Type NS08MW-CS	Connector Color WHITE		H.S.		- 0 0			f		4 W -	
B36	EVAP CONTROL SYSTEM PRESSURE	SENSOR	E03FGY-RS	GRAY	1	f Signal Namo	Odia Maria	-		1		B37	FUEL PUMP CONTROL MODULE (FPCM)	TB06FB	BLACK				1 2 3 4 5 6			Signal Name	1	-	1	1	-	1	
Connector No.	Connector Name		Connector Type	Connector Color	मिन्न H.S.	a	No. Wire	<del>ت</del>	2 GRM	е В		Connector No.	Connector Name	Connector Type	Connector Color			H.S.			Terminal Color of	No. Wire	1 G/Y	2 G/R	en en	4	5 GR	9 9	
	Connector Name KNOCK SENSOR (BANK 1)	Connector Type BS02FGY-B-H	Connector Color GRAY		HS.	Terminal Color of Signal Name No. Wire	1 GR –	2 SHIELD –		Connector No. F203	٩									Terminal Color of Signal Name		2 SHIELD -		Connector No B31	4			Connector Color BLACK	H.S.

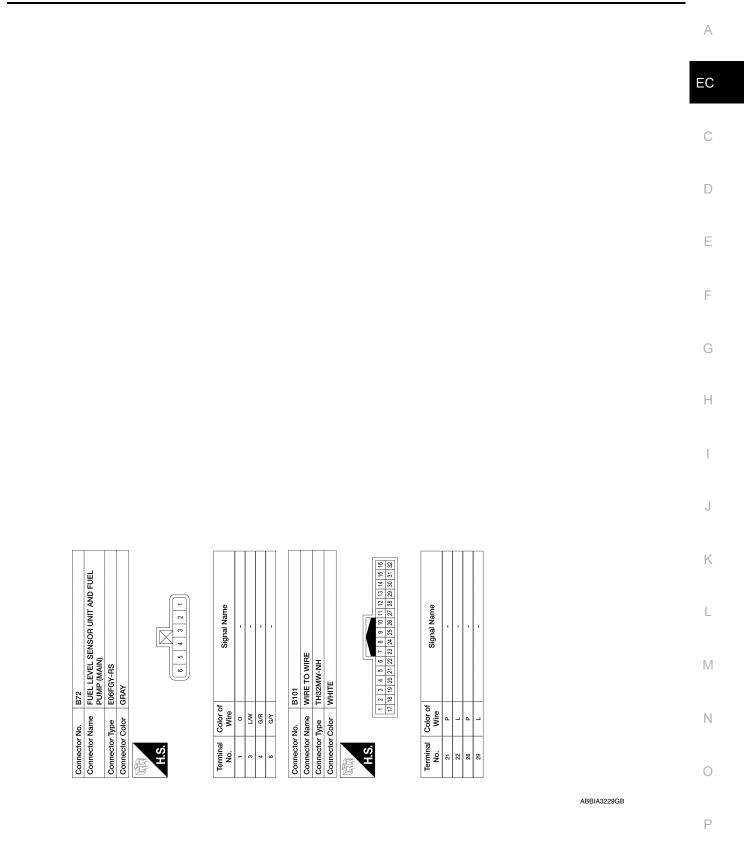
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Signal Name

Color of Wire G/W

Terminal No.

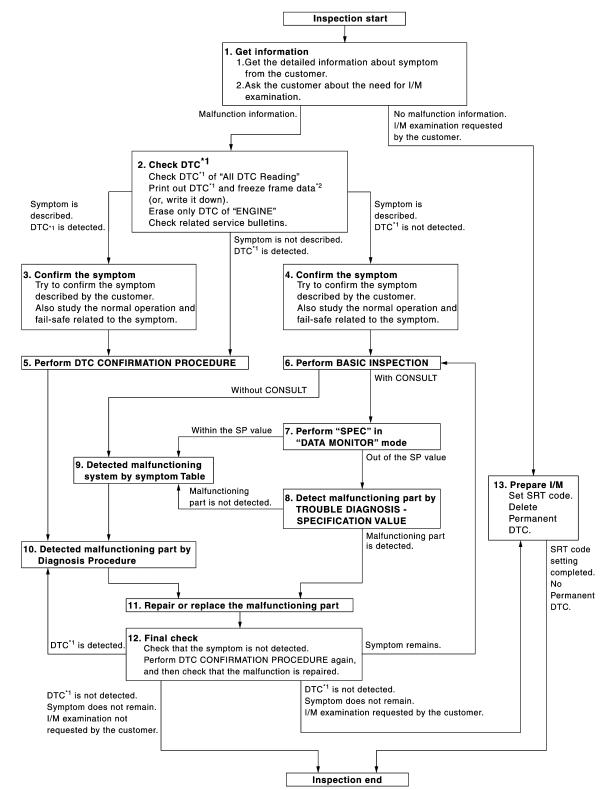
ABBIA3228GB



# BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

**OVERALL SEQUENCE** 



JSBIA0123GB

INFOID:000000012891216

< BASIC INSPECTION >

1.

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Function".

IVQ35DE1 \*1: Include 1st trip DTC. А \*2: Include 1st trip freeze frame data. DETAILED FLOW EC **1**.GET INFORMATION FOR SYMPTOM Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the "Diagnostic Work Sheet". (Refer to EC-147, "Diagnostic Work Sheet".) Ask if the customer requests I/M examination. D Malfunction information, obtained>>GO TO 2. No Malfunction information, but a request for I/M examination>>GO TO 13. 2.CHECK DTC Ε Check DTC of "All DTC Reading". Perform the following procedure if DTC is displayed. Record DTC and freeze frame data. (Print them out with CONSULT or GST.) Erase only DTC of "ENGINE". 🕅 With CONSULT: Refer to "How to Erase DTC and 1st Trip DTC" in EC-70, "CONSULT Function". R Without CONSULT: Refer to "How to Erase Self-diagnostic Results" in EC-67, "On Board Diagnosis Turn ignition switch OFF. Study the relationship between the cause detected by DTC and the symptom described by the customer. Н (Symptom Table is useful. Refer to EC-564, "Symptom Table".) Check related service bulletins for information. Are any symptoms described and any DTCs detected? Symptom is described, DTC is detected>>GO TO 3. Symptom is described, DTC is not detected>>GO TO 4. Symptom is not described, DTC is detected>>GO TO 5. 3. CONFIRM THE SYMPTOM Try to confirm the symptom described by the customer (except MIL ON). Also study the normal operation and fail-safe related to the symptom. Refer to EC-568, "Description" and EC-K 102, "Fail-safe". Diagnosis Work Sheet is useful to verify the incident. Verify relation between the symptom and the condition when the symptom is detected. >> GO TO 5. **4.**CONFIRM THE SYMPTOM M Try to confirm the symptom described by the customer. Also study the normal operation and fail-safe related to the symptom. Refer to EC-568, "Description" and EC-102, "Fail-safe". Ν Diagnosis Work Sheet is useful to verify the incident. Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

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

If two or more DTCs are detected, refer to EC-104, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

#### NOTE:

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

## DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

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

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

#### Is DTC detected?

- YES >> GO TO 10.
- NO >> Check according to <u>GI-42, "Intermittent Incident"</u>.

**Ó**.PERFORM BASIC INSPECTION

Perform EC-158, "Work Procedure".

Do you have CONSULT?

YES >> GO TO 7.

NO >> GO TO 9.

7.PERFORM SPEC IN DATA MONITOR MODE

#### With CONSULT

Make sure that "MAS AIR FLOW SENSOR (Hz), "B/FUEL SCHDL", "A/F ALPHA-B1" and "A/F ALPHA-B2" are within the SP value using CONSULT "SPEC" in "DATA MONITOR" mode of "ENGINE". Refer to <u>EC-176</u>, "<u>Component Function Check</u>".

Is the measurement value within the SP value?

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

 $\mathbf{8}$ . DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to EC-177, "Diagnosis Procedure".

Is a malfunctioning part detected?

YES >> GO TO 11.

NO >> GO TO 9.

9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to <u>EC-564</u>, "<u>Symptom Table</u>" based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptoms.

#### >> GO TO 10.

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

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

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to <u>GI-44</u>, "<u>Circuit Inspection</u>".

Is a malfunctioning part detected?

YES >> GO TO 11.

NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CON-SULT. Refer to <u>EC-84, "Reference Value"</u>.

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

- 1. Repair or replace the malfunctioning part.
- 2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
- Check DTC. If DTC is displayed, erase it.
   With CONSULT: Refer to "How to Erase DTC and 1st Trip DTC" in <u>EC-70, "CONSULT Function"</u>.
   Without CONSULT: Refer to "How to Erase Self-diagnostic Results" in <u>EC-67, "On Board Diagnosis Function"</u>.

>> GO TO 12.

## DIAGNOSIS AND REPAIR WORKFLOW

#### < BASIC INSPECTION >

[VQ35DE]

#### 12.FINAL CHECK А When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then make sure that the malfunction have been completely repaired. When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure EC that the symptom is not detected. Is DTC detected and does symptom remain? YES-1 >> DTC is detected: GO TO 10. YES-2 >> Symptom remains: GO TO 6. NO-1 >> No request for I/M examination from the customer. Before returning the vehicle to the customer, always erase unnecessary DTC in ECM and TCM (🕅 With CONSULT: Refer to "How to Read D DTC and 1st Trip DTC" in EC-70, "CONSULT Function", (R) Without CONSULT: Refer to "How to Read Self-diagnostic Results" in EC-67, "On Board Diagnosis Function"). NO-2 >> I/M examination, requested from the customer: GO TO 13. **13.**PREPARE FOR I/M EXAMINATION Е 1. Set SRT codes. Refer to EC-164, "Description". Erase permanent DTCs. Refer to <u>EC-170, "Description"</u>. F >> INSPECTION END. Diagnostic Work Sheet INFOID:000000012891217 DESCRIPTION Н There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make trou-**KEY POINTS** bleshooting faster and more accurate. In general, each customer feels differently about symptoms. It is WHAT ..... Vehicle & engine model important to fully understand the symptoms or conditions for a cus-WHEN ..... Date, Frequencies tomer complaint. WHERE..... Road conditions Utilize a diagnostic worksheet like the WORKSHEET SAMPLE HOW ..... Operating conditions, below in order to organize all the information for troubleshooting. Weather conditions, Some conditions may cause the MIL to illuminate or blink, and DTC Symptoms to be detected. Examples: · Vehicle ran out of fuel, which caused the engine to misfire. Κ SEE907I · Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere. L

Revision: December 2015

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# DIAGNOSIS AND REPAIR WORKFLOW

### < BASIC INSPECTION >

### WORKSHEET SAMPLE

Customer name MR/MS		Model & Year	VIN
Engine #		Trans.	Mileage
Incident Date		Manuf. Date	In Service Date
Fuel and fuel filler cap		<ul> <li>Vehicle ran out of fuel causing misfire</li> <li>Fuel filler cap was left off or incorrectly screwed on.</li> </ul>	
	☐ Startability	Impossible to start No combust Partial combustion affected by th Partial combustion NOT affected Possible but hard to start Other	nrottle position I by throttle position
Symptoms	🗌 Idling	□ No fast idle □ Unstable □ H □ Others [	High idle 🔲 Low idle ]
	Driveability	Stumble Surge Knock Intake backfire Exhaust backfi Others [	Lack of power re ]
	🗌 Engine stall	At the time of start       While idling         While accelerating       While dece         Just after stopping       While loadi	lerating
Incident occu	irrence	☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night [	☐ In the daytime
Frequency		All the time Under certain cond	ditions 🗌 Sometimes
Weather cond	ditions	Not affected	
	Weather	🗌 Fine 🗌 Raining 🗌 Snowing	Others [ ]
	Temperature	🗌 Hot 🗌 Warm 🗌 Cool 🗌	] Cold 🔲 Humid °F
		Cold During warm-up	After warm-up
Engine conditions		Engine speed 0 2,000	4,000 6,000 8,000 rpm
Road conditions		🗌 In town 🗌 In suburbs 🗌 Hig	hway 🛛 Off road (up/down)
Driving conditions		Not affected     At starting     While idling     While accelerating     While decelerating     While turning     Vehicle speed	5
		0 10 20	30 40 50 60 MPH
Malfunction indicator lamp		Turned on Not turned on	

MTBL0017

### SERVICE AFTER REPLACING OR REMOVING ENGINE PARTS NSPECTION > [VQ35DE]

< BASIC INSPECTION >

# SERVICE AFTER REPLACING OR REMOVING ENGINE PARTS

## Description

### SPECIAL REPAIR REQUIREMENT

				×: Applicable
	Service performed			
Part name	Replacement	Removal <sup>*1</sup>	- Required service	Reference
	×		Additional service when replacing ECM	<u>EC-150</u>
		×	Accelerator pedal released position learning	EC-152
ECM			Throttle valve closed position learning	<u>EC-153</u>
			Idle air volume learning	<u>EC-154</u>
			VIN registration	<u>EC-157</u>
Accelerator Pedal	×	×	Accelerator pedal released position learning	EC-152
	×	×	Throttle valve closed position learning	EC-153
Electric throttle	×		Idle air volume learning	EC-154
			Throttle valve closed position learning*2	<u>EC-153</u>
Engine accombly	×		Idle air volume learning <sup>*2</sup>	<u>EC-154</u>
Engine assembly			Accelerator pedal released position learning	<u>EC-152</u>
		×	Throttle valve closed position learning <sup>*2</sup>	<u>EC-153</u>

\*1: Harness connector disconnection included.

\*2: Replacement of engine with a electric throttle.

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## ADDITIONAL SERVICE WHEN REPLACING ECM

< BASIC INSPECTION >

# ADDITIONAL SERVICE WHEN REPLACING ECM

## Description

When replacing ECM, the following procedure must be performed. (For details, refer to <u>EC-150, "Work Proce-dure"</u>.)

### PROGRAMMING OPERATION

#### NOTE:

After replacing with a blank ECM, programming is required to write ECM information. Be sure to follow the procedure to perform the programming.

#### **BEFORE REPLACEMENT**

When replacing ECM, perform "SAVING DATA FOR REPLC CPU" in "WORK SUPPORT" of "ENGINE" by using CONSULT to save current ECM data before replacement.

### AFTER REPLACEMENT

After replacing ECM, the following items must be performed:

- · Write data after replace CPU
- · Accelerator pedal released position learning
- · Throttle valve closed position learning
- · Idle air volume learning

### Work Procedure

## **1**.SAVE ECM DATA

#### With CONSULT

- Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Turn ignition switch ON.
- 4. Select "SAVING DATA FOR REPLC CPU" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
- 5. Follow the instruction of CONSULT display.

#### NOTE:

- · Necessary data in ECM is copied and saved to CONSULT.
- · Go to Step 2 regardless of with or without success in saving data.

>> GO TO 2.

### 2.CHECK ECM PART NUMBER

Check ECM part number to see whether it is blank ECM or not.

NOTE:

• Part number of blank ECM is 23703 - xxxxx.

• Check part number when ordering ECM or the one included in the label on the container box.

Is the ECM a blank ECM?

YES >> GO TO 3. NO >> GO TO 5.

3.SAVE ECM PART NUMBER

Read out the part number from the old ECM and save the number, following the programming instructions. Refer to CONSULT Operation Manual.

#### NOTE:

- The ECM part number is saved in CONSULT.
- Even when ECM part number is not saved in CONSULT, go to 4.

>> GO TO 4.

**4.**PERFORM ECM PROGRAMMING

After replacing ECM, perform the ECM programming. Refer to CONSULT Operation Manual. **NOTE:** 

• Refer to EC-574, "Removal and Installation" for replacement of ECM.

### EC-150

INFOID:000000012891219

INFOID:000000012891220

# ADDITIONAL SERVICE WHEN REPLACING ECM

< BASIC INSPECTION >	[VQ35DE]
<ul> <li>During programming, maintain the following conditions:</li> <li>Ignition switch: ON</li> <li>Electric load: OFF</li> <li>Brake pedal: Not depressed</li> <li>Battery voltage: 12 – 13.5 V (Be sure to check the value of battery voltage by selecting "BATTI" "Data monitor" of CONSULT.)</li> </ul>	A ERY VOLT" in EC
>> GO TO 6.	C
5.REPLACE ECM	0
Replace ECM. Refer to EC-574, "Removal and Installation".	D
>> GO TO 6. <b>6.</b> PERFORM INITIALIZATION OF IVIS (NATS) SYSTEM AND REGISTRATION OF ALL IVIS TION KEY IDS	
Refer to <u>SEC-58, "ECM : Work Procedure"</u> .	F
>> GO TO 7.	1
7. CHECK ECM DATA STATUS	
Check if the data is successfully copied from the ECM at Step 1 (before replacement) and saved	in CONSULT.
<u>Is the data saved successfully?</u> YES >> GO TO 8. NO >> GO TO 9.	Н
8.WRITE ECM DATA	
With CONSULT  Select "WRITING DATA FOR REPLC CPU" in "WORK SUPPORT" mode of "ENGINE" using Follow the instruction of CONSULT display. NOTE:	g CONSULT.
The data saved by "SAVING DATA FOR REPLC CPU" is written to ECM.	
>> GO TO 10. 9.PERFORM VIN REGISTRATION Refer to <u>EC-157, "Description"</u> .	L
>> GO TO 10. <b>10.</b> PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING Refer to <u>EC-152, "Description"</u> .	M
>> GO TO 11. 11.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING	Ν
Refer to EC-153, "Description".	0
>> GO TO 12. <b>12.</b> PERFORM IDLE AIR VOLUME LEARNING Refer to <u>EC-154, "Description"</u> .	P

>> END

# ACCELERATOR PEDAL RELEASED POSITION LEARNING

### < BASIC INSPECTION >

# ACCELERATOR PEDAL RELEASED POSITION LEARNING

### Description

INFOID:000000012891221

[VQ35DE]

Accelerator Pedal Released Position Learning is a function of ECM to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time the harness connector of the accelerator pedal position sensor or ECM is disconnected. For details, refer to <u>EC-152</u>, "Work Procedure".

### Work Procedure

INFOID:000000012891222

# **1**.START

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

>> END

## THROTTLE VALVE CLOSED POSITION LEARNING

< BASIC INSPECTION >

# THROTTLE VALVE CLOSED POSITION LEARNING

### Description

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

For details, refer to EC-153, "Work Procedure".

# Work Procedure

1.START	L
<ul> <li>WITH CONSULT</li> <li>Turn ignition switch ON.</li> <li>Select "CLSD THL POS LEARN" in "WORK SUPPORT" mode.</li> <li>Follow the instructions on the CONSULT display.</li> </ul>	E
4. Turn ignition switch OFF and wait at least 10 seconds. Check that throttle valve moves during the above 10 seconds by confirming the operating sound.	F
<ul> <li>WITHOUT CONSULT</li> <li>Start the engine.</li> <li>NOTE:</li> </ul>	G
<ul> <li>Coolant temperature is less than 25°C (77°F) before engine starts.</li> <li>Warm up the engine.</li> <li>NOTE:</li> </ul>	H
Warm up the engine until "COOLANT TEMP/S" on "DATA MONITOR" of CONSULT reaches more th 65°C (149°F).	ian
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>NOTE: Check that throttle valve moves during the above 10 seconds by confirming the operating sound.</li> </ol>	I
>> END	J

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[VQ35DE]

< BASIC INSPECTION >

# IDLE AIR VOLUME LEARNING

## Description

Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps engine idle speed within the specific range. It must be performed under the following conditions:

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

For details, refer to EC-154, "Work Procedure".

## Work Procedure

INFOID:000000012891226

### 1.PRECONDITIONING

Check that all of the following conditions are satisfied.

Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9 V (At idle)
- Engine coolant temperature: 70 100°C (158 212°F)
- Selector lever position: P or N
- Electric load switch: OFF

   (Air conditioner, head lamp, rear window defogger)
   On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the head lamp will not illuminate.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
- With CONSULT: Drive vehicle until "ATF TEMP SEN" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9 V.
- Without CONSULT: Drive vehicle for 10 minutes.

Will CONSULT be used?

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

**2.** PERFORM IDLE AIR VOLUME LEARNING

### With CONSULT

- 1. Perform Accelerator Pedal Released Position Learning. Refer to EC-152, "Description".
- 2. Perform Throttle Valve Closed Position Learning. Refer to EC-153, "Description".
- 3. Start engine and warm it up to normal operating temperature.
- 4. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.
- 5. Touch "START" and wait 20 seconds.

Is "CMPLT" displayed on CONSULT screen?

YES >> GO TO 4. NO >> GO TO 5.

3. Perform idle air volume learning

### Without CONSULT

#### NOTE:

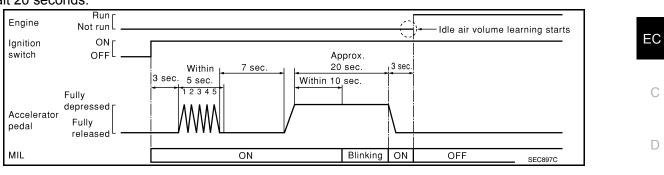
- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- 1. Perform Accelerator Pedal Released Position Learning. Refer to EC-152, "Description".
- 2. Perform Throttle Valve Closed Position Learning. Refer to EC-153, "Description".
- 3. Start engine and warm it up to normal operating temperature.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
- 6. Repeat the following procedure quickly 5 times within 5 seconds.
- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.
- 7. Wait 7 seconds, fully depress the accelerator pedal for approx. 20 seconds until the MIL stops blinking and turns ON.

INFOID:000000012891225

# IDLE AIR VOLUME LEARNING

#### < BASIC INSPECTION >

- 8. Fully release the accelerator pedal within 3 seconds after the MIL turns ON.
- 9. Start engine and let it idle.
- 10. Wait 20 seconds.



#### >> GO TO 4.

# 4. CHECK IDLE SPEED AND IGNITION TIMING

Rev up the engine 2 or 3 times and check that idle speed and ignition timing are within the specifications. For procedure, refer to <u>EC-569, "Work Procedure"</u> and <u>EC-570, "Work Procedure"</u> . For specifications, refer to <u>EC-576, "Idle Speed"</u> and <u>EC-576, "Ignition Timing</u> ".	F
Is the inspection result normal?	G
YES >> INSPECTION END NO >> GO TO 5.	0
5.DETECT MALFUNCTIONING PART-I	Н
<ul> <li>Check the following</li> <li>Check that throttle valve is fully closed.</li> <li>Check PCV valve operation.</li> <li>Check that downstream of throttle valve is free from air leakage.</li> </ul>	Ι
<u>Is the inspection result normal?</u> YES >> GO TO 6. NO >> Repair or replace malfunctioning part.	J
6.DETECT MALFUNCTIONING PART-II	
Engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.	K
It is useful to perform "TROUBLE DIAGNOSIS - SPECIFICATION VALUE". Refer to <u>EC-176. "Description"</u> . If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning again: • Engine stalls.	L
Incorrect idle.	M
>> INSPECTION END	
	Ν
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[VQ35DE]

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### MIXTURE RATIO SELF-LEARNING VALUE CLEAR

#### < BASIC INSPECTION >

# MIXTURE RATIO SELF-LEARNING VALUE CLEAR

### Description

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

For details, refer to EC-156, "Work Procedure".

### Work Procedure

### 1.START

### With CONSULT

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

#### With GST

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF.
- 3. Disconnect mass air flow sensor harness connector.
- 4. Restart engine and let it idle for at least 5 seconds.
- 5. Stop engine and reconnect mass air flow sensor harness connector.
- 6. Select Service \$03 with GST. Check that DTC P0102 is detected.
- 7. Select Service \$04 with GST to erase the DTC P0102.

>> END

INFOID:000000012891228

[VQ35DE]

## **VIN REGISTRATION**

# < BASIC INSPECTION >

# VIN REGISTRATION

	А
Description	A
VIN Registration is an operation to register VIN in ECM. It must be performed each time ECM is replaced. <b>NOTE:</b>	EC
Accurate VIN which is registered in ECM may be required for Inspection & Maintenance (I/M). For details, refer to <u>EC-157, "Work Procedure"</u> .	С
Work Procedure	C
1.CHECK VIN	D
Check the VIN of the vehicle and note it. Refer to GI-36, "Identification Plate".	
>> GO TO 2. 2.PERFORM VIN REGISTRATION	E
<ul> <li>With CONSULT</li> <li>1. Turn ignition switch ON with engine stopped.</li> <li>2. Select "VIN REGISTRATION" in "WORK SUPPORT" mode.</li> </ul>	F
<ol> <li>Select Vin REGISTRATION in WORKSOFFORT mode.</li> <li>Follow the instructions on the CONSULT display.</li> </ol>	G
>> END	Н
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[VQ35DE]

### < BASIC INSPECTION >

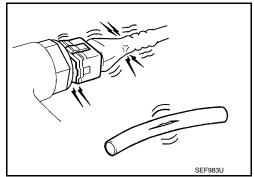
# BASIC INSPECTION

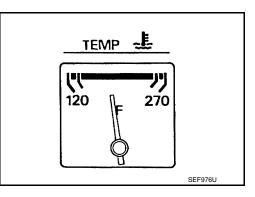
# Work Procedure

[VQ35DE]

# **1**.INSPECTION START

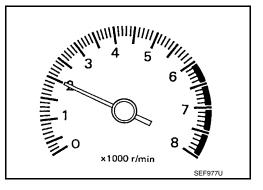
- 1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
- 2. Open engine hood and check the following:
- Harness connectors for improper connections
- Wiring harness for improper connections, pinches and cut
- Vacuum hoses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





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

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



# 2.REPAIR OR REPLACE

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

### >> GO TO 3

# **3.**CHECK TARGET IDLE SPEED

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

## **BASIC INSPECTION**

#### < BASIC INSPECTION >

#### [VQ35DE]

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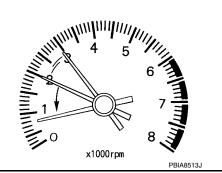
EC

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- 2. Rev engine (2,000 to 3,000 rpm) 2 or 3 times under no load, then run engine at idle speed for approximately 1 minute.
- Check idle speed.
   For procedure, refer to <u>EC-569</u>, "Work Procedure".
   For specification, refer to <u>EC-576</u>, "Idle Speed".

Is the inspection result normal?

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



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PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING   D				
<ol> <li>Stop engine.</li> <li>Perform <u>EC-152, "Description"</u>.</li> </ol>				
>> GO TO 5.				
<b>5.</b> PERFORM THROTTLE VALVE CLOSED POSITION LEARNING				
Perform <u>EC-153</u> , "Description".				
>> GO TO 6.				
6. PERFORM IDLE AIR VOLUME LEARNING				
Perform EC-154, "Description".				
Is Idle Air Volume Learning carried out successfully?				
YES >> GO TO 7. NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.				
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4. 7.CHECK IDLE SPEED AGAIN				
1. Start engine and warm it up to normal operating temperature.				
2. Check idle speed.				
For procedure, refer to <u>EC-569, "Work Procedure"</u> . For specification, refer to <u>EC-576, "Idle Speed"</u> .				
Is the inspection result normal?				
YES >> GO TO 10. NO >> GO TO 8.				
8. DETECT MALFUNCTIONING PART				
Check the Following.				
<ul> <li>Check camshaft position sensor (PHASE) and circuit. Refer to <u>EC-335, "Diagnosis Procedure"</u>.</li> </ul>				
<ul> <li>Check crankshaft position sensor (POS) and circuit. Refer to <u>EC-330, "Diagnosis Procedure"</u>. <u>Is the inspection result normal?</u></li> </ul>				
YES >> GO TO 9.				
NO >> Repair or replace malfunctioning part. Then GO TO 4.				
9.CHECK ECM FUNCTION				
1. Substitute with a non-malfunctioning ECM to check ECM function. (ECM may be the cause of the incident, although this is rare.)				
<ol> <li>Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to <u>SEC-58. "ECM : Description"</u>.</li> </ol>				
>> GO TO 4.				
10. CHECK IGNITION TIMING				

1. Run engine at idle.

 Check ignition timing with a timing light. For procedure, refer to <u>EC-570, "Work Procedure"</u>.

# **BASIC INSPECTION**

< BASIC INSPECTION >

For specification, refer to EC-576, "Ignition Timing".

Is the inspection result normal?

YES >> GO TO 19.

NO >> GO TO 11.

11.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.

2. Perform EC-152, "Description".

>> GO TO 12.

12.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-153, "Description".

>> GO TO 13.

 $13. {\tt perform\ idle\ air\ volume\ learning}$ 

Perform EC-154, "Description".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 14.

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

14. CHECK IDLE SPEED AGAIN

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

Check idle speed.
 For procedure, refer to <u>EC-569, "Work Procedure"</u>.
 For specification, refer to <u>EC-576, "Idle Speed"</u>.

Is the inspection result normal?

YES >> GO TO 15.

NO >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.

 Check ignition timing with a timing light. For procedure, refer to <u>EC-570, "Work Procedure"</u>. For specification, refer to <u>EC-576, "Ignition Timing</u>".

Is the inspection result normal?

YES >> GO TO 19.

NO >> GO TO 16.

**16.**CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to <u>EM-66, "Exploded View"</u>.

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair the timing chain installation. Then GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

Check camshaft position sensor (PHASE) and circuit. Refer to <u>EC-335, "Diagnosis Procedure"</u>.

Check crankshaft position sensor (POS) and circuit. Refer to <u>EC-330, "Diagnosis Procedure"</u>.

Is the inspection result normal?

YES >> GO TO 18.

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

**18.**CHECK ECM FUNCTION

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

# **BASIC INSPECTION**

< BASIC INSPECTION > [VQ35DE]	
<ol> <li>Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to <u>EC-150, "Description"</u>.</li> </ol>	А
>> GO TO 4.	50
	EC
If ECM is replaced during this BASIC INSPECTION procedure, perform <u>EC-150, "Description"</u> .	
>> INSPECTION END	С
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## < BASIC INSPECTION >

# FUEL PRESSURE

### Work Procedure

FUEL PRESSURE RELEASE

(I) With CONSULT

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

### **Without CONSULT**

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

### FUEL PRESSURE CHECK

### **CAUTION:**

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

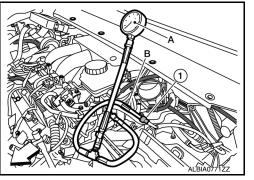
- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because this models do not have fuel return system.
- Be careful not to scratch or get the fuel hose connection area dirty when servicing, so that the quick connector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

 $\textcircled{1} : \mathsf{Quick \ connector}$ 

- 4. Turn ignition switch ON (reactivate fuel pump) and check for fuel leakage.
- 5. Start engine and check for fuel leakage.
- 6. Read the indication of fuel pressure gauge kit [SST: (J-44321)].
  - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.

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

- 7. If result is unsatisfactory, go to next step.
- 8. Check the following.
  - · Fuel hoses and fuel tubes for clogging
  - Fuel filter for clogging
  - Fuel pump



INFOID:000000012891232

# **FUEL PRESSURE**

< B	ASIC INSPECTION > [VQ35DE]	
	Fuel pressure regulator for clogging	
9.	If OK, replace fuel pressure regulator. If NG, repair or replace malfunctioning part.	А
10.	Before disconnecting Fuel Pressure Gauge kit [SST: — (J-44321)] and Fuel Pressure Adapter [SST: — (J-44321-6)], release fuel pressure to zero.	EC
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# HOW TO SET SRT CODE

### < BASIC INSPECTION >

# HOW TO SET SRT CODE

### Description

INFOID:000000012891233

[VQ35DE]

### OUTLINE

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

### SRT ITEM

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

SRT item <sup>*1</sup> (CONSULT indication)	Performance Priority <sup>*2</sup>	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420, P0430
EVAP SYSTEM	2	EVAP control system purge flow monitoring	P0441
		EVAP control system	P0456
HO2S	2	Air fuel ratio (A/F) sensor 1	P014C, P014D, P014E, P014F, P015A, P015B,P015C, P015D
		Heated oxygen sensor 2	P0137, P0157
		Heated oxygen sensor 2	P0138, P0158
		Heated oxygen sensor 2	P0139, P0159
EGR/VVT SYSTEM	3	Intake valve timing control function	P0011, P0021, P052A, P052B, P052C, P052D

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

\*2: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT.

SRT SERVICE PROCEDURE

# HOW TO SET SRT CODE

#### < BASIC INSPECTION >

Start

Check for DTC

Check SRT status.

All "CMPLT"

Check for permanent DTC.

Perform road test.

Check for DTC

Check for all SRT "CMPLT".

No DTC

Any "INCMP"

No DTC

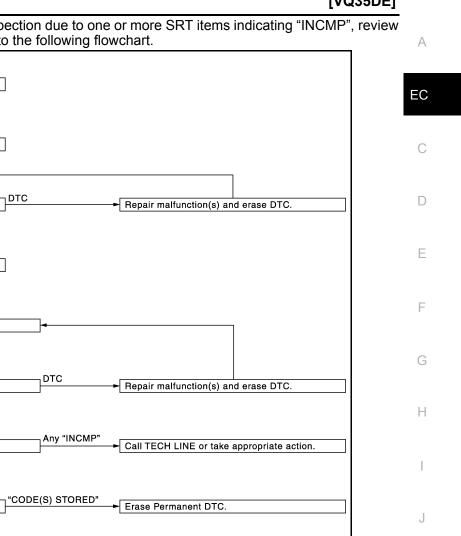
All "CMPLT"

"CODE NOT STORED"

Vehicle rejected by I/M

#### [VQ35DE]

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



# SRT Set Driving Pattern

End

INFOID:000000012891234 L

JSBIA0400GB

### **CAUTION:**

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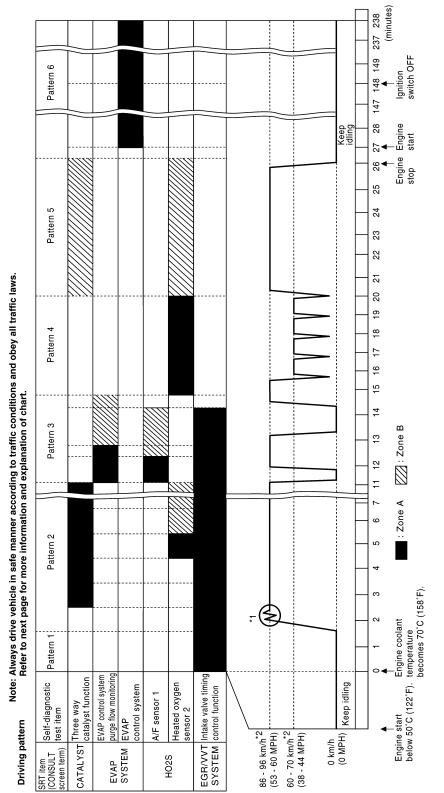
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#### < BASIC INSPECTION >

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



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

\*2: Checking the vehicle speed with GST is advised.

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

# HOW TO SET SRT CODE

HOW TO SET SRT CODE	
< BASIC INSPECTION >	VQ35DE]
*: Normal conditions - Sea level - Flat road - Ambient air temperature: 20 – 30°C (68 – 86°F)	А
NOTE: $(00 - 00 F)$	
Diagnosis is performed as quickly as possible under normal conditions. However, under other diagnosis may also be performed. [For example: ambient air temperature other than 20 – 30°C (68	
Work Procedure	D:000000012891235
Check DTC. <u>Is any DTC detected?</u>	D
YES >> Repair malfunction(s) and erase DTC. Refer to <u>EC-105. "DTC Index"</u> . NO >> GO TO 2.	E
2.CHECK SRT STATUS	_
With CONSULT Select "SRT STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT.	F
Without CONSULT Perform "SRT status" mode with EC-67, "On Board Diagnosis Function".	
With GST Select Service \$01 with GST.	G
Is SRT code(s) set?	Н
YES >> GO TO 12. NO-1 >> With CONSULT: GO TO 3. NO-2 >> Without CONSULT: GO TO 4.	
<b>3.</b> DTC CONFIRMATION PROCEDURE	I
<ol> <li>Select "SRT WORK SUPPORT" in "DTC &amp; SRT CONFIRMATION" mode with CONSULT.</li> <li>For SRT(s) that is not set, perform the corresponding "DTC CONFIRMATION PROCEDURE" at the "Performance Priority" in the "SRT ITEM" table. Refer to <u>EC-164</u>. "<u>Description</u>".</li> <li>Check DTC.</li> </ol>	ccording to
Is any DTC detected?	К
YES >> Repair malfunction(s) and erase DTC. Refer to <u>EC-105, "DTC Index"</u> . NO >> GO TO 11.	1 X
4.PERFORM ROAD TEST	1
<ul> <li>Check the "Performance Priority" in the "SRT ITEM" table. Refer to <u>EC-164, "Description"</u>.</li> <li>Perform the most efficient SRT set driving pattern to set the SRT properly. Refer to <u>EC-165, "SR</u>"</li> </ul>	└
ing Pattern". In order to set all SRTs, the SRT set driving pattern must be performed at least once.	M
in order to set all ortris, the ortri set driving pattern must be performed at least once.	
>> GO TO 5.	Ν
5.PATTERN 1	
<ol> <li>Check the vehicle condition;</li> <li>Engine coolant temperature is -10 to 35°C (14 to 95°F).</li> <li>Fuel tank temperature is more than 0°C (32°F).</li> <li>Start the opgine</li> </ol>	0
<ol> <li>Start the engine.</li> <li>Keep engine idling until the engine coolant temperature is greater than 70°C (158°F)</li> <li>NOTE:</li> <li>ECM terminal voltage is follows;</li> <li>Engine coolant temperature</li> </ol>	Ρ
- −10 to 35°C (14 to 95°F): 3.0 − 4.3 V - 70°(158°F): Less than 4.1 V	
<ul> <li>Fuel tank temperature: Less than 1.4 V Refer to <u>EC-84, "Reference Value"</u>.</li> </ul>	

Revision: December 2015

< BASIC INSPECTION >

>> GO TO 6.

# 6.PATTERN 2

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

#### NOTE:

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

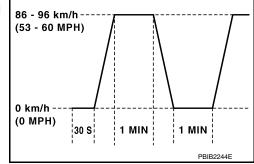
>> GO TO 7.

# 7.PATTERN 3

• Operate vehicle following the driving pattern shown in the figure.

 Release the accelerator pedal during deceleration of vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).
 86 - 96 km/ (53 - 60 MP

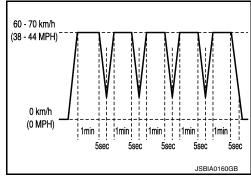
>> GO TO 8.



# 8. PATTERN 4

- Operate vehicle, following the driving pattern shown in the figure.
- Drive the vehicle in a proper gear at 60 km/h (38 MPH) and maintain the speed.
- Release the accelerator pedal fully at least 5 seconds.
- Repeat the above two steps at least 5 times.

>> GO TO 9.



# 9. PATTERN 5

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

>> GO TO 10.

# **10**.PATTERN 6

Cool down the engine so that the engine coolant temperature lowers between 15 – 35°C (59 – 95°F).
 CAUTION:

### Never turn the ignition switch ON while cooling down the engine.

Engine coolant temperature at engine start is between 15 – 35°C (59 – 95°F) and has lowered 45°C (113°F) or more since the latest engine stop.

>> GO TO 11.

**11.**CHECK SRT STATUS

With CONSULT

# HOW TO SET SRT CODE

HOW TO SET SRT CODE		
< BASIC INSPECTION >	[VQ35DE]	
Select "SRT STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT. Without CONSULT Perform "SRT status" mode with <u>EC-67, "On Board Diagnosis Function"</u> .		А
With GST     Select Service \$01 with GST.		EC
Is SRT(s) set?		
YES >> GO TO 12. NO >> Call TECH LINE or take appropriate action. <b>12.</b> CHECK PERMANENT DTC		С
NOTE: Permanent DTC cannot be checked with a tool other than CONSULT or GST. (P)With CONSULT		D
Select "SRT STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT. With GST Select Service \$0A with GST.		Е
Is permanent DTC(s) detected?         YES       >> Proceed to EC-170. "Description".         NO       >> END		F
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#### < BASIC INSPECTION >

# HOW TO ERASE PERMANENT DTC

### Description

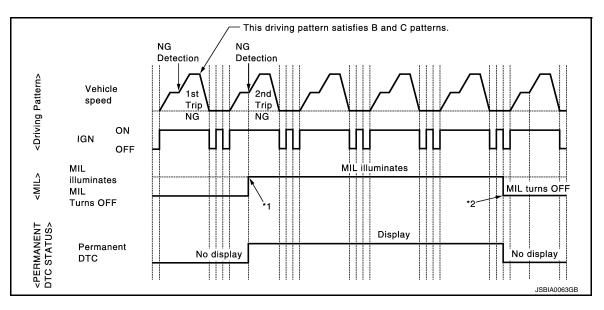
INFOID:000000012891236

[VQ35DE]

#### OUTLINE

#### When a DTC is stored in ECM

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



\*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate. \*2: MIL will turn off after vehicle is driven 3 times (driving pattern B) without any malfunctions.

When a DTC is not stored in ECM

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

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

×: Applicable —: Not applicable

Croup	Perform "DTC CONFIRMATION PROCEDURE"	Driving pattern		Reference	
	for applicable DTCs.	В	D	Treference	
А	x	_	_	EC-171, "Work Pro- cedure (Group A)"	
В	_	×	×	EC-173, "Work Pro- cedure (Group B)"	

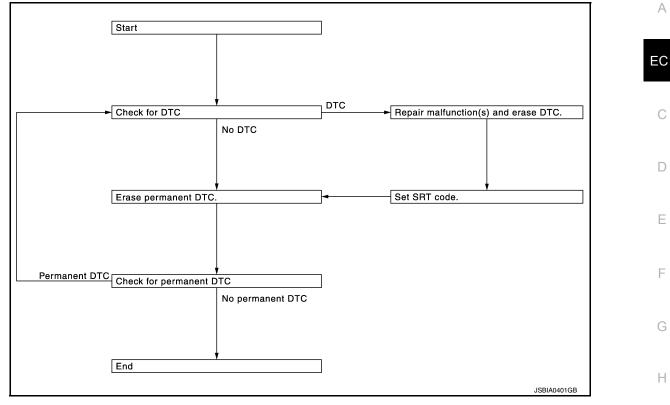
\*: For group, refer to EC-105, "DTC Index".

#### PERMANENT DTC ITEM

For permanent DTC items, MIL turns ON. Refer to EC-105, "DTC Index".

### < BASIC INSPECTION >

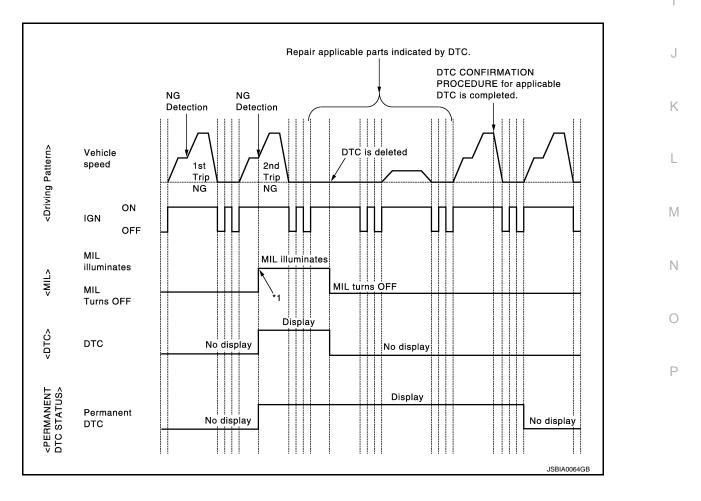
#### PERMANENT DTC SERVICE PROCEDURE



Work Procedure (Group A)

INFOID:000000012891237

[VQ35DE]



Revision: December 2015

### < BASIC INSPECTION >

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

# 1. СНЕСК DTC

### Check DTC.

Is any DTC detected?

YES >> Repair malfunction(s) and erase DTC. Refer to <u>EC-67, "On Board Diagnosis Function"</u> or <u>EC-70,</u> <u>"CONSULT Function"</u>.

NO >> GO TO 2.

2. CHECK PERMANENT DTC

### With CONSULT

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

With GST

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Select Service \$0A with GST.

### Is any permanent DTC detected?

YES >> GO TO 3.

NO >> END

**3.** PERFORM DTC CONFIRMATION PROCEDURE

Perform "DTC CONFIRMATION PROCEDURE" for DTCs which are the same as permanent DTCs stored in ECM. Refer to EC-105. "DTC Index".

>> GO TO 4.

### **4.**CHECK PERMANENT DTC

### With CONSULT

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

With GST

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

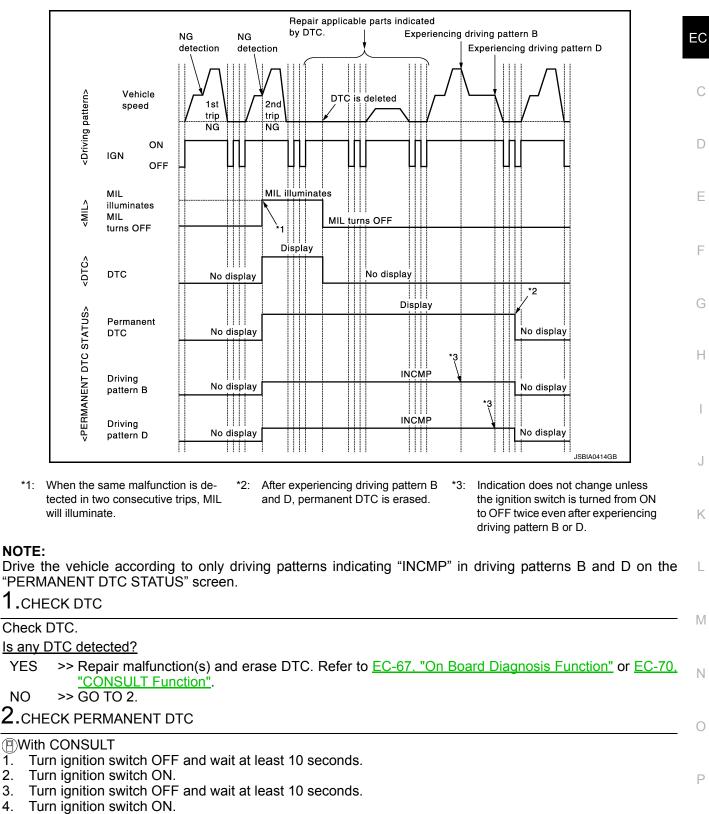
#### < BASIC INSPECTION >

## Work Procedure (Group B)



[VQ35DE]

А



Select "PERMANENT DTC STATUS" mode with CONSULT. 5.

#### Gerein GST

NO

1. 2.

3. 4.

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

< BASIC INSPECTION >

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

Is any permanent DTC detected?

YES >> GO TO 3. NO >> END

**3.** DRIVE DRIVING PATTERN B

### CAUTION:

- Always drive at a safe speed.
- Never erase self-diagnosis results.
- If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B and D is reset.

With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driving pattern B. Refer to <u>EC-70</u>, "<u>CONSULT Function</u>", <u>EC-64</u>, "<u>DIAGNOSIS DESCRIPTION</u> : <u>Driving Pat-</u> <u>tern</u>".

With GST

- 1. Start engine and warm it up to normal operating temperature.
- Drive the vehicle according to driving pattern B. Refer to <u>EC-64, "DIAGNOSIS DESCRIPTION : Driving</u> <u>Pattern"</u>.

>> GO TO 4.

### **4.**CHECK PERMANENT DTC

#### () With CONSULT

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

With GST

- Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Select Service \$0A with GST.

Is any permanent DTC detected?

YES >> GO TO 5. NO >> END

**5.** DRIVE DRIVING PATTERN D

### CAUTION:

• Always drive at a safe speed.

Never erase self-diagnosis results.

- If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B and D is reset.
- 1. Drive the vehicle according to driving pattern D. Refer to <u>EC-64. "DIAGNOSIS DESCRIPTION : Driving</u> <u>Pattern"</u>.

>> GO TO 6.

6.CHECK PERMANENT DTC

### With CONSULT

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

HOW TO ERASE PERMANENT DTC	
< BASIC INSPECTION >	[VQ35DE]
5. Select "PERMANENT DTC STATUS" mode with CONSULT.	
	А
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>	
2. Turn ignition switch ON.	
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>	EC
5. Select Service \$0A with GST.	
Is any permanent DTC detected?	
YES >> GO TO 1.	С
NO >> END	
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### < DTC/CIRCUIT DIAGNOSIS >

# DTC/CIRCUIT DIAGNOSIS **TROUBLE DIAGNOSIS - SPECIFICATION VALUE**

## Description

INFOID:000000012891239

INFOID:000000012891240

[VQ35DE]

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

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

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

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1/B2 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS AIR FLOW SENSOR (Hz) (The signal frequency of the mass air flow sensor)

## Component Function Check

1.START

Check that all of the following conditions are satisfied.

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 104.3 kPa (1.003 1.064 kg/cm<sup>2</sup>, 14.25 15.12 psi)
- Atmospheric temperature: 20 30°C (68 86°F)
- Engine coolant temperature: 75 95°C (167 203°F)
- Transmission: Warmed-up
- After the engine is warmed up to normal operating temperature, drive vehicle until "FLUID TEMP SE" (CVT fluid temperature sensor signal) indicates more than 60°C (140°F).
- Electrical load: Not applied
- Rear window defogger switch, air conditioner switch lighting switch are OFF. Steering wheel is straight ahead.
- · Engine speed: Idle

>> GO TO 2.

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

### With CONSULT

#### NOTE:

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

- Perform basic inspection. Refer to <u>EC-158, "Work Procedure"</u>.
   Select "B/FUEL SCHDL", "A/F ALPHA-B1", "A/F ALPHA-B2" and "MAS AIR FLOW SENSOR (Hz)" in "SPEC" of "DATA MONITOR" mode with CONSULT.
- Check that monitor items are within the SP value. 3

Is the measurement value within the SP value?

- YES >> INSPECTION END
- >> Proceed to EC-177, "Diagnosis Procedure". NO

### < DTC/CIRCUIT DIAGNOSIS >

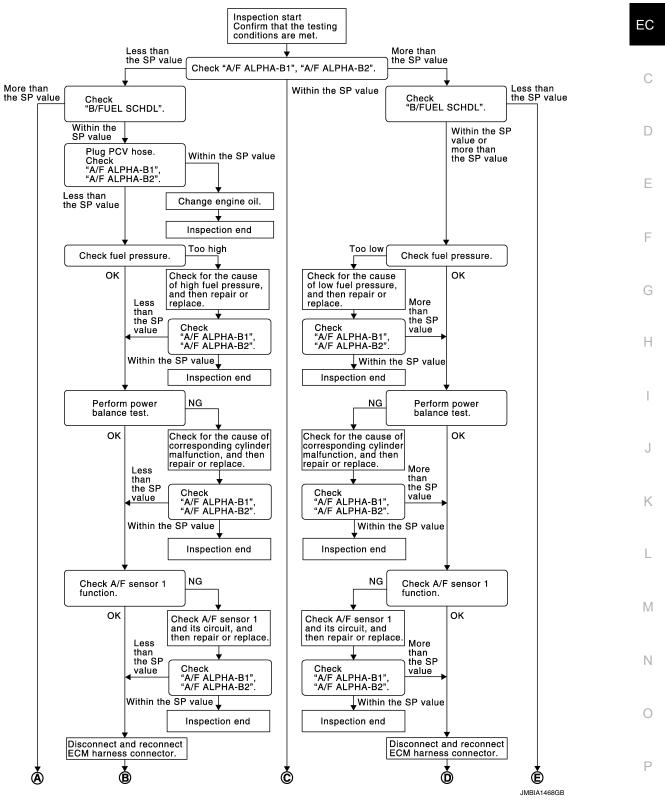
### **Diagnosis** Procedure



INFOID:000000012891241

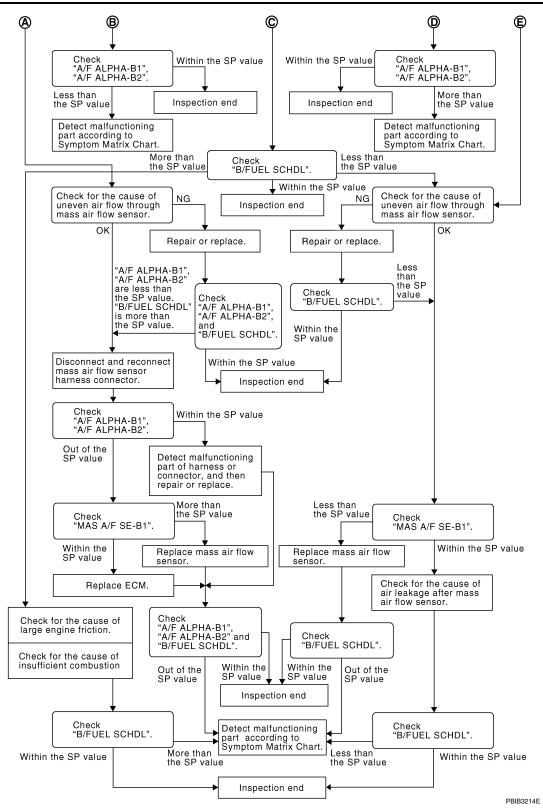
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### **OVERALL SEQUENCE**



### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]



### DETAILED PROCEDURE

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

### With CONSULT

- 1. Start engine.
- Confirm that the testing conditions are met. Refer to <u>EC-176, "Component Function Check"</u>.
- 3. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

### EC-178

< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]	
<b>NOTE:</b> Check "A/F ALPHA-B1", "A/F ALPHA-B2" for approximately 1 minute because they may fluctuate. It is NG if the indication is out of the SP value even a little.	- } /
Is the measurement value within the SP value? YES >> GO TO 17. NO-1 >> Less than the SP value: GO TO 2. NO-2 >> More than the SP value: GO TO 3.	E
2.CHECK "B/FUEL SCHDL"	(
Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SF value.	5
<u>Is the measurement value within the SP value?</u> YES >> GO TO 4. NO >> More than the SP value: GO TO 19.	
3. CHECK "B/FUEL SCHDL"	E
Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SF value.	5 F
Is the measurement value within the SP value? YES >> GO TO 6. NO-1 >> More than the SP value: GO TO 6. NO-2 >> Less than the SP value: GO TO 25.	(
4.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"	
<ol> <li>Stop the engine.</li> <li>Disconnect PCV hose, and then plug it.</li> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each</li> </ol>	ר ד ו ר
indication is within the SP value. <u>Is the measurement value within the SP value?</u> YES >> GO TO 5. NO >> GO TO 6.	,
5. CHANGE ENGINE OIL	
<ol> <li>Stop the engine.</li> <li>Change engine oil. NOTE:</li> </ol>	- k
This symptom may occur when a large amount of gasoline is mixed with engine oil because of driving conditions (such as when engine oil temperature does not rise enough since a journey distance is too short during winter). The symptom will not be detected after changing engine oil or changing driving conditions.	5
	IV
>> INSPECTION END 6.CHECK FUEL PRESSURE	Ν
Check fuel pressure. (Refer to EC-162, "Work Procedure".)	- '
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; GO TO 9.</li> <li>NO-1 &gt;&gt; Fuel pressure is too high: Replace "fuel filter and fuel pump assembly", refer to <u>FL-5. "Remova</u> and <u>Installation"</u>, and then GO TO 8.</li> <li>NO-2 &gt;&gt; Fuel pressure is too low: GO TO 7.</li> </ul>	C 11 F
7. DETECT MALFUNCTIONING PART	
Check fuel hoses and fuel tubes for clogging.	-
Is the inspection result normal?	
YES >> Replace "fuel filter and fuel pump assembly", refer to <u>FL-5, "Removal and Installation"</u> , and ther GO TO 8.	۱

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

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

8. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

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

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> GO TO 9.

9.PERFORM POWER BALANCE TEST

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.

2. Check that the each cylinder produces a momentary engine speed drop.

Is the inspection result normal?

YES >> GO TO 12. NO >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following below.

- Ignition coil and its circuit (Refer to EC-545, "Component Function Check".)
- Fuel injector and its circuit (Refer to EC-542, "Component Function Check".)
- Intake air leakage
- Low compression pressure (Refer to EM-24, "On-Vehicle Service".)

Is the inspection result normal?

- YES >> Replace fuel injector, refer to <u>EM-49, "Removal and Installation"</u>, and then GO TO 11.
- NO >> Repair or replace malfunctioning part and then GO TO 11.
- 11.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"
- 1. Start engine.
- 2. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> GO TO 12.
- 12.CHECK A/F SENSOR 1 FUNCTION

Perform all DTC CONFIRMATION PROCEDURE related with A/F sensor 1.

- For DTC P0130, P0150, refer to EC-252, "DTC Description".
- For DTC P0131, P0151, refer to <u>EC-256, "DTC Description"</u>.
- For DTC P0132, P0152, refer to <u>EC-259, "DTC Description"</u>.
- For DTC P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D, refer to <u>EC-285</u>, "<u>DTC Description</u>".
- For DTC P2096, P2097, P2098, P2099, refer to <u>EC-491, "DTC Description"</u>.

Are any DTCs detected?

YES >> GO TO 15.

NO >> GO TO 13.

13. CHECK A/F SENSOR 1 CIRCUIT

Perform Diagnostic Procedure according to corresponding DTC.

>> GO TO 14.

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

1. Start engine.

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

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> GO TO 15.

# **TROUBLE DIAGNOSIS - SPECIFICATION VALUE**

<pre></pre>	
15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR	
1. Stop the engine.	А
2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.	EC
>> GO TO 16.	
<b>16.</b> CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"	0
<ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.</li> </ol>	C
Is the measurement value within the SP value?	D
YES >> INSPECTION END NO >> Detect malfunctioning part according to <u>EC-564, "Symptom Table"</u> .	
17. CHECK "B/FUEL SCHDL"	Е
Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP	
value.	F
<u>Is the measurement value within the SP value?</u> YES >> INSPECTION END	
NO-1 >> More than the SP value: GO TO 18.	G
NO-2 >> Less than the SP value: GO TO 25.	0
18. DETECT MALFUNCTIONING PART	Н
<ol> <li>Check for the cause of large engine friction. Refer to the following.</li> <li>Engine oil level is too high</li> </ol>	11
- Engine oil viscosity	
<ul> <li>Belt tension of power steering, alternator, A/C compressor, etc. is excessive</li> <li>Noise from engine</li> </ul>	
- Noise from transmission, etc.	
<ol> <li>Check for the cause of insufficient combustion. Refer to the following.</li> <li>Valve clearance malfunction</li> </ol>	J
<ul> <li>Intake valve timing control function malfunction</li> <li>Camshaft sprocket installation malfunction, etc.</li> </ul>	
	Κ
>> Repair or replace malfunctioning part, and then GO TO 30.	
19.CHECK INTAKE SYSTEM	
Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.	
<ul> <li>Crushed air ducts</li> <li>Malfunctioning seal of air cleaner element</li> </ul>	5.4
Uneven dirt of air cleaner element	Μ
<ul> <li>Improper specification of intake air system </li> </ul> <u>Is the inspection result normal?</u>	
YES >> GO TO 21.	Ν
NO >> Repair or replace malfunctioning part, and then GO TO 20.	
20.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2", AND "B/FUEL SCHDL"	0
Select "A/F ALPHA-B1", "A/F ALPHA-B2", and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.	
Is the measurement value within the SP value?	Ρ
<ul> <li>YES &gt;&gt; INSPECTION END</li> <li>NO &gt;&gt; "B/FUEL SCHDL" is more, "A/F ALPHA-B1", "A/F ALPHA-B2" are less than the SP value: GO TO 21.</li> </ul>	
21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR	

1. Stop the engine.

# **TROUBLE DIAGNOSIS - SPECIFICATION VALUE**

### < DTC/CIRCUIT DIAGNOSIS >

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

>> GO TO 22.

22.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

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

Is the measurement value within the SP value?

YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to <u>EC-227. "Diagno-</u> <u>sis Procedure"</u>. Then GO TO 29.

NO >> GO TO 23.

23. CHECK "MAS AIR FLOW SENSOR (HZ)"

Select "MAS AIR FLOW SENSOR (Hz)" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 24.

NO >> More than the SP value: Replace mass air flow sensor, refer to <u>EM-26, "Removal and Installa-</u> tion", and then GO TO 29.

24.REPLACE ECM

Replace ECM. Refer to EC-574, "Removal and Installation".

>> GO TO 29.

**25.**CHECK INTAKE SYSTEM

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

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

Is the inspection result normal?

YES >> GO TO 27.

NO >> Repair or replace malfunctioning part, and then GO TO 26.

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

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

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Less than the SP value: GO TO 27.

27.CHECK "MAS AIR FLOW SENSOR (HZ)"

Select "MAS AIR FLOW SENSOR (Hz)" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 28.

NO >> Less than the SP value: Replace mass air flow sensor, refer to <u>EM-26. "Removal and Installation"</u>, and then GO TO 30.

# **28**.CHECK INTAKE SYSTEM

Check for the cause of air leakage after the mass air flow sensor. Refer to the following.

- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks in PCV valve

# **TROUBLE DIAGNOSIS - SPECIFICATION VALUE**

#### [VQ35DE] < DTC/CIRCUIT DIAGNOSIS > Disconnection or cracks in EVAP purge hose, stuck open EVAP canister purge volume control solenoid valve Malfunctioning seal in rocker cover gasket • Disconnection, looseness, or cracks in hoses, such as a vacuum hose, connecting to intake air system parts Malfunctioning seal in intake air system, etc. EC >> GO TO 30. 29. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2", AND "B/FUEL SCHDL" Select "A/F ALPHA-B1", "A/F ALPHA-B2", and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value. Is the measurement value within the SP value? YES >> INSPECTION END NO >> Detect malfunctioning part according to EC-564, "Symptom Table". 30. CHECK "B/FUEL SCHDL" Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and then check that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Detect malfunctioning part according to EC-564, "Symptom Table".

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### < DTC/CIRCUIT DIAGNOSIS >

# POWER SUPPLY AND GROUND CIRCUIT

# Diagnosis Procedure

1.CHECK FUSE

Check that there is no blowout in the following fuses.

Location	Fuse No.	Capacity
IPDM E/R	#41	15 A
	#56	10 A

Is the fuse blown (open)?

YES >> Replace the fuse after repairing the applicable circuit.

NO >> GO TO 2.

2. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9 and E15. Refer to PG-76, "Harness Layout".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace ground connection.

**3.**CHECK ECM GROUND CIRCUIT

1. Disconnect ECM harness connectors.

2. Check the continuity between ECM harness connector and ground.

	+		
E	СМ	_	Continuity
Connector	Terminal	*	
	147		
E32	149		
	152		
F78	10	Ground	Existed
170	55		
F79	105	l	
179	110		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

**4.**CHECK ECM POWER SUPPLY (MAIN)-I

- 1. Reconnect ECM harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between ECM harness connector terminals.

	ECM		
Connector	+	-	Voltage
Connector	Terr	ninal	
E32	145	152	Battery voltage

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 5. INFOID:000000012891242

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Disconr Disconr	nect IPDN	harness c /I E/R harn	ess conr	nector.	connector and IPDM E/R ha	rness conr	nector.	
	+		_					
E	CM		IPDM E/	R	Continuity			
Connector	Termin	al Conne	ector	Terminal				
E32	145	F1		59	Existed			
<u>s the inspec</u> YES >>	<u>ction resu</u> Perform Repair o	the trouble r replace e	diagnos rror-dete	is for pov cted part	wer supply circuit. ts.			
	the voltag	tch OFF ar le between			) seconds. onnector terminals as per the	following.		1
	ECM +		4		Condition			Voltage
Connector		 minal	_		Condition			(Approx.)
	ler							
YES >> NO >> CHECK	145 <u>ction resu</u> GO TO 9 GO TO 7 ECM REI	152 <u>Ilt normal?</u> ). .AY CONT	ROL SIC	GNAL	on switch OFF, battery voltage will e		seconds	Drop to 0 V
s the insper YES >> NO >> 7.CHECK	145 <u>ction resu</u> GO TO 9 GO TO 7 ECM REI	152 <u>Ilt normal?</u> ). .AY CONT	ROL SIC	GNAL	on switch OFF, battery voltage will ex ctor terminals as per the follo		seconds	Drop to 0 V
s the insper YES >> NO >> 7.CHECK	145 GO TO 9 GO TO 7 ECM REI voltage be	152 <u>Ilt normal?</u> ). .AY CONT	ROL SIC	GNAL				
s the insper YES >> NO >> 7.CHECK I Check the v	145 GO TO 9 GO TO 7 ECM REI voltage be	152 <u>Ilt normal?</u>	ROL SIC	GNAL			seconds Voltag (Appro	ge
s the insper YES >> NO >> 7.CHECK I Check the v	145 GO TO 9 GO TO 7 ECM REI voltage be	152 <u>Ilt normal?</u>	ROL SIC	GNAL	ctor terminals as per the follo		Voltag (Appro	ge px.)
s the insper YES >> NO >> CHECK I Check the v	145 GO TO 9 GO TO 7 ECM REI voltage be	152 <u>Ilt normal?</u>	ROL SIC	GNAL ss conned	ctor terminals as per the follo Condition	owing.	Voltag (Appro 0 V	ge ix.)
s the insper YES >> NO >> 7.CHECK I Check the v + Connector F79	145 Ction resu GO TO 9 GO TO 7 ECM REI voltage be EC Terminal	152 <u>Ilt normal?</u> AY CONT tween ECI CM Connector E32	ROL SIC M harnes - Terminal 152	GNAL ss conned	ctor terminals as per the follo	owing.	Voltag (Appro	ge ix.)
s the insper YES >> NO >> 7.CHECK I Check the v + Connector F79 S the insper YES >> NO >>	145 GO TO 9 GO TO 7 ECM REI roltage be roltage be reminal 86 <u>Ction resu</u> Check in GO TO 8	152 <u>Ilt normal?</u> AY CONT tween ECI CM Connector E32 <u>Ilt normal?</u> termittent i 3.	ROL SIC M harnes - Terminal 152	GNAL ss connect Ignition Turn igr Refer to	ctor terminals as per the folic Condition • switch ON nition switch OFF and wait at least 1	owing. 0 seconds.	Voltag (Appro 0 V	ge ix.)
s the insper YES >> NO >> 7.CHECK I Check the v + Connector F79 s the insper YES >> NO >> 8.CHECK I 1. Turn igr 2. Disconr 3. Disconr 4. Check t	145 GO TO 9 GO TO 7 ECM REI roltage be roltage be reconstruction 86 <u>Ction resu</u> Check in GO TO 8 ECM REI nition switt nect ECM	152 Ilt normal? AY CONT AY CONT AY CONT E32 Ilt normal? E32 Ilt normal? termittent i AY CONT termittent i AY CONT tharness c A E/R harn uity betwe	ROL SIC M harnes 	GNAL ss connections Ignition Turn igr Refer to GNAL CIF r. hector. harness	ctor terminals as per the folic Condition • switch ON nition switch OFF and wait at least 1	owing. 0 seconds.	Voltag (Appro 0 V Battery vo	ge ix.)



< DTC/CIRCUIT DIAGNOSIS >

### YES >> Replace IPDM E/R. Refer to <u>PCS-36, "Removal and Installation"</u>.

NO >> Repair or replace error-detected parts.

# **9.**CHECK IGNITION SWITCH SIGNAL

- 1. Turn ignition switch ON.
- 2. Check the voltage between ECM harness connector terminals.

ECM				
Connector	+	_	Condition	Voltage (Approx.)
Connector	Terminal			( II )
E32	133	152	Ignition switch OFF	0 V
L32	100	152	Ignition switch ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

# 10. CHECK IGNITION SWITCH SIGNAL CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Disconnect IPDM E/R harness connector.

4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

+			_	
ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E32	133	F119	21	Existed

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

Is the inspection result normal?

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

NO >> Repair or replace error-detected parts.

# 11. CHECK ECM POWER SUPPLY (BACK-UP)

Check the voltage between ECM harness connector terminals.

	E			
+		_		Voltage
Connector	Terminal	Connector	Terminal	
F79	116	E32	152	Battery voltage

Is the inspection result normal?

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

NO >> GO TO 12.

12. CHECK ECM POWER SUPPLY (BACK-UP) CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Disconnect IPDM E/R harness connector.

4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

+			_	
E	ECM		IPDM E/R	
Connector	Terminal	Connector	Terminal	
F79	116	F19	58	Existed

< DTC	/CIRCUIT DIAGNOSIS >	[VQ35DE]
5. Als	so check harness for short to ground.	
<u>Is the i</u> YES	nspection result normal? >> Perform the trouble diagnosis for power supply circuit.	A
NO	>> Repair or replace error-detected parts.	
		EC
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# **U0101 CAN COMM CIRCUIT**

### Description

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

### DTC Description

INFOID:000000012891244

### DTC DETECTION LOGIC

When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) with TCM for 2 seconds or more.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Ignition switch ON	
		Signal (terminal)	CAN communication signal	
U0101	LOST COMM (TCM) (Lost Communication with TCM)	Threshold	ECM is not transmitting or receiving CAN communication signal of OBD (emission-re-lated diagnosis) with TCM.	
		Diagnosis delay time	2 seconds or more	

### POSSIBLE CAUSE

- CAN communication line between TCM and ECM
- CAN communication line open or shorted

### FAIL-SAFE

Engine operating condition in fail-safe mode				
Fail safe mode     Vehicle behavior				
CAN communication line ECM operates active grille shutter to fully-open position.				

### DTC CONFIRMATION PROCEDURE

**1.**PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

YES >> Proceed to EC-188, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

INFOID:000000012891245

Perform the trouble diagnosis for CAN communication system. Refer to <u>LAN-21</u>, "Trouble Diagnosis Flow <u>Chart"</u>.

INFOID:000000012891243

# U0284 ACTIVE GRILLE SHUTTER

### DTC Description

DTC DETECTION LOGIC

When ECM cannot receive the engine communication signal from active grille shutter.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		(
		Diagnosis condition	Ignition switch ON	
		Signal (terminal)	Engine communication signal	Γ
U0284		Threshold	ECM cannot receive the engine communica- tion signal from active grille shutter	
		Diagnosis delay time		E

### POSSIBLE CAUSE

• Harness and connectors (Engine communication line is open or circuit shorted.)

Active grille shutter

#### FAIL-SAFE

	Engine operating condition in fail-safe mode	
Fail safe mode	Vehicle behavior	
Active grille shutter	ECM operates active grille shutter to fully-open position.	

### DTC CONFIRMATION PROCEDURE

## **1.**CHECK DTC PRIORITY

If DTC U0284 is displayed with another DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX. Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-105, "DTC Index"</u>.

NO >> GO TO 2.

2.PRECONDITIONING

If another DTC Confirmation Procedure is conducted just before this procedure, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test. TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is 10 V or more with ignition switch ON.

#### >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

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

### 2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-189, "Diagnosis Procedure".

NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-42</u>, "Intermittent Incident".

NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

# **1.**CHECK DTC PRIORITY

If DTC U0284 is displayed with another DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX. <u>Is applicable DTC detected?</u>

YES >> Perform diagnosis of applicable. Refer to <u>EC-105, "DTC Index"</u>.

## EC-189

INFOID:000000012891247

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# **U0284 ACTIVE GRILLE SHUTTER**

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

### NO >> GO TO 2.

# **2.**CHECK ACTIVE GRILLE SHUTTER POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect active grille shutter harness connector.
- 3. Check the voltage between active grille shutter harness connector and ground as follows.

	+			Voltage	
Active gri	Active grille shutter		Condition	(Approx.)	
Connector	Terminal				
E238	1	Ground	Ignition switch: ON	Battery volt- age	
			Ignition switch: OFF	0 V	

#### Is the inspection result normal?

YES >> GO TO 4.

# 3. check active grille shutter power supply circuit

#### 1. Turn ignition switch OFF

- 2. Disconnect IPDM E/R harness connector.
- 3. Check the continuity between active grille shutter harness connector and IPDM E/R harness connector.

Active grille shutter		IPDN	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
E238	1	F19	52	Existed	

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace the error-detected parts.

### **4.**CHECK ACTIVE GRILLE SHUTTER GROUND CIRCUIT

- 1. Turn ignition switch OFF
- 2. Check the continuity between active grille shutter harness connector and ground.

Active gri	lle shutter		Continuity	
Connector	Terminal		Continuity	
E238	4	Ground	Existed	

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

#### Is the inspection result normal?

YES >> GO TO 5.

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

 ${f 5}.$ CHECK ACTIVE GRILLE SHUTTER INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.

2. Check the continuity between ECM harness connector and active grille shutter harness connector.

+		_		
E	ECM		Active grille shutter	
Connector	Terminal	Connector	Terminal	
F79	99	E238	3	Existed

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace the error-detected parts.

# **U0284 ACTIVE GRILLE SHUTTER**

		VE GRILLE SHUTTER
DTC/CIRCUIT DIAG	NOSIS >	[VQ35DE]
CHECK ACTIVE GR	RILLE SHUTTER	
Check active grille shut	ter. Refer to <u>EC-191, "Co</u>	mponent Inspection (Active Grille Shutter)".
s the inspection result i		
YES >> INSPECTION >> Replace ac	-	EVT 22 "Demovel and Installation"
•	ction (Active Grille S	o <u>EXT-32, "Removal and Installation"</u> .
		INFOID:000000012891248
.CHECK ACTIVE GR	RILLE SHUTTER	
With CONSULT		
. Start the engine. . Select "ACTIVE GF	$\mathbf{P} = \mathbf{P} = $	TIVE TEST" mode of "ENGINE" using CONSULT.
B. Touch "CALIBRTN"		The rest mode of Engline using consolit.
After the calibration	n completes, check the op	peration of active grille shutter as follows.
Queditien		-
Condition Select "CLOSE"	$\begin{array}{c} \text{Active grille shutter} \\ \hline \\ \text{Close} \rightarrow \text{Open} \end{array}$	-
		-
Select "OPEN"	Open → Close	-
Select "OPEN" Without CONSULT . Turn ignition switch	Open → Close	-
Select "OPEN" Without CONSULT . Turn ignition switch . Operate shutter by	Open $\rightarrow$ Close OFF. hands to close position.	- -
Select "OPEN" Without CONSULT . Turn ignition switch . Operate shutter by	Open → Close	s follows.
Select "OPEN" Without CONSULT . Turn ignition switch . Operate shutter by	Open $\rightarrow$ Close OFF. hands to close position.	- - s follows. -
Select "OPEN" Without CONSULT Turn ignition switch Operate shutter by Check the operation	Open $\rightarrow$ Close OFF. hands to close position. n of active grille shutter a	- s follows. -
Select "OPEN" Without CONSULT . Turn ignition switch . Operate shutter by . Check the operation Condition Ignition switch: ON	Open → Close OFF. hands to close position. n of active grille shutter a Active grille shutter Close → Open	- s follows. - -
Select "OPEN" Without CONSULT Operate shutter by Condition Condition Ignition switch: ON the inspection result of YES >> INSPECTIO	Open → Close OFF. hands to close position. n of active grille shutter a Active grille shutter Close → Open normal? DN END	-
Select "OPEN" Without CONSULT Operate shutter by Condition Condition Ignition switch: ON the inspection result of YES >> INSPECTIO	Open → Close OFF. hands to close position. n of active grille shutter a Active grille shutter Close → Open normal? DN END	s follows. - - - - - -
Select "OPEN" Without CONSULT Operate shutter by Condition Condition Ignition switch: ON the inspection result of YES >> INSPECTIO	Open → Close OFF. hands to close position. n of active grille shutter a Active grille shutter Close → Open normal? DN END	-
Select "OPEN" Without CONSULT Operate shutter by Condition Condition Ignition switch: ON the inspection result of YES >> INSPECTIO	Open → Close OFF. hands to close position. n of active grille shutter a Active grille shutter Close → Open normal? DN END	-
Select "OPEN" Without CONSULT Operate shutter by Condition Condition Ignition switch: ON the inspection result of YES >> INSPECTIO	Open → Close OFF. hands to close position. n of active grille shutter a Active grille shutter Close → Open normal? DN END	-
Select "OPEN" Without CONSULT Operate shutter by Condition Condition Ignition switch: ON the inspection result of YES >> INSPECTIO	Open → Close OFF. hands to close position. n of active grille shutter a Active grille shutter Close → Open normal? DN END	-

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# U1001 CAN COMM CIRCUIT

# Description

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

# DTC Description

INFOID:000000012891250

### DTC DETECTION LOGIC

When ECM is not transmitting or receiving CAN communication signal of OBD (emission related diagnosis) for 2 seconds or more.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Ignition switch ON	
		Signal (terminal)	CAN communication signal	
U1001	U1001 CAN COMM CIRCUIT (CAN COMM CIRCUIT)	Threshold	ECM is not transmitting or receiving CAN communication signal of OBD (emission related diagnosis)	
		Diagnosis delay time	2 seconds or more	

### POSSIBLE CAUSE

Harness and connectors (CAN communication line is open or shorted)

### FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 3 seconds.
- 2. Check DTC.

### Is DTC detected?

- YES >> Proceed to EC-192, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

INFOID:000000012891251

Perform the trouble diagnosis for CAN communication system. Refer to <u>LAN-21</u>, "Trouble Diagnosis Flow <u>Chart"</u>.

INFOID:000000012891249

# U1040 ENG COMM CIRCUIT

# **DTC Description**

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INFOID:000000012891252

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### DTC DETECTION LOGIC

When ECM unable to transmit engine communication signal.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		(
	U1040 Engine communication line	Diagnosis condition	Ignition switch ON	
		Signal (terminal)	Engine communication signal	ļ
U1040		Threshold	ECM unable to transmit engine communica- tion signal	
		Diagnosis delay time		

### POSSIBLE CAUSE

• Harness and connectors (Engine communication line is open or shorted.)

• ECM

#### FAIL-SAFE

	Engine operating condition in fail-safe mode
Fail safe mode	Vehicle behavior
Engine communication line	ECM operates active grille shutter to fully-open position.
DTC CONFIRMATION PRO	CEDURE
1.PRECONDITIONING	
	Procedure is conducted just before this procedure, always turn ignition switch nds before conducting the next test.
>> GO TO 2. 2.PERFORM DTC CONFIRM	IATION PROCEDURE
2. Check 1st trip DTC. Is 1st trip DTC detected?	id wait at least 10 seconds. 3. "Diagnosis Procedure".
	ion symptom before repair: Refer to GI-42, "Intermittent Incident".
Diagnosis Procedure	INFOID:000000012891253
1. CHECK ACTIVE GRILLE S	HUTTER SIGNAL CIRCUIT
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect ECM harness</li> <li>Disconnect active grille sh</li> </ol>	

4. Check the continuity between ECM harness connector and active grille shutter harness connector.

	+		-		
E	ECM		Active grille shutter		
Connector	Terminal	Connector	Terminal		
F79	99	E238	3	Existed	

5. Also check harness for short to ground and short to power. <u>Is the inspection result normal?</u>

- YES >> INSPECTION END
- NO >> Repair or replace error-detected parts.

# U1044 ENG COMM CIRCUIT

# **DTC** Description

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INFOID:000000012891254

[VQ35DE]

### DTC DETECTION LOGIC

A signal voltage of LIN communication between ECM and generator is excessively low or excessively high.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	Ignition switch ON
	ENG COMM CIRCUIT	Signal (terminal)	Signal voltage of LIN communication
U1044	(Engine communication circuit)	Threshold	Signal voltage between ECM and generator is excessively low or excessively high
		Diagnosis delay time	_
(LIN comr • Generator	or connectors munication circuit is open or sho r	orted.)	
FAIL-SAFE Not applical			
	FIRMATION PROCEDURE		
•	NDITIONING		
3. Turn iği	nition switch ON. nition switch OFF and wait at lea GO TO 2.		
	RM DTC CONFIRMATION PRO		
1. Turn igi 2. Check	nition ON and wait at least 10 so	econds.	
Is DTC dete			
NO-1 >>	Proceed to <u>EC-195, "Diagnosis</u> To check malfunction symptom Confirmation after repair: INSP	before repair: Refer to <u>(</u>	GI-42, "Intermittent Incident".
Diagnosis	s Procedure		INFOID:000000012891.
1.снеск	ACTIVE GRILLE SHUTTER SI	GNAL CIRCUIT	
<ol> <li>Disconi</li> <li>Disconi</li> </ol>	nition switch OFF. nect ECM harness connector. nect active grille shutter harness the continuity between ECM ha		ve grille shutter harness connector.
	+ _		

+				
ECM		Active grille shutter		Continuity
Connector	Terminal	Connector	Terminal	
F79	99	E238	3	Existed

5. Also check harness for short to ground and short to power. <u>Is the inspection result normal?</u>

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- YES >> INSPECTION END
- NO >> Repair or replace error-detected parts.

# P0011, P0021 IVT CONTROL

# **DTC** Description

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INFOID:000000012891256

[VQ35DE]

### DTC DETECTION LOGIC

There is a gap between angle of target and phase-control angle degree.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		DTC detection condition	
		Diagnosis condition	_		
	INT/V TIM CONT-B1	Signal (terminal)	_		
P0011 ("A" Camshaft Position - Timing Over- Advanced or System Performance bank 1)	Advanced or System Performance	Threshold	There is a gap between angle of target and phase-control angle degree		
		Diagnosis delay time	-		
P0021 INT/V TIM CONT-B2 ("B" Camshaft Position - Timing Over- Advanced or System Performance bank 2)	Diagnosis condition	-			
		Signal (terminal)	_		
	Advanced or System Performance	Threshold	There is a gap between angle of target and phase-control angle degree		
		Diagnosis delay time	-		

### POSSIBLE CAUSE

- Crankshaft position sensor (POS)
- Camshaft position sensor (PHASE)
- Intake valve timing control solenoid valve
- · Accumulation of debris to the signal pick-up portion of the camshaft
- Timing chain installation
- · Foreign matter caught in the oil groove for intake valve timing control

#### FAIL-SAFE

Engine operating condition in fail-safe mode				
Fail safe mode	Vehicle behavior			
Intake valve timing control	<ul> <li>The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.</li> <li>ECM activates the IVT intermediate lock control solenoid valve to bring the cam sprocket into an intermediate lock condition.</li> </ul>			

### DTC CONFIRMATION PROCEDURE

# **1.**CHECK DTC PRIORITY

If DTC P0011 or P0021 is displayed with DTC P0075 or P0081, first perform the trouble diagnosis for DTC P0075 or P0081.

#### Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- DTC P0075: Refer to EC-213, "DTC Description".
- DTC P0081: Refer to <u>EC-213</u>, "<u>DTC Description</u>".
- NO >> GO TO 2.

# 2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct- P ing the next test.

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

#### TESTING CONDITION:

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

### >> GO TO 3.

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

#### With CONSULT

- Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm
COOLANT TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 6.0 msec
Selector lever	D position

### CAUTION:

#### Always drive at a safe speed.

- 4. Stop vehicle with engine running and let engine idle for 10 seconds.
- 5. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT" above.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-198. "Diagnosis Procedure"

NO >> GO TO 4.

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

#### With CONSULT

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

ENG SPEED	1,200 - 3,175 rpm (A constant rotation is maintained.)
COOLANT TEMP/S	More than 60°C (140°F)
Selector lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions re- quired for this test.)

#### CAUTION:

#### Always drive at a safe speed.

2. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT" above.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-198. "Diagnosis Procedure"

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

INFOID:000000012891257

### **1.**CHECK DTC PRIORITY

If DTC P0011 or P0021 is displayed with DTC P0075 or P0081, first perform the trouble diagnosis for DTC P0075 or P0081.

#### Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC P0075: Refer to EC-213, "DTC Description".
    - DTC P0081: Refer to <u>EC-213, "DTC Description"</u>.

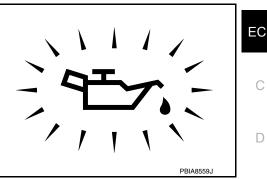
NO >> GO TO 2.

# P0011, P0021 IVT CONTROL

### < DTC/CIRCUIT DIAGNOSIS >

 $\overline{2.}$  CHECK OIL PRESSURE WARNING LAMP

- 1. Start engine.
- Check oil pressure warning lamp and confirm it is not illuminated.
- Is oil pressure warming lamp illuminated?
- YES >> Check the engine oil level. Refer to <u>LU-8</u>, "Inspection".
- NO >> GO TO 3.



#### 3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE Е Check intake valve timing control solenoid valve. Refer to EC-200, "Component Inspection". Is the inspection result normal? F YES >> GO TO 4. NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to EM-54, "Exploded View". **4.**CHECK CRANKSHAFT POSITION SENSOR (POS) Check crankshaft position sensor (POS). Refer to EC-331, "Component Inspection". Is the inspection result normal? Н YES >> GO TO 5. NO >> Replace crankshaft position sensor (POS). Refer to EM-38. "Exploded View". 5.CHECK CAMSHAFT POSITION SENSOR (PHASE) Check camshaft position sensor (PHASE). Refer to EC-337, "Component Inspection". Is the inspection result normal? YES >> GO TO 6. NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-45, "Exploded View". **Ó.**CHECK CAMSHAFT (INTAKE) Κ Check the following. Accumulation of debris on the signal plate of camshaft rear end · Chipping signal plate of camshaft rear end L Is the inspection result normal? YES >> GO TO 7. NO >> Remove debris and clean the signal plate of camshaft M rear end or replace camshaft. Refer to EM-79, "Removal and Installation". Ν JMBIA0058Z $7_{-}$ CHECK TIMING CHAIN INSTALLATION Check service records for any recent repairs that may cause timing chain misalignment. Are there any service records that may cause timing chain misalignment? Ρ YES >> Check timing chain installation. Refer to EM-66, "Removal and Installation". NO >> GO TO 8.

**8.**CHECK LUBRICATION CIRCUIT

Check lubrication circuit. Refer to LU-8, "Inspection".

Is the inspection result normal?

YES >> INSPECTION END

# P0011, P0021 IVT CONTROL

### < DTC/CIRCUIT DIAGNOSIS >

#### NO >> Clean lubrication line.

### Component Inspection

INFOID:000000012891258

[VQ35DE]

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

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

Intake valve timing control solenoid valve		Condition		
+	_			Resistance
Terminal				
1	2			7.0 – 7.8 Ω
1		Temperature	20°C (68°F)	8
2	Ground			(Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.

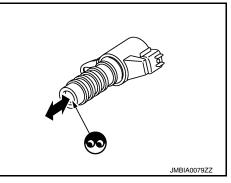
# 2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

- 1. Remove intake valve timing control solenoid valve. Refer to <u>EM-54</u>, "Exploded View".
- Provide 12 V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure.
   CAUTION:

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

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





Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> <u>View</u>".

NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> <u>View</u>".

# P0014, P0024 EVT CONTROL

# DTC Description

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INFOID:000000012891259

[VQ35DE]

### DTC DETECTION LOGIC

There is a gap between angle of target and phase-control angle degree.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	_
	EXH/V TIM CONT-B1	Signal (terminal)	_
P0014 [Exhaust valve timing control performance (bank 1)]	[Exhaust valve timing control perfor- mance (bank 1)]	Threshold	There is a gap between angle of target and phase-control angle degree
		Diagnosis delay time	_
EXH/V TIM CONT-B2 [Exhaust valve timing control perfor- mance (bank 2)]		Diagnosis condition	
	EXH/V TIM CONT-B2	Signal (terminal)	_
	[Exhaust valve timing control perfor- mance (bank 2)]	Threshold	There is a gap between angle of target and phase-control angle degree
		Diagnosis delay time	—

### POSSIBLE CAUSE

- · Crankshaft position sensor
- · Camshaft position sensor
- Exhaust valve timing control position sensor
- Exhaust valve timing control solenoid valve
- · Accumulation of debris to the signal pick-up portion of the camshaft
- Timing chain installation
- · Foreign matter caught in the oil groove for exhaust valve timing control

#### FAIL-SAFE

Engine operating condition in fail-safe mode			
Fail safe mode	Vehicle behavior	K	
Exhaust valve timing control	The signal is not energized to the exhaust valve timing control magnet retarder and the magnet retarder control does not function.		

### DTC CONFIRMATION PROCEDURE

## **1.**CHECK DTC PRIORITY

If DTC P0014 or P0024 is displayed with DTC P0078, P0084, P1078, or P1084, first perform the confirmation procedure (trouble diagnosis) for DTC P0078, P0084, P1078, or P1084.

#### Is applicable DTC detected?

 YES
 >> Perform diagnosis of applicable.
 N

 • DTC P0078: Refer to EC-218, "DTC Description".
 • DTC P0084: Refer to EC-218, "DTC Description".

 • DTC P1078: Refer to EC-436, "DTC Description".
 • DTC P1078: Refer to EC-436, "DTC Description".

 • DTC P1084: Refer to EC-436, "DTC Description".
 • O

 • NO
 >> GO TO 2.

## 2. PRECONDITIONING

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

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

#### **TESTING CONDITION:**

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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

>> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE - 1

(I) With CONSULT

- 1. Turn the ignition switch ON and select "DATA MONITOR" mode of "ENGINE" using CONSULT.
- 2. Warm engine up to the normal operating temperature.
- 3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	500 – 2,000 rpm (A constant rotation is maintained)
COOLAN TEMP/S	More than 20°C (68°F)
Selector lever	P or N position

4. Let engine idle for 10 seconds.

5. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

YES >> Proceed to EC-202, "Diagnosis Procedure"

NO >> GO TO 4.

**4.**PERFORM DTC CONFIRMATION PROCEDURE - 2

With CONSULT

1. Select "DATA MONITOR" mode of "ENGINE" using CONSULT.

2. Maintain the following conditions for at least 20 consecutive seconds.

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

#### CAUTION:

#### Always drive vehicle at a safe speed.

3. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

YES >> Proceed to EC-202. "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

INFOID:000000012891260

### **1.**CHECK DTC PRIORITY

If DTC P0014 or P0024 is displayed with DTC P0078, P0084, P1078, or P1084, first perform the confirmation procedure (trouble diagnosis) for DTC P0078, P0084, P1078, or P1084.

#### Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC P0078: Refer to EC-218, "DTC Description".
  - DTC P0084: Refer to EC-218, "DTC Description".

## EC-202

P0014, P0024 EVT CONTROL	
< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]	_
<ul> <li>DTC P1078: Refer to <u>EC-436</u>, "<u>DTC Description</u>".</li> <li>DTC P1084: Refer to <u>EC-436</u>, "<u>DTC Description</u>".</li> <li>NO &gt;&gt; GO TO 2.</li> </ul>	A
2.CHECK ENGINE OIL PRESSURE WARNING LAMP	EC
<ol> <li>Start the engine.</li> <li>Check that engine oil pressure warning lamp is not illuminated.</li> </ol>	EC
Is engine oil pressure warning lamp illuminated?         YES         YES         NO         >> GO TO 3.	С
	D
PBIA8559J	E
3. CHECK EXHAUST VALVE TIMING CONTROL SOLENOID VALVE	F
Check exhaust valve timing control solenoid valve. Refer to <u>EC-206</u> , "Component Inspection (Exhaust Valve Timing Control Solenoid Valve)".	
Is the inspection result normal?	G
<ul> <li>YES &gt;&gt; GO TO 4.</li> <li>NO &gt;&gt; Replace malfunctioning exhaust valve timing control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> View".</li> </ul>	Н
4. CHECK EXHAUST VALVE TIMING CONTROL POSITION SENSOR	
Check exhaust valve timing control position sensor. Refer to <u>EC-205</u> , "Component Inspection (Exhaust Valve Timing Control Position Sensor)".	I
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; GO TO 5.</li> <li>NO &gt;&gt; Replace malfunctioning exhaust valve timing control position sensor. Refer to <u>EM-45</u>, "<u>Exploded</u> <u>View</u>".</li> </ul>	J
5. CHECK CRANKSHAFT POSITION SENSOR	
Check crankshaft position sensor. Refer to EC-205, "Component Inspection (Crankshaft Position Sensor)".	K
Is the inspection result normal?	
YES >> GO TO 6.	L
NO >> Replace crankshaft position sensor. Refer to <u>EM-38, "Exploded View"</u> . 6.CHECK CAMSHAFT POSITION SENSOR	
Check camshaft position sensor. Refer to EC-204, "Component Inspection (Camshaft Position Sensor)".	M
Is the inspection result normal?	
YES >> GO TO 7.	Ν
NO >> Replace malfunctioning camshaft position sensor. Refer to <u>EM-45, "Exploded View"</u> .	IN
I.CHECK CAMSHAFT (EXH)	
Check the following.	0

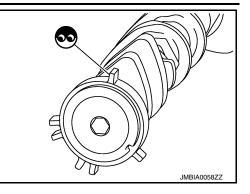
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### < DTC/CIRCUIT DIAGNOSIS >

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

#### Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to <u>EM-79, "Removal and Installation"</u>.



# 8. CHECK TIMING CHAIN INSTALLATION

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

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

YES >> Check timing chain installation. Refer to <u>EM-66</u>, "Removal and Installation".

NO >> GO TO 9.

9. CHECK LUBRICATION CIRCUIT

Perform "Inspection of Camshaft Sprocket (EXT) Oil Groove". Refer to <u>EM-87. "Inspection after Installation"</u>. <u>Is the inspection result normal?</u>

- YES >> INSPECTION END
- NO >> Clean lubrication line.

## Component Inspection (Camshaft Position Sensor)

INFOID:000000012891261

[VQ35DE]

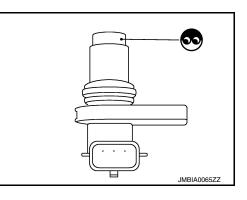
# 1.CHECK CAMSHAFT POSITION SENSOR (PHASE) - 1

- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect camshaft position sensor (PHASE) harness connector.
- Remove the sensor. Refer to <u>EM-45, "Exploded View"</u>.
- 5. Visually check the sensor for chipping.

### Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to <u>EM-45</u>, "<u>Exploded View</u>".



# **2.**CHECK CAMSHAFT POSITION SENSOR (PHASE) - 2

Check resistance camshaft position sensor (PHASE) terminals as follows.

Crankshaft position sensor				
+	-	Con	Resistance	
Term	ninals			
1	2			
1	3	Temperature	25°C (77°F)	Except 0 $\Omega$ or $\infty$
2	3			

Is the inspection result normal?

YES >> INSPECTION END

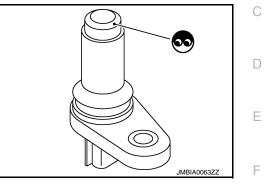
NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-45, "Exploded View".

### < DTC/CIRCUIT DIAGNOSIS >

# Component Inspection (Crankshaft Position Sensor)

1.CHECK CRANKSHAFT POSITION SENSOR (POS) - 1

- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect crankshaft position sensor (POS) harness connector.
- 4. Remove the sensor. Refer to EM-38, "Exploded View".
- 5. Visually check the sensor for chipping.
- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Replace crankshaft position sensor (POS). Refer to <u>EM-</u> <u>38, "Exploded View"</u>.



# 2. CHECK CRANKSHAFT POSITION SENSOR (POS) - 2

Check resistance between crankshaft position sensor (POS) terminals as follows. Crankshaft position sensor + Condition Resistance Н Terminals 2 1 1 3 Temperature 25°C (77°F) Except 0  $\Omega$  or  $\infty$ 2 3 Is the inspection result normal? YES >> INSPECTION END >> Replace crankshaft position sensor (POS). Refer to EM-38, "Exploded View". NO Component Inspection (Exhaust Valve Timing Control Position Sensor) Κ INFOID:000000012891263 1. EXHAUST VALVE TIMING CONTROL POSITION SENSOR - 1 1. Turn ignition switch OFF. Disconnect exhaust valve timing control position sensor harness connector. 3. Loosen the fixing bolt of the sensor. Remove the sensor. Refer to EM-45, "Exploded View". M 4. 5. Visually check the sensor for chipping. Is the inspection result normal? 00 YES >> GO TO 2. Ν >> Replace malfunctioning exhaust valve timing control NO position sensor. Refer to EM-45, "Exploded View". Ρ JMBIA0065ZZ

## 2.EXHAUST VALVE TIMING CONTROL POSITION SENSOR - 2

Check resistance exhaust valve timing control position sensor terminals as follows.

[VQ35DE]

INFOID:000000012891262

A

EC

### < DTC/CIRCUIT DIAGNOSIS >

Exhaust valve timing control position sensor		Condi			
+	_	Condition		Resistance	
Terr	Terminal				
1	2				
1	3	Temperature	25°C (77°F)	Except 0 $\Omega$ or $\infty$ $\Omega$	
2	3				

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning exhaust valve timing control position sensor. Refer to <u>EM-45</u>, "<u>Exploded</u> <u>View</u>".

Component Inspection (Exhaust Valve Timing Control Solenoid Valve)

INFOID:000000012891264

# 1. CHECK EXHAUST VALVE TIMING CONTROL SOLENOID VALVE - 1

1. Turn ignition switch OFF.

2. Disconnect exhaust valve timing control solenoid valve harness connector.

3. Check resistance between exhaust valve timing control solenoid valve terminals as follows.

Exhaust valve timing control solenoid valve		Conditio	5	
+	_			Resistance
Terr	ninal			
1	2			7.0 – 7.8 Ω
1	<b>a</b> 1	Temperature	20°C (68°F)	∞
2	2 Ground			(Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning exhaust valve timing control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> <u>View</u>".

2. CHECK EXHAUST VALVE TIMING CONTROL SOLENOID VALVE - 2

- 1. Remove intake valve timing control solenoid valve. Refer to EM-54, "Exploded View". 2. Apply 12 V between exhaust valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure. **CAUTION:** Never apply 12 V continuously for 5 seconds or more. Doing so may result in damage to the coil in exhaust valve timing control solenoid valve. NOTE: Always replace O-ring when exhaust valve timing control solenoid valve is removed. Is the inspection result normal? JMBIA0079ZZ YES >> INSPECTION END
- NO >> Replace malfunctioning exhaust valve timing control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> <u>View</u>".

### P0030, P0031, P0032, P0036, P0051, P0052 A/F SENSOR 1 HEATER < DTC/CIRCUIT DIAGNOSIS > [VQ35DE]

# P0030, P0031, P0032, P0036, P0051, P0052 A/F SENSOR 1 HEATER

# **DTC Description**

INFOID:000000012891265

А

EC

### DTC DETECTION LOGIC

• Deterioration in A/F sensor 1 heater performance.

• The current amperage in the A/F sensor 1 heater circuit is out of the normal range.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	Start engine and let it idle
Air fuel ratio (A/F) s	Air fuel ratio (A/F) sensor 1 heater	Signal (terminal)	Voltage signal transmitted from A/F sensor 1 heater to ECM
P0030	(bank 1) performance	Threshold	Voltage signal is higher/lower than voltage in the normal range
		Diagnosis delay time	_
		Diagnosis condition	Start engine and let it idle
D0024	A/F SEN1 HTR (B1)	Signal (terminal)	Voltage signal transmitted from A/F sensor 1 heater to ECM
P0031	(HO2S heater control circuit low bank 1 sensor 1)	Threshold	An excessively low voltage signal is sent to ECM through the A/F sensor 1 heater
		Diagnosis delay time	-
		Diagnosis condition	Start engine and let it idle
D0020	A/F SEN1 HTR (B1)	Signal (terminal)	Voltage signal transmitted from A/F sensor 1 heater to ECM
P0032	(HO2S heater control circuit high bank 1 sensor 1)	Threshold	An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater
		Diagnosis delay time	_
		Diagnosis condition	Start engine and let it idle
Doooc	Air fuel ratio (A/F) sensor 1 heater	Signal (terminal)	Voltage signal transmitted from A/F sensor 1 heater to ECM
P0036	(bank 2) performance	Threshold	Voltage signal is higher/lower than voltage in the normal range
		Diagnosis delay time	
		Diagnosis condition	Start engine and let it idle
D0054	A/F SEN1 HTR (B2)	Signal (terminal)	Voltage signal transmitted from A/F sensor 1 heater to ECM
P0051	(HO2S heater control circuit low bank 2 sensor 1)	Threshold	An excessively low voltage signal is sent to ECM through the A/F sensor 1 heater
		Diagnosis delay time	
		Diagnosis condition	Start engine and let it idle
D0050	A/F SEN1 HTR (B2)	Signal (terminal)	Voltage signal transmitted from A/F sensor 1 heater to ECM
P0052	(HO2S heater control circuit high bank 2 sensor 1)	Threshold	An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater
		Diagnosis delay time	_

#### POSSIBLE CAUSE

P0030

• Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)

• The A/F sensor 1 heater

P0031

**Revision: December 2015** 

- < DTC/CIRCUIT DIAGNOSIS >
- Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)
- The A/F sensor 1 heater

### P0032

- Harness or connectors (The A/F sensor 1 heater circuit is shorted.)
- The A/F sensor 1 heater

P0036

- Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)
- The A/F sensor 1 heater

#### P0051

- Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)
- The A/F sensor 1 heater

P0052

- Harness or connectors (The A/F sensor 1 heater circuit is shorted.)
- The A/F sensor 1 heater

FAIL-SAFE

Not applicable

DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

#### TESTING CONDITION:

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

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

YES >> Proceed to EC-208, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

INFOID:000000012891266

[VQ35DE]

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

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

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

DTC		A/F sensor 1	Ground	Voltage	
DIG	Bank	Connector	Terminal	Cround	vollage
P0030, P0031, P0032	1	F12	1	Ground	Battery voltage
P0036, P0051, P0052	2	F61	1	Giouna	Dattery Voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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

1. Turn ignition switch OFF.

### P0030, P0031, P0032, P0036, P0051, P0052 A/F SENSOR 1 HEATER [VQ35DE]

### < DTC/CIRCUIT DIAGNOSIS >

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between A/F sensor 1 harness connector and IPDM E/R harness connector.

DTC		A/F sensor 1		IPDM	1E/R	Continuity	
	Bank	Connector	Terminal	Connector	Terminal		
P0030, P0031, P0032	1	F12	1	F19	52	Existed	
P0036, P0051, P0052	2	F61	1	119	53	Existed	
the inspection resu							
		diagnosis fo		oply circuit.			
	•	ror-detected	•				
CHECK A/F SEN	SOR 1 HEA	TER OUTPU	UT SIGNAL	CIRCUIT			
. Turn ignition swit							
<ol> <li>Disconnect ECM</li> <li>Check harness c</li> </ol>			eneor 1 ha	rness conne	octor and E	CM harness connecto	\r
	ontinuity be						л.
		A/F sensor 1		EC	M		
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0030, P0031, P0032	1	F12	2		6		
P0036, P0051, P0052	2	F61	2	F78	46	Existed	
Also check harne	es for sho	t to around a	and short to	nower			
s the inspection resu				power.			
	<u>iit noimai :</u>						
•							
YES >> GO TO 4		- h - ut t - uu - u		• • • • • • • • • • • •			
YES >> GO TO 4 NO >> Repair o	pen circuit,	-	und or shor	t to power in	harness o	connectors.	
YES >> GO TO 4	pen circuit,	-	und or shor	t to power in	i harness o	r connectors.	
YES >> GO TO 4 NO >> Repair o	pen circuit, SOR 1 HEA	TER				connectors.	
YES >> GO TO 4 NO >> Repair o LCHECK A/F SENS	pen circuit, SOR 1 HEA neater. Ref	TER				r connectors.	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS	pen circuit, SOR 1 HEA neater. Refe <u>Ilt normal?</u>	TER				connectors.	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace	pen circuit, SOR 1 HEA neater. Refe It normal? TION END malfunctio	ATER er to <u>EC-209</u> ning air fuel	, "Compone ratio (A/F)	ent Inspection	<u>on"</u> .	connectors.	nstallatio
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace	pen circuit, SOR 1 HEA neater. Refe It normal? TION END malfunctio	ATER er to <u>EC-209</u>	, "Compone ratio (A/F)	ent Inspection	<u>on"</u> .		nstallation
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace	pen circuit, SOR 1 HEA neater. Refe It normal? TION END malfunctio ', <u>EM-35, "F</u>	ATER er to <u>EC-209</u> ning air fuel	, "Compone ratio (A/F)	ent Inspection	<u>on"</u> .	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp	pen circuit, SOR 1 HEA neater. Refu <u>It normal?</u> TION END malfunctio <u>', EM-35, "f</u> ection	ATER er to <u>EC-209</u> ning air fuel <u>Removal and</u>	ratio (A/F)	ent Inspection	<u>on"</u> .	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2)	pen circuit, SOR 1 HEA neater. Refu <u>It normal?</u> TION END malfunctio <u>', EM-35, "f</u> ection	ATER er to <u>EC-209</u> ning air fuel <u>Removal and</u>	ratio (A/F)	ent Inspection	<u>on"</u> .	-33, "Removal and I	nstallation
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI	pen circuit, SOR 1 HEA neater. Refu <u>It normal?</u> TION END malfunctio <u>, EM-35, "I</u> ection _ RATIO (A tch OFF.	ATER er to <u>EC-209</u> ning air fuel <u>Removal and</u> /F) SENSOF	ratio (A/F) Installation	ent Inspection	<u>on"</u> .	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI	pen circuit, SOR 1 HEA neater. Refu It normal? TION END malfunctio <u>, EM-35, "I</u> ection _ RATIO (A cch OFF. sensor 1 ha	ATER er to <u>EC-209</u> ning air fuel <u>Removal and</u> /F) SENSOF	ratio (A/F) Installation	ent Inspection sensor 1. F n (bank 1)".	on". Refer to <u>EN</u>	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection result YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI	pen circuit, SOR 1 HEA neater. Refu It normal? TION END malfunctio <u>, EM-35, "I</u> ection _ RATIO (A cch OFF. sensor 1 ha	ATER er to <u>EC-209</u> ning air fuel <u>Removal and</u> /F) SENSOF	ratio (A/F) Installation	ent Inspection sensor 1. F n (bank 1)".	on". Refer to <u>EN</u>	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI Disconnect A/F s Check resistance	pen circuit, SOR 1 HEA neater. Refu It normal? TION END malfunctio <u>, EM-35, "F</u> ection _ RATIO (A cch OFF. sensor 1 ha e between A	ATER er to <u>EC-209</u> ning air fuel <u>Removal and</u> /F) SENSOF	ratio (A/F) Installation	ent Inspection sensor 1. F n (bank 1)".	on". Refer to <u>EN</u>	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI . Turn ignition swift Disconnect A/F s . Check resistance	pen circuit, SOR 1 HEA neater. Refu It normal? TION END malfunctio , EM-35, "f ection - RATIO (A cch OFF. sensor 1 ha between 7	ATER er to <u>EC-209</u> ning air fuel <u>Removal and</u> /F) SENSOF	ratio (A/F) Installation R 1 ector. terminals a	ent Inspection sensor 1. For (bank 1)".	on". Refer to <u>EN</u>	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI . Turn ignition swift Disconnect A/F s Check resistance	pen circuit, SOR 1 HEA neater. Refu It normal? TION END malfunctio , EM-35, "f ection - RATIO (A cch OFF. sensor 1 ha between 7	ATER er to <u>EC-209</u> ning air fuel <u>Removal and</u> /F) SENSOF	ratio (A/F) Installation	ent Inspection sensor 1. For (bank 1)".	on". Refer to <u>EN</u>	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp COMPONENT Insp CHECK AIR FUEI Disconnect A/F s Check resistance	pen circuit, SOR 1 HEA neater. Refu It normal? TION END malfunctio , EM-35, "f ection - RATIO (A cch OFF. sensor 1 ha between 7	ATER er to EC-209 ning air fuel Removal and /F) SENSOF rness conne A/F sensor 1	ratio (A/F) Installation R 1 ector. terminals a Resistance	ent Inspection sensor 1. For (bank 1)".	on". Refer to <u>EN</u>	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS check A/F sensor 1 I the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI Disconnect A/F sensor + A/F sensor	pen circuit, SOR 1 HEA neater. Refu It normal? TION END malfunctio , EM-35, "f ection - RATIO (A cch OFF. sensor 1 ha between 7	ATER er to EC-209 ning air fuel Removal and /F) SENSOF rness conne A/F sensor 1	ratio (A/F) Installation R 1 ector. terminals a	ent Inspection sensor 1. For (bank 1)".	on". Refer to <u>EN</u>	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o .CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI . Turn ignition swit Disconnect A/F sensor + A/F sensor	pen circuit, SOR 1 HEA neater. Refu It normal? TION END malfunctio , EM-35, "f ection - RATIO (A tch OFF. sensor 1 ha between 7	ATER er to EC-209 ning air fuel Removal and /F) SENSOF rness conne A/F sensor 1	ratio (A/F) Installation R 1 ector. terminals a Resistance	ent Inspection sensor 1. For (bank 1)".	on". Refer to <u>EN</u>	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o .CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI . Turn ignition swift Disconnect A/F sensor + A/F sensor Terminal	pen circuit, SOR 1 HEA neater. Refu <u>lt normal?</u> TION END malfunctio <u>, EM-35, "I</u> pection _ RATIO (A tch OFF. sensor 1 has between 7 	ATER er to EC-209 ning air fuel Removal and /F) SENSOF rness conne A/F sensor 1	ratio (A/F) d Installation R 1 ector. terminals a Resistance 2.44 $\Omega$ [at 25°( $\infty \Omega$	ent Inspection sensor 1. For (bank 1)". as per the for C (77°F)]	on". Refer to <u>EN</u>	-33, "Removal and I	
YES >> GO TO 4 NO >> Repair o CHECK A/F SENS Check A/F sensor 1 I s the inspection resu YES >> INSPEC NO >> Replace (bank 2) Component Insp .CHECK AIR FUEI . Turn ignition swift Disconnect A/F sensor terminal	pen circuit, SOR 1 HEA neater. Refu It normal? TION END malfunctio , EM-35, "I ection - RATIO (A cch OFF. sensor 1 ha between 7 - 1	ATER er to EC-209 ning air fuel Removal and /F) SENSOF rness conne A/F sensor 1	ratio (A/F) <u>Installation</u> R 1 ctor. terminals a Resistance 2.44 Ω [at 25°0	ent Inspection sensor 1. For (bank 1)". as per the for C (77°F)]	on". Refer to <u>EN</u>	-33, "Removal and I	

NO >> Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to EM-33, "Removal and Installation (bank 2)", EM-35. "Removal and Installation (bank 1)".

А

# P0037, P0038, P0057, P0058 HO2S2 HEATER

### < DTC/CIRCUIT DIAGNOSIS >

# P0037, P0038, P0057, P0058 H02S2 HEATER

### DTC Description

INFOID:000000012891268

[VQ35DE]

### DTC DETECTION LOGIC

The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range.

DTC	CONSULT screen terms (Trouble diagnosis content)	DT	C detection condition
		Diagnosis condition	—
	HO2S2 HTR (B1)	Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 heater to ECM
P0037	(HO2S heater control circuit low bank 1 sensor 2)	Threshold	An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater
		Diagnosis delay time	-
		Diagnosis condition	-
	HO2S2 HTR (B1)	Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 heater to ECM
P0038	(HO2S heater control circuit high bank 1 sensor 2)	Threshold	An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater
		Diagnosis delay time	-
		Diagnosis condition	-
	H02S2 HTR (B2)	Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 heater to ECM
P0057	(HO2S heater control circuit low bank 2 sensor 2)	Threshold	An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater
		Diagnosis delay time	-
		Diagnosis condition	-
	H02S2 HTR (B2)	Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 heater to ECM
P0058	(HO2S heater control circuit high bank 2 sensor 2)	Threshold	An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater
		Diagnosis delay time	-

### POSSIBLE CAUSE

P0037

- Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)
- Heated oxygen sensor 2 heater

P0038

- Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)
- Heated oxygen sensor 2 heater

P0057

- Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)
- Heated oxygen sensor 2 heater

#### P0058

- Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)
- Heated oxygen sensor 2 heater

FAIL-SAFE Not applicable

# P0037, P0038, P0057, P0058 HO2S2 HEATER

	P	0037, P0	038, P0	057,	P005	8 HO2S2	2 HEATER
< DTC/CIRCU	JIT DIAGN	OSIS >					[VQ35DE]
DTC CONFIF	RMATION F	PROCEDU	IRE				
1.PRECOND	ITIONING						
ing the next te	st.			-		ed, always	perform the following before conduct-
	on switch O on switch O		t at least 1	U seco	onas.		
3. Turn igniti	on switch O		t at least 1	0 seco	onds.		
TESTING CO		ollowing pr	ocedure	confir	m that	hattery vo	oltage is between 10.5 V and 16 V at
idle.		shering pi	occuaro, ·		in that	bullory vo	
• ·	0 TO 2.						
2.PERFORM							
	ne and warr on switch O					perature.	
3. Turn igniti	on switch O	N.					
	on switch O ne and keep					and 4.000 m	om for at least 1 minute under no load.
6. Let engine	e idle for 1 n				-,	,	
7. Check 1st I <u>s 1st tip DTC</u>	•						
•	roceed to E	C-211 "Diad	nosis Pro	cedure	<b>-</b> ,"		
NO-1 >> To	check malf	function syn	nptom befo	ore rep	oair: Re	fer to <u>GI-42</u>	2, "Intermittent Incident".
	onfirmation	•	INSPECT	ION E	ND		
Diagnosis F	Procedure	e					INFOID:000000012891269
1. СНЕСК НС	2S2 POWE	ER SUPPLY	,				
1. Disconnec	t heated ox	ygen senso	or 2 (HO2S	2) har	ness c	onnector.	
2. Turn igniti	on switch O	N.	·	,			
3. Check the	voltage bet		52 namess	s conn	ector a	na grouna.	
		HO2S2					
DTC	Bank	Connector -	Terminal	iround	Vo	ltage	
P0037, P0038	1	F62	1	round	Batter	y voltage	
P0057, P0058	2	F54	1	irounu	Datter	yvollage	
Is the inspection		<u>rmal?</u>					
	0 TO 3. 0 TO 2.						
2.снеск но		OR 1 POW	ER SUPPL	Y CIR	CUIT		
	on switch O						
2. Disconneo	t IPDM E/R	harness co					
3. Check the	continuity b	between HC	02S2 harne	ess co	nnecto	r and IPDM	I E/R harness connector.
		HO2S2			IDU	/I E/R	
DTC	Bank	Connector	Terminal	Cor	nnector	Terminal	Continuity
P0037, P0038	1	F62	1			52	
					F19		- Existed

Is the inspection result normal?

2

P0057, P0058

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

F54

1

NO >> Repair or replace error-detected parts.

F19

53

Existed

# P0037, P0038, P0057, P0058 HO2S2 HEATER

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

# $\overline{\mathbf{3}}$ . CHECK HO2S2 HEATER OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

#### 1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between HO2S2 harness connector and ECM harness connector.

DTC		HO2S2		EC	ECM		
ыс	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0037, P0038	1	F62	2	F78	7	Existed	
P0057, P0058	2	F54	2	170	47	LAISIEU	

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK HEATED OXYGEN SENSOR 2 HEATER

Check heated oxygen sensor 2 heater. Refer to EC-212, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33</u>, "Removal and Installation (bank 2)", <u>EM-33</u>, "Removal and Installation (bank 2)".

# Component Inspection

INFOID:000000012891270

# 1.CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.

2. Disconnect heated oxygen sensor 2 harness connector.

3. Check resistance between HO2S2 terminals as per the following.

+	_	
Heated oxy	gen sensor 2	Resistance
Terr	minal	
1	2	3.0 Ω [at 25°C (77°F)]
	1	
3	2	
	4	$\Omega \propto$
	1	(Continuity should not exist)
4	2	
	3	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33</u>, "<u>Removal and Installation</u> (bank 2)", <u>EM-35</u>, "<u>Removal and Installation (bank 1)</u>".

### < DTC/CIRCUIT DIAGNOSIS >

# P0075, P0081 IVT CONTROL SOLENOID VALVE

### DTC Description

INFOID:000000012891271

[VQ35DE]

### DTC DETECTION LOGIC

- ECM detects an abnormal voltage in the intake valve timing control solenoid valve control circuit.
- ECM detects an abnormal voltage in the intake valve timing intermediate lock control solenoid valve control circuit.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	Start engine and let it idle
	INT/V TIM V/CIR-B1	Signal (terminal)	<ul> <li>Voltage signal transmitted from intake valve timing control solenoid valve to ECM</li> <li>Voltage signal transmitted from intake valve timing intermediate lock control sole- noid valve to ECM</li> </ul>
P0075	(Intake valve control solenoid circuit bank 1)	Threshold	<ul> <li>ECM detects an abnormal voltage in the intake valve timing control solenoid valve control circuit.</li> <li>ECM detects an abnormal voltage in the intake valve timing intermediate lock control solenoid valve control circuit.</li> </ul>
		Diagnosis delay time	-
		Diagnosis condition	Start engine and let it idle
	INT/V TIM V/CIR-B1 P0081 (Intake valve control solenoid circuit bank 2)	Signal (terminal)	<ul> <li>Voltage signal transmitted from intake valve timing control solenoid valve to ECM</li> <li>Voltage signal transmitted from intake valve timing intermediate lock control sole- noid valve to ECM</li> </ul>
P0081		Threshold	<ul> <li>ECM detects an abnormal voltage in the in- take valve timing control solenoid valve control circuit.</li> <li>ECM detects an abnormal voltage in the in- take valve timing intermediate lock control solenoid valve control circuit.</li> </ul>
		Diagnosis delay time	_

### POSSIBLE CAUSE

P0075 · Harness or connectors Μ Intake valve timing control solenoid valve circuit is open or shorted. - Intake valve timing intermediate lock control solenoid valve circuit is open or shorted. Intake valve timing control solenoid valve Ν · Intake valve timing intermediate lock control solenoid valve P0081 Harness or connectors Ο - Intake valve timing control solenoid valve circuit is open or shorted. - Intake valve timing intermediate lock control solenoid valve circuit is open or shorted. Intake valve timing control solenoid valve Ρ Intake valve timing intermediate lock control solenoid valve

### FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

А

EC

С

### < DTC/CIRCUIT DIAGNOSIS >

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

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

### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-214, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## **Diagnosis** Procedure

INFOID:000000012891272

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

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

3. Turn ignition switch ON.

4. Check the voltage between intake valve timing control solenoid valve harness connector and ground with CONSULT or tester.

DTC	IVT co	ontrol solenoio	d valve	Ground	Voltage			
DIC	Bank	Connector	Terminal	Ground				
P0075	1	F67	1	Ground	Potton voltago			
P0081	2	F66	1	Ground	Battery voltage			
المعالم مالم	a the increation requit normal?							

Is the inspection result normal?

YES >> GO TO 2.

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

### 2.CHECK IVT CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

- 2. Disconnect IPDM E/R harness connector.
- Check the continuity between IVT control solenoid valve harness connector and IPDM E/R harness connector.

DTC	IVT co	IVT control solenoid valve			/IE/R	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0075	1	F67	1	F19	59	Evisted
P0081	2	F66	1	119	29	Existed

#### 4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

 $\mathbf{3}$ .CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between intake valve timing control solenoid valve harness connector and ECM harness connector.

[VQ35DE]

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Bank         Connector         Terminal         Connector		IVT control solenoid valve			ECM					
probat       2       F66       2       F79       119       Existed         Also check harness for short to ground and short to power.       he inspection result normal?       ES       >> GO TO 4.         D       >> Repair open circuit, short to ground or short to power in harness or connectors.       CHECK IVT CONTROL SOLENOID VALVE         each the inspection result normal?       ES       >> GO TO 4.       Control solenoid valve. Refer to EC-216. "Component Inspection (IVT Control Solenoid Valve)".         Each the inspection result normal?       ES       >> GO TO 5.       CO TO 5.         D       >> Replace IVT control solenoid valve. Refer to EM-54. "Exploded View".         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY       Disconnect IVT intermediate lock control solenoid valve harness connector.         Turn ignition switch ON.       Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground.         DTC       Intermediate lock control solenoid valve harness connector and ground.         DTC       Intermediate lock control solenoid valve harness connector and ground.         ES       >> GO TO 7.         O       >> GO TO 6.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.         Disconnect IPDM E/R harness connector.         Check the continuity between IVT	DTC	Bank	Connecto	or Termina	I Connector	Terminal	Continuity			
PO081       2       F66       2       119       Entransition         Also check harness for short to ground and short to power.       Insection result normal?       Image: Comparison of the inspection result normal?         ES       >> GO TO 4.       O       >> Repair open circuit, short to ground or short to power in harness or connectors.         CHECK IVT CONTROL SOLENOID VALVE       Each text the IVT control solenoid valve. Refer to EC-216. "Component Inspection (IVT Control Solenoid Valve)".         Beinspection result normal?       ES       >> GO TO 5.         O       >> Replace IVT control solenoid valve. Refer to EM-54. "Exploded View".         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY         Disconnect VT intermediate lock control solenoid valve harness connector and ground.         Control valve       Ground       Voltage         DTC       Iff intermediate lock control solenoid valve harness connector and ground.         DTC       Iff intermediate lock control solenoid valve harness connector and ground.         DTC       Iff intermediate lock control solenoid valve         Bank       Connector Terminal       Ground         Voltage       F75       1         DTC       F75       1       Ground         DISS > OO TO 6.       Check NT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Tu	P0075	1	F67	2	F70	117	Eviete d	-		
he inspection result normal? So $>>$ GO TO 4. So $>>$ Repair open circuit, short to ground or short to power in harness or connectors. CHECK IVT CONTROL SOLENOID VALVE each the IVT control solenoid valve. Refer to EC-216, "Component Inspection (IVT Control Solenoid Valve)". he inspection result normal? So $>>$ GO TO 5. O $>>$ Replace IVT control solenoid valve. Refer to EM-54, "Exploded View". CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY Disconnect IVT intermediate lock control solenoid valve harness connector. Turn ignition switch ON. Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground. Turn ignition switch ON. Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground. Turn ignition switch OFF. Disconnect IPDM E/R harness connector. Check the Continuity between IVT intermediate lock control solenoid valve power SUPPLY CIRCUIT Turn ignition switch OFF. Disconnect IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. POTC VI intermediate lock control solenoid Valve harness connector and IPDM E/R harness connector. Check the Continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Also check harness for short to ground. he inspection result normal? S >> Perform the trouble diagnosis for power supply circuit. D >> Repair or replace error-detected parts. CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT Turn ignition switch OFF. Disconnect E/M harness connector.	P0081	2	F66	2	— F79	119	Existed			
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	. Also	check harn	ess for sho	ort to groun	d and short	to power.				
0       >> Repair open circuit, short to ground or short to power in harness or connectors.         CHECK IVT CONTROL SOLENOID VALVE         eck the IVT control solenoid valve. Refer to EC-216, "Component Inspection (IVT Control Solenoid Valve)".         he inspection result normal?         25       >> GO TO 5.         0       >> Replace IVT control solenoid valve. Refer to EM-54, "Exploded View".         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY         Disconnect IVT intermediate lock control solenoid valve harness connector.         Turn ignition switch ON.         Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground.         0075       1       F74         1       F75       1       Ground       Voltage         0081       2       F75       1       Ground       Valvage         Peinspection result normal?       ES       >> GO TO 7.       O       >> GO TO 7.         Disconnect IPDM E/R harness connector.       Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.       Continuity         Disconnect IPDM E/R harness for short to ground.       IPDM E/R Contextor Terminal Contextor Terminal Contextor Terminal Contextor Termin				<u>-</u>						
CHECK IVT CONTROL SOLENOID VALVE         ext the IVT control solenoid valve. Refer to EC-216, "Component Inspection (IVT Control Solenoid Valve)".         he inspection result normal?         ES       >> GO TO 5.         O       >> Replace IVT control solenoid valve. Refer to EM-54, "Exploded View".         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY         Disconnect IVT intermediate lock control solenoid valve harness connector.         Turn ignition switch ON.         Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground.         DTC       IVT intermediate lock control sole         0075       1       F74       1         0075       2       F75       1         0075       1       F74       1       Ground         0075       2       F75       1       Ground       Voltage         he inspection result normal?       Es       > GO TO 7.       >       >       SO TO 7.         0       >> GO TO 7.       O       >       SO TO 7.       O       >         Disconnect IPDM E/R harness connector.       Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R       Continuity         POTC       IVT intermediate lock control solenoid       IPDM E/R										
eck the IVT control solenoid valve. Refer to EC-216, "Component Inspection (IVT Control Solenoid Valve)".         he inspection result normal?         SS       >> GO TO 5.         O       >> Replace IVT control solenoid valve. Refer to EM-54, "Exploded View".         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY         Disconnect IVT intermediate lock control solenoid valve harness connector.         Turn ignition switch ON.         Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground.         DTC       IVT intermediate lock control sole- noid valve         Ground       Voltage         Protect IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.       Ground         Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R         Continuity         PDTC       IVT intermediate lock control solenoid         Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R         PO081       2       F75         DTC       IVT intermediate lock control solenoid       IPDM E/R         Continuity       Bank       Connector       Terminal         P		•	•			ort to power	in namess or c	onnectors.		
he inspection result normal? S $>>$ GO TO 5. O $>>$ Replace IVT control solenoid valve. Refer to EM-54. "Exploded View". CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY Disconnect IVT intermediate lock control solenoid valve harness connector. Turn ignition switch ON. Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground. Turn ignition switch ON. Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground. Turn ignition switch OT. Turn ignition switch OT. Control valve $rest = 10^{-100}$ Voltage Turn ignition switch OFF. Disconnect IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. DTC Valve Valve Connector Terminal Connector Terminal Continuity PO075 1 F74 1 F19 59 Existed Also check harness for short to ground. he inspection result normal? ES $>>$ Perform the trouble diagnosis for power supply circuit. O $>$ Repair or replace error-detected parts. CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT Turn ignition switch OFF. Disconnect ECM harness connector.										
ES       >> G0 T0 5.         O       >> Replace IVT control solenoid valve. Refer to EM-54, "Exploded View".         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY         Disconnect IVT intermediate lock control solenoid valve harness connector.         Turn ignition switch ON.         Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground.         DTC       IVT intermediate lock control sole- noid valve         Ground       Voltage         Bank       Connector Terminal         0075       1       F74         0081       2       F75         1       Ground       Battery voltage         the inspection result normal?       ES         SS       > G0 T0 6.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.       Disconnect IPDM E/R harness connector.         Otck the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid Terminal         P0075       1       F74       1       F19       59       Existed         Also check harness for short to ground.       the inspection result normal?       S       > Repair or replace error-detected parts.					er to <u>EC-216</u>	<u>o, "Compone</u>	ent Inspection (	IVI Control Solenoid Valve)".		
0       >> Replace IVT control solenoid valve. Refer to EM-54, "Exploded View".         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY         Disconnect IVT intermediate lock control solenoid valve harness connector.         Turn ignition switch ON.         Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground.         DTC       IVT intermediate lock control sole- noid valve         0075       1       F74       1         0075       1       F74       1         0075       1       F74       1         0075       1       F74       1         0081       2       F75       1         0       > GO TO 6.       CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.       Disconnect IPDM E/R       Continuity         Protom				<u></u>						
Disconnect IVT intermediate lock control solenoid valve harness connector. Turn ignition switch ON. Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground. Turn ignition switch OT intermediate lock control solenoid valve harness connector and ground. Turn ignition switch OT. Disconnect IPDM E/R harness connector. Check the continuity between IVT intermediate lock control Solenoid valve harness connector and ground. Turn ignition switch OFF. Disconnect IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. DTC Valve Valve Connector Terminal Connector Terminal PDM E/R Continuity PO075 1 F74 1 F19 59 Existed Also check harness for short to ground. he inspection result normal? ES >> Perform the trouble diagnosis for power supply circuit. O >> Repair or replace error-detected parts. CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT Turn ignition switch OFF. Disconnect E/M harness connector.	-		-	ol solenoid	valve. Refei	to <u>EM-54,</u> "	'Exploded View	n		
Disconnect IVT intermediate lock control solenoid valve harness connector. Turn ignition switch ON. Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground. Turn ignition switch OT intermediate lock control solenoid valve harness connector and ground. Turn ignition switch OF. Disconnect IPDM E/R harness connector. Check the continuity between IVT intermediate lock control Solenoid valve harness connector and IPDM E/R harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. DTC VI intermediate lock control solenoid IPDM E/R Continuity PO075 1 F74 1 F19 59 Existed Also check harness for short to ground. he inspection result normal? ES >> Perform the trouble diagnosis for power supply circuit. O >> Repair or replace error-detected parts. CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT Turn ignition switch OFF. Disconnect ECM harness connector.		•						—		
Turn ignition switch ON.         Check the voltage between IVT intermediate lock control solenoid valve harness connector and ground.         Turn ignition switch ON.         OT intermediate lock control sole- noid valve       Ground       Voltage         DTC intermediate lock control sole- noid valve       Ground       Voltage         DTC intermediate lock control sole- noid valve       Ground       Voltage         DTC intermediate lock control sole- noid valve       Ground       Battery voltage         DTC intermediate lock control solenoid       Battery voltage         DTC intermediate LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.         Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R valve         IPDM E/R intermediate lock control solenoid         IPDM E/R intermediate lock control solenoid         One valve         IPDM E/R intermediate lock control solenoid valve harness connector and IPDM E/R intermediate lock control solenoid valve harness connector and IPDM E/R intermediate lock control solenoid valve harness connector interminal <td <="" colspan="2" td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td>	<td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
Image: constrained and the control sole indication of the control sole indicating the control sole indication of the contro	Turn	ignition sw	itch ON.							
DTC       noid value       Ground       Voltage         00075       1       F74       1       Ground       Battery voltage         00081       2       F75       1       Ground       Battery voltage         be inspection result normal?       Es       >> GO TO 7.       Battery voltage         00       >> GO TO 6.       CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.       Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid valve harness connector and IPDM E/R continuity         P0075       1       F74       1         P0081       2       F75       1       F19       59         Also check harness for short to ground.       teinspection result normal?       Es       >> Perform the trouble diagnosis for power supply circuit.         O       >> Repair or replace error-detected parts.       CONTROL SOLENOID VALVE GROUND CIRCUIT         Turn ignition switch OFF.       Disconnect FCM harness connector.       Continuity         DIS       PORT       Torminal       Continuity         DIS       F75       1       F19       59       <	Chec	k the voltag	ge betweer	n IVT intern	nediate lock	control sole	noid valve harr	less connector and ground.		
DTC         noid valve         Ground         Voltage           00075         1         F74         1         Ground         Battery voltage           00081         2         F75         1         Battery voltage           be inspection result normal?         Es         >> GO TO 7.         Battery voltage           00         >> GO TO 6.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT           Turn ignition switch OFF.         Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.           DTC         IVT intermediate lock control solenoid valve         IPDM E/R         Continuity           P0075         1         F74         1         F19         59           P0081         2         F75         1         F19         59         Existed           Also check harness for short to ground.         teinspection result normal?         ES         >> Perform the trouble diagnosis for power supply circuit.         O         >> Repair or replace error-detected parts.           CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT         Turn ignition switch OFF.         Disconnect FCM harness connector.         Disconnect ECM harness connector.		D (T - )								
Bank       Connector       Terminal         p0075       1       F74       1       Ground       Battery voltage         he inspection result normal?       ES       >> GO TO 7.       O       >> GO TO 6.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT       Turn ignition switch OFF.       Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.       Continuity         DTC       IVT intermediate lock control solenoid valve       IPDM E/R continuity         P0075       1       F74       1       F19       59         P0081       2       F75       1       F19       59       Existed         Also check harness for short to ground.       he inspection result normal?       ES       >> Perform the trouble diagnosis for power supply circuit.       O       >> Repair or replace error-detected parts.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT       Turn ignition switch OFF.       Disconnect EOM harness connector.	DTC	IV I interm			Ground	Voltage				
voltage       Ground       Battery voltage         he inspection result normal?       ES       >> GO TO 7.         O       >> GO TO 6.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.         Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid valve harness connector and IPDM E/R valve         DTC       IVT intermediate lock control solenoid valve         Valve       IPDM E/R         Continuity         P0075       1         F74       1         P0081       2         F75       1         F19       59         Existed         Also check harness for short to ground.         he inspection result normal?         ES       > Perform the trouble diagnosis for power supply circuit.         O       >> Repair or replace error-detected parts.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.	DIC	Bank	Connector	Terminal	Ground	voltage				
20081       2       F75       1         he inspection result normal?         ES       >> GO TO 7.         O       >> GO TO 6.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.         Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid         UVT       IPDM E/R         Continuity         Bank       Connector         Valve       IPDM E/R         Continuity         P0075       1         F74       1         P0081       2         2       F75         Also check harness for short to ground.         he inspection result normal?         ES       >> Perform the trouble diagnosis for power supply circuit.         O       >> Repair or replace error-detected parts.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.	P0075	1	F74	1						
ES       >> GO TO 7.         0       >> GO TO 6.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.         Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid       IPDM E/R       Continuity         0075       1       F74       1       F19       59       Existed         PO075       1       F74       1       F19       59       Existed         Also check harness for short to ground.         he inspection result normal?         ES       >> Perform the trouble diagnosis for power supply circuit.         0       >> Repair or replace error-detected parts.       CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.	P0081	2	F75	1	Ground	Battery voltage	9			
ES       >> GO TO 7.         0       >> GO TO 6.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.         Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid       IPDM E/R       Continuity         0075       1       F74       1       F19       59       Existed         PO075       1       F74       1       F19       59       Existed         Also check harness for short to ground.         he inspection result normal?         ES       >> Perform the trouble diagnosis for power supply circuit.         0       >> Repair or replace error-detected parts.       CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.	the ins	pection res	ult normal?	)						
CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT         Turn ignition switch OFF.       Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid       IPDM E/R         Continuity       Bank       Connector       Terminal         P0075       1       F74       1       F19       59         P0081       2       F75       1       F19       59       Existed         Also check harness for short to ground.       the inspection result normal?       ES       >> Perform the trouble diagnosis for power supply circuit.       >> Repair or replace error-detected parts.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT       Turn ignition switch OFF.       Disconnect ECM harness connector.				-						
Turn ignition switch OFF.         Disconnect IPDM E/R harness connector.         Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         Output: IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid valve       IPDM E/R harness       Continuity         Bank       Connector       Terminal       Continuity         P0075       1       F74       1       F19       59       Existed         P0081       2       F75       1       F19       59       Existed         Also check harness for short to ground.       he inspection result normal?       ES       >> Perform the trouble diagnosis for power supply circuit.       >> Repair or replace error-detected parts.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT       Turn ignition switch OFF.       Disconnect ECM harness connector.										
Disconnect IPDM E/R harness connector. Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector. The terminal lock control solenoid liPDM E/R continuity The terminal lock control solenoid liPDM E/R continuity The terminal lock connector Terminal Connector Terminal lock control solenoid valve harness connector. The terminal lock control solenoid liPDM E/R continuity The terminal lock control solenoid liPDM E/R continuity The terminal lock connector lock connector lock control solenoid valve harness connector and IPDM E/R continuity The terminal lock control solenoid liPDM E/R continuity The terminal lock connector lock control solenoid liPDM E/R continuity The terminal lock connector lock control solenoid liPDM E/R continuity The terminal lock control solenoid liPDM E/R control solenoid liPDM E/	.CHEC	K IVT INTE	ERMEDIAT	E LOCK C	ONTROL S	OLENOID V	ALVE POWER	SUPPLY CIRCUIT		
Check the continuity between IVT intermediate lock control solenoid valve harness connector and IPDM E/R harness connector.         DTC       IVT intermediate lock control solenoid       IPDM E/R continuity         DTC       IVT intermediate lock control solenoid       IPDM E/R       Continuity         Bank       Connector       Terminal       Connector       Terminal         P0075       1       F74       1       F19       59       Existed         P0081       2       F75       1       F19       59       Existed         Also check harness for short to ground.       he inspection result normal?       ES       >> Perform the trouble diagnosis for power supply circuit.       O       >> Repair or replace error-detected parts.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT       Turn ignition switch OFF.       Disconnect ECM harness connector.										
E/R harness connector.         IVT intermediate lock control solenoid IPDM E/R Continuity         DTC       IVT intermediate lock control solenoid valve       IPDM E/R       Continuity         Bank       Connector       Terminal       Connector       Terminal         P0075       1       F74       1       F19       59       Existed         P0081       2       F75       1       F19       59       Existed         Also check harness for short to ground.       he inspection result normal?       ES       >> Perform the trouble diagnosis for power supply circuit.       O       >> Repair or replace error-detected parts.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT       Turn ignition switch OFF.       Disconnect ECM harness connector.						nck control s	olenoid valve h	arness connector and IPDM		
DTC     valve     IPDM E/R     Continuity       Bank     Connector     Terminal     Connector     Terminal       P0075     1     F74     1     F19     59     Existed       P0081     2     F75     1     F19     59     Existed       Also check harness for short to ground.     He inspection result normal?     ES     >> Perform the trouble diagnosis for power supply circuit.       O     >> Repair or replace error-detected parts.     CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT       Turn ignition switch OFF.     Disconnect ECM harness connector.			•							
DTC     valve     IPDM E/R     Continuity       Bank     Connector     Terminal     Connector     Terminal       P0075     1     F74     1     F19     59     Existed       P0081     2     F75     1     F19     59     Existed       Also check harness for short to ground.     He inspection result normal?     ES     >> Perform the trouble diagnosis for power supply circuit.       O     >> Repair or replace error-detected parts.     CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT       Turn ignition switch OFF.     Disconnect ECM harness connector.										
Bank       Connector       Terminal       Connector       Terminal         P0075       1       F74       1       F19       59       Existed         P0081       2       F75       1       F19       59       Existed         Also check harness for short to ground.       he inspection result normal?       ES       >> Perform the trouble diagnosis for power supply circuit.         O       >> Repair or replace error-detected parts.       CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT         Turn ignition switch OFF.       Disconnect ECM harness connector.       Disconnect ECM harness connector.					id IPDM E/R					
P0075       1       F74       1       F19       59       Existed         P0081       2       F75       1       F19       59       Existed         Also check harness for short to ground.       he inspection result normal?       ES       >> Perform the trouble diagnosis for power supply circuit.         O       >> Repair or replace error-detected parts.       CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT         Turn ignition switch OFF.       Disconnect ECM harness connector.	DTC	Ponk		r Tormino	L Connector	Torminal	Continuity			
P0081       2       F75       1       F19       59       Existed         Also check harness for short to ground.       Also check harness for short to ground.       Also check harness for short to ground.         he inspection result normal?       ES       >> Perform the trouble diagnosis for power supply circuit.         O       >> Repair or replace error-detected parts.         CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.	P0075				Connector	remina		-		
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<ul> <li>&gt;&gt; Perform the trouble diagnosis for power supply circuit.</li> <li>&gt;&gt; Repair or replace error-detected parts.</li> <li>CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT</li> <li>Turn ignition switch OFF.</li> <li>Disconnect ECM harness connector.</li> </ul>				-	u.					
<ul> <li>&gt;&gt; Repair or replace error-detected parts.</li> <li>CHECK IVT INTERMEDIATE LOCK CONTROL SOLENOID VALVE GROUND CIRCUIT</li> <li>Turn ignition switch OFF.</li> <li>Disconnect ECM harness connector.</li> </ul>				_	for power s	upply circuit				
Turn ignition switch OFF. Disconnect ECM harness connector.	NO >	>> Repair o	or replace e	error-detect	ted parts.					
Turn ignition switch OFF. Disconnect ECM harness connector.	.CHEC	K IVT INTE	ERMEDIAT	E LOCK C	ONTROL S		ALVE GROUNI	D CIRCUIT		
Disconnect ECM harness connector.										
Check the continuity between IVT intermediate lock control solenoid valve harness connector and ECM	. Disco	nnect ECN	/I harness of							
harness connector.			•	een IVT int	ermediate le	ock control s	solenoid valve	harness connector and ECM		

### < DTC/CIRCUIT DIAGNOSIS >

DTC	IVT interme	diate lock con valve	trol solenoid	ECM		Continuity	
	Bank	Connector	Terminal	Connector	Terminal		
P0075	1	F74	2	F79	118	Existed	
P0081	2	F75	2	175	120	Existed	

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

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

 $8. {\sf CHECK \, \text{ivt intermediate lock control solenoid valve}}$ 

Check the IVT intermediate lock control solenoid valve. Refer to <u>EC-217</u>, "Component Inspection (IVT Intermediate Lock Control Solenoid Valve)".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace IVT intermediate lock control solenoid valve. Refer to EM-54. "Exploded View".

### Component Inspection (IVT Control Solenoid Valve)

INFOID:000000012891273

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

- 1. Turn ignition switch OFF.
- 2. Disconnect intake valve timing control solenoid valve harness connector.
- 3. Check resistance between intake valve timing control solenoid valve terminals as follows.

	timing control id valve	Conditio	Resistance	
+	-			
Terr	ninal			
1	2			7.0 – 7.8 Ω
1		Temperature	20°C (68°F)	8
2	Ground			(Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing control solenoid valve. Refer to EM-54, "Exploded View".

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve. Refer to EM-54, "Exploded View"

Provide 12 V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.
 CAUTION:
 Do not early 12 V DC continuously for 5 eccende or more.

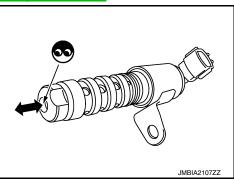
Do not apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve. NOTE:

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve. Refer to EM-54, "Exploded View".



# P0075, P0081 IVT CONTROL SOLENOID VALVE

### < DTC/CIRCUIT DIAGNOSIS >

Component Inspection (IVT Intermediate Lock Control Solenoid Valve)

1. CHECK INTAKE VALVE TIMING INTERMEDIATE LOCK CONTROL SOLENOID VALVE-I

- 1. Turn ignition switch OFF.
- 2. Disconnect intake valve timing intermediate lock control solenoid valve harness connector.
- 3. Check resistance between intake valve timing intermediate lock control solenoid valve terminals as follows.

diate lock co	timing interme- ontrol solenoid alve	Conditio	on	Resistance
+	-	-		
Terr	minal			
1	2			7.0 – 7.8 Ω
1		Temperature	20°C (68°F)	×
2	Ground			(Continuity should not exist)

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing intermediate lock control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> <sup>(</sup><u>View</u>".

# 2.CHECK INTAKE VALVE TIMING INTERMEDIATE LOCK CONTROL SOLENOID VALVE-II

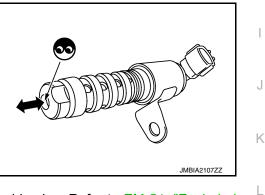
- 1. Remove intake valve timing intermediate lock control solenoid valve. Refer to EM-54. "Exploded View"
- Provide 12 V DC between intake valve timing intermediate lock control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure. CAUTION:
   Do not apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing intermediate lock control solenoid valve. NOTE:

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

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace intake valve timing intermediate lock control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> <u>View</u>".

**Revision: December 2015** 



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# P0078, P0084 EVT CONTROL SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

# P0078, P0084 EVT CONTROL SOLENOID VALVE

### DTC Description

INFOID:000000012891275

[VQ35DE]

### DTC DETECTION LOGIC

An improper voltage is sent to the ECM through exhaust valve timing control solenoid valve.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Start engine and let it idle	
	EX V/T ACT/CIRC-B1	Signal (terminal)	Voltage signal transmitted from exhaust valve timing control solenoid valve to ECM	
P0078	[Exhaust valve timing control solenoid valve (bank 1) circuit]	Threshold	An improper voltage is sent to the ECM through exhaust valve timing control solenoid valve	
		Diagnosis delay time	—	
		Diagnosis condition	Start engine and let it idle	
	EX V/T ACT/CIRC-B2	Signal (terminal)	Voltage signal transmitted from exhaust valve timing control solenoid valve to ECM	
P0084	[Exhaust valve timing control solenoid valve (bank 2) circuit]	Threshold	An improper voltage is sent to the ECM through exhaust valve timing control solenoid valve	
		Diagnosis delay time	-	

#### POSSIBLE CAUSE

P0078

- · Harness or connectors (Exhaust valve timing control solenoid valve circuit is open or shorted.)
- · Exhaust valve timing control solenoid valve

P0084

- Harness or connectors (Exhaust valve timing control solenoid valve circuit is open or shorted.)
- Exhaust valve timing control solenoid valve

FAIL-SAFE Not applicable

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start the engine and let it idle for 5 seconds.
- 2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to EC-219, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# P0078, P0084 EVT CONTROL SOLENOID VALVE

### < DTC/CIRCUIT DIAGNOSIS >

### **Diagnosis** Procedure

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[VQ35DE]

1. CHECK EXHAUST VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT - 1

- 1. Turn ignition switch OFF.
- 2. Disconnect exhaust valve timing control solenoid valve harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between exhaust valve timing control solenoid valve harness connector and ground.

DTC	Exhaust valve Bank	+ e timing control Connector	solenoid valve Terminal	-	Voltage	
P0078	1	F72	1	Ground	Battery volt-	
P0084	2	F73	1	Cround	age	
Is the inspec	ction result r	ormal?				
NO >> 2.CHECK			DID VALVE (	OUTPUT SIC	SNAL CIRCU	JIT FOR OPEN AND SHORT
<ol> <li>Disconr</li> <li>Check t</li> </ol>		rness conne		timing cont	rol solenoid	valve harness connector and ECM
		+			_	
DTC	Exhaust valv	e timing control	solenoid valve	E	CM	Continuity
	Bank	Connector	Terminal	Connector	Terminal	

F79

F73 4. Also check harness for short to ground and short to power.

F72

Is the inspection result normal?

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2

YES >> GO TO 3.

P0078

P0084

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

2

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3.CHECK EXHAUST VALVE TIMING CONTROL SOLENOID VALVE

Check exhaust valve timing control solenoid valve. Refer to EC-220, "Component Inspection".

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning exhaust valve timing control solenoid valve. Refer to EM-54. "Exploded View".

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- ${f 4}$  . CHECK EXHAUST VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT 2
- 1. Turn ignition switch OFF.
- 2. Disconnect IPDM E/R harness connector.
- 3. Check the continuity between IPDM E/R harness connector and exhaust valve timing control solenoid valve harness connector.

		+		_		
DTC	DTC IPDN		Exhaust valve soleno	Continuity		
	Connector	Terminal	Connector	Terminal		
P0075	F19	59	F72	1	Existed	
P0081	119	59	F73		Existed	

# P0078, P0084 EVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

4. Also check harness for short to ground.

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for power supply circuit.
- NO >> Repair or replace error-detected parts.

### Component Inspection

INFOID:000000012891277

[VQ35DE]

# 1. CHECK EXHAUST VALVE TIMING CONTROL SOLENOID VALVE - 1

#### 1. Turn ignition switch OFF.

- 2. Disconnect exhaust valve timing control solenoid valve harness connector.
- 3. Check resistance between exhaust valve timing control solenoid valve terminals as follows.

	timing control id valve	Condition		Resistance
+	_			
Terminal				
2	1			7.0 – 7.8 Ω
1	0 -	Temperature	20°C (68°F)	8
2	Ground			(Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning exhaust valve timing control solenoid valve. Refer to <u>EM-54, "Exploded</u> <u>View"</u>.

**2.**CHECK EXHAUST VALVE TIMING CONTROL SOLENOID VALVE - 2

- 1. Remove exhaust valve timing control solenoid valve. Refer to EM-54, "Exploded View".
- Apply 12 V between exhaust valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure.
   CAUTION: Never apply 12 V continuously for 5 seconds or more. Doing so may result in damage to the coil in exhaust valve timing control solenoid valve.

#### NOTE:

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

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning exhaust valve timing control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> <u>View</u>".

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### < DTC/CIRCUIT DIAGNOSIS >

# P0101 MAF SENSOR

# DTC Description

- DTC DETECTION LOGIC1. A high voltage from the sensor is sent to ECM under light load driving condition.
- A low voltage from the sensor is sent to ECM under heavy load driving condition.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
			Diagnosis condition	-
		1	Signal (terminal)	Voltage signal transmitted from MAF sensor to ECM
		1	Threshold	A high voltage from the sensor is sent to ECM under light load driving condition
P0101	MAF SEN/CIRCUIT-B1 (Mass or volume air flow "A" circuit		Diagnosis delay time	_
FUIUI	range/performance)	t	Diagnosis condition	-
		2	Signal (terminal)	Voltage signal transmitted from MAF sensor to ECM
		2	Threshold	A low voltage from the sensor is sent to ECM under heavy load driving condition
			Diagnosis delay time	_

### POSSIBLE CAUSE

- · Harness and connectors (The sensor circuit is open or shorted.)
- Intake air leaks
- MAF sensor
- EVAP control system pressure sensor
- Intake air temperature sensor

### FAIL-SAFE

	Engine operating condition in fail-safe mode	V
Fail safe mode	Vehicle behavior	N
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
DTC CONFIRMATION P	ROCEDURE	L

# **1.**CHECK DTC PRIORITY

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

### Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to EC-105, "DTC Index".
- NO >> GO TO 2.

# 2. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

### >> GO TO 3.

# **3.** PERFORM DTC CONFIRMATION PROCEDURE

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

2. Drive the vehicle for at least 5 seconds under the following conditions: CAUTION:

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#### Always drive vehicle at safe speed.

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

#### NOTE:

- · The gear must be fixed while driving the vehicle.
- Keep the accelerator pedal as steady as possible during cruising.
- 3. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-222, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

INFOID:000000012891279

### **1.**CHECK DTC PRIORITY

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

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-105, "DTC Index"</u>.

NO >> GO TO 2.

2. CHECK INTAKE SYSTEM

#### Check the following for connection.

Air duct

Vacuum hoses

• Intake air passage between air duct and intake manifold

Is the inspection result normal?

YES >> GO TO 3.

NO >> Reconnect the parts.

3. CHECK MASS AIR FLOW (MAF) SENSOR POWER SUPPLY

- 1. Disconnect MAF sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between MAF sensor harness connector and ground.

	+			
MAF	sensor	_	Voltage	
Connector	Connector Terminal			
F93	1	Ground	Approx. 5 V	

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

# **4.**CHECK MASS AIR FLOW (MAF) SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

MAF	sensor	E	Continuity	
Connector	Connector Terminal		Terminal	Continuity
F93	1	F78	28	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	e continuity be	etween MAF se	ensor harness	s connector a	nd ECM harness connector.
MAF s	sensor	EC		Continuity	-
Connector	Terminal	Connector	Terminal		-
F93 Also chec	2 k harnoss for	F78 short to grour	40	Existed	-
	on result norn	-		power.	
YES >> G	O TO 6.				
			-	nort to power	in harness or connectors.
		INPUT SIGNA			
Check the	e continuity be	etween MAF se	ensor harness	s connector a	nd ECM harness connector.
MAF s	sensor	EC	CM		-
Connector	Terminal	Connector	Terminal	Continuity	
F93	3	F78	38	Existed	-
Also chec	k harness for	short to groun	d and short to	o power.	-
	on result norn	-		•	
	O TO 7.	ouit or obort to		ort to now or	in harness or connectors.
10 >> R	epair open cir	cuit or short it	) ground or sr	ion to power	
<u></u>				•	
		MPERATURE		•	
heck intake a	air temperatu	re sensor. Ref		•	
heck intake a the inspection	air temperatur	re sensor. Ref		•	
heck intake a the inspection YES >> G	air temperatur on result norn O TO 8.	re sensor. Ref nal?	er to <u>EC-223,</u>	"Component	Inspection".
heck intake a the inspection YES >> G NO >> Re	air temperatur on result norn O TO 8. eplace MAF s	re sensor. Refe nal? sensor (with int	er to <u>EC-223,</u> take air tempe	"Component	Inspection".
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neck intake a the inspection (ES >> G IO >> R IO >> R ICHECK EV Neck EVAP of the inspection (ES >> G IO >> R	air temperatur on result norr O TO 8. eplace MAF s /AP CONTRC control system on result norr O TO 9. eplace EVAP	re sensor. Refe <u>nal?</u> sensor (with int DL SYSTEM P n pressure ser	er to <u>EC-223,</u> take air tempe RESSURE SI nsor. Refer to	"Component erature senso ENSOR EC-368, "Con	Inspection". r).
heck intake a the inspection (ES >> G NO >> Ro CHECK EV heck EVAP of the inspection (ES >> G NO >> Ro	air temperatur on result norn O TO 8. eplace MAF s /AP CONTRC control systen on result norn O TO 9.	re sensor. Refe nal? sensor (with inf DL SYSTEM P n pressure ser nal?	er to <u>EC-223,</u> take air tempe RESSURE SI nsor. Refer to	"Component erature senso ENSOR EC-368, "Con	Inspection". r).
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heck intake a the inspection (ES >> G NO >> R .CHECK EV heck EVAP of the inspection (ES >> G NO >> R .CHECK MA heck MAF set the inspection (ES >> IN NO >> R NO >> R	air temperatur on result norm O TO 8. eplace MAF s /AP CONTRC control system on result norm O TO 9. eplace EVAP AF SENSOR ensor. Refer to on result norm ISPECTION B	re sensor. Refe nal? sensor (with inf DL SYSTEM P n pressure ser nal? control system o <u>EC-223, "Co</u> nal? END sensor. Refer t	er to <u>EC-223,</u> take air tempe RESSURE SI nsor. Refer to n pressure se	"Component erature senso ENSOR EC-368, "Col nsor.	Inspection". r). mponent Inspection".
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heck intake a the inspection YES >> G NO >> R CHECK EV heck EVAP of the inspection YES >> G NO >> R CHECK MAF se the inspection YES >> IN NO >> R COMPONEN	air temperatur on result norm O TO 8. eplace MAF s /AP CONTRC control system on result norm O TO 9. eplace EVAP AF SENSOR ensor. Refer t on result norm ISPECTION F eplace MAF s t Inspectio	re sensor. Refe nal? sensor (with inf DL SYSTEM P n pressure ser nal? control system o <u>EC-223, "Co</u> nal? END sensor. Refer t <b>n</b> W (MAF) SEN	er to <u>EC-223,</u> take air tempe RESSURE SI isor. Refer to in pressure se imponent Insp o <u>EM-26, "Re</u>	"Component erature senso ENSOR EC-368, "Col nsor.	Inspection". r). mponent Inspection". stallation".

#### < DTC/CIRCUIT DIAGNOSIS >

Monitor item	Condition	Indication (Hz)
	Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz
MASS AIR FLOW SENSOR (Hz)	Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz
	Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*

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

Without CONSULT

1. Turn ignition switch OFF.

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

ECM				
Connector	+	-	Condition	Frequency (Hz)
Connector	Terminal			
	38 40		Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz
F78		Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz	
			Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

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

1. Turn ignition switch OFF.

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

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts
- Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK MAF SENSOR-II

#### (D) With CONSULT

1. Repair or replace malfunctioning part.

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

- 3. Connect CONSULT and select "DATA MONITOR" mode.
- 4. Select "MASS AIR FLOW SENSOR (Hz)" and check the indication.

Monitor item	Condition	Indication (Hz)
	Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz
MASS AIR FLOW SENSOR (Hz)	Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz
	Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*

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

Without CONSULT

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

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	ECM			
Connector	+	-	Condition	Frequency (Hz)
Terminal		inal		
			Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz
F78	38	40	Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz
			Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*
*: Check for	linear frequenc	y rise in respor	nse to engine being increased to about 4,000 rpm.	
he inspecti	on result nor	mal?		
-	SPECTION	END		
	O TO 4.			
CHECK M	AF SENSOR	-111		
With CONS	ULT			
	ion switch OF			
			connector and reconnect it again. mal operating temperature.	
			ATA MONITOR" mode.	
Connect	CONSULT ar	nd select "D/		
Connect ( Select "M	CONSULT ar ASS AIR FLO	nd select "D/	ATA MONITOR" mode. R (Hz)" and check the indication.	
Connect ( Select "M	CONSULT ar	nd select "D/ DW SENSO	ATA MONITOR" mode. R (Hz)" and check the indication.	Indication (Hz)
Connect ( Select "M	CONSULT ar ASS AIR FLO	nd select "D/ DW SENSO	ATA MONITOR" mode. R (Hz)" and check the indication.	Indication (Hz) Approx. 3,720 Hz
Connect ( Select "M Monite	CONSULT ar ASS AIR FLO	Ignition swi	ATA MONITOR" mode. R (Hz)" and check the indication.	. ,
Connect ( Select "M Monit	CONSULT ar ASS AIR FL( or item	Ignition swi	ATA MONITOR" mode. R (Hz)" and check the indication. Condition tch ON (Engine stopped.)	Approx. 3,720 Hz
Connect ( Select "M Monit	CONSULT ar ASS AIR FL( or item W SENSOR (Hz	Ignition swi Idle (Engine Idle to abou	ATA MONITOR" mode. R (Hz)" and check the indication. Condition tch ON (Engine stopped.) e is warmed-up to normal operating temperature.)	Approx. 3,720 Hz 4,100 – 4,700 Hz 4,100 – 4,700 to Approx. 8,000 Hz
Connect ( Select "M Monit ASS AIR FLO *: Check for Without CC	CONSULT ar ASS AIR FLO or item W SENSOR (Hz linear frequenc NSULT	Ignition swi Idle (Engine Idle to abou y rise in respor	ATA MONITOR" mode. R (Hz)" and check the indication. Condition tch ON (Engine stopped.) e is warmed-up to normal operating temperature.) ut 4,000 rpm	Approx. 3,720 Hz 4,100 – 4,700 Hz 4,100 – 4,700 to Approx. 8,000 Hz
Connect ( Select "M Monit ASS AIR FLO *: Check for Without CC Turn ignit	CONSULT ar ASS AIR FLO or item W SENSOR (Hz linear frequenc WSULT ion switch OF	Ignition swi Ignition swi Idle (Engine Idle to abou y rise in respor	ATA MONITOR" mode. R (Hz)" and check the indication. Condition tch ON (Engine stopped.) e is warmed-up to normal operating temperature.) ut 4,000 rpm	Approx. 3,720 Hz 4,100 – 4,700 Hz 4,100 – 4,700 to Approx. 8,000 Hz

4. Check the frequency between ECM harness connector terminals under the following conditions.

	ECM				
Connector	+	-	Condition	Frequency (Hz)	
CONNECTOR	Terminal				
			Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz	
F78	38	40	Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz	
			Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*	

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

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Clean or replace MAF sensor. Refer to EM-26, "Removal and Installation".

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# DTC Description

[VQ35DE]

#### DTC DETECTION LOGIC

- An excessively low voltage from the sensor is sent to ECM.
- An excessively high voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Start engine and let it idle	
<b>P0102</b>	MAF SEN/CIRCUIT-B1 (Mass or volume air flow "A" circuit low	Signal (terminal)	Voltage signal transmitted from mass air flow sensor to ECM	
P0102	input)	Threshold	An excessively low voltage from the sensor is sent to ECM	
		Diagnosis delay time	—	
		Diagnosis condition	<ul><li> Ignition switch ON</li><li> Start engine and let it idle</li></ul>	
P0103	MAF SEN/CIRCUIT-B1 (Mass or volume air flow "A" circuit high input)	Signal (terminal)	Voltage signal transmitted from mass air flow sensor to ECM	
		Threshold	An excessively high voltage from the sensor is sent to ECM	
		Diagnosis delay time	-	

### POSSIBLE CAUSE

P0102

- · Harness or connectors (The sensor circuit is open or shorted.)
- Intake air leakage
- Mass air flow sensor

P0103

- Harness or connectors (The sensor circuit is open or shorted.)
- Mass air flow sensor

FAIL-SAFE

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

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK DTC PRIORITY

If DTC P0102 or P0103 is displayed with another DTC P0643, first perform the trouble diagnosis for DTC P0643.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-430, "DTC Description"</u>.

NO >> GO TO 2.

### 2.PRECONDITIONING

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

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

### Which DTC is detected?

P0102 >> GO TO 3.

Revision: December 2015

# EC-226

P0102, P0103 MAF SENSOR	
< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]	
P0103 >> GO TO 4.	
<b>3.</b> PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102	А
<ol> <li>Start engine and wait at least 5 seconds.</li> <li>Check DTC.</li> </ol>	FO
Is DTC detected?	EC
YES >> Proceed to <u>EC-227, "Diagnosis Procedure"</u> . NO >> INSPECTION END	С
4.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-I	0
<ol> <li>Turn ignition switch ON and wait at least 5 seconds.</li> <li>Check DTC.</li> </ol>	D
Is DTC detected?	
YES >> Proceed to <u>EC-227, "Diagnosis Procedure"</u> . NO >> GO TO 5.	E
5.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-II	
<ol> <li>Start engine and wait at least 5 seconds.</li> <li>Check DTC.</li> </ol>	F
<u>Is DTC detected?</u> YES >> Proceed to <u>EC-227, "Diagnosis Procedure"</u> . NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u> . NO-2 >> Confirmation after repair: INSPECTION END	G
Diagnosis Procedure	Н
1. CHECK DTC PRIORITY	
If DTC P0102 or P0103 is displayed with another DTC P0643, first perform the trouble diagnosis for DTC P0643.	I
Is applicable DTC detected?	
<ul> <li>YES &gt;&gt; Perform diagnosis of applicable. Refer to <u>EC-430, "DTC Description"</u>.</li> <li>NO &gt;&gt; GO TO 2.</li> </ul>	J
2.INSPECTION START	IZ.
Confirm the detected DTC.	K
Which DTC is detected?	
P0102 >> GO TO 3. P0103 >> GO TO 4.	L
3. CHECK INTAKE SYSTEM	
Check the following for connection.	$\mathbb{M}$
Air duct	
<ul> <li>Vacuum hoses</li> <li>Intake air passage between air duct to intake manifold</li> </ul>	Ν
Is the inspection result normal?	
YES >> GO TO 4. NO >> Reconnect the parts.	0
NO >> Reconnect the parts. <b>4.</b> CHECK MAF SENSOR POWER SUPPLY	0
1. Disconnect mass air flow (MAF) sensor harness connector.	
2. Turn ignition switch ON.	Ρ
<ol><li>Check the voltage between MAF sensor harness connector and ground.</li></ol>	

### < DTC/CIRCUIT DIAGNOSIS >

	+		
MAF	sensor	_	Voltage
Connector	Terminal		
F93	1	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

# 5. CHECK MASS AIR FLOW (MAF) SENSOR POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between MAF sensor harness connector and ECM harness connector.

MAF	sensor	E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F93	1	F78	28	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

**6.**CHECK MAF SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

	MAF	sensor	E	Continuity	
	Connector	Terminal	Connector	Terminal	Continuity
_	F93	2	F78	40	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

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

7.CHECK MAF SENSOR INPUT SIGNAL CIRCUIT

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

	MAF sensor		E	Continuity	
	Connector	Terminal	Connector	Terminal	Continuity
-	F93	3	F78	38	Existed

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

#### Is the inspection result normal?

YES >> GO TO 8.

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

 ${f 8}$ .CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-229, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace mass air flow sensor. Refer to <u>EM-26</u>, "Removal and Installation".

- Improper specification of intake air system parts

### Is the inspection result normal?

- YES >> GO TO 4. NO >> GO TO 3.
- 3.CHECK MAF SENSOR-II

# (I) With CONSULT

- 1. Repair or replace malfunctioning part.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Connect CONSULT and select "DATA MONITOR" mode.
- Select "MASS AIR FLOW SENSOR (Hz)" and check the indication. 4.

### **Revision: December 2015**

INFOID:000000012891283

[VQ35DE]

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# P0102, P0103 MAF SENSOR

# 1.CHECK MASS AIR FLOW (MAF) SENSOR-I (P)With CONSULT

1. Turn ignition switch OFF.

**Component Inspection** 

- 2. Reconnect all harness connectors disconnected.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Connect CONSULT and select "DATA MONITOR" mode.
- 5. Select "MASS AIR FLOW SENSOR (Hz)" and check the indication.

Monitor item	Condition	Indication (Hz)
	Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz
MASS AIR FLOW SENSOR (Hz)	Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz
	Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*

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

Without CONSULT

1. Turn ignition switch OFF.

ECM

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

Connector	+	_	Condition	Frequency (Hz)	F
Connector Terminal		minal			
			Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz	
F78	38	40	Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz	
			Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*	,
NO >> (	GO TO 4. GO TO 2.		EVEN AIR FLOW THROUGH MAF SEN	ISOR	
<ol> <li>Check fo</li> <li>Crushed</li> <li>Malfunction</li> </ol>	air ducts ioning seal o			following.	ſ

#### < DTC/CIRCUIT DIAGNOSIS >

Monitor item	Condition	Indication (Hz)
	Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz
MASS AIR FLOW SENSOR (Hz)	Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz
	Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*

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

#### Without CONSULT

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

ECM					
Connector	+ – Terminal		Condition	Frequency (Hz)	
Connector					
	38 40		Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz	
F78		Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz		
		Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*		

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

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 4.

### 4.CHECK MAF SENSOR-III

#### (I) With CONSULT

- 1. Turn ignition switch OFF.
- 2. Disconnect MAF sensor harness connector and reconnect it again.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Connect CONSULT and select "DATA MONITOR" mode.
- 5. Select "MASS AIR FLOW SENSOR (Hz)" and check the indication.

Monitor item	Condition	Indication (Hz)
	Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz
MASS AIR FLOW SENSOR (Hz)	Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz
	Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*

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

Without CONSULT

1. Turn ignition switch OFF.

2. Disconnect MAF sensor harness connector and reconnect it again.

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

ECM					
Connector	+	_	Condition	Frequency (Hz)	
Connector	Terminal				
	38 40		Ignition switch ON (Engine stopped.)	Approx. 3,720 Hz	
F78		Idle (Engine is warmed-up to normal operating temperature.)	4,100 – 4,700 Hz		
		Idle to about 4,000 rpm	4,100 – 4,700 to Approx. 8,000 Hz*		

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

Is the inspection result normal?



< DTC/	CIRCUIT DIAGNOSIS >	[VQ35DE]
YES	>> INSPECTION END	
NO	>> Clean or replace MAF sensor. Refer to EM-26, "Removal and Installation".	

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# P0111 IAT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# P0111 IAT SENSOR

### DTC Description

INFOID:000000012891284

[VQ35DE]

### DTC DETECTION LOGIC

The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the voltage signal of the IAT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	_
		Signal (terminal)	Voltage signal transmitted from IAT sensor to ECM
P0111	IAT SENSOR 1 B1 (Intake air temperature sensor 1 circuit range/performance bank 1)	Threshold	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the voltage signal of the IAT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state
		Diagnosis delay time	—

### POSSIBLE CAUSE

• Harness and connectors (High or low resistance in the IAT sensor circuit)

IAT sensor

### FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

### Is it necessary to erase permanent DTC?

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

 $2. {\sf CHECK} \text{ intake air temperature (iat) sensor}$ 

1. Turn ignition switch OFF.

2. Disconnect mass air flow sensor harness connector.

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

Terminals	Condition	Resistance (k $\Omega$ )	
2 and 4	Temperature [°C (°F)]	25 (77)	1,800 – 2,200

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-233, "Diagnosis Procedure".

# 3. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

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

**TESTING CONDITION:** 

• Before performing the following procedure, do not add fuel.

• Before performing the following procedure, check that fuel level is between 1/4 and 4/4.

### EC-232

# **P0111 IAT SENSOR**

< DTC/CIRCUIT DIAGNOSIS > [VQ35DI	Ξ]
• Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.	
	A
>> GO TO 4. <b>4.</b> PERFORM DTC CONFIRMATION PROCEDURE	
1. Move the vehicle to a cool place.	EC
NOTE:	
<ul> <li>Cool the vehicle in an environment of ambient air temperature between -10°C (14°F) and 35°C (95°F).</li> <li>Turn ignition switch OFF and leave the vehicle for 12 hours.</li> <li>CAUTION:</li> </ul>	С
Never turn ignition switch ON during this procedure.	D
NOTE: The vehicle must be cooled with the hood open.	D
3. Start engine and let it idle for 5 minutes or more.	
CAUTION: Never turn ignition switch OFF during idling.	E
4. Check 1st trip DTC.	
Is 1st trip DTC detected?	F
<ul> <li>YES &gt;&gt; Proceed to <u>EC-233, "Diagnosis Procedure"</u>.</li> <li>NO-1 &gt;&gt; To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u>.</li> <li>NO-2 &gt;&gt; Confirmation after repair: INSPECTION END</li> </ul>	
Diagnosis Procedure	G
1. CHECK INTAKE AIR TEMPERATURE (IAT) SENSOR	Н
Check intake air temperature sensor. Refer to <u>EC-233, "Component Inspection"</u> .	
<u>Is the inspection result normal?</u> YES >> INSPECTION END	1
YES >> INSPECTION END NO >> Replace mass air flow sensor. Refer to <u>EM-26, "Removal and Installation"</u> .	1
Component Inspection	1286
	J
1. CHECK INTAKE AIR TEMPERATURE SENSOR	
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect mass air flow sensor harness connector and reconnect it again.</li> </ol>	K
3. Turn ignition switch ON.	
<ol> <li>Select "DATA MONITOR" mode with CONSULT.</li> <li>Check that the indicated value of "INT/A TEMP SEN" is almost the same as intake air temperature.</li> </ol>	L
Is the inspection result normal?	
YES >> INSPECTION END	nd M
NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to <u>EM-26, "Explode</u> <u>View"</u>	<u>əd</u>
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# P0112, P0113 IAT SENSOR

# DTC Description

[VQ35DE]

INFOID:000000012891287

### DTC DETECTION LOGIC

- · An excessively low voltage from the sensor is sent to ECM.
- An excessively high voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	Ignition switch ON
P0112 (	IAT SEN/CIRCUIT-B1	Signal (terminal)	Voltage signal transmitted from intake air temperature sensor to ECM
	(Intake air temperature sensor 1 circuit low bank 1)	Threshold	An excessively low voltage from the sensor is sent to ECM
		Diagnosis delay time	—
		Diagnosis condition	Ignition switch ON
P0113	IAT SEN/CIRCUIT-B1	Signal (terminal)	Voltage signal transmitted from intake air temperature sensor to ECM
	(Intake air temperature sensor 1 circuit high bank 1)	Threshold	An excessively high voltage from the sensor is sent to ECM
		Diagnosis delay time	—

### POSSIBLE CAUSE

P0112

- Harness and connectors (The sensor circuit is open or shorted.)
- Intake air temperature sensor

P0113

- · Harness and connectors (The sensor circuit is open or shorted.)
- Intake air temperature sensor

FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

### >> GO TO 2.

# 2.PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-234, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

1. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY

INFOID:000000012891288

# P0112, P0113 IAT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

1. Disconnect mass air flow sensor (with intake air temperature sensor) harness connector.

- 2. Turn ignition switch ON.
- 3. Check the voltage between mass air flow sensor harness connector and ground.

MAF	sensor	Ground	Voltage	
Connector	Terminal	Giodila	vollage	
F93	4	Ground	Approx, 5 V	

Is the inspection result normal?

YES >> GO TO 2.

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

2.check intake air temperature sensor ground circuit for open and short

1. Turn ignition switch OFF.

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

MAF s	MAF sensor ECM		Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F93	2	F78	40	Existed

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

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK INTAKE AIR TEMPERATURE SENSOR

Check intake air temperature sensor. Refer to EC-235, "Component Inspection". Is the inspection result normal? YES >> INSPECTION END NO >> Replace mass air flow sensor. Refer to EM-26, "Removal and Installation". Component Inspection INFOID:000000012891289 Κ **1.**CHECK INTAKE AIR TEMPERATURE SENSOR 1. Turn ignition switch OFF. 2. Disconnect mass air flow sensor harness connector and reconnect it again. L Turn ignition switch ON. 3. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "INT/A TEMP SEN". 4. Check that the indicated value of "INT/A TEMP SEN" is almost the same as intake air temperature. 5. Μ Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace mass air flow sensor. Refer to EM-26, "Removal and Installation".

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# P0116 ECT SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# P0116 ECT SENSOR

# **DTC** Description

INFOID:000000012891290

[VQ35DE]

### DTC DETECTION LOGIC

The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the voltage signal of the ECT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	—
		Signal (terminal)	Voltage signal transmitted from ECT sensor to ECM
P0116	ECT SEN/CIRC (Engine coolant temperature sensor 1 circuit range/performance)	Threshold	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the voltage signal of the ECT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state
		Diagnosis delay time	—

### POSSIBLE CAUSE

- Harness and connectors (High or low resistance in the ECT sensor circuit)
- ECT sensor

### FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

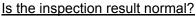
### Is it necessary to erase permanent DTC?

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

 $2. {\sf CHECK} \ {\sf ENGINE} \ {\sf COOLANT} \ {\sf TEMPERATURE} \ ({\sf ECT}) \ {\sf SENSOR}$ 

- 1. Turn ignition switch OFF.
- 2. Disconnect ECT sensor harness connector.
- 3. Remove ECT sensor. Refer to CO-23, "Exploded View".
- 4. Check resistance between ECT sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance (k $\Omega$ )	
		20 (68)	2.37 – 2.63
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 – 1.00
		90 (194)	0.236 – 0.260



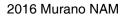
- YES >> INSPECTION END
- NO >> Proceed to <u>EC-237, "Diagnosis Procedure"</u>.

# 3. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

# EC-236



JMBIA008077

# **P0116 ECT SENSOR**

	CIRCUIT	DIAGNOSIS >			[VQ35DE]	
		switch OFF and wait	at least 10 se	conds.		
	ING CONDI	TION: ning the following p	rocedure. do	not add fuel.		
<ul> <li>Befo</li> </ul>	ore perform	ning the following p	rocedure, ch	eck that fuel lev	el is between 1/4 and 4/4. y voltage is 11 V or more at idle.	
- Delo	bre periorii	ing the following p	rocedure, co		y voltage is it v or more at fule.	E
_	>> GO T	O 4.				
<b>4.</b> PEF	RFORM DT	C CONFIRMATION	PROCEDURE	Ξ		
	love the veh OTE:	icle to a cool place.				
Co	ool the vehi	cle in an environmen switch OFF and leave			etween –10°C (14°F) and 35°C (95°F).	
C	AUTION:					
	ever turn iç OTE:	gnition switch ON d	uring this pro	ocedure.		
Th	he vehicle m	nust be cooled with th				
	tart engine a	and let it idle for 20 m	inutes or more	е.		
	ever turn ig heck 1st trip	nition switch OFF	during idling.			
	trip DTC de					
YES		ed to <u>EC-237, "Diag</u>				
NO-1					-42, "Intermittent Incident".	
	2 >> Confi	rmation after repair:	INSPECTION	END		
NO-2			INSPECTION	END	INFOID:000000012891291	
NO-2 Diagr	nosis Pro	cedure			INFOID:000000012891291	
NO-2 Diagr <b>1.</b> сні	nosis Pro IECK ENGII	CECURE	PERATURE (E	CT) SENSOR	INFOID:000000012891291	
NO-2 Diagr 1.CHI Check	nosis Pro IECK ENGII	cedure	PERATURE (E	CT) SENSOR	INFCID:000000012891291	
NO-2 Diagr 1.CHI Check Is the i YES	nosis Pro IECK ENGII ECT senso inspection r >> INSP	NE COOLANT TEMF or. Refer to <u>EC-237, '</u> result normal? ECTION END	PERATURE (E "Component Ir	CT) SENSOR	INFCID:000000012891291	
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NO-2 Diagr 1.chi Check Is the i YES NO Comp 1.chi 1. Tu	IECK ENGI ECT senso inspection r >> INSP >> Repla ponent In IECK ENGI urn ignition s	NE COOLANT TEMP or. Refer to <u>EC-237, '</u> result normal? ECTION END ace ECT sensor. Refe ispection NE COOLANT TEMP switch OFF.	PERATURE (E <u>"Component Ir</u> er to <u>CO-23. "I</u> PERATURE SE	ECT) SENSOR <u>Ispection</u> ". Exploded View". ENSOR	INFOID:000000012891292	
NO-2 Diagr 1.сні Сheck Is the i YES NO Comp 1.сні 1. ти 2. ді: 3. ке	nosis Pro IECK ENGI ECT senso inspection r >> INSP >> Repla ponent In IECK ENGI urn ignition s isconnect en emove engi	NE COOLANT TEMP or. Refer to <u>EC-237, '</u> <u>result normal?</u> ECTION END ace ECT sensor. Refer ispection NE COOLANT TEMP switch OFF. ngine coolant temperation	PERATURE (E "Component Ir er to <u>CO-23, "I</u> PERATURE SE rature sensor l ure sensor. Re	ECT) SENSOR <u>spection</u> ". Exploded View". ENSOR harness connector fer to <u>CO-23, "Exp</u>	INFOID:000000012891292	
NO-2 Diagr 1.CHI Check Is the i YES NO Comp 1.CHI 1. Tu 2. Dia 3. Re 4. Ch	nosis Pro IECK ENGI ECT sense inspection r >> INSP >> Repla ponent In IECK ENGI urn ignition s isconnect el emove engi heck resista	NE COOLANT TEMP or. Refer to <u>EC-237, '</u> result normal? ECTION END ace ECT sensor. Refer ispection NE COOLANT TEMP switch OFF. ngine coolant temperature ne coolant temperature ance between engine	PERATURE (E "Component Ir er to <u>CO-23, "I</u> PERATURE SE rature sensor l ure sensor. Re	ECT) SENSOR <u>spection</u> ". Exploded View". ENSOR harness connector fer to <u>CO-23, "Exp</u>	INFOID:000000012891292	
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NO-2 Diagr 1.CHI Check Is the i YES NO Comp 1.CHI 1. Tu 2. Di: 3. Re 4. CH 4. CH 4. CH 4. CH	IECK ENGI ECT senso inspection r >> INSP >> Repla ponent In IECK ENGI urn ignition s isconnect en emove engi heck resista rminals as p CT sensor	NE COOLANT TEMP or. Refer to <u>EC-237, '</u> result normal? ECTION END ace ECT sensor. Refer ispection NE COOLANT TEMP switch OFF. ngine coolant temperature ne coolant temperature ance between engine	PERATURE (E <u>"Component Ir</u> er to <u>CO-23, "I</u> PERATURE SE rature sensor I ure sensor. Re e coolant tem	ECT) SENSOR <u>spection</u> ". Exploded View". ENSOR harness connector fer to <u>CO-23, "Exp</u>	INFOID:000000012891292	
NO-2 Diagr 1.CHI Check Is the i YES NO Comp 1.CHI 1. Tu 2. Di: 3. Re 4. CH 4. CH ter EC +	nosis Pro IECK ENGI ECT senso inspection r >> INSP >> Repla ponent In IECK ENGI urn ignition s isconnect en emove engi heck resista erminals as p	NE COOLANT TEMP or. Refer to <u>EC-237.</u> <u>result normal?</u> ECTION END ace ECT sensor. Reference aspection NE COOLANT TEMP switch OFF. ngine coolant temperatures ance between engine ber the following.	PERATURE (E <u>"Component Ir</u> er to <u>CO-23, "I</u> PERATURE SE rature sensor I ure sensor. Re e coolant tem	ECT) SENSOR  Section".  Exploded View".  ENSOR  harness connector for to <u>CO-23, "Explored to CO-23, "Experimentation of the sensor  Resistance (kΩ)</u>	INFOID:000000012891292	
NO-2 Diagr 1.CHI Check Is the i YES NO Comp 1.CHI 1. Tu 2. Di: 3. Re 4. CH 4. CH ter <u>EC</u> +	IECK ENGI ECT senso inspection r >> INSP >> Repla ponent In IECK ENGI urn ignition s isconnect en emove engi heck resista rminals as p CT sensor	NE COOLANT TEMP or. Refer to <u>EC-237.</u> <u>result normal?</u> ECTION END ace ECT sensor. Reference aspection NE COOLANT TEMP switch OFF. ngine coolant temperatures ance between engine ber the following.	PERATURE (E "Component Ir er to <u>CO-23. "</u> PERATURE SE rature sensor I ure sensor. Re e coolant tem on 20 (68)	ECT) SENSOR Spection". Exploded View". ENSOR harness connector fer to <u>CO-23, "Exp</u> erature sensor Resistance	INFOID:000000012891292	

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-23, "Exploded View"</u>.

< DTC/CIRCUIT DIAGNOSIS >

# P0117, P0118 ECT SENSOR

# DTC Description

[VQ35DE]

# DTC DETECTION LOGIC

- An excessively low voltage from the sensor is sent to ECM.
- An excessively high voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Ignition switch ON	
P0117	ECT SEN/CIRC	Signal (terminal)	Voltage signal transmitted from engine cool- ant temperature sensor to ECM	
PUIII	(Engine coolant temperature sensor 1 circuit low)	Threshold	An excessively low voltage from the sensor is sent to ECM	
		Diagnosis delay time	—	
		Diagnosis condition	Ignition switch ON	
D0110	ECT SEN/CIRC (Engine coolant temperature sensor 1 circuit high)	Signal (terminal)	Voltage signal transmitted from engine cool- ant temperature sensor to ECM	
P0118		Threshold	An excessively high voltage from the sensor is sent to ECM	
		Diagnosis delay time	—	

### POSSIBLE CAUSE

P0117

- Harness or connectors (The sensor circuit is open or shorted.)
- · Engine coolant temperature sensor

#### P0118

- · Harness or connectors (The sensor circuit is open or shorted.)
- Engine coolant temperature sensor

### FAIL-SAFE

Engine operating condition in fail-safe mode				
Fail safe mode	Vehicle be	havior		
	Engine coolant temperature will be determined by ECM based on the following condition. CONSULT displays the engine coolant temperature decided by ECM.			
	Condition	Engine coolant temperature decided (CONSULT display)		
Engine coolant temperature	Just as ignition switch is turned ON or START	40°C (104°F)		
sensor circuit	Approx 4 minutes or more after engine starting	80°C (176°F)		
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)		
	When the fail-safe system for engine coolant temper ates while engine is running.	rature sensor is activated, the cooling fan op		

### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

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

# P0117, P0118 ECT SENSOR

DTC/CIRCL	JIT DIAGNC	SIS >	,. •		[VQ35DE]
>> G	O TO 2.				
PERFORM	DTC CONF	IRMATION PR	OCEDUR	E	
		N and wait at le	east 5 seco	onds.	
. Check DT					
		-239, "Diagnos	sis Proced	ure".	
NO-1 >> To	check malfu		m before r	epair: Refer to <u>GI-42, "Intermitt</u>	ent Incident".
iagnosis F		•			INFOID:000000012891294
•					NY CID.00000012071207
		POWER SUP			
	ct engine coo on switch ON		ure (ECT) s	sensor harness connector.	
			sor harnes	s connector and ground.	
		1			
	CT sensor		ound	Voltage	
Connector	Termi	-			
F11	n result nor		round	Approx. 5 V	
NO >> Re		GROUND CIR		short to power in harness or co	nnectors.
Disconneo	ct ECM harne	ess connector.	ensor harn	ess connector and ECM harnes	ss connector.
ECT s	ensor	EC	СМ		
Connector	Terminal	Connector	Terminal	Continuity	
F11	2	F78	35	Existed	
		r short to grour	nd and sho	rt to power.	
the inspection		mal?			
	O TO 3. epair open ci	rcuit. short to c	around or s	short to power in harness or cor	nnectors.
		ANT TEMPER		•	
				EC-239, "Component Inspection	on".
the inspection					_
-	SPECTION				
			erature se	ensor. Refer to <u>CO-23, "Explode</u>	ed View".
omponen	t Inspectio	n			INFOID:000000012891295
.CHECK EN	IGINE COOI	ANT TEMPER	RATURE S	ENSOR	
	on switch OF				
	ct engine coo	olant temperatu		harness connector. efer to CO-23, "Exploded View"	

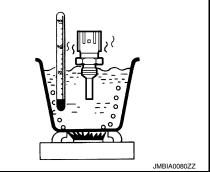
3. Remove engine coolant temperature sensor. Refer to CO-23, "Exploded View".

# P0117, P0118 ECT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

4. Check resistance between engine coolant temperature sensor terminals as per the following.

ECT	sensor				
+	-	Condition		Resistance (kΩ)	
Те	rminal			· · · ·	°
			20 (68)	2.37 - 2.63	° – · –
1	2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00	
			90 (194)	0.236 - 0.260	



[VQ35DE]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-23, "Exploded View"</u>.

< DTC/CIRCUIT DIAGNOSIS >

# P0122, P0123 TP SENSOR

# **DTC Description**

### DTC DETECTION LOGIC

• An excessively low voltage from the TP sensor 2 is sent to ECM.

· An excessively high voltage from the TP sensor 2 is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	Start engine and let it idle
P0122	TP SEN 2/CIRC-B1	Signal (terminal)	Voltage signal transmitted from TP sensor 2 to ECM
P0122	(Throttle/Pedal position sensor/switch "A" circuit low)	Threshold	An excessively low voltage from the TP sen- sor 2 is sent to ECM
		Diagnosis delay time	_
		Diagnosis condition	Start engine and let it idle
P0123	TP SEN 2/CIRC-B1	Signal (terminal)	Voltage signal transmitted from TP sensor 2 to ECM
FU123	(Throttle/Pedal position sensor/switch "A" circuit high)	Threshold	An excessively high voltage from the TP sensor 2 is sent to ECM
		Diagnosis delay time	—

### POSSIBLE CAUSE

P0122

- Harness or connectors (TP sensor 2 circuit is open or shorted.)
- Electric throttle control actuator (TP sensor 2)

#### P0123

- · Harness or connectors (TP sensor 2 circuit is open or shorted.)
- Electric throttle control actuator (TP sensor 2)

### FAIL-SAFE

Engine operating condition in fail-safe mode				
Fail safe mode     Vehicle behavior				
Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.	M		

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK DTC PRIORITY

If DTC P0122 or P0123 is displayed with another DTC P0643, first perform the trouble diagnosis for DTC P0643.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-430, "DTC Description"</u>.

NO >> GO TO 2.

### 2.PRECONDITIONING

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

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

# [VQ35DE]

INFOID:000000012891296

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# P0122, P0123 TP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

#### Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

>> GO TO 3.

# **3.**PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.

2. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-242, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

INFOID:000000012891297

### **1.**CHECK DTC PRIORITY

If DTC P0122 or P0123 is displayed with another DTC P0643, first perform the trouble diagnosis for DTC P0643.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to EC-430, "DTC Description".

NO >> GO TO 2.

### 2.CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY

- 1. Disconnect electric throttle control actuator harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between electric throttle control actuator harness connector and ground.

	+		
Electric throttle	control actuator	_	Voltage
Connector	Terminal		
F50	5	Ground	Approx. 5 V
		•	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

# $\mathbf{3}$ .check throttle position sensor 2 power supply circuit

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle	control actuator	E	CM	Continuity
Connector	Terminal	Connector Terminal		Continuity
F50	5	F79	98	Existed

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

### **4.**CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT

1. Turn ignition switch OFF.

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

# P0122, P0123 TP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Electric thro	ttle control actuate	rol actuator ECM Continuity		uity			
Connector	Terminal	Connector	Terminal	Continu			
F50	4	F79	75	Existe	ed		
		r short to ground	and short to p	oower.			
-	ction result nor	mal?					
	GO TO 5.	rouit abort to an	ound or abort t	la nover ir	hornoon or oor	anactora	
_		rcuit, short to gro SITION SENSC		•		Inectors.	
<ol> <li>Check 1 nector.</li> </ol>	he continuity b	etween electric	throttle control	actuator I	harness connec	ctor and ECM harness co	n-
nector.							
Electric thro	ttle control actuate	r E	CM				
Connector	Terminal	Connector	Terminal	- Continu	uity		
F50	3	F79	72	Existe	ed		
2. Also ch	eck harness fo	short to ground	and short to r				
	ction result nor	-					
	GO TO 6.	<u></u>					
	Repair open c	rcuit, short to gr	ound or short t	to power ir	n harness or cor	inectors.	
NO >>	· ·	-		to power in	harness or cor	inectors.	
NO >>	THROTTLE P	SITION SENSO	DR				
NO >> CHECK Check throt	THROTTLE P	SITION SENSO	DR				
NO >> CHECK Check throt	THROTTLE Policies of the set of t	DSITION SENSO sor. Refer to <u>EC</u> <u>mal?</u>	DR				
NO >> CHECK Check throt s the inspe YES >>	THROTTLE Position ser ction result nor INSPECTION	DSITION SENSO sor. Refer to <u>EC</u> <u>mal?</u> END	DR -243, "Compoi	nent Inspe	<u>ection"</u> .		
NO >> CHECK Check throt s the inspe YES >> NO >>	THROTTLE Po- le position ser ction result nor INSPECTION Replace elect	OSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro	DR -243, "Compoi	nent Inspe	<u>ection"</u> .	iew".	
NO >> CHECK Check throt s the inspe YES >> NO >>	THROTTLE Position ser ction result nor INSPECTION	OSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro	DR -243, "Compoi	nent Inspe	<u>ection"</u> .		1298
NO >> CHECK Check throt s the inspe YES >> NO >> Compone	THROTTLE Po- cle position ser ction result nor INSPECTION Replace elect ent Inspectio	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro	DR <u>-243, "Compo</u> I actuator. Ref	nent Inspe	<u>ection"</u> .	iew".	1298
NO >> CHECK Check throt <u>s the inspe</u> YES >> NO >> Compone I.CHECK	THROTTLE Po the position ser <u>ction result non</u> INSPECTION Replace elect ent Inspection	OSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on	DR <u>-243, "Compo</u> I actuator. Ref	nent Inspe	<u>ection"</u> .	iew".	1298
NO >> CHECK The construction of the construct	THROTTLE Po- cle position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Po- nition switch O	OSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on	DR -243, "Compos I actuator. Ref DR	nent Inspe	<u>ection"</u> .	iew".	1298
NO >> CHECK Check throt <u>s the inspe</u> YES >> NO >> Compone COMPONE CHECK . Turn igr 2. Reconn 3. Perform	THROTTLE Po- cle position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Po- nition switch O ect all harness <u>EC-153, "Des</u>	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro DN DSITION SENSO F. connectors disc cription".	DR -243, "Compos I actuator. Ref DR	nent Inspe	<u>ection"</u> .	iew".	1298
NO >> D.CHECK Check throt <u>s the inspe</u> YES >> NO >> Compone I.CHECK . Turn igr 2. Reconn 3. Perform 4. Turn igr	THROTTLE Per cle position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Per nition switch O ect all harness <u>EC-153, "Des</u> nition switch O	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on DSITION SENSO F. connectors disc <u>cription</u> ".	DR -243, "Compos I actuator. Ref DR	nent Inspe	<u>ection"</u> .	iew".	1298
NO >> CHECK Check throt s the inspe YES >> NO >> Compone Compone COMPONE CHECK Reconn Reconn Perform Set sele	THROTTLE Per cle position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Per nition switch O ect all harness <u>EC-153, "Des</u> nition switch O ector lever to E	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on OSITION SENSO F. connectors disc <u>cription"</u> . N. position.	DR -243, "Compos I actuator. Ref DR connected.	nent Inspe	<u>ection"</u> . 28. "Exploded Vi	iew". INFOID:00000001286	1298
NO >> CHECK Check throt s the inspe YES >> NO >> Compone Compone COMPONE CHECK Reconn Reconn Perform Set sele	THROTTLE Per cle position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Per nition switch O ect all harness <u>EC-153, "Des</u> nition switch O ector lever to E	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on DSITION SENSO F. connectors disc <u>cription</u> ".	DR -243, "Compos I actuator. Ref DR connected.	nent Inspe	<u>ection"</u> . 28. "Exploded Vi	iew". INFOID:00000001286	1298
NO >> CHECK Check throt s the inspe YES >> NO >> Compone Compone COMPONE CHECK Reconn Reconn Perform Set sele	THROTTLE Per cle position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Per nition switch O ect all harness <u>EC-153, "Des</u> nition switch O ector lever to E	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on OSITION SENSO F. connectors disc <u>cription"</u> . N. position.	DR -243, "Compos I actuator. Ref DR connected.	nent Inspe	<u>ection"</u> . 28. "Exploded Vi	iew". INFOID:00000001286	1298
NO >> CHECK Check throt s the inspe YES >> NO >> Compone Compone COMPONE CHECK CHECK CHECK CHECK CHECK CHECK CHECK CHECK CHECK	THROTTLE Per cle position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Per nition switch O ect all harness <u>EC-153, "Des</u> nition switch O ector lever to D he voltage bet	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on OSITION SENSO F. connectors disc <u>cription"</u> . N. position.	DR -243, "Compos I actuator. Ref DR connected.	nent Inspe	<u>ection"</u> . 28. "Exploded Vi	iew". INFOID:00000001286	1298
NO >> CHECK Check throt s the inspe YES >> NO >> Compone Compone COMPONE CHECK Reconn Reconn Perform Set sele	THROTTLE Period le position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Period THROTTLE Period ition switch O ector lever to D he voltage bet ECM	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on OSITION SENSO F. connectors disc <u>cription"</u> . N. position.	DR -243, "Compose I actuator. Refe DR connected. ess connector	nent Inspe	ection". 28. "Exploded Vi	iew". INFOID:00000001286	1298
NO >> CHECK Check throt s the inspe YES >> NO >> Compone Compone COMPONE CHECK CHECK CHECK CHECK CHECK CHECK CHECK CHECK CHECK	THROTTLE Po cle position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Po nition switch O ect all harness <u>EC-153, "Des</u> nition switch O ector lever to D he voltage bet <u>ECM</u>	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on OSITION SENSO F. connectors disc <u>cription"</u> . N. position.	DR -243, "Compose I actuator. Refe DR connected. ess connector Condition	nent Inspe	ection". 28. "Exploded Vi under the follow Voltage	iew". INFOID:00000001285	1298
NO >> CHECK Check throt s the inspe YES >> NO >> Compone Compone COMPONE CHECK CHECK CHECK CHECK CHECK CHECK CHECK CHECK CHECK	THROTTLE Po cle position ser ction result nor INSPECTION Replace elect ent Inspection THROTTLE Po nition switch O ect all harness <u>EC-153, "Des</u> nition switch O ector lever to D he voltage bet <u>ECM</u>	DSITION SENSO sor. Refer to <u>EC</u> mal? END ic throttle contro on OSITION SENSO F. connectors disc <u>cription"</u> . N. position.	DR -243, "Compose I actuator. Refe DR connected. ess connector Condition	nent Inspe er to EM-2 terminals	ection". 28. "Exploded Vi under the follow Voltage More than 0.36	iew". <i>INFOID:00000001286</i>	1298
NO >> CHECK Check throt s the inspe YES >> NO >> Compone Compone COMPONE CHECK CHECK CHECK CHECK CHECK CHECK CHECK CHECK CHECK	THROTTLE Po the position ser <u>ction result non</u> INSPECTION Replace elect ent Inspection THROTTLE Po nition switch O ect all harness <u>EC-153, "Des</u> he voltage bet <u>ECM</u> + <u>Terminal</u>	DSITION SENSO sor. Refer to EC mal? END ic throttle contro DN DSITION SENSO FF. connectors disc cription". N. position. ween ECM harne	DR -243, "Compose I actuator. Reference DR connected. ess connector Condition Fully reference Fully defined Fully def	nent Inspe er to EM-2 terminals	ection". 28. "Exploded Vi under the follow Voltage More than 0.36 Less than 4.75	iew". <i>INFOID:00000001285</i>	1298
NO >> D.CHECK Check throt <u>s the inspe</u> YES >> NO >> Compone Compone COMPONE COMPONE COMPONE COMPONE CONNECTOR	THROTTLE Per the position ser the position ser INSPECTION Replace elect THROTTLE Per inition switch O ect all harness <u>EC-153, "Des</u> inition switch O ector lever to D he voltage bet <u>ECM</u> + Terminal	DSITION SENSO sor. Refer to EC mal? END ic throttle contro DN DSITION SENSO FF. connectors disc cription". N. position. ween ECM harne	DR -243, "Compose I actuator. Reference DR connected. connected. Condition Fully reference Fully Fully Fully reference Fully Ful	nent Inspe er to EM-2 terminals	ection". 28. "Exploded Vi under the follow Voltage More than 0.36	iew". <i>INFOID:00000001286 V</i> V  V  V  V  V	1298

# P0125 ECT SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# P0125 ECT SENSOR

# DTC Description

INFOID:000000012891299

[VQ35DE]

### DTC DETECTION LOGIC

- 1. Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.
- 2. Engine coolant temperature is insufficient for closed loop fuel control.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
			Diagnosis condition	—
			Signal (terminal)	Voltage signal transmitted from engine cool- ant temperature sensor to ECM
	ECT SENSOR	1	Threshold	Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine
P0125	(Insufficient coolant temperature for		Diagnosis delay time	—
	closed loop fuel control)		Diagnosis condition	—
		2	Signal (terminal)	Voltage signal transmitted from engine cool- ant temperature sensor to ECM
		2	Threshold	Engine coolant temperature is insufficient for closed loop fuel control
			Diagnosis delay time	—

### POSSIBLE CAUSE

- Harness and connectors (High resistance in the circuit)
- Engine coolant temperature sensor
- Thermostat

FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

**1.**CHECK DTC PRIORITY

If DTC P00125 is displayed with DTC P0116, P0117 or P0118, first perform the trouble diagnosis for DTC P0116, P0117 or P0118.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC P0116: Refer to <u>EC-236</u>, "<u>DTC Description</u>".
    DTC P0117: Refer to <u>EC-238</u>, "<u>DTC Description</u>".

  - DTC P0118: Refer to <u>EC-238, "DTC Description"</u>.

NO >> GO TO 2.

# 2. PRECONDITIONING

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

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

>> GO TO 3.

 ${\it 3.}$  CHECK ENGINE COOLANT TEMPERATURE SENSOR FUNCTION

### With CONSULT

- 1. Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT. 2.

**Revision: December 2015** 

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
3. Check that "COOLANT TEMP/S" is above 10°C (50°F).	
With GST	Δ
Follow the procedure "With CONSULT" above.	
Is the temperature above 10°C (50°F)?	
YES >> INSPECTION END NO >> GO TO 4.	EC
4. PERFORM DTC CONFIRMATION PROCEDURE	
	C
<ul> <li>With CONSULT</li> <li>Start engine and run it for 65 minutes at idle speed.</li> </ul>	
If "COOLANT TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop eng	gine because
the test result will be OK.	
CAUTION: Never overheat engine.	
2. Check 1st trip DTC.	E
With GST	
Follow the procedure "With CONSULT" above.	
Is 1st trip DTC detected?	F
YES >> <u>EC-245, "Diagnosis Procedure"</u> NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u> .	
NO-2 >> Confirmation after repair: INSPECTION END	G
Diagnosis Procedure	INFOID:0000000012891300
	IN CID.000000072097300
1.CHECK DTC PRIORITY	F
If DTC P00125 is displayed with DTC P0116, P0117 or P0118, first perform the trouble diagonal P0116, P0117 or P0118.	nosis for DTC
Is applicable DTC detected?	
YES >> Perform diagnosis of applicable.	
<ul> <li>DTC P0116: Refer to <u>EC-236, "DTC Description"</u>.</li> <li>DTC P0117: Refer to <u>EC-238, "DTC Description"</u>.</li> </ul>	J
DTC P0117. Refer to <u>EC-238. "DTC Description"</u> .	0
NO >> GO TO 2.	
2. CHECK ENGINE COOLANT TEMPERATURE SENSOR	K
Check engine coolant temperature sensor. Refer to EC-245. "Component Inspection".	
Is the inspection result normal?	1
YES >> GO TO 3.	L
NO >> Replace engine coolant temperature sensor.	
3.CHECK THERMOSTAT OPERATION	$\mathbb{N}$
When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and co engine coolant does not flow.	onfirm that the
Is the inspection result normal?	Ν
YES >> INSPECTION END	
NO >> Repair or replace thermostat. Refer to <u>CO-21, "Removal and Installation"</u> .	_
Component Inspection	INFOID:000000012891301
1.CHECK ENGINE COOLANT TEMPERATURE SENSOR	-
1. Turn ignition switch OFF.	P
2. Disconnect engine coolant temperature sensor harness connector.	

**P0125 ECT SENSOR** 

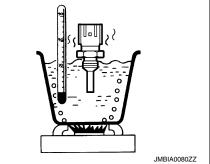
3. Remove engine coolant temperature sensor. Refer to <u>CO-23, "Exploded View"</u>.

# **P0125 ECT SENSOR**

### < DTC/CIRCUIT DIAGNOSIS >

4. Check resistance between engine coolant temperature sensor terminals as per the following.

-	ECT :	sensor				، رواند المراجع
_	+	_	Condition		Resistance (kΩ)	
	Terr	minal			~ /	
				20 (68)	2.37 - 2.63	
	1	2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00	
_				90 (194)	0.236 - 0.260	



[VQ35DE]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to CO-23, "Exploded View".

# P0127 IAT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# P0127 IAT SENSOR

# DTC Description

### DTC DETECTION LOGIC

Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	—	D
	Signal (terminal)	Voltage signal transmitted from intake air temperature sensor to ECM		
P0127	P0127 IAT SENSOR-B1 (Intake air temperature too high)	Threshold	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage sig- nal from engine coolant temperature sensor	Ε
		Diagnosis delay time		F
	ECAUSE and connectors (The sensor circuit temperature sensor	is open or shorted)		G
FAIL-SAFE Not applical				
DTC CON	FIRMATION PROCEDURE			Н
1.PRECO	NDITIONING			
		viously conducted, alwa	ays perform the following before conduct-	
<ol> <li>Turn iği</li> <li>Turn iği</li> </ol>	nition switch OFF and wait at leas nition switch ON. nition switch OFF and wait at leas			J
This test m	TESTING CONDITION: This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road est is expected to be easier, it is unnecessary to lift the vehicle.			Κ
>>	GO TO 2.			I
2.PERFOR	RM DTC CONFIRMATION PROCE	EDURE		
	NSULT til engine coolant temperature is le nition switch ON.	ess than 96°C (205°F)		M
- Select ' - Check	Select "DATA MONITOR" mode with CONSULT. Check the engine coolant temperature. If the engine coolant temperature is not less than 96°C (205°F), turn ignition switch OFF and cool down			Ν
NOTE:				0
	ne following steps before engine c nition switch ON.	oolant temperature is al	bove 96°C (205°F).	0
<ol> <li>Select '</li> <li>Start er</li> <li>Hold ver</li> </ol>	<ul> <li>Select "DATA MONITOR" mode with CONSULT.</li> <li>Start engine.</li> <li>Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.</li> </ul>			Ρ
	ON: s drive vehicle at a safe speed. 1st trip DTC.			
With GS		2.		
r				

Is 1st trip DTC detected?

INFOID:000000012891302

EC

С

# P0127 IAT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

>> Proceed to EC-248, "Diagnosis Procedure".

- YES NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## **Diagnosis** Procedure

**1.**CHECK INTAKE AIR TEMPERATURE SENSOR

Check intake air temperature sensor. Refer to EC-248, "Component Inspection".

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace mass air flow sensor (with intake air temperature sensor).

# Component Inspection

1. CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.

2. Disconnect mass air flow sensor harness connector.

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

Mass air f	low sensor				
+	_	Condition Resistance (kG			
Terminals					
4	2	Temperature [°C (°F)] 25 (77)		1.800 - 2.200	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace mass air flow sensor. Refer to EM-26, "Removal and Installation". [VQ35DE]

INFOID:000000012891304

# **P0128 THERMOSTAT FUNCTION**

### < DTC/CIRCUIT DIAGNOSIS >

# P0128 THERMOSTAT FUNCTION

# **DTC** Description

#### DTC DETECTION LOGIC

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.

This is due to a leak in the seal or the thermostat being stuck open.

The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	—
	THERMSTAT FNCTN	Signal (terminal)	—
P0128	[Coolant thermostat (coolant tempera- ture below thermostat regulating tem- perature)]	Threshold	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough
		Diagnosis delay time	_
<ul> <li>Engine co</li> </ul>	at rom sealing portion of thermostat olant temperature sensor		
FAIL-SAFE Not applicat			
• •	FIRMATION PROCEDURE		
NOTE:	I before and during the following n	rocedure	
4	l before and during the following p DTC PRIORITY		
trouble diag	28 is displayed with DTC P0300, nosis for DTC P0300, P0301, P03 DTC detected?		P0304, P0305 or P0306, first perform the 305 and P0306.
YES >>	Perform diagnosis of applicable • DTC P0300: Refer to <u>EC-318</u> , " • DTC P0301: Refer to <u>EC-318</u> , " • DTC P0302: Refer to <u>EC-318</u> , " • DTC P0303: Refer to <u>EC-318</u> , " • DTC P0304: Refer to <u>EC-318</u> , " • DTC P0305: Refer to <u>EC-318</u> , "	DTC Description". DTC Description". DTC Description". DTC Description". DTC Description". DTC Description".	
•	GO TO 2. IDITIONING-I		
If DTC Con before cond 1. Turn igr 2. Turn igr		10 seconds.	always perform the following procedure
•	GO TO 3. IDITIONING-II		

- With CONSULT
- 1. Turn ignition switch ON.
- 2. Check the following conditions:

INFOID:000000012891305

EC

С

# P0128 THERMOSTAT FUNCTION

### < DTC/CIRCUIT DIAGNOSIS >

Ambient temperature	–10°C (14°F) or more
A/C switch	OFF
Blower fan switch	OFF

3. Select "DATA MONITOR" mode of "ENGINE" using CONSULT.

4. Check the following conditions:

COOLANT TEMP/S -10°C - 46°C (14 - 114°F)

Is the condition satisfied?

- YES >> GO TO 4.
- NO >> 1. Satisfy the condition.
  - 2. GO TO 4.

### 4.PERFORM DTC CONFIRMATION PROCEDURE-I

#### With CONSULT

#### 1. Start engine.

2. Drive the vehicle until the following condition is satisfied. CAUTION:

#### Always drive vehicle at safe speed. STEP 1

Drive the vehicle under the conditions instructed below until the difference between "COOLANT TEMP/S" and "FUEL T/TMP SE" becomes at least 24°C (75°F).

COOLANT TEMP/S	65°C (149°F) or less
FUEL T/TMP SE	Less than the value calculated by sub- tracting 25°C (45°F) from "COOLANT TEMP/S".*

COOLANT TEMP/S	FUEL T/TMP SE
70°C (158°F)	45°C (113°F) or less
65°C (149°F)	40°C (104°F) or less
60°C (140°F)	35°C (95°F) or less

#### STEP 2

Drive the vehicle at 50 km/h (32 MPH) or more with the difference between "COOLANT TEMP/S" and "FUEL T/TMP SE" maintained at 24°C (75°F) or more.

#### NOTE:

Keep the accelerator pedal as steady as possible during cruising.

#### STEP 3

Drive the vehicle at 50 km/h (32 MPH) or more until "COOLANT TEMP/S" increases by 6°C (43°F). **NOTE:** 

Keep the accelerator pedal as steady as possible during cruising.

#### Is the condition satisfied?

YES >> GO TO 5. NO >> GO TO 1.

5. PERFORM DTC CONFIRMATION PROCEDURE-II

#### With CONSULT

T. Drive the vehicle until the following condition is satisfied.

COOLANT TEMP/S

65°C (149°F) or more

#### **CAUTION:**

#### Always drive vehicle at safe speed.

- 2. Check 1st trip DTC.
- Is 1st trip DTC detected?

# **P0128 THERMOSTAT FUNCTION**

	P012	8 THERM	OSTAT FUN	CTION				
< DTC/CIRCUIT	DIAGNOSIS >				[VQ35DE]			
NO-1 >> To che	ed to <u>EC-251, "Diagnosis Procedure"</u> . ck malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u> . mation after repair: INSPECTION END							
Diagnosis Procedure								
1.CHECK DTC PRIORITY								
If DTC P00128 is displayed with DTC P0300, P0301, P0302, P0303, P0304, P0305 or P0306, first perform the trouble diagnosis for DTC P0300, P0301, P0302, P0303, P0304, P0305 and P0306.								
Is applicable DTC detected?								
<ul> <li>YES &gt;&gt; Perform diagnosis of applicable.</li> <li>DTC P0300: Refer to <u>EC-318, "DTC Description"</u>.</li> <li>DTC P0301: Refer to <u>EC-318, "DTC Description"</u>.</li> </ul>								
• DTC	<ul> <li>DTC P0302: Refer to <u>EC-318, "DTC Description"</u>.</li> <li>DTC P0303: Refer to <u>EC-318, "DTC Description"</u>.</li> </ul>							
• DTC	<ul> <li>DTC P0304: Refer to <u>EC-318, "DTC Description"</u>.</li> <li>DTC P0305: Refer to <u>EC-318, "DTC Description"</u>.</li> </ul>							
	$\sim$ P0305: Refer to <u>EC</u> $\sim$ P0306: Refer to <u>EC</u>					E		
•	GO TO 2.							
	E COOLANT TEMP							
Check engine coo	lant temperature ser	isor. Refer to	<u>EC-251, "Compo</u>	nent Inspection".		G		
YES >> GO T								
<b>^</b>	NO >> Replace engine coolant temperature sensor.							
<b>3.</b> CHECK THER	3.CHECK THERMOSTAT							
	Refer to <u>CO-21, "Re</u>	emoval and In	stallation".					
Is the inspection result normal? YES >> INSPECTION END								
NO >> Replace thermostat. Refer to <u>CO-21, "Removal and Installation"</u> .								
Component Inspection								
						K		
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect engine coolant temperature sensor harness connector.</li> </ol>								
<ol> <li>Remove engine coolant temperature sensor. Refer to <u>CO-23, "Exploded View"</u>.</li> <li>Check resistance between engine coolant temperature sensor</li> </ol>								
terminals as per the following.								
	1		1	۲. ر <b>السال</b> کر		M		
	ECT sensor				ſ			
+ – Terminal	Condition		(kΩ)			Ν		
		20 (68)	2.37 - 2.63					
1 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00		-	0		
		90 (194)	0.236 - 0.260		JMBIA0080ZZ			
Is the inspection result normal?								
YES >> INSPI	ECTION END					Ρ		

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-23, "Exploded View"</u>.

### < DTC/CIRCUIT DIAGNOSIS >

# P0130, P0150 A/F SENSOR 1

### DTC Description

INFOID:000000012891308

[VQ35DE]

### DTC DETECTION LOGIC

To judge malfunctions, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal fluctuates according to fuel feedback control.

- 1. The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in a range other than approx. 2.2 V.
- 2. The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition				
P0130	A/F SENSOR1 (B1) (O2 sensor circuit bank 1 sensor 1)	1	Diagnosis condition	_		
			Signal (terminal)	The A/F signal computed by ECM		
			Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is constantly in a range oth- er than approx. 2.2 V		
			Diagnosis delay time	_		
			Diagnosis condition	_		
		2	Signal (terminal)	The A/F signal computed by ECM		
			Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is constantly approx. 2.2 V		
			Diagnosis delay time	_		
P0150	A/F SENSOR1 (B2) (O2 sensor circuit bank 2 sensor 1)	1	Diagnosis condition			
			Signal (terminal)	The A/F signal computed by ECM		
			Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is constantly in a range oth- er than approx. 2.2 V		
			Diagnosis delay time	_		
		2	Diagnosis condition	_		
			Signal (terminal)	The A/F signal computed by ECM		
			Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is constantly approx. 2.2 V		
			Diagnosis delay time	_		

#### POSSIBLE CAUSE

P0130 - 1

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

P0130 - 2

- · Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

P0150 - 1

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

#### P0150 - 2

Harness or connectors (The A/F sensor 1 circuit is open or shorted.)

A/F sensor 1

FAIL-SAFE Not applicable

### DTC CONFIRMATION PROCEDURE

### P0130, P0150 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

1.PRECONDITIONING		А
If DTC Confirmation Proceeding the next test.	lure has been previously conducted, always perform the following before conduct-	
1. Turn ignition switch OF	F and wait at least 10 seconds.	EC
	F and wait at least 10 seconds.	
TESTING CONDITION: Before performing the follo	owing procedure, confirm that battery voltage is more than 11 V at idle.	С
		0
>> GO TO 2.		D
	RMATION PROCEDURE FOR MALFUNCTION 1	D
<ol> <li>Start engine and warm</li> <li>Let engine idle for 2 min</li> <li>Check 1st trip DTC.</li> </ol>	it up to normal operating temperature. nutes.	E
Is 1st trip DTC detected?		
YES >> Proceed to EC- NO-1 >> With CONSULT	254, "Diagnosis Procedure".	F
NO-2 >> With GST: GO		
<b>3.</b> CHECK AIR FUEL RATI	O (A/F) SENSOR 1 FUNCTION	G
2. Select "A/F SEN1 (B1)"	it up to normal operating temperature. or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT. or "A/F SEN1 (B2)" indication.	Н
Does the indication fluctuate	e around 2.2 V?	
	254, "Diagnosis Procedure".	I
	RMATION PROCEDURE FOR MALFUNCTION 2-I	
SEN1" in "DTC WORK 2. Touch "START".	) P1276" (for DTC P0130) or "A/F SEN1 (B2) P1286" (for DTC P0150) of "A/F SUPPORT" mode with CONSULT.	J
3. When the following con	ditions are met, "TESTING" will be displayed on the CONSULT screen.	K
ENG SPEED	1,000 - 3,200 rpm	
VHCL SPEED SE	More than 64 km/h (40 mph)	L
B/FUEL SCHDL	1.0 - 10.0 msec	
	D position splayed after 20 seconds, retry from step 2.	M
CAUTION: Always drive vehicle a	at a safe speed.	
Is "TESTING" displayed on	-	Ν
YES >> GO TO 5.		
_	sor 1 function again. GO TO 3. RMATION PROCEDURE FOR MALFUNCTION 2-II	0
		0
Release accelerator pedal f <b>NOTE</b> :		
	easing the accelerator pedal.	Ρ
Which does "TESTING" cha COMPLETED>>GO TO 6.		
	etry DTC CONFIRMATION PROCEDURE. GO TO 4.	
6.PERFORM DTC CONFI	RMATION PROCEDURE FOR MALFUNCTION 2-III	
Touch "SELF-DIAG RESUL	Τ".	

### P0130, P0150 A/F SENSOR 1

#### < DTC/CIRCUIT DIAGNOSIS >

#### Which is displayed on CONSULT screen?

- OK-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- OK-2 >> Confirmation after repair: INSPECTION END
- NG >> Proceed to EC-254, "Diagnosis Procedure".

**7.**PERFORM COMPONENT FUNCTION CHECK

#### With GST

- 1. Start engine and warm it up to normal operating temperature.
- 2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.
- 3. Shift the selector lever to the D position, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (31 MPH).

#### CAUTION:

## Always drive vehicle at a safe speed. NOTE:

Never apply brake when releasing the accelerator pedal.

- 4. Repeat steps 2 and 3 for 5 times.
- 5. Stop the vehicle and turn ignition switch OFF.
- 6. Wait at least 10 seconds and restart engine.
- 7. Repeat steps 2 and 3 for 5 times.
- 8. Stop the vehicle.
- 9. Check 1st trip DTC.

#### Is 1st trip DTC detected?

#### YES >> Proceed to EC-254, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42. "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### **Diagnosis** Procedure

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

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

DTC		A/F sensor 1		Ground	Voltage
DIC	Bank	Connector	Terminal	Oround	voltage
P0130	1	F12	1	Ground	Battery voltage
P0150	2	F61	1	Giouna	Dattery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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

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

DTC	A/F sensor 1			IPDM E/R		Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0130	1	F12	1	F19	52	Existed
P0150	2	F61	1	119	53	LAISIEU

#### Is the inspection result normal?

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

NO >> Repair or replace error-detected parts.

**3.**CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.

Revision: December 2015

INFOID:000000012891309

### P0130, P0150 A/F SENSOR 1

#### < DTC/CIRCUIT DIAGNOSIS >

#### 2. Disconnect ECM harness connector.

3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

6							
	DTC	A/F sensor 1			E	Continuity	
	DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
	P0130	1	F12	3		66	
	F 0 1 3 0	1	1 12	4	F79	67	Existed
-	P0150	2	F61	3	175	76	LAISIEU
	F 0 130	2	101	4	1	77	

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector D and ground.

DTC		A/F sensor 1		Ground	Continuity
DIC	Bank	Connector Termina		Giouna	Continuity
P0130	1	F12	3		
F0130	I	F 12	4	Ground	Not existed
P0150	2	F61	3	Giouna	NUL EXISIEU
F0150	2	FOI	4	1	

DTC	EC	CM	Ground	Continuity
DIC	Connector	Terminal	Giouna	Continuity
P0130		66		
F0130	F79	67	Ground	Not existed
P0150	F79	76	Ground	NUL EXISIEU
P0150		77		

5. Also check harness for short to power.

Is the inspection result normal?

YES >> INSPECTION END

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

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[VQ35DE]

#### < DTC/CIRCUIT DIAGNOSIS >

P0131, P0151 A/F SENSOR 1

### DTC Description

INFOID:000000012891310

[VQ35DE]

#### DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately low.

The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0 V.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	—	
	A/F SENSOR1 (B1)	Signal (terminal)	The A/F signal computed by ECM	
P0131	(O2 sensor circuit low voltage bank 1 sensor 1)	Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is constantly approx. 0 V	
		Diagnosis delay time	—	
		Diagnosis condition	—	
	A/F SENSOR1 (B2)	Signal (terminal)	The A/F signal computed by ECM	
P0151	( )	Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is constantly approx. 0 V	
		Diagnosis delay time	—	

#### POSSIBLE CAUSE

P0131

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

P0151

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

FAIL-SAFE Not applicable

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

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

2. Turn ignition switch ON.

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

>> GO TO 2.

### 2. CHECK A/F SENSOR 1 FUNCTION

#### With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "Ă/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT.
- 3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

#### With GST

Follow the procedure "With CONSULT" above.

Is the indication constantly approx. 0 V?

YES >> Proceed to <u>EC-257, "Diagnosis Procedure"</u>.

NO >> GO TO 3.

### P0131, P0151 A/F SENSOR 1

# < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

				PROCEDL					
With CON Turn ian			oit at la	aat 10 coo	ondo				
	ntion swite		aitatie	east 10 sec	unus.				
Turn ign	nition swite	ch OFF, w			onds and the				ł
		ate vehicl	le to mo	ore than 40	km/h (25 M	PH) within	20 seconds af	fter restarting engine.	
	ON: drive vel	niclo at a	safa s	nood					
					nately 20 co	nsecutive s	seconds.		
					-				
ENG SPEED			00 - 3,20						
HCL SPEED				10 km/h (25 m	ph)				
B/FUEL SCHI	DL	1.5	- 9.0 ms	sec					
Selector lever	ſ	Sui	itable po	sition					
NOTE:									
					possible d				
• ir triis 1.	proceau	reis not	compi	etea withir	i i minute a	inter restar	ting engine a	t step 1, return to ste	.b
Check 1	lst trip DT	C.							
With GST									
ollow the p			NSULT	" above.					
1st trip DT									
				nosis Proc			)	luc o i al o un fill	
						rer to <u>GI-42</u>	2. "Intermittent	<u>incident"</u> .	
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			repair: I	INSPECTIO	ON END				
iagnosis			repair: I	INSPECTIC	ON END			INFOID:000000012891	311
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CHECK A	S Proced AIR FUEL nect A/F so nition swite	dure RATIO (A ensor 1 ha ch ON.	VF) SE arness	NSOR 1 P			ound.	INFOID:000000012891	311
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CHECK A Disconn Turn ign Check th	S Proced AIR FUEL nect A/F so nition switc he voltage	dure RATIO (A ensor 1 ha ch ON.	VF) SE arness	NSOR 1 P connector. ensor 1 har	OWER SUP	ctor and gro	ound.	INFOID:000000012891	311
CHECK A	AIR FUEL hect A/F so he voltage	dure RATIO (A ensor 1 ha ch ON. e between	VF) SE arness	ENSOR 1 P connector. ensor 1 har	OWER SUP	ctor and gro	ound.	INFOID:000000012891	311
CHECK A Disconn Turn ign Check th	AIR FUEL hect A/F so he voltage	ATIO (A ensor 1 ha ch ON. e between	VF) SE arness a A/F se	ENSOR 1 P connector. ensor 1 har	OWER SUP	ctor and gro	ound.	INFOID:000000012891	311
CHECK A Disconn Turn ign Check th	AIR FUEL hect A/F so he voltage Bank	Aure RATIO (A ensor 1 ha ch ON. e between /F sensor 1 Connector	VF) SE arness a A/F se Termin	ENSOR 1 P connector. ensor 1 har	OWER SUP	ctor and gro	ound.	INFOID:000000012891	311
Disconn Turn ign Check th DTC P0131 P0151	AIR FUEL hect A/F so he voltage Bank 1 2	ATIO (A ensor 1 ha ch ON. e between VF sensor 1 Connector F12 F61	VF) SE arness a A/F se Termir 1 1	ENSOR 1 P connector. ensor 1 har	OWER SUP	ctor and gro	ound.	INFOID:000000012891	311
CHECK A Disconn Turn ign Check th DTC P0131 P0151 the inspec	AIR FUEL hect A/F so he voltage Bank 1 2 Ction result	ATIO (A ensor 1 ha ch ON. between VF sensor 1 Connector F12 F61 t normal?	VF) SE arness a A/F se Termir 1 1	ENSOR 1 P connector. ensor 1 har	OWER SUP	ctor and gro	ound.	INFOID:000000012891	311
CHECK A Disconn Turn ign Check th DTC P0131 P0151 the inspec (ES >>	AIR FUEL hect A/F so he voltage Bank 1 2	ATIO (A ensor 1 ha ch ON. between VF sensor 1 Connector F12 F61 t normal?	VF) SE arness a A/F se Termir 1 1	ENSOR 1 P connector. ensor 1 har	OWER SUP	ctor and gro	ound.	INFOID:000000012891	311
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CHECK A Disconn Turn ign Check th DTC P0131 P0151 the inspect (ES >> NO >> CHECK A Turn ign Disconn Check th	AIR FUEL hect A/F so he voltage Bank 1 2 Ction result GO TO 3 GO TO 3 GO TO 3 AIR FUEL hition switch hect IPDM	ATIO (A ensor 1 ha ch ON. e between VF sensor 1 Connector F12 F61 t normal? RATIO (A ch OFF. E/R harn uity betwe	VF) SE arness A/F se Termir 1 1 VF) SE ess col	NSOR 1 P connector. ensor 1 har Ground Ground	OWER SUP	oltage	UIT IPDM E/R harr		311
CHECK A Disconn Turn ign Check th DTC P0131 P0151 the inspec (ES >> NO >> CHECK A Turn ign Disconn	AIR FUEL hect A/F so he voltage Bank 1 2 Ction result GO TO 3 GO TO 3 GO TO 3 AIR FUEL hition switch hect IPDM	ATIO (A ensor 1 ha ch ON. between VF sensor 1 Connector F12 F61 t normal? RATIO (A ch OFF. E/R harn uity between A/F se	VF) SE arness A/F se Termin 1 1 VF) SE ess col en A/F	NSOR 1 P connector. ensor 1 har Ground Ground	OWER SUP	oltage	UIT		311
CHECK A Disconn Turn ign Check th DTC P0131 P0151 the inspec (ES >> CHECK A Turn ign Disconn Check th DTC	AIR FUEL hect A/F so he voltage Bank 1 2 Ction resul GO TO 3 GO TO 3 GO TO 3 GO TO 2 AIR FUEL hition switch he continu Ban	ATIO (A ensor 1 ha ch ON. e between VF sensor 1 Connector F12 F61 t normal? RATIO (A ch OFF. E/R harn uity betwe A/F se k Con	VF) SE arness A/F se Termin 1 1 VF) SE ess col en A/F ensor 1 nector	ENSOR 1 P connector. ensor 1 har Ground Ground ENSOR 1 P nnector. sensor 1 h Terminal	OWER SUP	ctor and gro ge oltage PLY CIRC hector and I E/R Terminal	UIT IPDM E/R harr		
Disconn Turn ign Check th DTC P0131 P0151 the inspec YES >> NO >> .CHECK A Turn ign Disconn Check th	Bank AIR FUEL hect A/F so he voltage Bank 1 2 Ction resul GO TO 3 GO TO 3 GO TO 2 AIR FUEL hect IPDM he continu	ATIO (A ensor 1 ha ch ON. between VF sensor 1 Connector F12 F61 t normal? RATIO (A ch OFF. E/R harn uity betwe A/F so k Con	VF) SE arness a A/F se Termin 1 1 VF) SE ess col en A/F ensor 1	ENSOR 1 P connector. ensor 1 har Ground Ground ENSOR 1 P nnector. sensor 1 h	OWER SUP	oltage PPLY CIRC	UIT IPDM E/R harr		

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

NO >> Repair or replace error-detected parts.

### P0131, P0151 A/F SENSOR 1

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

# 3. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC		A/F sensor 1		E	ECM		
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0131	1	F12	3		66		
FUIJI	I	1 12	4	F79	67	Existed	
P0151	2	F61	3	F79	76	Existed	
FUIJI	2	FUI	4		77	*	

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

DTC		A/F sensor 1		Ground	Continuity	
DIC	Bank	Connector	Terminal	Ground	Continuity	
P0131	1	F12	3			
FUIJI	I	F 12	4	Ground	Not existed	
D0151	0	2 F61	<b>E61</b>	3	Ground	NUL EXISIEU
PUIDI	2	FOI	4			

DTC	ECM		Ground	Continuity	
DIC	Connector	Terminal	Ground	Continuity	
P0131	– F79	66			
P0131		E70	67	Ground	Not existed
P0151		76	Ground	NUL EXISIEU	
PUISI		77			

5. Also check harness for short to power.

Is the inspection result normal?

YES >> INSPECTION END

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

#### < DTC/CIRCUIT DIAGNOSIS >

### P0132, P0152 A/F SENSOR 1

### DTC Description

#### DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately high.

The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5 V.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	-	
	A/F SENSOR1 (B1)	Signal (terminal)	The A/F signal computed by ECM	
P0132	(O2 sensor circuit high voltage bank 1 sensor 1)	Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is constantly approx. 5 V	
		Diagnosis delay time	-	
		Diagnosis condition	-	
	A/F SENSOR1 (B2)	Signal (terminal)	The A/F signal computed by ECM	
P0152	(O2 sensor circuit high voltage bank 2 sensor 1)	Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is constantly approx. 5 V	
		Diagnosis delay time		
OSSIBL	E CAUSE			
0132 Harness	or connectors (The A/F sensor 1 ci	rcuit is open or shorted	d.)	

A/F sensor 1

P0152

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

#### FAIL-SAFE Not applicable

DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

2. Turn ignition switch ON.

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

>> GO TO 2.

2.CHECK A/F SENSOR 1 FUNCTION

#### With CONSULT

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

2. Select "Ă/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT.

3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

#### With GST

Follow the procedure "With CONSULT" above.

Is the indication constantly approx. 5 V?

YES >> Proceed to <u>EC-260. "Diagnosis Procedure"</u>.

NO >> GO TO 3.

EC

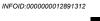
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#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

# 3.PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
- 4. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine. CAUTION:

#### Always drive vehicle at a safe speed.

5. Maintain the following conditions for approximately 20 consecutive seconds.

ENG SPEED	1,000 - 3,200 rpm
VHCL SPEED SE	More than 40 km/h (25 mph)
B/FUEL SCHDL	1.5 - 9.0 msec
Selector lever	Suitable position

NOTE:

• Keep the accelerator pedal as steady as possible during cruising.

• If this procedure is not completed within 1 minute after restarting engine at step 1, return to step

- 1.
- 6. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

YES >> Proceed to EC-260, "Diagnosis Procedure".

NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

INFOID:000000012891313

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

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

DTC		A/F sensor 1	Ground	Voltage		
DIC	Bank	Connector	Terminal	Oround	voltage	
P0132	1	F12	1	Ground	Battery voltage	
P0152	2	F61	1	Oround	Dattery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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

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

DTC		A/F sensor 1		IPDN	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0132	1	F12	1	F19	52	Existed
P0152	2	F61	1	119	53	LAISIEU

Is the inspection result normal?

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

NO >> Repair or replace error-detected parts.

### P0132, P0152 A/F SENSOR 1

#### < DTC/CIRCUIT DIAGNOSIS >

#### [VQ35DE]

# 3. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC		A/F sensor 1		E	Continuity		
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0132	1	F12	3		66		
F0132	I	F 12	4	F79	67	Existed	
P0152	2	E61	3	F/9	76	Existed	
F0152	2	F61	4	-	77		

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector Е and ground.

DTC		A/F sensor 1		Ground	Continuity
DIC	Bank	Connector	Terminal	Giounu	Continuity
P0132	1	E12	3		
P0132	1 F124	4	No. 1 - 1 - 1		
	•	504	3	Ground	Not existed
P0152	2	F61	4	l I	

DTC	EC	CM	Ground	Continuity
	Connector	Terminal	Ground	Continuity
P0132		66		
F0132	- F79	67	Ground	Not existed
P0152	F79	76	Ground	NUL EXISTEN
F0152		77		
5. Also cl	neck harness	s for short to	power	

5. Also check harness for short to power.

Is the inspection result normal?

>> INSPECTION END YES

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

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#### < DTC/CIRCUIT DIAGNOSIS >

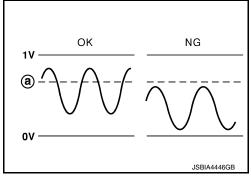
### P0137, P0157 HO2S2

**DTC** Description

#### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during various driving conditions such as fuel-cut.

(a) : 0.72 V



The maximum voltage from the sensor does not reach the specified voltage.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition			
		Diagnosis condition			
P0137	HO2S2 (B1) (O2 sensor circuit low voltage bank 1	Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 to ECM		
(	sensor 2)	Threshold	The maximum voltage from the sensor does not reach the specified voltage		
		Diagnosis delay time	—		
		Diagnosis condition	—		
P0157	HO2S2 (B2)	Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 to ECM		
FU15/	(O2 sensor circuit low voltage bank 2 sensor 2)	Threshold	The maximum voltage from the sensor does not reach the specified voltage		
		Diagnosis delay time	—		

#### POSSIBLE CAUSE

P0137

- · Harness or connectors (The sensor circuit is open or shorted)
- Heated oxygen sensor 2
- Fuel pressure
- Fuel injector
- Intake air leakage

P0157

- Harness or connectors (The sensor circuit is open or shorted)
- Heated oxygen sensor 2
- Fuel pressure
- Fuel injector
- Intake air leakage

#### FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

#### Will CONSULT be used?

Will CONSULT be used?

INFOID:000000012891314

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
NO >> GO TO 5.	[ ]
2. PRECONDITIONING	
If DTC confirmation Procedure has been previously conducted, always perform the following before	ore conduct-
ing the next test.	
1. Turn ignition switch OFF and wait at least 10 seconds.	E
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>	
TESTING CONDITION:	(
For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°	'F).
	ſ
>> GO TO 3. 3.PERFORM DTC CONFIRMATION PROCEDURE	[
With CONSULT <ol> <li>Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.</li> </ol>	E
2. Start engine and warm it up to the normal operating temperature.	
3. Turn ignition switch OFF and wait at least 10 seconds.	1
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>	I
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute ur	ider no load.
<ol> <li>Let engine idle for 1 minute.</li> <li>Check that "COOLANT TEMP/S" indicates more than 70°C (158°F).</li> </ol>	(
If not, warm up engine and go to next step when "COOLANT TEMP/S" indication reaches 70°	°C (158°F).
9. Open engine hood.	, , ,
10. Select "HO2S2 (B1) P1147" (for DTC P0137) or "HO2S2 (B2) P1167" (for DTC P0157) of "DTC WORK SUPPORT" mode with CONSULT.	"HO2S2" in
11. Follow the instruction of CONSULT display.	
NOTE:	
It will take at most 10 minutes until "COMPLETED" is displayed. 12. Touch "SELF-DIAG RESULTS".	
Which is displayed on CONSULT screen?	
OK-1 >> To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u> .	
OK-2 >> Confirmation after repair: INSPECTION END NG >> Proceed to EC-264, "Diagnosis Procedure".	
NG >> Proceed to <u>EC-264. "Diagnosis Procedure"</u> . CAN NOT BE DIAGNOSED>>GO TO 4.	ł
4. PERFORM DTC CONFIRMATION PROCEDURE AGAIN	
1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).	
2. Perform DTC confirmation procedure again.	
>> GO TO 3.	Γ
5.PERFORM COMPONENT FUNCTION CHECK-I	
Without CONSULT	1
<ol> <li>Start engine and warm it up to the normal operating temperature.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>	
3. Turn ignition switch ON.	
4. Turn ignition switch OFF and wait at least 10 seconds.	(
<ol> <li>Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute ur</li> <li>Let engine idle for 1 minute.</li> </ol>	
7. Check the voltage between ECM harness connector terminals under the following conditions.	. F

#### < DTC/CIRCUIT DIAGNOSIS >

		ECM				
DTC		+	-	Condition	Voltage	
			minal			
P0137	F78	41	35	Revving up to 4,000 rpm under no load	The voltage should be above 0.72 V at least	
P0157	170	32	- 55	at least 10 times	once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

#### **6**.PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector terminals under the following conditions.

	DTC ECM + –					
DTC			-	Condition	Voltage	
	Connector	Terminal				
P0137	F78	41	35	Keeping engine at idle for 10 minutes	The voltage should be above 0.72 V at	
P0157	170	32		Reeping engine at the for To minutes	least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 7.

### 7.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector terminals under the following conditions.

		ECM			Voltage	
DTC	Connector	+	-	Condition		
	Terminal		minal			
P0137	F78	41	35	Coasting from 80 km/h (50 MPH) with se-	The voltage should be above 0.72 V at least once during this procedure.	
P0157	170	32		lector lever in the D position		

Is the inspection result normal?

YES-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

- YES-2 >> Confirmation after repair: INSPECTION END
- NO >> Proceed to <u>EC-264</u>, "Diagnosis Procedure".

### **Diagnosis** Procedure

INFOID:000000012891315

### 1.CLEAR MIXTURE RATIO SELF-LEARNING VALUE

- 1. Clear the mixture ratio self-learning value. Refer to EC-156, "Description".
- 2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0174 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171 or P0174. Refer to <u>EC-292, "DTC Description"</u>. NO >> GO TO 2.

### 2. CHECK HO2S2 GROUND CIRCUIT

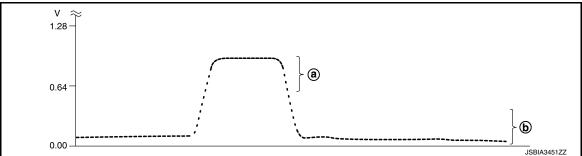
- 1. Turn ignition switch OFF.
- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between heated oxygen sensor 2 (HO2S2) harness connector and ECM harness connector.

#### < DTC/CIRCUIT DIAGNOSIS >

		HO2S2		E	СМ		
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0137	1	F62	4	570	05		
P0157	2	F54	4	F78	35	Existed	
5. Also c	heck harne	ess for shor	t to ground	and short	to power.		
		<u>ult normal?</u>					
	> GO TO 3						
-			•				or connectors.
					PEN AND S		
1. Check	the contin	uity betwee	en HO2S2	harness co	nnector and	ECM harne	ess connector.
DTO		HO2S2		E	СМ		
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0137	1	F62	3	F78	41	Eviated	
P0157	2	F54	3	F/0 -	32	Existed	
		nuity betwe	en HO2S2	2 harness o	connector a	nd ground,	or ECM harness connector and
ground	d.						
		HO2S2				-	
DTC	Bank	Connector	Terminal	Ground	Continuity		
P0137	1	F62	3				
P0157	2	F54	3	Ground	Not existed		
						-	
	E	ECM					
DTC	Connector	Terminal	Ground	Continu	ity		
P0137	570	41	0				
P0157	F78	32	- Ground	Not exis	ied		
3. Also c	heck harne	ess for shor	t to power.	L			
<u>s the insp</u>	ection resu	<u>ult normal?</u>					
	> GO TO 4						
	•	•	-		ort to power	in narness	or connectors.
		OXYGEN S					
			Refer to E	<u>C-265, "Cc</u>	mponent In	spection".	
		<u>ilt normal?</u> TION END					
-			ning heate	ed oxygen	sensor 2. I	Refer to EN	1-33. "Removal and Installation
					on (bank 1)		
Compon	ent Insp	ection					INFOID:000000012891316
	CTION STA	ART					
	ULT be us						
	SULT be us						
	> GO TO 2						
YES >							
	> GO TO 3	3.					
NO >		3. OXYGEN \$	SENSOR 2	2			

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- 6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT.
- 7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to  $\pm$  25%.



- (a) : The voltage should be above 0.72 V at least on time.
- (b) : The voltage should be below 0.27 V at least on time.

"HO2S2 (B1)/(B2)" should be above 0.72 V at least once when the "FUEL INJECTION" is + 25%. "HO2S2 (B1)/(B2)" should be below 0.27 V at least once when the "FUEL INJECTION" is -25%.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33</u>, "<u>Removal and Installation</u> (bank 2)", <u>EM-35</u>, "<u>Removal and Installation (bank 1)</u>".

**3.**CHECK HEATED OXYGEN SENSOR 2-I

#### **Without CONSULT**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM				
Connector	+	-	Condition	Voltage	
Connector	Term	ninal	-		
	32			The voltage should be above 0.72 V at least once dur- ing this procedure. The voltage should be below 0.27 V at least once dur- ing this procedure.	
F78 41 35		35	Revving up to 4,000 rpm under no load at least 10 times		

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

**4.**CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector terminals under the following conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	ECM			
Connector + – Terminal		_	Condition	Voltage
	Terr	minal		
F78	32 41	35	Keeping engine at idle for 10 minutes	The voltage should be above 0.72 V at least once during this procedure. The voltage should be below 0.27 V at least once during this procedure.
′ES >> 10 >> .CHECK		ION EN DXYGEI	D N SENSOR 2-III	nals under the following conditions.
onnector -	ECM + Termina	-	Condition	Voltage
F78	32 41		Coasting from 80 km/h (50 MPH) vith selector lever in the D position	The voltage should be above 0.72 V at least once during this procedure. The voltage should be below 0.27 V at least once during this procedure.
		nalfunc		sor 2. Refer to <u>EM-33, "Removal and Installatio</u> bank 1)".
	Replace r	nalfunc	tioning heated oxygen sen	
	Replace r	nalfunc	tioning heated oxygen sen	
	Replace r	nalfunc	tioning heated oxygen sen	
	Replace r	nalfunc	tioning heated oxygen sen	

#### < DTC/CIRCUIT DIAGNOSIS >

### P0138, P0158 HO2S2

#### DTC Description

INFOID:000000012891317

[VQ35DE]

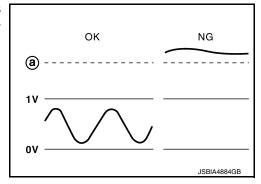
#### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/ F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time.

#### **MALFUNCTION 1**

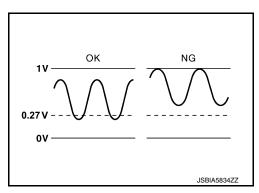
To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during various driving conditions such as fuel cut.

(a) : 1.3 V



#### **MALFUNCTION 2**

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during various driving conditions such as fuel-cut.



- 1. An excessively high voltage from the sensor is sent to ECM.
- 2. The minimum voltage from the sensor is not reached to the specified voltage.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition				
			Diagnosis condition	-		
		1	Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 to ECM		
		1	Threshold	An excessively high voltage from the sensor is sent to ECM		
P0138	HO2S2 (B1) (O2 sensor circuit high voltage bank		Diagnosis delay time	-		
F 0 130	1 sensor 2)	2	Diagnosis condition	-		
			Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 to ECM		
		2	Threshold	The minimum voltage from the sensor is not reached to the specified voltage		
			Diagnosis delay time	—		

#### < DTC/CIRCUIT DIAGNOSIS >

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			Diagnosis condition	—	
		1	Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 to ECM	A
			Threshold	An excessively high voltage from the sensor is sent to ECM	EC
P0158	HO2S2 (B2)		Diagnosis delay time	-	
PU100	(O2 sensor circuit high voltage bank 2 sensor2)		Diagnosis condition	-	C
			Signal (terminal)	Voltage signal transmitted from heated oxy- gen sensor 2 to ECM	0
		2	Threshold	The minimum voltage from the sensor is not reached to the specified voltage	D
			Diagnosis delay time	_	
POSSIBLE	ECAUSE				Е
P0138 - 1					

<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul>	
<ul> <li>P0138 - 2</li> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> <li>Fuel pressure</li> <li>Fuel injector</li> </ul>	
<ul><li>P0158 - 1</li><li>Harness or connectors (The sensor circuit is open or shorted)</li><li>Heated oxygen sensor 2</li></ul>	
P0158 - 2	

- Harness or connectors (The sensor circuit is open or shorted)
- Heated oxygen sensor 2
- Fuel pressure Fuel injector

FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

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

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION 1

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

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-271, "Diagnosis Procedure".
- NO-1 >> With CONSULT: GO TO 3.

#### < DTC/CIRCUIT DIAGNOSIS >

#### NO-2 >> Without CONSULT: GO TO 5.

### 3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION 2

#### NOTE:

#### For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

- 1. Select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 7. Let engine idle for 1 minute.
- 8. Check that "COOLANT TEMP/S" indicates more than 70°C (158°F).
- If not, warm up engine and go to next step when "COOLANT TEMP/S" indication reaches 70°C (158°F).
- 9. Open engine hood.
- 10. Select "HO2S2 (B1) P1146" (for DTC P0138) or "HO2S2 (B2) P1166" (for DTC P0158) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT.
- 11. Follow the instruction of CONSULT display. **NOTE:**

It will take at most 10 minutes until "COMPLETED" is displayed.

12. Touch "SELF-DIAG RESULTS".

#### Which is displayed on CONSULT screen?

- OK-1 >> To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u>.
- OK-2 >> Confirmation after repair: INSPECTION END
- NG >> Proceed to <u>EC-271, "Diagnosis Procedure"</u>.

CON NOT BE DIAGNOSED>>GO TO 4.

#### **4.**PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION 2 AGAIN

- 1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
- 2. Perform DTC confirmation procedure again.

>> GO TO 3.

### 5.PERFORM COMPONENT FUNCTION CHECK-1

#### **Without CONSULT**

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

	ECM					
DTC	DTC Connector		-	Condition	Voltage	
	Connector	Terminal		*		
P0138	F78	41	35	Revving up to 4,000 rpm under no load	The voltage should be below 0.27 V at	
P0158				at least 10 times	least once during this procedure.	

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

#### **6.**PERFORM COMPONENT FUNCTION CHECK-2

Check the voltage between ECM harness connector terminals under the following conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

А ECM DTC + Condition Voltage \_ Connector Terminal EC P0138 41 Keeping engine speed at idle for 10 The voltage should be below 0.27 V F78 35 minutes at least once during this procedure. P0158 32 С

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 7.

### 7.PERFORM COMPONENT FUNCTION CHECK-3

Check the voltage between ECM harness connector terminals under the following conditions.

						E
		ECM				
DTC	Connector	+	-	Condition	Voltage	
	Connector	Term	ninal			F
P0138	F78	41	35	Coasting from 80 km/h (50 MPH) with se-	The voltage should be below 0.27 V at	
P0158	170	32	- 55	lector lever in the D position	least once during this procedure.	G

#### Is the inspection result normal?

YES-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

- YES-2 >> Confirmation after repair: INSPECTION END
- >> Proceed to EC-271, "Diagnosis Procedure". NO

Diagnosis Procedure	NFOID:000000012891318
1.INSPECTION START	
Confirm the detected malfunction (A or B). Refer to <u>EC-268, "DTC Description"</u> . <u>Which malfunction is detected?</u> A >> GO TO 2.	J
B >> GO TO 6. 2.CHECK HO2S2 CONNECTOR FOR WATER	К
<ol> <li>Disconnect heated oxygen sensor 2 harness connector.</li> <li>Check that water is not inside connectors.</li> <li>Is the inspection result normal?</li> </ol>	L
YES >> GO TO 3. NO >> Repair or replace harness or connectors. <b>3.</b> CHECK HO2S2 GROUND CIRCUIT	Μ
<ol> <li>Disconnect heated oxygen sensor 2 harness connector.</li> <li>Disconnect ECM harness connector.</li> <li>Check the continuity between heated oxygen sensor 2 (HO2S2) harness connector and E connector.</li> </ol>	N CM harness

DTC		HO2S2		E	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0138	1	F62	4	F78	35	Existed
P0158	2	F54	4	170	55	LAISIEU

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

Is the inspection result normal?

YES >> GO TO 4.

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

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#### < DTC/CIRCUIT DIAGNOSIS >

#### 4.CHECK HO2S2 INPUT SIGNAL CIRCUIT

#### 1. Check the continuity between HO2S2 harness connector and ECM harness connector.

DTC		HO2S2		E	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0138	1	F62	3	F78	41	Existed
P0158	2	F54	3	F70	32	Existed

2. Check the continuity between HO2S2 harness connector and ground, or ECM harness connector and ground.

DTC		HO2S2	Ground	Continuity	
DIC	Bank	Connector	Terminal	Ground	Continuity
P0138	1	F62	3	Ground	Not existed
P0158	2	F54	3	Ground	

DTC	E	CM	Ground	Continuity	
DIC	Connector	Terminal	Ground		
P0138	F78	41	Ground	Not existed	
P0158	170	32	Ground	NUL EXISTED	

#### 3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

#### **5.**CHECK HEATED OXYGEN SENSOR 2

Check heated oxygen sensor 2. Refer to EC-273, "Component Inspection".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33</u>, "<u>Removal and Installation</u> (bank 2)", <u>EM-35</u>, "<u>Removal and Installation (bank 1)</u>".

#### **6.**CLEAR MIXTURE RATIO SELF-LEARNING VALUE

- 1. Clear the mixture ratio self-learning value. Refer to EC-156, "Description".
- 2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 or P0175 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0172, P0175. Refer to <u>EC-297, "DTC Description"</u>. NO >> GO TO 7.

7.CHECK HO2S2 GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between HO2S2 harness connector and ECM harness connector.

DTC	HO2S2			ECM		Continuity
ыс	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0138	1	F62	4	F78	35	Existed
P0158	2	F54	4	170	55	LAISLEU

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

Is the inspection result normal?

YES >> GO TO 8.

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#### < DTC/CIRCUIT DIAGNOSIS >

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

#### **8.**CHECK HO2S2 INPUT SIGNAL CIRCUIT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

DTC		HO2S2			CM	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0138	1	F62	3	F78	41	Existed
P0158	2	F54	3	170	32	LAISIEU

 Check the continuity between HO2S2 harness connector and ground, or ECM harness connector and ground.

	HO2S2		Ground	Continuity
Bank	Connector	Terminal	Ground	Continuity
1	F62	3	Ground	Not existed
2	F54	3	Ground	NUL EXISTEN
	Bank 1 2	BankConnector1F62	BankConnectorTerminal1F623	Bank   Connector   Terminal     1   F62   3     Ground

DTC	E	СМ	Ground	Continuity	
DIC	Connector	Terminal	Cround	Continuity	
P0138	F78	41	Ground	Not existed	
P0158			Ground	NOT EXISTED	

3. Also check harness for short to power.

#### Is the inspection result normal?

YES >> GO TO 9.

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

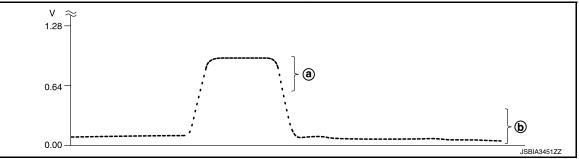
#### **9.**CHECK HEATED OXYGEN SENSOR 2

	J
Check heated oxygen sensor 2. Refer to EC-273, "Component Inspection"	
Is the inspection result normal?	
YES >> INSPECTION END	Κ
NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33</u> , " <u>Removal and Installation</u> (bank 2)", <u>EM-35</u> , " <u>Removal and Installation (bank 1)</u> ".	
Component Inspection	L
1.INSPECTION START	
Will CONSULT be used?	IVI
Will CONSULT be used?	
YES >> GO TO 2.	N
NO >> GO TO 3.	IN
2.CHECK HEATED OXYGEN SENSOR 2	
With CONSULT  Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.  Start engine and warm it up to the normal operating temperature.	0

- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- 6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT.

#### < DTC/CIRCUIT DIAGNOSIS >

7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to  $\pm$  25%.



- (a) : The voltage should be above 0.72 V at least on time.
- (b) : The voltage should be below 0.27 V at least on time.

# "HO2S2 (B1)/(B2)" should be above 0.72 V at least once when the "FUEL INJECTION" is + 25%. "HO2S2 (B1)/(B2)" should be below 0.27 V at least once when the "FUEL INJECTION" is -25%.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning heated oxygen sensor 2. Refer to EM-33, "Removal and Installation (bank 2)", EM-35, "Removal and Installation (bank 1)".

### **3.**CHECK HEATED OXYGEN SENSOR 2-1

#### Without CONSULT

- T. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector terminals under the following conditions.

ECM + -					
		_	Condition	Voltage	
Connector	Term	ninal			
	32			The voltage should be above 0.72 V at least once during this	
F78	41	35	Revving up to 4,000 rpm under no load at least 10 times	procedure. The voltage should be below 0.27 V at least once during this procedure.	

#### Is the inspection result normal?

#### YES >> INSPECTION END

NO >> GO TO 4.

#### **4.**CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector terminals under the following conditions.

ECM					
Connector	+	-	Condition	Voltage	
Connector	Term	ninal			
	32			The voltage should be above 0.72 V at least once during this	
F78	41	35	Keeping engine at idle for 10 minutes	procedure. The voltage should be below 0.27 V at least once during this procedure.	
s the inspec	tion result	normal?			

### YES >> INSPECTION END

NO >> GO TO 5.

**5.**CHECK HEATED OXYGEN SENSOR 2-III

#### < DTC/CIRCUIT DIAGNOSIS >

Check the voltage between ECM harness connector terminals under the following conditions.

	ECM				
Connector	+	-	Condition	Voltage	EC
Connector	Term	ninal	*		
	32			The voltage should be above 0.72 V at least once dur-	
F78 35		35	Coasting from 80 km/h (50 MPH) with selector lever in the D position	ing this procedure. The voltage should be below 0.27 V at least once dur- ing this procedure.	С

Is the inspection result normal?

YES >> INSPECTION END

NO	>> Replace malfunctioning heated oxygen sensor 2. Refer to EM-33, "Removal and Installation
	(bank 2)", EM-35, "Removal and Installation (bank 1)".

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#### < DTC/CIRCUIT DIAGNOSIS >

### P0139, P0159 HO2S2

### DTC Description

#### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst 1 causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel cut.

The switching time between rich and lean of a heated oxygen sensor 2 signal delays more than the specified time computed by ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DT	C detection condition
		Diagnosis condition	-
	HO2S2 (B1)	Signal (terminal)	Heated oxygen sensor 2 signal
P0139	(O2 sensor circuit slow response bank 1 sensor 2)	Threshold	The switching time between rich and lean of a heated oxygen sensor 2 signal delays more than the specified time computed by ECM
		Diagnosis delay time	-
		Diagnosis condition	-
		Signal (terminal)	Heated oxygen sensor 2 signal
P0159	HO2S2 (B2) (O2 sensor circuit slow response bank 2 sensor2)	Threshold	The switching time between rich and lean of a heated oxygen sensor 2 signal delays more than the specified time computed by ECM
		Diagnosis delay time	-

#### POSSIBLE CAUSE

#### P0139

- · Harness or connectors (The sensor circuit is open or shorted)
- Heated oxygen sensor 2
- Fuel pressure
- EVAP system
- Intake air system

P0159

- Harness or connectors (The sensor circuit is open or shorted)
- Heated oxygen sensor 2
- Fuel pressure
- EVAP system
- Intake air system

FAIL-SAFE Not applicable

#### DTC CONFIRMATION PROCEDURE

**1**.INSPECTION START

Do you have CONSULT? Do you have CONSULT?

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INFOID:000000012891320

	IT DIAGNOSIS >	[VQ35DE
YES >> GO	) TO 2.	-
	D TO 7.	
.PRECONDI	TIONING	
efore conduct	ing the next test.	previously conducted, always perform the following procedure
	on switch OFF and wait at lea on switch ON.	ist 10 seconds.
•	on switch OFF and wait at lea	ist 10 seconds.
ESTING CON	IDITION:	
or better res	ults, perform "DTC WORK S	SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).
	) TO 3.	
PERFORM	DTC CONFIRMATION PROC	JEDURE
With CONS		
	e and warm it up to the norm	A MONITOR" mode with CONSULT.
Turn ignitio	on switch OFF and wait at lea	
	on switch ON. on switch OFF and wait at lea	est 10 seconds
		l between 3,500 and 4,000 rpm for at least 1 minute under no load
Let engine	idle for 1 minute.	·
		dicates more than 70°C (158°F). km/h (38MPH) and maintain the speed.
		Khim (John Tr) and maintain the speed.
	ive vehicle at a safe speed.	
	e accelerator pedal fully at le	east 5 seconds.
CAUTION		ast 5 seconds.
• Enable t • Always	he engine brake. drive carefully.	
CAUTION <ul> <li>Enable t</li> <li>Always</li> <li>Never approximately</li> </ul>	: he engine brake. drive carefully. oply brake when releasing t	
<ul> <li>CAUTION</li> <li>Enable t</li> <li>Always</li> <li>Never application</li> <li>Repeat stepents</li> </ul>	he engine brake. drive carefully.	the accelerator pedal.
CAUTION • Enable t • Always • Never ap . Repeat ste 2. Check the	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON	t <b>he accelerator pedal.</b> NITOR".
<ul> <li>CAUTION</li> <li>Enable t</li> <li>Always</li> <li>Never approximation</li> <li>Repeat steepends</li> </ul>	he engine brake. drive carefully. oply brake when releasing t op 9 and 10 at least 8 times. following item of "DATA MON Data monitor item	the accelerator pedal.
CAUTION • Enable t • Always • Never ap Repeat ste 2. Check the	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1)	t <b>he accelerator pedal.</b> NITOR".
CAUTION • Enable t • Always o • Never ap . Repeat ster . Check the DTC	he engine brake. drive carefully. oply brake when releasing t op 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1)	t <b>he accelerator pedal.</b> NITOR".
CAUTION • Enable t • Always of • Never ap . Repeat ster . Check the DTC	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG1 (B2)	the accelerator pedal. NITOR".
CAUTION • Enable t • Always o • Never ap • Repeat ste 2. Check the DTC P0139 P0159	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2)	the accelerator pedal. NITOR".
CAUTION • Enable t • Always o • Never ap . Repeat ster 2. Check the DTC P0139 P0159 <u>"CMPLT" dis</u>	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG1 (B2) HO2 S2 DIAG2 (B2) played on CONSULT screen	the accelerator pedal. NITOR".
CAUTION • Enable t • Always o • Never ap . Repeat ste 2. Check the DTC P0139 P0159 <u>"CMPLT" dis</u> (ES >> GO	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) HO2 S2 DIAG2 (B2) played on CONSULT screen D TO 6.	the accelerator pedal. NITOR". Status CMPLT 2
CAUTION  • Enable t  • Always o  • Never ap  . Repeat ste  2. Check the  DTC  P0139  P0159 <u>"CMPLT" dis</u> (ES >> GC VO-1: "CMPL	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) HO2 S2 DIAG2 (B2) played on CONSULT screen D TO 6.	the accelerator pedal. NITOR". Status CMPLT ? 1>>Perform DTC confirmation procedure again.
CAUTION • Enable t • Always o • Never ap • Repeat ste 2. Check the DTC P0139 P0159 <u>"CMPLT" dis</u> ZES >> GO NO-1: "CMPL NO-2: "CMPL	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) HO2 S2 DIAG2 (B2) played on CONSULT screen D TO 6. T" is not displayed on DIAG 1	the accelerator pedal. NITOR". Status CMPLT ? 1>>Perform DTC confirmation procedure again.
CAUTION • Enable t • Always of • Never ap • Repeat ste 2. Check the DTC P0139 P0159 <u>"CMPLT" dis</u> <u>'ES</u> >> GO NO-1: "CMPL NO-2: "CMPL	he engine brake. drive carefully. oply brake when releasing t oply brake when releasing t Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) HO2 S2 DIAG2 (B2) played on CONSULT screen O TO 6. T" is not displayed on DIAG 1 T" is not displayed on DIAG 2 DTC WORK SUPPORT	the accelerator pedal. NITOR". Status CMPLT ? 1>>Perform DTC confirmation procedure again.
CAUTION • Enable t • Always of • Never ap • Repeat ste • Check the DTC P0139 P0159 <u>"CMPLT" dis</u> (ES >> GC IO-1: "CMPL IO-2: "CMPL • PERFORM Open engi Select "HC	he engine brake. drive carefully. oply brake when releasing t op 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) played on CONSULT screen O TO 6. T" is not displayed on DIAG 1 T" is not displayed on DIAG 2 DTC WORK SUPPORT ne hood. D2S2 (B1) P0139" or "HO2S2	the accelerator pedal. NITOR". Status CMPLT ? 1>>Perform DTC confirmation procedure again.
CAUTION • Enable t • Always o • Never ap • Repeat ste • Check the DTC P0139 P0159 <u>*CMPLT" dis</u> (ES >> GC IO-1: "CMPL IO-2: "CMPL • PERFORM Open engi Select "HC CONSULT	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) HO2 S2 DIAG2 (B2) played on CONSULT screen D TO 6. T" is not displayed on DIAG 1 T" is not displayed on DIAG 2 DTC WORK SUPPORT ne hood. D2S2 (B1) P0139" or "HO2S2	Status   Status   CMPLT   ?   1>>Perform DTC confirmation procedure again.   2>>GO TO 4.   2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode wit
CAUTION  Enable t Always o Never ap Repeat ste Check the  DTC P0139 P0159 CMPLT" dis (ES >> GC NO-1: "CMPL NO-2: "CMPL PERFORM Open engi Select "HC CONSULT Start engin	he engine brake. drive carefully. oply brake when releasing t op 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) played on CONSULT screen O TO 6. T" is not displayed on DIAG 1 T" is not displayed on DIAG 2 DTC WORK SUPPORT ne hood. D2S2 (B1) P0139" or "HO2S2	Status   Status   CMPLT   ?   1>>Perform DTC confirmation procedure again.   2>>GO TO 4.   2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode wit
CAUTION • Enable t • Always of • Never ap • Repeat step • Check the DTC P0139 P0159 *CMPLT" dis (ES >> GC VO-1: "CMPL VO-2: "CMPL VO-2: "CMPL VO-2: "CMPL VO-2: "CMPL VO-2: "CMPL VO-1: "CMPL VO-2: "CMPL VO-1: "CMPL VO-2: "CMPL VO-1:	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) HO2 S2 DIAG2 (B2) played on CONSULT screen D TO 6. T" is not displayed on DIAG 1 T" is not displayed on DIAG 2 DTC WORK SUPPORT ne hood. D2S2 (B1) P0139" or "HO2S2	the accelerator pedal. NITOR". Status CMPLT CMPLT 2 1>>Perform DTC confirmation procedure again. 2>>GO TO 4. 2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode wit f CONSULT display.
CAUTION • Enable t • Always of • Never ap • Never ap • Never ap • DTC P0139 P0159 <u>*CMPLT* dis</u> (ES >> GO NO-1: *CMPL • OPERFORM Open engin Select *HO CONSULT Start engin NOTE: It will take	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) played on CONSULT screen D TO 6. T" is not displayed on DIAG 1 T" is not displayed on DIAG 2 DTC WORK SUPPORT ne hood. D2S2 (B1) P0139" or "HO2S2 is and follow the instruction o	the accelerator pedal. NITOR". Status CMPLT CMPLT ? 1>>Perform DTC confirmation procedure again. 2>>GO TO 4. 2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode wit f CONSULT display. MPLETED" is displayed.
CAUTION	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) HO2 S2 DIAG2 (B2) played on CONSULT screen D TO 6. T" is not displayed on DIAG 1 T" is not displayed on DIAG 2 DTC WORK SUPPORT ne hood. D2S2 (B1) P0139" or "HO2S2 ie and follow the instruction o at most 10 minutes until "COI D" displayed on CONSULT screen D TO 6.	the accelerator pedal. NITOR". Status CMPLT CMPLT ? 1>>Perform DTC confirmation procedure again. 2>>GO TO 4. 2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode wit f CONSULT display. MPLETED" is displayed.
CAUTION • Enable t • Always of • Never ap 1. Repeat ste 2. Check the DTC P0139 P0159 <u>"CMPLT" dis</u> (ES >> GO NO-1: "CMPL • CMPL • CMPLT" dis (ES >> GO NO-2: "CMPL • CMPL • C	he engine brake. drive carefully. oply brake when releasing t p 9 and 10 at least 8 times. following item of "DATA MON Data monitor item HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG2 (B2) played on CONSULT screen D TO 6. T" is not displayed on DIAG 1 T" is not displayed on DIAG 2 DTC WORK SUPPORT ne hood. D2S2 (B1) P0139" or "HO2S2 ie and follow the instruction o at most 10 minutes until "COI ED" displayed on CONSULT screen	the accelerator pedal. NITOR". Status CMPLT CMPLT 2 1>>Perform DTC confirmation procedure again. 2>>GO TO 4. 2 2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode with f CONSULT display. MPLETED" is displayed. screen?

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#### < DTC/CIRCUIT DIAGNOSIS >

2. Perform DTC confirmation procedure again.

>> GO TO 3.

**6.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

Perform ECM self-diagnosis.

Is DTC "P0139" or "P0159" detected?

- YES >> Proceed to EC-279, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

7.PERFORM COMPONENT FUNCTION CHECK-I

#### Without CONSULT

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

		ECM				
DTC		+	-	Condition	Voltage	
	Connector	Connector Terminal				
P0139	F78	41	35	Revving up to 4,000 rpm under no	A change of voltage should be more than	
P0159				load at least 10 times	0.28 V for 1 second during this procedure.	

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 8.

#### 8.PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector terminals under the following conditions.

		ECM			
DTC	Connector	+	-	Condition	Voltage
	Connector	Terr	ninal		
P0139	F78	41	35	Keeping engine at idle for 10 min-	A change of voltage should be more than
P0159	170	32		utes	0.28 V for 1 second during this procedure.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 9.

#### **9.**PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector terminals under the following conditions.

		ECM			
DTC	Connector	+	-	Condition	Voltage
	CONNECTOR	Tern	ninal		
P0139	F78	41	35	Coasting from 80 km/h (50 MPH) in	A change of voltage should be more than
P0159	170	32		D position	0.28 V for 1 second during this procedure.

Is the inspection result normal?

	RCUIT DIA	GNOSIS >	>					[VQ35DE]
YES-2 >	> Confirma	tion after re	epair: İNSI	n before repa PECTION El s Procedure	ND	o <u>GI-42, "Inte</u>	ermittent Incide	<u>nt"</u> .
iagnos	is Proce	dure						INFOID:000000012891321
.CLEAR		RATIO SE	ELF-LEAR	NING VALUE	E			
					<u>EC-156, '</u>	'Description"		
	ngine for a			•	a ata dΩ la i		tort ongine?	
YES > NO >	> Perform	trouble dia on" or <u>EC-2</u>	agnosis fo 297. "DTC		'1, P0174	<u>t difficult to s</u> or P0172, F		o <u>EC-292, "DTC</u>
Turn ig Discor Discor	gnition swit nnect heate nnect ECM the contir	ch OFF. ed oxygen s harness co	sensor 2 h onnector.	arness conn oxygen ser		02S2) harnes	ss connector a	nd ECM harness
DTC		HO2S2		EC	М	Continuity		
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity		
P0139	1	F62	4	570	25			
			4 t to ground	F78 d and short t	35 o power.	Existed		
Also c the insp /ES > /O > .CHECk	heck harne <u>ection resu</u> > GO TO 3 > Repair op ( HO2S2 IN	ess for shor <u>It normal?</u>  Den circuit, NPUT SIGN	t to ground short to gr	d and short t round or sho JIT	o power. rt to power	r in harness o	or connectors.	
Also c <u>the insp</u> /ES > /O > .CHECk	heck harne <u>ection resu</u> > GO TO 3 > Repair op ( HO2S2 IN	ess for shor <u>It normal?</u> oen circuit, IPUT SIGN uity betwee	t to ground short to gr	d and short t round or sho JIT harness cor	o power. rt to power nnector and	r in harness o		
Also c the insp YES > NO > .CHECk	heck harne ection resu > GO TO 3 > Repair of < HO2S2 IN < the contin	ess for shor <u>It normal?</u> 5. 5. 5. 5. 5. 5. 5. 5. 5. 5.	t to ground short to gr IAL CIRCI	d and short t round or sho JIT harness cor EC	o power. rt to power mector and	r in harness o		
Also c the insp YES > NO > CHECK Check	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S2 IN ( the contin Bank	ess for shor <u>It normal?</u> ben circuit, NPUT SIGN uity betwee HO2S2 Connector	t to ground short to gr IAL CIRCI en HO2S2 Terminal	d and short t round or sho JIT harness cor	o power. rt to power nnector and M Terminal	r in harness o d ECM harne		
Also c the insp YES > NO > CHECK Check DTC P0139	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S2 IN ( the contin Bank 1	ess for shor <u>It normal?</u> ben circuit, VPUT SIGN uity betwee HO2S2 Connector F62	t to ground short to gr IAL CIRCI	d and short t round or sho JIT harness cor EC	o power. rt to power inector and M Terminal 41	r in harness o d ECM harne		
Also c the insp YES > NO > CHECk Check DTC P0139 P0159	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN ( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN)( HO2S2 IN	ess for shor <u>It normal?</u> ben circuit, NPUT SIGN uity betwee HO2S2 Connector F62 F54	t to ground short to gr JAL CIRCU en HO2S2 Terminal 3 3	d and short to round or sho JIT harness con EC Connector F78	o power. rt to power nector and M Terminal 41 32	r in harness o d ECM harne Continuity Existed	ss connector.	ss connector and
Also c the insp YES > NO > CHECK Check DTC P0139 P0159 Check ground	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN ( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN)( HO2S2 IN	ess for shor <u>It normal?</u> ben circuit, NPUT SIGN uity betwee HO2S2 Connector F62 F54	t to ground short to gr JAL CIRCU en HO2S2 Terminal 3 3	d and short t round or sho JIT harness cor EC Connector F78 2 harness co	o power. rt to power nector and M Terminal 41 32 onnector a	r in harness o d ECM harne Continuity Existed	ss connector.	ss connector and
Also c the insp YES > NO > CHECK Check DTC P0139 P0159 Check	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN ( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN)( HO2S2 IN ( HO2S2 IN)( HO2S2 IN	ess for shor <u>It normal?</u> ben circuit, <b>IPUT SIGN</b> uity betwee HO2S2 Connector F62 F54 huity betwee	t to ground short to gr JAL CIRCU en HO2S2 Terminal 3 3	d and short to round or sho JIT harness con EC Connector F78	o power. rt to power nector and M Terminal 41 32	r in harness o d ECM harne Continuity Existed	ss connector.	ss connector and
Also c the insp YES > NO > CHECK DTC P0139 P0159 Check ground DTC DTC	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S) IN	ess for shor <u>It normal?</u> Den circuit, NPUT SIGN uity between HO2S2 Connector F62 F54 huity between HO2S2 Connector F62 F54	t to ground short to gr IAL CIRCU en HO2S2 Terminal 3 een HO2S2 Terminal 3	d and short t round or sho JIT harness cor EC Connector F78 2 harness co	o power. rt to power nector and M Terminal 41 32 onnector a	r in harness of d ECM harne Continuity Existed and ground, o	ss connector.	ss connector and
Also c the insp YES > NO > CHECK Check DTC P0139 P0159 Check ground	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S) IN ( HO2S) IN	ess for shor <u>It normal?</u> ben circuit, Den circuit, NPUT SIGN uity betwee HO2S2 Connector F62 F54 nuity betwee HO2S2 Connector	t to ground short to gr JAL CIRCU en HO2S2 Terminal 3 een HO2S2 Terminal	d and short to round or sho JIT harness cor EC Connector F78 2 harness co Ground	o power. rt to power nector and M Terminal 41 32 onnector a Continuity	r in harness of d ECM harne Continuity Existed and ground, o	ss connector.	ss connector and
Also c the insp YES > NO > CHECK Check DTC P0139 P0159 Check ground DTC P0139	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S2 IN	ess for shor <u>It normal?</u> Den circuit, NPUT SIGN uity between HO2S2 Connector F62 F54 huity between HO2S2 Connector F62 F54	t to ground short to gr IAL CIRCU en HO2S2 Terminal 3 een HO2S2 Terminal 3	d and short to round or sho JIT harness cor EC Connector F78 2 harness co Ground	o power. rt to power nector and M Terminal 41 32 onnector a Continuity	r in harness of d ECM harne Continuity Existed and ground, o	ss connector.	ss connector and
Also c the insp YES > NO > CHECK Check DTC P0139 P0159 Check ground DTC P0139	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S2 IN	ss for shor <u>It normal?</u> ben circuit, PUT SIGN uity betwee HO2S2 Connector F62 F54 huity betwee HO2S2 Connector F62 F54 Connector F62 Connector F62 Connector F62 Connector F62 Connector F62 Connector F62 Connector F62 Connector F62 Connector F62 Connector F62 Connector	t to ground short to gr IAL CIRCU en HO2S2 Terminal 3 een HO2S2 Terminal 3	d and short to round or sho JIT harness cor EC Connector F78 2 harness co Ground Ground	o power. rt to power nector and M Terminal 41 32 onnector a Continuity Not existed	r in harness of d ECM harne Continuity Existed and ground, o	ss connector.	ss connector and
Also c the insp YES > NO > CHECK Check DTC P0139 P0159 Check ground DTC P0139 P0159	heck harne ection resu > GO TO 3 > Repair op ( HO2S2 IN ( HO2S2 IN	ess for shor <u>It normal?</u> Den circuit, NPUT SIGN uity between HO2S2 Connector F62 F54 huity between HO2S2 Connector F62 F54	t to ground short to gr IAL CIRCU en HO2S2 Terminal 3 een HO2S2 Terminal 3 3	d and short to round or sho JIT harness cor Connector F78 2 harness co Ground Ground	o power. rt to power nector and M Terminal 41 32 onnector a Continuity Not existed	r in harness of d ECM harne Continuity Existed and ground, o	ss connector.	ss connector and

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

< DTC/CIRCUIT DIAGNOSIS >

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

#### **4.**CHECK HEATED OXYGEN SENSOR 2

Check heated oxygen sensor 2. Refer to EC-280, "Component Inspection".

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33</u>, "<u>Removal and Installation</u> (bank 2)", <u>EM-35</u>, "<u>Removal and Installation (bank 1)</u>".

### Component Inspection

**1.**INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

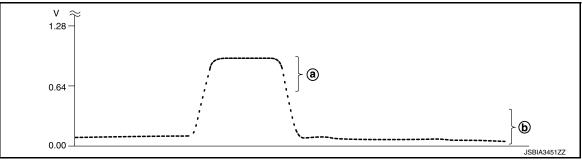
YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

#### With CONSULT

- Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT.
- 7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to  $\pm$  25%.



(a) : The voltage should be above 0.72 V at least on time.

(b) : The voltage should be below 0.27 V at least on time.

"HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the "FUEL INJECTION" is + 25%. "HO2S2 (B1)/(B2)" should be below 0.18 V at least once when the "FUEL INJECTION" is – 25%.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33</u>, "<u>Removal and Installation</u> (bank 2)", <u>EM-35</u>, "<u>Removal and Installation</u> (bank 1)".

### 3.CHECK HEATED OXYGEN SENSOR 2-I

#### Without CONSULT

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector terminals under the following conditions.

INFOID:000000012891322

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	ECM			
Connector	+	-	Condition	Voltage
Connector	Ter	minal		
F78	32	35	Revving up to 4,000 rpm under	The voltage should be above 0.72 V at least once during this procedure.
	41		no load at least 10 times	The voltage should be below 0.27 V at least once during this procedure.
	ection resul		—	
NO >>	> INSPECT > GO TO 4	•		
4.CHECK	HEATED	OXYGEN	SENSOR 2-II	
Check the	voltage bet	ween EC	M harness connector termina	Is under the following conditions.
	ECM			
Connector	+	_	Condition	Voltage
Connector -	Termi	nal		
	32			The voltage should be above 0.72 V at least once during
F78	41	35	Keeping engine at idle for 10 min- utes	this procedure. The voltage should be below 0.27 V at least once during
YES >> NO >>	ection resul > INSPECT > GO TO 5	ION END	—	this procedure.
YES >> NO >> 5.CHECK	ection resul > INSPECT > GO TO 5 ( HEATED (	TION ENI OXYGEN	) I SENSOR 2-III	this procedure.
YES >> NO >> 5.CHECK	ection resul > INSPECT > GO TO 5 ( HEATED (	TION ENI OXYGEN	) I SENSOR 2-III	
YES >> NO >> 5.CHECK Check the	ection resul > INSPECT > GO TO 5 ( HEATED ( voltage bet	TION ENI OXYGEN	) I SENSOR 2-III	
YES >> NO >> 5.CHECK	ection resul > INSPECT > GO TO 5 ( HEATED ( voltage bet ECM	-ION ENI OXYGEN tween EC	D I SENSOR 2-III CM harness connector termina	Is under the following conditions.
YES >> NO >> 5.CHECK Check the	ection resul > INSPECT > GO TO 5 ( HEATED ( voltage bef ECM +	-ION ENI OXYGEN tween EC	D I SENSOR 2-III CM harness connector termina Condition	Is under the following conditions. Voltage The voltage should be above 0.72 V at least once
YES >> NO >> 5.CHECK Check the	ection resul > INSPECT > GO TO 5 ( HEATED ( voltage bet ECM + Term	-ION ENI OXYGEN tween EC	D I SENSOR 2-III CM harness connector termina	Is under the following conditions. Voltage The voltage should be above 0.72 V at least once
YES >> NO >> 5.CHECK Check the Connector F78	ection resul > INSPECT > GO TO 5 (HEATED ( voltage bet ECM + Term 32	TION ENI OXYGEN tween EC	Condition Coasting from 80 km/h (50 MPH) w selector lever in the D position	Is under the following conditions. Voltage The voltage should be above 0.72 V at least once during this procedure. The voltage should be below 0.27 V at least once dur-
YES >> NO >> 5.CHECK Check the Connector F78 Is the inspense YES >>	ection resul > INSPECT > GO TO 5 C HEATED ( voltage bet ECM + Term 32 41 ection resul > INSPECT	TON ENI OXYGEN tween EC	Condition Condition Coasting from 80 km/h (50 MPH) w selector lever in the D position	Is under the following conditions. Voltage The voltage should be above 0.72 V at least once during this procedure. The voltage should be below 0.27 V at least once dur- ing this procedure.
YES >> NO >> 5.CHECK Check the Connector F78 Is the inspense YES >>	ection resul > INSPECT > GO TO 5 (HEATED ( voltage bef ECM + Term 32 41 ection resul > INSPECT > Replace	TION ENI OXYGEN tween EC - inal 35 It normal TION ENI malfuncti	Condition Condition Coasting from 80 km/h (50 MPH) w selector lever in the D position	Is under the following conditions.  Voltage  The voltage should be above 0.72 V at least once during this procedure.  The voltage should be below 0.27 V at least once dur- ing this procedure.  2. Refer to EM-33, "Removal and Installation"
YES >> NO >> 5.CHECK Check the Connector F78 Is the inspense YES >>	ection resul > INSPECT > GO TO 5 C HEATED ( voltage bef ECM + Term 32 41 ection resul > INSPECT > Replace	TION ENI OXYGEN tween EC - inal 35 It normal TION ENI malfuncti	Condition Condition Coasting from 80 km/h (50 MPH) w selector lever in the D position	Is under the following conditions.  Voltage  The voltage should be above 0.72 V at least once during this procedure.  The voltage should be below 0.27 V at least once dur- ing this procedure.  2. Refer to EM-33, "Removal and Installation"
YES >> NO >> 5.CHECK Check the Connector F78 Is the inspense YES >>	ection resul > INSPECT > GO TO 5 C HEATED ( voltage bef ECM + Term 32 41 ection resul > INSPECT > Replace	TION ENI OXYGEN tween EC - inal 35 It normal TION ENI malfuncti	Condition Condition Coasting from 80 km/h (50 MPH) w selector lever in the D position	Is under the following conditions.  Voltage  The voltage should be above 0.72 V at least once during this procedure.  The voltage should be below 0.27 V at least once dur- ing this procedure.  2. Refer to EM-33, "Removal and Installation"
YES >> NO >> 5.CHECK Check the Connector F78 Is the inspense YES >>	ection resul > INSPECT > GO TO 5 C HEATED ( voltage bef ECM + Term 32 41 ection resul > INSPECT > Replace	TION ENI OXYGEN tween EC - inal 35 It normal TION ENI malfuncti	Condition Condition Coasting from 80 km/h (50 MPH) w selector lever in the D position	Is under the following conditions.  Voltage  The voltage should be above 0.72 V at least once during this procedure.  The voltage should be below 0.27 V at least once dur- ing this procedure.  2. Refer to EM-33, "Removal and Installation"
YES >> NO >> 5.CHECK Check the Connector F78 Is the inspense YES >>	ection resul > INSPECT > GO TO 5 C HEATED ( voltage bef ECM + Term 32 41 ection resul > INSPECT > Replace	TION ENI OXYGEN tween EC - inal 35 It normal TION ENI malfuncti	Condition Condition Coasting from 80 km/h (50 MPH) w selector lever in the D position	Is under the following conditions.  Voltage  The voltage should be above 0.72 V at least once during this procedure.  The voltage should be below 0.27 V at least once dur- ing this procedure.  2. Refer to EM-33, "Removal and Installation"
YES >> NO >> 5.CHECK Check the Connector F78 Is the inspense YES >>	ection resul > INSPECT > GO TO 5 C HEATED ( voltage bef ECM + Term 32 41 ection resul > INSPECT > Replace	TION ENI OXYGEN tween EC - inal 35 It normal TION ENI malfuncti	Condition Condition Coasting from 80 km/h (50 MPH) w selector lever in the D position	Is under the following conditions.  Voltage  The voltage should be above 0.72 V at least once during this procedure.  The voltage should be below 0.27 V at least once dur- ing this procedure.  2. Refer to EM-33, "Removal and Installation"
YES >> NO >> 5.CHECK Check the Connector F78 Is the inspense YES >>	ection resul > INSPECT > GO TO 5 C HEATED ( voltage bef ECM + Term 32 41 ection resul > INSPECT > Replace	TION ENI OXYGEN tween EC - inal 35 It normal TION ENI malfuncti	Condition Condition Coasting from 80 km/h (50 MPH) w selector lever in the D position	Is under the following conditions.  Voltage  The voltage should be above 0.72 V at least once during this procedure.  The voltage should be below 0.27 V at least once dur- ing this procedure.  2. Refer to EM-33, "Removal and Installation"

### P0141, P0161 HEATED OXYGEN SENSOR 2 HEATER

#### < DTC/CIRCUIT DIAGNOSIS >

### P0141, P0161 HEATED OXYGEN SENSOR 2 HEATER

### DTC Description

INFOID:000000012891323

[VQ35DE]

#### DTC DETECTION LOGIC

- 1. Sensor temperature does not increase for 100 consecutive seconds or more despite the maximum operating condition of the heated oxygen sensor 2 heater.
- 2. Sensor temperature does not decrease for 100 consecutive seconds or more despite the inactive condition of the heated oxygen sensor 2 heater.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC	detection condition
			Diagnosis condition	-
			Signal (terminal)	-
		1	Threshold	Sensor temperature does not increase de- spite the maximum operating condition of the heated oxygen sensor 2 heater
P0141	HO2S2 HTR (B1) (O2 sensor heater circuit bank 1		Diagnosis delay time	100 seconds or more
FU141	sensor 2)		Diagnosis condition	-
			Signal (terminal)	-
		2	Threshold	Sensor temperature does not decrease de- spite the inactive condition of the heated oxy- gen sensor 2 heater
			Diagnosis delay time	100 seconds or more
			Diagnosis condition	-
			Signal (terminal)	-
		1	Threshold	Sensor temperature does not increase de- spite the maximum operating condition of the heated oxygen sensor 2 heater
P0161	HO2S2 HTR (B2)		Diagnosis delay time	100 seconds or more
PUIDI	(O2 sensor heater circuit bank 2 sensor 2)		Diagnosis condition	-
			Signal (terminal)	-
		2	Threshold	Sensor temperature does not decrease de- spite the inactive condition of the heated oxy- gen sensor 2 heater
			Diagnosis delay time	100 seconds or more

#### POSSIBLE CAUSE

P0141

- Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)
- Heated oxygen sensor 2 heater

P0161

- Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)
- Heated oxygen sensor 2 heater

### FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

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

### P0141, P0161 HEATED OXYGEN SENSOR 2 HEATER

< DTC/CIRCUIT DIAGNOSIS > 3. Turn ignition switch OFF and wait at least 10 seconds. **TESTING CONDITION:** А Before performing the following procedure, confirm that battery voltage is between 10.5 V and 16 V at idle. EC >> GO TO 2. 2.PERFORM DTC CONFIRMATION PROCEDURE 1. Start engine and warm it up to the normal operating temperature. 2. Turn ignition switch OFF and wait at least 10 seconds. Turn ignition switch ON. 3. Turn ignition switch OFF and wait at least 10 seconds. 4. D Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 60 seconds under no 5. load. Let engine idle for 120 seconds. 6. Е Check 1st trip DTC. 7. Is 1st tip DTC detected? YES >> Proceed to EC-283, "Diagnosis Procedure" >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident". NO-1 NO-2 >> Confirmation after repair: INSPECTION END Diagnosis Procedure INFOID:0000000012891324 1.CHECK HO2S2 POWER SUPPLY Н 1. Disconnect heated oxygen sensor 2 (HO2S2) harness connector. 2. Turn ignition switch ON. Check the voltage between HO2S2 harness connector and ground. 3. HO2S2 DTC Ground Voltage Bank Connector Terminal 1 F62 P0141 1 Ground Battery voltage 2 P0161 F54 1 Is the inspection result normal? Κ YES >> GO TO 3. NO >> GO TO 2. 2.CHECK HO2S2 SENSOR 1 POWER SUPPLY CIRCUIT L 1. Turn ignition switch OFF. 2. Disconnect IPDM E/R harness connector. Check the continuity between HO2S2 harness connector and IPDM E/R harness connector. M 3. HO2S2 IPDM E/R DTC Continuity Ν Bank Connector Terminal Connector Terminal P0141 1 F62 1 52 F19 Existed P0161 2 F54 1 53 Is the inspection result normal? YES >> Perform the trouble diagnosis for power supply circuit. NO >> Repair or replace error-detected parts. Ρ  ${f 3.}$  CHECK HO2S2 HEATER OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT 1. Turn ignition switch OFF. 2. Disconnect ECM harness connector.

Check the continuity between HO2S2 harness connector and ECM harness connector. 3.

### P0141, P0161 HEATED OXYGEN SENSOR 2 HEATER

#### < DTC/CIRCUIT DIAGNOSIS >

DTC		HO2S2		E	CM	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0141	1	F62	2	F78	7	Existed
P0161	2	F54	2	170	47	LAISted

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK HEATED OXYGEN SENSOR 2 HEATER

Check heated oxygen sensor 2 heater. Refer to EC-284, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33</u>, "<u>Removal and Installation</u> (bank 2)", <u>EM-35</u>, "<u>Removal and Installation (bank 1)</u>".

#### Component Inspection

INFOID:000000012891325

### 1.CHECK HEATED OXYGEN SENSOR 2 HEATER

- 1. Turn ignition switch OFF.
- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Check resistance between HO2S2 terminals as per the following.

+	_	
Heated oxy	gen sensor 2	Resistance
Terr	minal	
1	2	3.0 Ω [at 25°C (77°F)]
	1	
3	2	
	4	$\Omega \propto$
	1	(Continuity should not exist)
4	2	
	3	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33</u>, "<u>Removal and Installation</u> (bank 2)", <u>EM-35</u>, "<u>Removal and Installation</u> (bank 1)".

### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1 < DTC/CIRCUIT DIAGNOSIS > [VQ35DE]

# P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR

### DTC Description

INFOID:000000012891326

#### DTC DETECTION LOGIC

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

The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	—
		Signal (terminal)	A/F sensor 1 signal
P014C	A/F SENSOR1 (B1) (O2 sensor slow response - rich to lean bank 1 sensor 1)	Threshold	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM
		Diagnosis delay time	_
		Diagnosis condition	—
		Signal (terminal)	A/F sensor 1 signal
P014D	A/F SENSOR1 (B1) (O2 sensor slow response - lean to rich bank 1 sensor 1)	Threshold	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM
		Diagnosis delay time	_
		Diagnosis condition	—
	A/F SENSOR1 (B2)	Signal (terminal)	A/F sensor 1 signal
P014E	(O2 sensor slow response - rich to lean bank 2 sensor 1)	Threshold	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM
		Diagnosis delay time	-
		Diagnosis condition	-
		Signal (terminal)	A/F sensor 1 signal
P014F	A/F SENSOR1 (B2) (O2 sensor slow response - lean to rich bank 2 sensor 1)	Threshold	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM
		Diagnosis delay time	_
		Diagnosis condition	—
	A/F SENSOR1 (B1)	Signal (terminal)	A/F sensor 1 signal
P015A	(O2 sensor delayed response - rich to lean bank 1 sensor 1)	Threshold	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM
		Diagnosis delay time	_
		Diagnosis condition	-
	A/F SENSOR1 (B1)	Signal (terminal)	A/F sensor 1 signal
P015B	(O2 sensor delayed response - lean to rich bank 1 sensor 1)	Threshold	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM
		Diagnosis delay time	_

EC

D

### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1 < DTC/CIRCUIT DIAGNOSIS > [VQ35DE]

		Diagnosis condition	—
	A/F SENSOR1 (B2)	Signal (terminal)	A/F sensor 1 signal
P015C	(O2 sensor delayed response - rich to lean bank 2 sensor 1)	Threshold	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM
		Diagnosis delay time	—
		Diagnosis condition	—
	A/F SENSOR1 (B2)	Signal (terminal)	A/F sensor 1 signal
P015D	(O2 sensor delayed response - lean to rich bank 2 sensor 1)	Threshold	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM
		Diagnosis delay time	—

#### POSSIBLE CAUSE

#### P014C

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

#### P014D

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

#### P014E

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

#### P014F

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

#### P015A

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

#### P015B

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

#### P015C

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

P015D

- Harness or connectors (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1

### FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

2. Turn ignition switch ON.

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

#### **TESTING CONDITION:**

#### Before performing the following procedure, confirm that battery voltage is more than 11 V at idle. Do you have CONSULT?

YES >> GO TO 2.

```
NO >> GO TO 6.
```

Revision: December 2015

#### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1 [VQ35DE]

< DTC/CIRCUIT DIAGNOSIS >

 $\overline{2}$ .PERFORM DTC CONFIRMATION PROCEDURE-1

#### With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Increase the engine speed up to about 3,600 rpm and keep it for 10 seconds.
- 8. Fully release accelerator pedal and then let engine idle for about 1 minute.
- 9. Check the items status of "DATA MONITOR" as follows.
  - NOTE:

#### If "PRSNT" changed to "ABSNT", refer to EC-176, "Component Function Check".

DTC	Data monitor item	Status	
<ul> <li>P014C</li> <li>P014D</li> <li>P015A</li> <li>P015B</li> </ul>	A/F SEN1 DIAG3 (B1)	PRSNT	
<ul> <li>P014E</li> <li>P014F</li> <li>P015C</li> <li>P015D</li> </ul>	A/F SEN1 DIAG3 (B2)		
Is "PRSNT" displayed	on CONSULT screen?		
YES >> GO TO 4			
NO >> GO TO 3			
<b>3.</b> PERFORM DTC C	ONFIRMATION PROCEDURE	-2	
	ation procedure-1 again.		
YES >> GO TO 4			
	EC-176, "Component Function		
<b>4.</b> PERFORM DTC C	CONFIRMATION PROCEDURE	-2	
With CONSULT Wait for about 20 Check the items of	seconds at idle.	follows	

Check the items status of "DATA MONITOR" as follows.

NOTE:

#### If "CMPLT" changed to "INCMP", refer to EC-176, "Component Function Check".

DTC	Data monitor item	Status
• P014C	A/F SEN1 DIAG1 (B1)	
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	A/F SEN1 DIAG2 (B1)	CMPLT
• P014E	A/F SEN1 DIAG1 (B2)	GMPLI
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>	A/F SEN1 DIAG2 (B2)	

#### Is "CMPLT" displayed on CONSULT screen?

YES >> GO TO 5.

NO >> Refer to EC-176, "Component Function Check".

**5.**PERFORM SELF-DIAGNOSIS

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### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

Is any DTC detected?

- YES >> Proceed to EC-288, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

**Ó.**CHECK AIR-FUEL RATIO SELF-LEARNING VALUE

#### With GST

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select Service \$01 with GST.
- 3. Calculate the total value of "Short term fuel trim" and "Long term fuel trim" indications.

Is the total percentage within ±15%?

YES >> GO TO 8. NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Intake air leaks
- Exhaust gas leaks
- Incorrect fuel pressure
- Lack of fuel
- Fuel injector
- Incorrect PCV hose connection
- PCV valve
- Mass air flow sensor

>> Repair or replace malfunctioning part.

8.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- 6. Increase the engine speed up to about 3,600 rpm and keep it for 10 seconds.
- 7. Fully release accelerator pedal and then let engine idle for about 1 minute.
- 8. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-288, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis Procedure**

INFOID:000000012891327

[VQ35DE]

**1.**RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1. Refer to EM-33, "Removal and Installation (bank 2)", EM-35, "Removal and Installation (bank 1)".

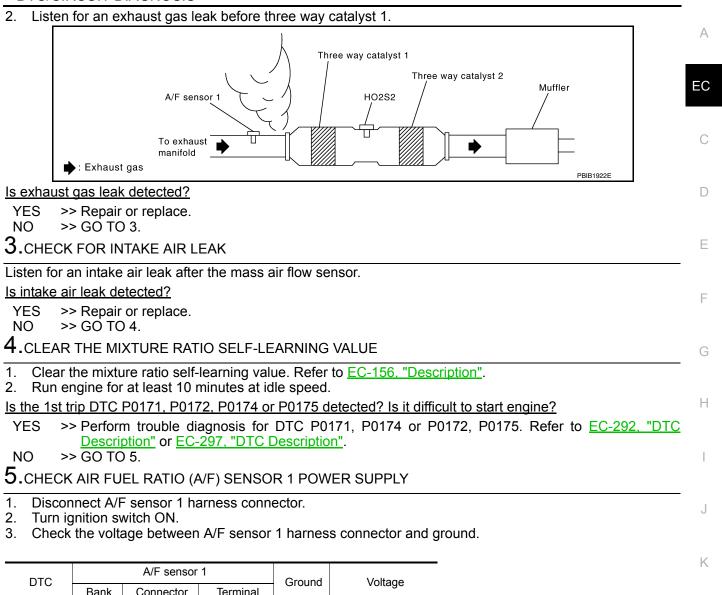
>> GO TO 2.

2.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.

# P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1

#### < DTC/CIRCUIT DIAGNOSIS >



DTC			•	Ground	Voltage
	Bank	Connector	Terminal		vollage
<ul> <li>P014C</li> <li>P014D</li> <li>P015A</li> <li>P015B</li> </ul>	1	F12	1	Ground	d Battery voltage
<ul> <li>P014E</li> <li>P014F</li> <li>P015C</li> <li>P015D</li> </ul>	2	F61	1		
	ection re > GO TC	<u>sult normal?</u> ) 7.			

NO >> GO TO 6.

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

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between A/F sensor 1 harness connector and IPDM E/R harness connector.

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[VQ35DE]

# P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1 < DTC/CIRCUIT DIAGNOSIS > [VQ35DE]

DTC		A/F sensor	1	IPDN	Continuity		
DIC	Bank Connector		Terminal	Connector	Connector Terminal		
<ul> <li>P014C</li> <li>P014D</li> <li>P015A</li> <li>P015B</li> </ul>	1	F12	1	F19	52	E intert	
<ul> <li>P014E</li> <li>P014F</li> <li>P015C</li> <li>P015D</li> </ul>	2	F61	1	1 19	53	Existed	

Is the inspection result normal?

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

NO >> Repair or replace error-detected parts.

# 7.CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC		A/F sensor	<sup>.</sup> 1	EC	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
• P014C		1 F12	3	F79	66	Existed
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	1		4		67	
• P014E	2 F61		3		76	
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>		F61	4		77	

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

DTC		A/F sensor	Ground	Continuity		
DIC	Bank Connector		Terminal	Cround	Continuity	
• P014C			3		Not existed	
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	1	F12	4	Ground		
• P014E			3	Ground		
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>	2	F61	4			

DTC		ECM		Ground	Continuity
DIC	Bank	Connector	Terminal	Ground	
• P014C			66		Not existed
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	1	F79	67	Ground	
• P014E		175	76	Ground	
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>	2		77		

5. Also check harness for short to power.

#### A/E CENIC A 4 4 4 4 F

<pre>P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1 &lt; DTC/CIRCUIT DIAGNOSIS &gt; [VQ35DE]</pre>	
Is the inspection result normal?	
YES >> GO TO 8.	А
NO >> Repair open circuit, short to ground or short to power in harness or connectors.	
8.CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER	EC
Check air fuel ratio (A/F) sensor 1 heater. Refer to EC-209. "Component Inspection".	EC
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; GO TO 9.</li> <li>NO &gt;&gt; Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to <u>EM-33. "Removal and Installation</u> (bank 2)", <u>EM-35. "Removal and Installation (bank 1)"</u>.</li> </ul>	С
9. CHECK MASS AIR FLOW SENSOR	D
Check both mass air flow sensor (bank 1 and bank 2). Refer to EC-223. "Component Inspection".	
Is the inspection result normal?	Е
YES >> GO TO 10. NO >> Replace malfunctioning mass air flow sensor. Refer to <u>EM-26, "Removal and Installation"</u> .	
10. CHECK PCV VALVE	
	F
Check PCV valve. Refer to <u>EC-573, "Work Procedure"</u> .	
<u>Is the inspection result normal?</u> YES >> INSPECTION END	0
<ul> <li>NO &gt;&gt; Repair or replace PCV valve. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Component Parts</u> <u>Location"</u>.</li> </ul>	G
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#### < DTC/CIRCUIT DIAGNOSIS >

# P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

### DTC Description

INFOID:000000012891328

[VQ35DE]

#### DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from A/F sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios. In case the amount of the compensation value is extremely large (the actual mixture ratio is too lean), the

ECM judges the condition as the fuel injection system malfunction and illuminates the MIL (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator
A/F sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

1. Fuel injection system does not operate properly.

2. The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)

DTC	CONSULT screen terms (Trouble diagnosis content)		DT	C detection condition
			Diagnosis condition	<ul><li>Start engine and let it idle</li><li>Start engine and drive the vehicle</li></ul>
P0171			Signal (terminal)	-
			Threshold	Fuel injection system does not operate prop- erly.
DIC       (Trouble diagnosis content)         P0171       FUEL SYS-LEAN-B1 (System too lean bank 1)       1       Diagnosis c Signal (term Threshold         P0171       FUEL SYS-LEAN-B1 (System too lean bank 1)       2       Signal (term Threshold         P0174       FUEL SYS-LEAN-B2 (System too lean bank 2)       Diagnosis c Signal (term Threshold         P0174       FUEL SYS-LEAN-B2 (System too lean bank 2)       Diagnosis c Signal (term Threshold	Diagnosis delay time	-		
PUITI	(System too lean bank 1)		Diagnosis condition	<ul><li>Start engine and let it idle</li><li>Start engine and drive the vehicle</li></ul>
		2	Signal (terminal)	-
		2	Threshold	The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)
			Diagnosis delay time	—
			Diagnosis condition	<ul><li>Start engine and let it idle</li><li>Start engine and drive the vehicle</li></ul>
		1	Signal (terminal)	-
			Threshold	Fuel injection system does not operate prop- erly.
D0174	FUEL SYS-LEAN-B2		Diagnosis delay time	-
P0174	(System too lean bank 2)	2 -	Diagnosis condition	<ul><li>Start engine and let it idle</li><li>Start engine and drive the vehicle</li></ul>
			Signal (terminal)	-
			Threshold	The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)
			Diagnosis delay time	

#### POSSIBLE CAUSE

P0171

- Intake air leakage
- A/F sensor 1
- Fuel injector
- Exhaust gas leakage
- Incorrect fuel pressure
- Lack of fuel
- Mass air flow sensor

P01/1, P01/4 FUEL INJECTION SYSTEM FUNCTION	
< DTC/CIRCUIT DIAGNOSIS > [VQ35	DE]
Incorrect PCV hose connection	
P0174	A
<ul> <li>Intake air leakage</li> <li>A/F sensor 1</li> </ul>	
Fuel injector	EC
<ul> <li>Exhaust gas leakage</li> <li>Incorrect fuel pressure</li> </ul>	
Lack of fuel	С
<ul> <li>Mass air flow sensor</li> <li>Incorrect PCV hose connection</li> </ul>	0
FAIL-SAFE	_
Not applicable	D
DTC CONFIRMATION PROCEDURE	
1.PRECONDITIONING	E
If DTC Confirmation Procedure has been previously conducted, always perform the following before cond	duct-
ing the next test. 1. Turn ignition switch OFF and wait at least 10 seconds.	F
2. Turn ignition switch ON.	
3. Turn ignition switch OFF and wait at least 10 seconds.	G
>> GO TO 2.	
2.PERFORM DTC CONFIRMATION PROCEDURE-I	Н
1. Clear the mixture ratio self-learning value. Refer to <u>EC-156, "Description"</u> .	
2. Start engine.	
<u>Is it difficult to start engine?</u> YES >> GO TO 3.	I
NO $>>$ GO TO 4.	
3.RESTART ENGINE	J
If it is difficult to start engine, the fuel injection system has a malfunction, too.	
Crank engine while depressing accelerator pedal. <b>NOTE:</b>	K
• When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start	t the
engine. Do not depress accelerator pedal too much. Does engine start?	L
YES >> Proceed to EC-294, "Diagnosis Procedure".	
NO >> Check exhaust and intake air leakage visually.	
4.PERFORM DTC CONFIRMATION PROCEDURE-II	M
1. Keep engine idle for at least 5 minutes.	
2. Check 1st trip DTC. Is 1st trip DTC detected?	Ν
YES >> Proceed to <u>EC-294</u> , "Diagnosis Procedure".	
NO >> GO TO 5.	0
5.PERFORM DTC CONFIRMATION PROCEDURE-III	
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Start engine.</li> </ol>	Р
3. Maintain the following conditions for at least 10 consecutive minutes.	1
Hold the accelerator pedal as steady as possible.	
VHCL SPEED SE 50 - 120 km/h (31 - 75 mph)	
CAUTION:	
Always drive vehicle at a safe speed.	

# Always drive vehicle at a safe speed.

4. Check 1st trip DTC.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-294, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

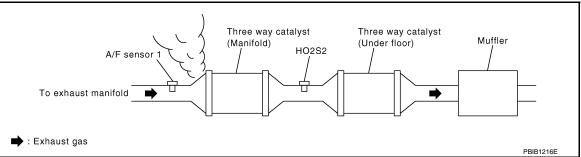
### **Diagnosis** Procedure

INFOID:000000012891329

# 1.CHECK EXHAUST GAS LEAKAGE

1. Start engine and run it at idle.

2. Listen for an exhaust gas leakage before three way catalyst (manifold).



Is exhaust gas leakage detected?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 2.

**2.**CHECK FOR INTAKE AIR LEAKAGE

- 1. Listen for an intake air leakage after the mass air flow sensor.
- 2. Check PCV hose connection.

#### Is intake air leakage detected?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 3.

**3.**CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect corresponding A/F sensor 1 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC		A/F sensor 1		E	Continuity	
	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0171	1	F12	3		66	Existed
FUITI		F1Z	4	- F79	67	
P0174	2	F61	3		76	
P0174			4		77	1

5. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

DTC		A/F sensor 1	Ground	Continuity		
DIC	Bank	Connector	3	Continuity		
P0171	1	F12	3			
FUITI	I	F 12	4	Ground	Not existed	
P0174	2	F61	3	Ground		
P0174	2	FUI	4			

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	E	СМ				А
DTC	Connector	Terminal	Ground	Continuity		
		66				EC
P0171	570	67				EC
D0174	F79	76	Ground	Not existed		
P0174		77				С
6. Also cl	heck harnes	s for short to	power.			
•	ection result	normal?				D
	> GO TO 4. > Renair one	an circuit she	ort to around	d or short to	power in harness or connectors.	D
	FUEL PRE		on to ground		oower in namess of connectors.	
			Defer to CC		Dropoduro	E
		ure to zero. e gauge kit [S			heck fuel pressure. Refer to <u>EC-162, "Work Proce-</u>	
<u>dure"</u> .	·		,	/1		F
			50 L D . (0 5	2 -	4 D	
	· · · ·	oximately 3	50 kPa (3.5	57 kg/cm², 5	1 psi)	
-	ection result	normal?				G
-	> GO TO 6. > GO TO 5.					
_		CTIONING F	PART			Н
		uel tubes for				
	ection result					I
YES >	> Replace "fi	uel filter and	fuel pump a	assembly". R	efer to FL-5, "Removal and Installation".	I
<b>^</b>	•	eplace malfu	0.	art.		
<b>b.</b> CHECK	MASS AIR	FLOW SENS	SOR			J
With CC						
	all removed		ινων ατα	TOR" mode	with CONSULT.	К
		efer to EC-5				1.4
With GS						
	all removed mass air flo	parts. w sensor sig	nal in Servi	ce \$01 with	<b>S</b> ST	L
		efer to <u>EC-5</u>				
		lue within the	e specificati	on?		M
-	> GO TO 7.	nactors for r	usted termi	nala ar lagar	connections in the mass sir flow concer sirewit or	
NO 2.		efer to <u>EC-22</u>			connections in the mass air flow sensor circuit or	
7.снеск	0				-	Ν
(P) With C	ONSULT					
1. Start e	ngine.		<i></i>			0
		BALANCE" i rcuit produce			with CONSULT.	
Billion Check     Billion					speed drop.	Р
1. Let en						í

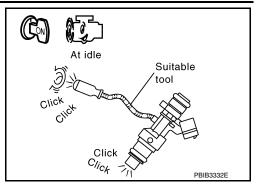
#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

- 2. Listen to each fuel injector operating sound.
- Is the inspection result normal?

YES >> GO TO 8.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to <u>EC-542, "Diagnosis Procedure"</u>.



# 8. CHECK FUEL INJECTOR

- 1. Turn ignition switch OFF.
- 2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- 3. Disconnect all fuel injector harness connectors.
- 4. Remove fuel tube assembly. Refer to <u>EM-49</u>, "<u>Removal and Installation</u>". Keep fuel hose and all fuel injectors connected to fuel tube.
- 5. For DTC P0171, reconnect fuel injector harness connectors on bank 1. For DTC P0174, reconnect fuel injector harness connectors on bank 2.
- 6. Disconnect all ignition coil harness connectors.
- 7. Prepare pans or saucers under each fuel injector.
- Crank engine for about 3 seconds.
   For DTC P0171, check that fuel sprays out from fuel injectors on bank 1.
   For DTC P0174, check that fuel sprays out from fuel injectors on bank 2.

#### Fuel should be sprayed evenly for each fuel injector.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace fuel injectors from which fuel does not spray out. Always replace O-ring with new ones. Refer to <u>EM-49</u>, "<u>Removal and Installation</u>".

### < DTC/CIRCUIT DIAGNOSIS >

# P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

### **DTC Description**

#### DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from A/F sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios. In case the amount of the compensation value is extremely large (the actual mixture ratio is too rich), the ECM judges the condition as the fuel injection system malfunction and illuminates the MIL (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator	D
A/F sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector	_

1. Fuel injection system does not operate properly.

2. The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)

DTC	CONSULT screen terms (Trouble diagnosis content)		D	TC detection condition
			Diagnosis condition	<ul> <li>Clear the mixture ratio self-learning value and start engine and let it idle</li> <li>Start engine and drive the vehicle</li> </ul>
		1	Signal (terminal)	_
			Threshold	Fuel injection system does not operate properly.
P0172	FUEL SYS-RICH-B1		Diagnosis delay time	_
P0172	(System too rich bank 1)		Diagnosis condition	<ul> <li>Clear the mixture ratio self-learning value and start engine and let it idle</li> <li>Start engine and drive the vehicle</li> </ul>
		2	Signal (terminal)	_
			Threshold	The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)
			Diagnosis delay time	_
		1	Diagnosis condition	<ul> <li>Clear the mixture ratio self-learning value and start engine and let it idle</li> <li>Start engine and drive the vehicle</li> </ul>
			Signal (terminal)	_
			Threshold	Fuel injection system does not operate prop- erly.
P0175	FUEL SYS-RICH-B2		Diagnosis delay time	-
P0175	(System too rich bank 2)		Diagnosis condition	<ul> <li>Clear the mixture ratio self-learning value and start engine and let it idle</li> <li>Start engine and drive the vehicle</li> </ul>
		2	Signal (terminal)	—
			Threshold	The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)
			Diagnosis delay time	_

#### POSSIBLE CAUSE

#### P0172

- Intake air leakage
- A/F sensor 1
- Fuel injector
- Exhaust gas leakage
- Incorrect fuel pressure

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< DTC/CIRCUIT DIAGNOSIS >

Mass air flow sensor

#### P0175

- Intake air leakage
- A/F sensor 1
- Fuel injector
- Exhaust gas leakage
- Incorrect fuel pressure
- Mass air flow sensor

### FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

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

>> GO TO 2.

# 2.PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Clear the mixture ratio self-learning value. Refer to EC-156, "Description".
- 2. Start engine.

Is it difficult to start engine?

YES >> GO TO 3. NO >> GO TO 4.

NO >> GO TO 4.

**3.**RESTART ENGINE

If it is difficult to start engine, the fuel injection system has a malfunction, too. Crank engine while depressing accelerator pedal.

#### NOTE:

 When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.

Does engine start?

YES >> Proceed to EC-299, "Diagnosis Procedure".

NO >> Check exhaust and intake air leakage visually.

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

1. Keep engine idle for at least 5 minutes.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-299, "Diagnosis Procedure".

NO >> GO TO 5.

**5.**PERFORM DTC CONFIRMATION PROCEDURE-III

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start engine.
- 3. Maintain the following conditions for at least 10 consecutive minutes.

Hold the accelerator pedal as steady as possible.

VHCL SPEED SE	50 - 120 km/h (31 - 75 mph)
VIICE SPEED SE	50 - 120 km/n (51 - 75 mpn)

#### **CAUTION:**

#### Always drive vehicle at a safe speed.

4. Check 1st trip DTC.

Is 1st trip DTC detected?

#### < DTC/CIRCUIT DIAGNOSIS >

1.CHECK EXHAUST GAS LEAKAGE Start engine and run it at idle.

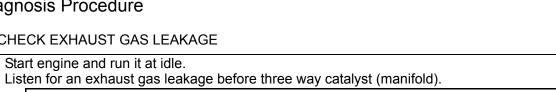
YES >> Proceed to EC-299, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

1.

2.



	A/F sensor 1 To exhaust manifold	]
	➡ : Exhaust gas	PBIB1216E
Is exhau	ust gas leakage detected?	
YES NO	>> Repair or replace malfunctioning part. >> GO TO 2.	
<b>2.</b> сне	CK FOR INTAKE AIR LEAKAGE	
	or an intake air leakage after the mass air flow sensor.	

YES >> Repair or replace malfunctioning part.

NO >> GO TO 3.

3. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect corresponding A/F sensor 1 harness connector.
- 3. Disconnect ECM harness connector.
- Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC	A/F sensor 1		ECM		Continuity	
	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0172	1 F12	E12	3 66 4 FZ0 67	66		
FUITZ		1 12		F79	67	Existed
P0175	2	F61	3		76	Existed
FUITS	2	101	4		77	

5. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

DTC		A/F sensor 1	Ground	Continuity		
DIC	Bank	Connector Terminal				Giouna
D0172	P0172 1	F12	3			
P0172		F IZ	4	Ground	Not existed	
P0175	2 F61		3	Giound	NOT EXISTED	
FU1/5			4			

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### < DTC/CIRCUIT DIAGNOSIS >

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DTC	EC	CM	Ground	Continuity	
DIC	Connector	Terminal	Ground		
P0172		66	Ground		
P0172	F79	67		Not existed	
P0175		76	Ground		
		77			

6. Also check harness for short to power.

Is the inspection result normal?

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

# **4.**CHECK FUEL PRESSURE

- 1. Release fuel pressure to zero. Refer to EC-162, "Work Procedure".
- Install fuel pressure gauge kit [SST: (J-44321)] and check fuel pressure. Refer to <u>EC-162, "Work Proce-dure"</u>.

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace "fuel filter and fuel pump assembly". Refer to <u>FL-5. "Removal and Installation"</u>.

# 5. CHECK MASS AIR FLOW SENSOR

### With CONSULT

- 1. Install all removed parts.
- Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT. For specification, refer to <u>EC-576, "Mass Air Flow Sensor"</u>.

### With GST

- 1. Install all removed parts.
- Check mass air flow sensor signal in "Service \$01" with GST. For specification, refer to <u>EC-576, "Mass Air Flow Sensor"</u>.

Is the measurement value within the specification?

- YES >> GO TO 6.
- NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to <u>EC-227, "Diagnosis Procedure"</u>.

# 6.CHECK FUNCTION OF FUEL INJECTOR

# With CONSULT

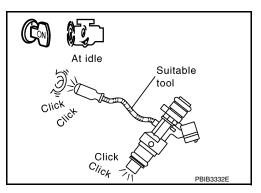
- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

#### With GST

- 1. Let engine idle.
- 2. Listen to each fuel injector operating sound.

### Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to <u>EC-542, "Diagnosis Procedure"</u>.



# 7. CHECK FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
<ol> <li>Remove fuel injector assembly. Refer to <u>EM-49, "Removal and Installation"</u>. Keep fuel hose and all fuel injectors connected to fuel tube.</li> <li>Confirm that the engine is cooled down and there are no fire hazards near the vehicle.</li> </ol>		А
<ol> <li>Disconnect all fuel injector harness connectors.</li> <li>Disconnect all ignition coil harness connectors.</li> <li>Prepare pans or saucers under each fuel injectors.</li> <li>Crank engine for about 3 seconds.</li> </ol>		EC
Check fuel does not drip from fuel injector.		С
Is the inspection result normal? YES >> INSPECTION END		0
NO >> Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new to <u>EM-49</u> , " <u>Removal and Installation</u> ".	one. Refer	D
		E
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		Н
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		Р

# P0181 FTT SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# P0181 FTT SENSOR

# DTC Description

INFOID:000000012891332

[VQ35DE]

### DTC DETECTION LOGIC

- 1. Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from ECT sensor and intake air temperature sensor.
- 2. The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, EOT sensor, and FTT sensor) shows that the voltage signal of the FTT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC	detection condition
			Diagnosis condition	-
		1	Signal (terminal)	Voltage signal transmitted from FTT sensor to ECM
	FTT SENSOR (Fuel temperature sensor a circuit range/performance)		Threshold	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage sig- nals from ECT sensor and intake air temper- ature sensor
			Diagnosis delay time	-
P0181		2	Diagnosis condition	-
20181			Signal (terminal)	Voltage signal transmitted from FTT sensor to ECM
			Threshold	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, EOT sensor, and FTT sensor) shows that the voltage signal of the FTT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state
			Diagnosis delay time	-

#### POSSIBLE CAUSE

P0181 - 1

- Harness or connectors (The FTT sensor circuit is open or shorted)
- FTT sensor

P0181 - 2

- · Harness or connectors (The FTT sensor circuit is open or shorted)
- FTT sensor

FAIL-SAFE Not applicable

#### DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

#### Is it necessary to erase permanent DTC?

YES >> GO TO 7.

NO >> GO TO 2.

### 2. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

2. Turn ignition switch ON.

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

# **P0181 FTT SENSOR**

dure before conducting the next t	est.
1. Turn ignition switch OFF and	wait at least 10 seconds.
2. Turn ignition switch ON.	
3. Turn ignition switch OFF and	wait at least 10 seconds.
TESTING CONDITION:	
<ul> <li>Before performing the following</li> </ul>	ing procedure, do not add fuel.
<ul> <li>Before performing the following /li></ul>	ing procedure, check that fuel lev
· Before performing the following	ing procedure, confirm that batte
Revision: December 2015	EC-303
	20 000

	Λ
>> GO TO 3. 3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION 1-I	A
<ol> <li>Turn ignition switch ON and wait at least 10 seconds.</li> <li>Check 1st trip DTC.</li> <li>Is 1st trip DTC detected?</li> </ol>	EC
YES >> Proceed to <u>EC-304, "Diagnosis Procedure"</u> . NO >> GO TO 4.	С
4. CHECK ENGINE COOLANT TEMPERATURE	
<ul> <li>With CONSULT</li> <li>Select "COOLANT TEMP/S" in "DATA MONITOR" with CONSULT.</li> <li>Check "COOLANT TEMP/S" value.</li> </ul>	D
With GST Follow the procedure "With CONSULT" above.	E
<u>"COOLANT TEMP/S" less than 60°C (140°F)?</u> YES >> INSPECTION END NO >> GO TO 5.	F
5. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION 1-II	G
<ul> <li>With CONSULT</li> <li>Cool engine down until "COOLANT TEMP/S" is less than 60°C (140°F).</li> <li>Wait at least 10 seconds.</li> <li>Check 1st trip DTC.</li> <li>With GST</li> <li>Follow the procedure "With CONSULT" above.</li> </ul>	Н
Is 1st trip DTC detected?	
YES >> Proceed to <u>EC-304, "Diagnosis Procedure"</u> . NO >> GO TO 6.	
6.CHECK FUEL TANK TEMPERATURE (FTT) SENSOR	J
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect fuel level sensor unit and fuel pump harness connector.</li> <li>Remove fuel level sensor unit. Refer to <u>FL-5</u>, "<u>Removal and Installation</u>".</li> </ol>	K
4. Check resistance between fuel level sensor unit and fuel pump terminals by heating with hot water as shown in the figure.	L
Terminals     Condition     Resistance (kΩ)     1	
1 and 3         Temperature [°C (°F)]         20 (68)         2.3 – 2.7           50 (122)         0.79 – 0.90         10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	M
Is the inspection result normal? YES >> INSPECTION END NO >> Presend to EC 304 "Diagnosis Presedure"	Ν

NO >> Proceed to EC-304, "Diagnosis Procedure".

# 7. PRECONDITIONING

< DTC/CIRCUIT DIAGNOSIS >

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following proce-

- evel is between 1/4 and 4/4.
- ery voltage is 11 V or more at idle.

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< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 8.

### 8.PERFORM DTC CONFIRMATION PROCEDURE 2

1. Move the vehicle to a cool place.

- NOTE:
- Cool the vehicle in an environment of ambient air temperature between –10°C (14°F) and 35°C (95°F). 2. Turn ignition switch OFF and leave the vehicle for 12 hours.
- CAUTION:

# Never turn ignition switch ON during this procedure. NOTE:

The vehicle must be cooled with the hood open.

3. Start engine and let it idle for 5 minutes or more. CAUTION:

### Never turn ignition switch OFF during idling.

4. Check 1st trip DTC.

### Is 1st trip DTC detected?

- YES >> Proceed to EC-304, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

INFOID:000000012891333

# **1.**INSPECTION START

Confirm the detected malfunction (A or B). Refer to EC-302, "DTC Description".

Which malfunction is detected?

A >> GO TO 2.

B >> GO TO 5.

2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.

2. Disconnect fuel level sensor unit and fuel pump harness connector.

3. Turn ignition switch ON.

4. Check the voltage between fuel level sensor unit and fuel pump harness connector and ground.

Fuel level sensor	unit and fuel pump	Ground	Voltage	
Connector	Terminal	Ground	voltage	
B72	3	Ground	Approx. 5 V	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

 $\mathbf{3}$ . CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between fuel tank temperature sensor harness connector and ECM harness connector.

	level sensor unit and fuel pump		СМ	Continuity
Connector	Terminal	Connector	Terminal	
B72	3	E32	128	Existed

Is the inspection result normal?

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

NO >> Repair or replace error-detected parts.

4.CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

# **P0181 FTT SENSOR**

### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- А 3. Check the continuity between fuel level sensor unit and fuel pump harness connector and ECM harness connector.

						EC
Fuel level sensor unit a			ECM	Conti	nuity	
	Terminal	Connector		ninal	·	
B72	1	E32	14	48 Exis	ted	С
4. Also check harn		to groun	id and sh	nort to power.		
Is the inspection res	ult normal?					D
YES >> GO TO						D
	•	-		•	r in harness or connector.	
5. CHECK FUEL TA						Ε
Check fuel tank tem	perature sens	sor. Refe	er to <u>EC-</u> :	<u>305, "Compone</u>	ent Inspection".	
Is the inspection res						
YES >> INSPEC						F
NO >> Replace	tuel level se	nsor unit	t and fue	l pump. Refer	to FL-5, "Removal and Installation".	
Component Insp	pection				INFOID:000000012891334	G
1.CHECK FUEL TA				D		0
		RATURE	SENSO	ĸ		
<ol> <li>Turn ignition swi</li> <li>Remove fuel lev</li> </ol>		it Defer		"Domoval and	Installation"	Н
<ol> <li>Remove fuel lev</li> <li>Check resistance</li> </ol>						
terminals by hea						1
						I
Mass air flow sensor					川川	
+ –	С	ondition		Resistance (kΩ)		J
Terminals						
3 1	Tomporatura		20 (68)	2.3 - 2.7 kΩ		
3 1	Temperature [	-C (-F)]	50 (122)	0.79 - 0.90 kΩ		K
Is the inspection res	ult normal?	4			JMBIA0167ZZ	
YES >> INSPEC	-					1
NO >> Replace	fuel level se	nsor unit	t and fue	l pump. Refer	to FL-5, "Removal and Installation".	
						M
						Ν

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[VQ35DE]

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# P0182, P0183 FTT SENSOR

# DTC Description

INFOID:000000012891335

### DTC DETECTION LOGIC

- · An excessively low voltage from the sensor is sent to ECM.
- An excessively high voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	וס	C detection condition
		Diagnosis condition	Ignition switch ON
D0102	FTT_SEN/CIRCUIT P0182 (Fuel temperature sensor "A" circuit	Signal (terminal)	Voltage signal transmitted from fuel tank tem- perature sensor to ECM
low)	, i	Threshold	An excessively low voltage from the sensor is sent to ECM
		Diagnosis delay time	_
		Diagnosis condition	Ignition switch ON
D0102	FTT_SEN/CIRCUIT	Signal (terminal)	Voltage signal transmitted from fuel tank tem- perature sensor to ECM
P0183	(Fuel temperature sensor "A" circuit high)	Threshold	An excessively high voltage from the sensor is sent to ECM
		Diagnosis delay time	_

### POSSIBLE CAUSE

P0182

- Harness or connectors (The sensor circuit is open or shorted.)
- Fuel tank temperature sensor

P0183

- · Harness or connectors (The sensor circuit is open or shorted.)
- Fuel tank temperature sensor

FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

### >> GO TO 2.

# 2.PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-306, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

1.CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY

INFOID:000000012891336

# DA402 DA402 ETT CENCOD

#### < DTC/C

		P0182	, P0183 F	TT SENSO		
< DTC/CIRCUI	T DIAGNOSIS	>			[VQ35DE]	
<ol> <li>Disconnect</li> <li>Turn ignitio</li> </ol>	n switch OFF. "fuel level sens n switch ON. /oltage betweer				or. arness connector and ground.	A
Fuel level sensor	unit and fuel pump	)				EC
Connector	Terminal	Ground	Ve	oltage		
B72	3	Ground	Арр	prox. 5 V		С
Is the inspection	n result normal?		U			
YES >> GO NO >> GO						D
2.CHECK FUE	EL TANK TEMPI	ERATURE SE	ENSOR PO	WER SUPPLY	CIRCUIT	
<ol> <li>Turn ignitio</li> <li>Disconnect</li> <li>Check the or</li> </ol>	n switch OFF. ECM harness o	connector.			' harness connector and ECM harness	Ε
connector.						F
Fuel level sensor	unit and fuel pump	EC	M			
Connector	Terminal	Connector	Terminal	Continuity		G
B72	3	E32	128	Existed	-	0
4. Also check	harness for sho	ort to ground a	and short to	power.	•	
Is the inspection		-				Н
YES >> GO						
· ·	pair or replace e		•			
3.CHECK FUE	EL TANK TEMPI	ERATURE SE	ENSOR GR	OUND CIRCUI	Г	
2. Disconnect	n switch OFF. ECM harness o continuity betwe		sensor unit	and fuel pump"	' harness connector and ECM harness	J
Fuel level energy			N 4			Κ
	unit and fuel pump	EC		Continuity		
Connector	Terminal	Connector	Terminal	Eviator	-	I
B72	1	E32	148	Existed		Ĺ
4. Also check Is the inspection	harness for sho	•	and short to	power.		
						M

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

**4.**CHECK FUEL TANK TEMPERATURE SENSOR

Check fuel tank temperature sensor. Refer to EC-307, "Component Inspection".

#### Is the inspection result normal?

YES >> INSPECTION END

>> Replace "fuel level sensor unit and fuel pump". Refer to FL-5, "Removal and Installation". NO

### **Component Inspection**

# 1.CHECK FUEL TANK TEMPERATURE SENSOR

Turn ignition switch OFF. 1.

Remove fuel level sensor unit. Refer to FL-5, "Removal and Installation". 2.

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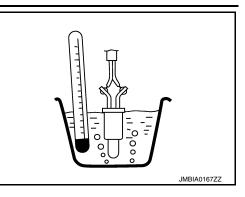
Ρ

# P0182, P0183 FTT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

3. Check resistance between "fuel level sensor unit and fuel pump" terminals by heating with hot water as shown in the figure.

Mass air flow sensor + Terminals			Resistance (kΩ)		
		Condition			
					3
5	I		50 (122)	0.79 - 0.90 kΩ	



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel level sensor unit and fuel pump. Refer to <u>FL-5</u>, "<u>Removal and Installation</u>".

# P0196 EOT SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# P0196 EOT SENSOR

# **DTC** Description

#### DTC DETECTION LOGIC

- Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from EOT 1. sensor and intake air temperature sensor.
- The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT 2. sensor, FTT sensor, and EOT sensor) shows that the signal voltage of the EOT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.

DTC	CONSULT screen terms (Trouble diagnosis content)		וס	IC detection condition
			Diagnosis condition	-
			Signal (terminal)	Voltage signal transmitted from EOT sensor to ECM
		1	Threshold	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage sig- nals from EOT sensor and intake air temper- ature sensor
	EOT SENSOR		Diagnosis delay time	-
P0196			Diagnosis condition	-
P0190	(Engine oil temperature sensor range/performance)		Signal (terminal)	Voltage signal transmitted from EOT sensor to ECM
		2	Threshold	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the signal voltage of the EOT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state
			Diagnosis delay time	_

### POSSIBLE CAUSE

P0196 - 1

- Harness or connectors (The EOT sensor circuit is open or shorted)
- EOT sensor

P0196 - 2

- · Harness or connectors (High or low resistance in the EOT sensor circuit)
- EOT sensor

#### FAIL-SAFE

	Engine operating condition in fail-safe mode	Ν
Fail safe mode	Vehicle behavior	
Engine oil temperature sensor	Intake valve timing control does not function.	$\cap$

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK DTC PRIORITY

If DTC P0196 is displayed with another DTC P0197 or P0198, first perform the trouble diagnosis for DTC P0197 or P0198.

#### Is applicable DTC detected?

- YES Perform diagnosis of applicable. >>
  - DTC P0197: Refer to <u>EC-313</u>, "<u>DTC Description</u>".
    DTC P0198: Refer to <u>EC-313</u>, "<u>DTC Description</u>".
- NO >> GO TO 2.

# EC-309

INFOID:000000012891338

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< DTC/CIRCUIT DIAGNOSIS >

# 2.INSPECTION START

#### Is it necessary to erase permanent DTC?

YES >> GO TO 7.

NO >> GO TO 3.

3. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

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

TESTING CONDITION:

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

>> GO TO 4.

### **4.**PERFORM DTC CONFIRMATION PROCEDURE FOR MULFUNCTION 1-I

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and let it idle for 5 minutes and 10 seconds.
- 6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to EC-311, "Diagnosis Procedure".
- NO >> GO TO 5.

**5.**PERFORM DTC CONFIRMATION PROCEDURE FOR MULFUNCTION 1-II

()With CONSULT

- 1. Select "DATA MONITOR" mode with CONSULT.
- Check that "COOLANT TEMP/S" indicates above 70°C (158°F). If it is above 70°C (158°F), go to the following steps. If it is below 70°C (158°F), warm engine up until "COOLANT TEMP/S" indicates more than 70°C (158°F). Then perform the following steps.
- 3. Turn ignition switch OFF and soak the vehicle in a cool place.
- Turn ignition switch ON. NOTE:

# Do not turn ignition switch OFF until step 8.

#### 5. Select "DATA MONITOR" mode with CONSULT.

6. Check the following.

COOLANT TEMP/S	Below 40°C (104°F)
INT/A TEMP SE	Below 40°C (104°F)
Difference between "COOLANT TEMP/S" and "INT/A TEMP SE"	Within 6°C (11°F)

If they are within the specified range, perform the following steps.

If they are out of the specified range, soak the vehicle to meet the above conditions. Then perform the following steps.

NOTE:

#### • Do not turn ignition switch OFF.

- If it is supposed to need a long period of time, do not deplete the battery.
- 7. Start engine and let it idle for 5 minutes.

8. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

< DTC/CIRCUIT	DIAGNOSIS >	F0190 E	OT SENSOR	[VQ35DE]	
	eed to EC-311. "Diagn	osis Proced	ure".	<u> </u>	
NO >> GO					А
	INE OIL TEMPERATU	RE (EOT) S	ENSOR		
<ol> <li>Turn ignition</li> <li>Disconnect E</li> </ol>	switch OFF. EOT sensor harness co	onnector			EC
3. Remove EO	T sensor. Refer to EC-	<u>15, "ENGIN</u>		TEM : Component Parts Location".	
	tance between EOT s er as shown in the figu		linals by heating		С
	5				
Terminals	Condition		Resistance (kΩ)		D
		20 (68)	2.37 – 2.63		D
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00		
Is the inspection	result normal?	90 (194)	0.236 – 0.260		E
	PECTION END				
_NO >> Proc	eed to <u>EC-311, "Diagn</u>	osis Proced	<u>ure"</u> .	JMBIA0080ZZ	F
7.PRECONDITI	ONING				
		has been	previously conduc	ted, always perform the following proce-	G
	lucting the next test. switch OFF and wait a	t least 10 se	econds.		0
2. Turn ignition	switch ON.				
3. Turn ignition TESTING COND	switch OFF and wait a	it least 10 se	econas.		Н
	ning the following pr				
				el is between 1/4 and 4/4. y voltage is 11 V or more at idle.	
•	0 01				
>> GO -					J
<b>Ö.</b> PERFORM D	TC CONFIRMATION F	ROCEDUR	E 2		
1. Move the ve NOTE:	hicle to a cool place.				K
	icle in an environment	of ambient a	air temperature be	etween –10°C (14°F) and 35°C (95°F).	
2. Turn ignition CAUTION:	switch OFF and leave	the vehicle	for 12 hours.		
	gnition switch ON du	ring this pr	ocedure.		L
NOTE:	must be cooled with the	e hood oper			
	and let it idle for 5 min				N
CAUTION:	gnition switch OFF d	urina idlina			
4. Check 1st tri			j.		Ν
Is 1st trip DTC de	•				1
	eed to <u>EC-311, "Diagn</u>			-42, "Intermittent Incident".	
	firmation after repair: IN			-42, Intermittent incluent.	C
Diagnosis Pro	-			INFOID:000000012891339	
					Ρ
1. СНЕСК DTC					
If DTC P0196 is P0197 or P0198.		er DTC P01	97 or P0198, first	t perform the trouble diagnosis for DTC	
Is applicable DT					
YES >> Pe	rform diagnosis of app				
D.7	C P0197: Refer to EC				

**P0196 EOT SENSOR** 

# **P0196 EOT SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

#### DTC P0198: Refer to <u>EC-313</u>, "DTC Description".

NO >> GO TO 2.

### 2.CHECK ENGINE OIL TEMPERATURE SENSOR

Check engine oil temperature sensor. Refer to EC-312. "Component Inspection".

#### Is the inspection result normal?

YES >> NSPECTION END

NO >> Replace engine oil temperature sensor. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Compo-</u> nent Parts Location".

### **Component Inspection**

INFOID:000000012891340

# 1. CHECK ENGINE OIL TEMPERATURE SENSOR

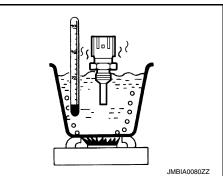
- 1. Turn ignition switch OFF.
- 2. Disconnect engine oil temperature sensor harness connector.
- 3. Remove engine oil temperature sensor. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Component</u> <u>Parts Location"</u>.
- 4. Check resistance between engine oil temperature sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition		Resistance (k $\Omega$ )
		20 (68)	2.37 - 2.63
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine oil temperature sensor. Refer to <u>EC-15</u>, <u>"ENGINE CONTROL SYSTEM : Component Parts Location"</u>.



< DTC/CIRCUIT DIAGNOSIS >

# P0197, P0198 EOT SENSOR

# DTC Description

### DTC DETECTION LOGIC

• An excessively low voltage from the sensor is sent to ECM.

• An excessively high voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	Start engine and let it idle
P0197	EOT SEN/CIRC	Signal (terminal)	Voltage signal transmitted from engine oil temperature sensor to ECM
-0197	0197 (Engine oil temperature sensor circuit low)	Threshold	An excessively low voltage from the sensor is sent to ECM
		Diagnosis delay time	_
		Diagnosis condition	Start engine and let it idle
P0198	EOT SEN/CIRC	Signal (terminal)	Voltage signal transmitted from engine oil temperature sensor to ECM
high)	(Engine oil temperature sensor circuit high)	Threshold	An excessively high voltage from the sensor is sent to ECM
		Diagnosis delay time	_

### POSSIBLE CAUSE

P0197

- Harness or connectors (The sensor circuit is open or shorted.)
- · Engine oil temperature sensor

#### P0198

- · Harness or connectors (The sensor circuit is open or shorted.)
- Engine oil temperature sensor

FAIL-SAFE

Engine operating condition in fail-safe mode			
Fail safe mode	Vehicle behavior	1	
Engine oil temperature sensor Intake valve timing control does not function.			

### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

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

### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

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

# Is 1st trip DTC detected?

# YES >> Proceed to EC-314. "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

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# P0197, P0198 EOT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

### Diagnosis Procedure

[VQ35DE]

# 1. CHECK EOT SENSOR POWER SUPPLY

- 1. Disconnect engine oil temperature (EOT) sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between EOT sensor harness connector and ground.

EOT sensor		Ground	Voltage
Connector	Terminal	Ground	voltage
F68	3	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 2.

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

# 2.CHECK EOT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between EOT sensor harness connector and ECM harness connector.

EOT sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F68	1	F78	15	Existed

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

Is the inspection result normal?

YES >> GO TO 3.

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

# **3.**CHECK ENGINE OIL TEMPERATURE SENSOR

Check engine oil temperature sensor. Refer to EC-314, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine oil temperature sensor. Refer to <u>EC-15. "ENGINE CONTROL SYSTEM : Compo-</u> nent Parts Location".

# Component Inspection

INFOID:000000012891343

# 1.CHECK ENGINE OIL TEMPERATURE SENSOR

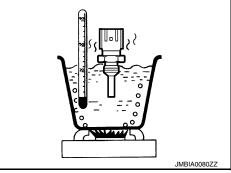
- 1. Turn ignition switch OFF.
- 2. Disconnect engine oil temperature sensor harness connector.
- 3. Remove engine oil temperature sensor. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Component</u> <u>Parts Location"</u>.
- 4. Check resistance between engine oil temperature sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition		Resistance (k $\Omega$ )
		20 (68)	2.37 - 2.63
3 and 1	Temperature [°C (°F)]	50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine oil temperature sensor. Refer to <u>EC-15</u>. <u>"ENGINE CONTROL SYSTEM : Component Parts Location"</u>.



< DTC/CIRCUIT DIAGNOSIS >

# P0222, P0223 TP SENSOR

# **DTC Description**

### DTC DETECTION LOGIC

• An excessively low voltage from the TP sensor 1 is sent to ECM.

· An excessively high voltage from the TP sensor 1 is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Start engine and let it idle	
P0222	TP SEN 1/CIRC-B1	Signal (terminal)	Voltage signal transmitted from TP sensor 1 to ECM	
P0222	0222 (Throttle/Pedal position sensor/switch "B" circuit low)	Threshold	An excessively low voltage from the TP sen- sor 1 is sent to ECM	
	Diagnosis delay time	—		
		Diagnosis condition	Start engine and let it idle	
P0223	TP SEN 1/CIRC-B1	Signal (terminal)	Voltage signal transmitted from TP sensor 1 to ECM	
P0223 (Throttle/Pedal position sensor/switch "B" circuit high)	Threshold	An excessively high voltage from the TP sen- sor 1 is sent to ECM		
	Diagnosis delay time	—		

### POSSIBLE CAUSE

P0222

- Harness or connectors (TP sensor 1 circuit is open or shorted.)
- Electric throttle control actuator (TP sensor 1)

#### P0223

- · Harness or connectors (TP sensor 1 circuit is open or shorted.)
- Electric throttle control actuator (TP sensor 1)

#### FAIL-SAFE

Engine operating condition in fail-safe mode				
Fail safe mode	Vehicle behavior	1		
Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.	M		

### DTC CONFIRMATION PROCEDURE

# **1.**CHECK DTC PRIORITY

If DTC P0222 or P0223 is displayed with another DTC P0643, first perform the trouble diagnosis for DTC P0643.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-430, "DTC Description"</u>.

NO >> GO TO 2.

### 2.PRECONDITIONING

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

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

TESTING CONDITION:

# [VQ35DE]

А

EC

Κ





2016 Murano NAM

# P0222, P0223 TP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

#### Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

>> GO TO 3.

# **3.**PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.

2. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-316. "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# **Diagnosis** Procedure

INFOID:000000012891345

### **1.**CHECK DTC PRIORITY

If DTC P0222 or P0223 is displayed with another DTC P0643, first perform the trouble diagnosis for DTC P0643.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to EC-430, "DTC Description".

NO >> GO TO 2.

# 2.CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY

- 1. Disconnect electric throttle control actuator harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between electric throttle control actuator harness connector and ground.

Electric throttle control actuator     -     Volta       Connector     Terminal		÷		
Connector Terminal	Electric throttle	control actuator	_	Voltage
	Connector	Terminal		
F50 5 Ground Approx	F50	5	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

# $\mathbf{3}$ .check throttle position sensor 1 power supply circuit

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

Electric throttle	Electric throttle control actuator		CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F50	5	F79	98	Existed

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

#### **4.**CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

Electric throttle	Electric throttle control actuator		СМ	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F50	4	F79	75	Existed

# P0222, P0223 TP SENSOR

		P0222,	P022	3 IP 5EM	150K			
< DTC/CIR	CUIT DIAGNOS	S >					[VQ35DE]	
4. Also ch	eck harness for s	hort to ground ar	nd short	to power.				
Is the inspe	ction result norma	<u>al?</u>						А
	GO TO 5.							
_	Repair open circ	-				onnectors.		50
<b>5.</b> CHECK	THROTTLE POS	ITION SENSOR	1 INPU	T SIGNAL C	IRCUIT			EC
1. Check	the continuity betw	ween electric thro	ottle con	trol actuator	and ECM harn	ess connector.		
					_			С
Electric thr	ottle control actuator	ECM		Continuity				
Connecto	r Terminal	Connector Te	erminal	Continuity	_			
F50	6	F79	71	Existed				D
2. Also ch	eck harness for s	hort to ground ar	nd short	to power.				
Is the inspe	ction result norma	<u>al?</u>						Е
	GO TO 6.							_
~	Repair open circ		nd or sh	ort to power	in harness or c	onnectors.		
	THROTTLE POS							F
	tle position senso		7, "Con	nponent Insp	<u>bection"</u> .			
	ction result norma							C
	· INSPECTION EN		otuator	Dofor to EM	29 "Domoval	and Installation"		G
	•					and installation.		
Compon	ent Inspection					١٨	IFOID:000000012891346	Н
1.CHECK	THROTTLE POS	ITION SENSOR						
	nition switch OFF.							
	nect all harness co		nected.					I
	n <u>EC-153, "Descri</u>	<u>ption"</u> .						
	nition switch ON. ector lever to D po	osition						J
	the voltage betwe		connec	ctor terminal	s under the follo	owing conditions		
	Ū.					U U		
	ECM							K
Connoctor	+	-		Conditi	ion	Voltage		
Connector	Terminal	Terminal						L
-	71				Fully released	More than 0.36 V		
<b>F7</b> 0	71	75	0		Fully depressed	Less than 4.75 V		
F79	70	75	Acce	lerator pedal	Fully released	Less than 4.75 V		M
	72				Fully depressed	More than 0.36 V		
Is the inspe	ction result norma	<u>al?</u>						Ν
	INSPECTION EN							IN
NO >>	Replace electric	throttle control ad	ctuator.	Refer to EM	-28, "Removal a	and Installation".		
								0
								Ρ

### < DTC/CIRCUIT DIAGNOSIS >

# P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

### **DTC** Description

INFOID:000000012891347

[VQ35DE]

### DTC DETECTION LOGIC

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)

On the 1st trip, when a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.

When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off. If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink. When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on. If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.

 Two Trip Detection Logic (Exhaust quality deterioration) For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only illuminate when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.

A misfire malfunction can be detected in any one cylinder or in multiple cylinders.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	-
DODOO	MULTI CYL MISFIRE (Random/Multiple cylinder misfire de- tected)	Signal (terminal)	
P0300		Threshold	Multiple cylinders misfire
,	Diagnosis delay time	-	
		Diagnosis condition	-
D0004	P0301 CYL 1 MISFIRE (Cylinder 1 misfire detected)	Signal (terminal)	-
P0301		Threshold	No. 1 cylinder misfires
		Diagnosis delay time	-
		Diagnosis condition	—
Dogoo	P0302 CYL 2 MISFIRE (Cylinder 2 misfire detected)	Signal (terminal)	-
P0302		Threshold	No. 2 cylinder misfires
	Diagnosis delay time	-	
		Diagnosis condition	—
Doooo	P0303 CYL 3 MISFIRE (Cylinder 3 misfire detected)	Signal (terminal)	-
P0303		Threshold	No. 3 cylinder misfires
	Diagnosis delay time	-	
		Diagnosis condition	-
P0304	CYL 4 MISFIRE	Signal (terminal)	-
FU3U4	(Cylinder 4 misfire detected)	Threshold	No. 4 cylinder misfires
		Diagnosis delay time	-

# < DTC/CIRCUIT DIAGNOSIS >

	CUIT DIAGNOSIS >		[140	JDL]
		Diagnosis condition	_	
	CYL 5 MISFIRE	Signal (terminal)	_	A
P0305	(Cylinder 5 misfire detected)	Threshold	No. 5 cylinder misfires	
		Diagnosis delay time	_	EC
		Diagnosis condition	_	
	CYL 6 MISFIRE	Signal (terminal)	_	
P0306	(Cylinder 6 misfire detected)	Threshold	No. 6 cylinder misfires	С
		Diagnosis delay time		
POSSIBLE				D
				D
P0300	anade plug			
<ul><li>Improper</li><li>Insufficier</li></ul>	nt compression			E
<ul> <li>Incorrect</li> </ul>	fuel pressure			
<ul> <li>The fuel i</li> <li>Fuel inject</li> </ul>	njector circuit is open or shorted			_
<ul> <li>Intake air</li> </ul>				F
<ul> <li>The ignition</li> </ul>	on signal circuit is open or shorted			
<ul> <li>Lack of full</li> <li>Signal plat</li> </ul>				G
<ul> <li>A/F sense</li> </ul>				
<ul> <li>Incorrect</li> </ul>	PCV hose connection			
P0301				H
<ul> <li>Improper</li> </ul>				
	nt compression fuel pressure			1
	njector circuit is open or shorted			
<ul> <li>Fuel inject</li> </ul>				
<ul> <li>Intake air</li> <li>The ignitic</li> </ul>	leakage on signal circuit is open or shorted			J
<ul> <li>Lack of full</li> </ul>	iel			
<ul> <li>Signal pla</li> </ul>				K
<ul> <li>A/F sense</li> <li>Incorrect</li> </ul>	PCV hose connection			r.
P0302				
<ul> <li>Improper</li> </ul>	spark plug			L
<ul> <li>Insufficier</li> </ul>	nt compression			
	fuel pressure			
<ul> <li>Fuel inject</li> </ul>	njector circuit is open or shorted			M
<ul> <li>Intake air</li> </ul>	leakage			
<ul> <li>The ignition</li> <li>Lack of full</li> </ul>	on signal circuit is open or shorted			Ν
<ul> <li>Signal pla</li> </ul>				
<ul> <li>A/F sense</li> </ul>	or 1			
<ul> <li>Incorrect</li> </ul>	PCV hose connection			0
P0303				
<ul> <li>Improper</li> <li>Insufficier</li> </ul>	spark plug nt compression			Р
	fuel pressure			ľ
<ul> <li>The fuel i</li> </ul>	njector circuit is open or shorted			
<ul><li>Fuel injec</li><li>Intake air</li></ul>				

- Intake air leakage
- The ignition signal circuit is open or shorted
- Lack of fuel
- Signal plate

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

- A/F sensor 1
- Incorrect PCV hose connection

#### P0304

- · Improper spark plug
- Insufficient compression
- Incorrect fuel pressure
- The fuel injector circuit is open or shorted
- Fuel injector
- Intake air leakage
- The ignition signal circuit is open or shorted
- Lack of fuel
- Signal plate
- A/F sensor 1
- Incorrect PCV hose connection

#### P0305

- Improper spark plug
- Insufficient compression
- · Incorrect fuel pressure
- The fuel injector circuit is open or shorted
- Fuel injector
- Intake air leakage
- The ignition signal circuit is open or shorted
- Lack of fuel
- Signal plate
- A/F sensor 1
- Incorrect PCV hose connection

#### P0306

- Improper spark plug
- Insufficient compression
- Incorrect fuel pressure
- · The fuel injector circuit is open or shorted
- Fuel injector
- Intake air leakage
- The ignition signal circuit is open or shorted
- Lack of fuel
- Signal plate
- A/F sensor 1
- Incorrect PCV hose connection

FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

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

#### >> GO TO 2.

# 2.PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Restart engine and let it idle for approximately 15 minutes.
- 6. Check 1st trip DTC.

#### P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE [VQ35DE] < DTC/CIRCUIT DIAGNOSIS > Is 1st trip DTC detected? А >> Proceed to EC-321, "Diagnosis Procedure". YES >> GO TO 3. NO 3.PERFORM DTC CONFIRMATION PROCEDURE-II EC 1. Turn ignition switch OFF and wait at least 10 seconds. 2. Turn ignition switch ON. 3. Turn ignition switch OFF and wait at least 10 seconds. Start engine and drive the vehicle under similar conditions to (1st trip) Freeze Frame Data for a certain 4. time. Refer to the table below. Hold the accelerator pedal as steady as possible. Similar conditions to (1st trip) Freeze Frame Data mean that the following conditions should be satisfied at

the same time. **CAUTION:** Е

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

Engine speed	Engine speed in the freeze frame data $\pm400$ rpm	F
Vehicle speed	Vehicle speed in the freeze frame data $\pm$ 10 km/h (6 MPH)	— Г
Basic fuel schedule	Basic fuel schedule in freeze frame data $\times$ (1 $\pm$ 0.1)	
Engine coolant temperature (T)	When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F).	G
condition	When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F).	H

Driving time varies according to the engine speed in the freeze frame data.

Engine speed	Time
Around 1,000 rpm	Approximately 10 minutes
Around 2,000 rpm	Approximately 5 minutes
More than 3,000 rpm	Approximately 3.5 minutes

5. Check 1st trip DTC. Is 1st trip DTC detected? YES >> Proceed to EC-321, "Diagnosis Procedure". NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident". NO-2 >> Confirmation after repair: INSPECTION END

# Diagnosis Procedure

#### 1. CHECK FOR INTAKE AIR LEAKAGE AND PCV HOSE Μ 1. Start engine and run it at idle speed. Listen for the sound of the intake air leakage. 2. Ν 3 Check PCV hose connection. Is intake air leakage detected? YES >> Discover air leakage location and repair. >> GO TO 2. NO 2.CHECK FOR EXHAUST SYSTEM CLOGGING Stop engine and visually check exhaust tube, three way catalyst and muffler for dents. Ρ Is the inspection result normal? YES-1 >> With CONSULT: GO TO 3. YES-2 >> Without CONSULT: GO TO 4.

>> Repair or replace malfunctioning part. NO

3.PERFORM POWER BALANCE TEST

#### (P) With CONSULT

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INFOID:000000012891348

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 4.

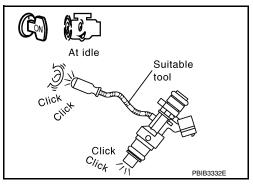
**4.**CHECK FUNCTION OF FUEL INJECTOR

- 1. Start engine and let it idle.
- 2. Listen to each fuel injector make operation sound.

#### Clicking sound should be heard.

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to <u>EC-542, "Diagnosis Procedure"</u>.



# 5. CHECK FUNCTION OF IGNITION COIL-I

### **CAUTION:**

Perform the following procedure in a place with no combustible objects and good ventilation.

- 1. Turn ignition switch OFF.
- Remove fuel pump fuse in IPDM E/R to release fuel pressure. NOTE:

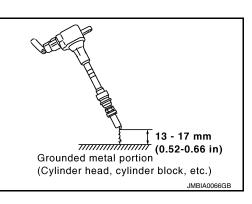
Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

- 3. Start engine.
- 4. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 5. Turn ignition switch OFF.
- 6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- 7. Remove ignition coil and spark plug of the cylinder to be checked.
- 8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- 9. Connect spark plug and harness connector to ignition coil.
- 10. Fix ignition coil using a rope etc. with gap of 13 17 mm (0.52 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
- 11. Crank engine for approximately 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

#### Spark should be generated.

#### CAUTION:

• During the operation, always stay 0.5 m (19.7 in) or more away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.



• It might damage the ignition coil if the gap of more than 17 mm (0.66 in) is made. NOTE:

When the gap is less than 13 mm (0.52 in), a spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 9. NO >> GO TO 6.

6.CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.

#### < DTC/CIRCUIT DIAGNOSIS >

- 2. Disconnect spark plug and connect a non-malfunctioning spark plug.
- 3. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark A plug and the grounded metal portion.

#### Spark should be generated.

#### Is the inspection result normal?

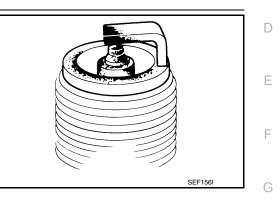
NO >> Check ignition coil, power transistor and their circuits. Refer to <u>EC-545</u>, "<u>Diagnosis Procedure</u>".

**7.**CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

#### Is the inspection result normal?

- YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-137, "Spark Plug"</u>.
- NO >> Repair or clean spark plug. Then GO TO 8.



# 8. CHECK FUNCTION OF IGNITION COIL-III

<ol> <li>Reconnect the initial spark plugs.</li> <li>Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.</li> </ol>	Η
Spark should be generated.	I
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; INSPECTION END</li> <li>NO &gt;&gt; Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-137, "Spark Plug"</u>.</li> </ul>	J
9. CHECK COMPRESSION PRESSURE	
Check compression pressure. Refer to <u>EM-24, "On-Vehicle Service"</u> . <u>Is the inspection result normal?</u>	K
YES >> GO TO 10. NO >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets. <b>10.</b> CHECK FUEL PRESSURE	L
<ol> <li>Install all removed parts.</li> <li>Release fuel pressure to zero. Refer to <u>EC-162</u>, "<u>Work Procedure</u>".</li> <li>Install fuel pressure gauge kit [SST: — (J-44321)] and check fuel pressure. Refer to <u>EC-162</u>, "<u>Work Proce-dure</u>".</li> </ol>	M
At idle: Approximately 350 kPa (3.57 kg/cm <sup>2</sup> , 51 psi)	
Is the inspection result normal? YES >> GO TO 12. NO >> GO TO 11.	0
11. DETECT MALFUNCTIONING PART	Ρ
Check fuel hoses and fuel tubes for clogging. <u>Is the inspection result normal?</u> YES >> Replace "fuel filter and fuel pump assembly". Refer to <u>FL-5, "Removal and Installation"</u> . NO >> Repair or replace malfunctioning part. <b>12.</b> CHECK IGNITION TIMING	

Revision: December 2015

[VQ35DE]

EC

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Check idle speed and ignition timing. For procedure, refer to <u>EC-158, "Work Procedure"</u>. For specification, refer to <u>EC-576, "Idle Speed"</u> and <u>EC-576, "Ignition Timing"</u>.

Is the inspection result normal?

YES >> GO TO 13.

NO >> Follow the <u>EC-158, "Work Procedure"</u>.

13. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect corresponding A/F sensor 1 harness connector.

3. Disconnect ECM harness connector.

4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

A/F sensor 1			ECM		Continuity
Bank	Connector	Terminal	Connector	Terminal	Continuity
1	F12	3	F79	66	Existed
I		4		67	
2	F61	3		76	
		4		77	

5. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

A/F sensor 1			Ground	Continuity
Bank	Connector	Terminal	Ground	Continuity
1	F12	3	Ground	Not existed
I		4		
2	F61	3		
2		4		

E	СМ	Ground	Continuity	
Connector	Terminal	Ground	Continuity	
	66		Not existed	
F79	67	Ground		
F79	76	Ground		
	77			

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 14.

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

**14.**CHECK A/F SENSOR 1 HEATER

Check A/F sensor 1 heater. Refer to EC-209, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace malfunctioning A/F sensor 1. Refer to <u>EM-33</u>, "Removal and Installation (bank 2)", <u>EM-33</u>, "Removal and Installation (bank 2)".

**15.**CHECK MASS AIR FLOW SENSOR

### With CONSULT

T. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT.

2. For specification, refer to EC-576, "Mass Air Flow Sensor".

### P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]	
<ol> <li>Check mass air flow sensor signal in Service \$01 with GST.</li> <li>For specification, refer to <u>EC-576, "Mass Air Flow Sensor"</u>.</li> </ol>	А
Is the measurement value within the specification?	
<ul> <li>YES &gt;&gt; GO TO 16.</li> <li>NO &gt;&gt; Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to <u>EC-227</u>, "Diagnosis Procedure".</li> </ul>	EC
16.CHECK SYMPTOM TABLE	
Check items on the rough idle symptom in EC-564, "Symptom Table".	С
Is the inspection result normal?	
YES >> GO TO 17.	D
NO >> Repair or replace malfunctioning part. 17.ERASE THE 1ST TRIP DTC	
	_
Some tests may cause a 1st trip DTC to be set. Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to <u>EC-70, "CONSULT Func-tion"</u> .	E
>> INSPECTION END	F
	G
	0
	Н
	J
	K
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	Ъ./І
	Μ
	Ν
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### < DTC/CIRCUIT DIAGNOSIS >

### P0327, P0328, P0332, P0333 KS

### DTC Description

[VQ35DE]

#### DTC DETECTION LOGIC

• An excessively low voltage from the sensor is sent to ECM.

An excessively high voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	D	TC detection condition
		Diagnosis condition	Start engine and let it idle
P0327	KNOCK SEN/CIRC-B1	Signal (terminal)	Voltage signal transmitted from knock sensor to ECM
	(Knock sensor 1 circuit low bank 1)	Threshold	An excessively low voltage from the sensor is sent to ECM
		Diagnosis delay time	_
		Diagnosis condition	Start engine and let it idle
P0328	KNOCK SEN/CIRC-B1	Signal (terminal)	Voltage signal transmitted from mass air flow sensor to ECM
	(Knock sensor 1 circuit high bank 1)	Threshold	An excessively high voltage from the sensor is sent to ECM.
		Diagnosis delay time	
		Diagnosis condition	Start engine and let it idle
P0332	KNOCK SEN/CIRC-B2	Signal (terminal)	Voltage signal transmitted from knock sensor to ECM
P0332	(Knock sensor 2 circuit low bank 2)	Threshold	An excessively low voltage from the sensor is sent to ECM
		Diagnosis delay time	
		Diagnosis condition	Start engine and let it idle
P0333	KNOCK SEN/CIRC-B1	Signal (terminal)	Voltage signal transmitted from mass air flow sensor to ECM
russs	(Knock sensor 2 circuit high bank 2)	Threshold	An excessively high voltage from the sensor is sent to ECM.
		Diagnosis delay time	_

#### POSSIBLE CAUSE

P0327

- Harness or connectors (The sensor circuit is open or shorted.)
- Knock sensor

P0328

- Harness or connectors (The sensor circuit is open or shorted.)
- Knock sensor

P0332

- Harness or connectors (The sensor circuit is open or shorted.)
- Knock sensor

P0333

- Harness or connectors (The sensor circuit is open or shorted.)
- Knock sensor

FAIL-SAFE Not applicable

DTC CONFIRMATION PROCEDURE

### P0327, P0328, P0332, P0333 KS

< DTC/CIRCUIT DIAGNOSIS >

#### 1.PRECONDITIONING А If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test. Turn ignition switch OFF and wait at least 10 seconds. 1. EC Turn ignition switch ON. 2. Turn ignition switch OFF and wait at least 10 seconds. 3. **TESTING CONDITION:** Before performing the following procedure, confirm that battery voltage is more than 10 V at idle. >> GO TO 2. D 2. PERFORM DTC CONFIRMATION PROCEDURE 1. Start engine and run it for at least 5 seconds at idle speed. 2. Check 1st trip DTC. Е Is 1st trip DTC detected? >> Proceed to EC-327, "Diagnosis Procedure". YES NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident". NO-2 >> Confirmation after repair: INSPECTION END Diagnosis Procedure INFOID:000000012891350 CHECK KNOCK SENSOR GROUND CIRCUIT 1. Disconnect knock sensor harness connector and ECM harness connector. Н 2. Check the continuity between knock sensor harness connector and ECM harness connector. ECM Knock sensor Continuity DTC Bank Connector Terminal Connector Terminal P0327, P0328 1 F202 2 F78 Existed 4 P0332, P0333 2 F203 2 3. Also check harness for short to ground and short to power. Is the inspection result normal? Κ YES >> GO TO 2. NO >> Repair open circuit, short to ground or short to power in harness or connectors. ${ m 2.}$ CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT 1. Check the continuity between knock sensor harness connector and ECM harness connector. Knock sensor ECM M DTC Continuity Bank Connector Terminal Connector Terminal P0327, P0328 1 F202 1 5 F78 Existed Ν P0332, P0333 F203 2 1 9 Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 3. NO >> Repair open circuit, short to ground or short to power in harness or connectors. ${ m 3.}$ CHECK KNOCK SENSOR Ρ Check knock sensor, Refer to EC-328, "Component Inspection". Is the inspection result normal? YES >> INSPECTION END

NO >> Replace malfunctioning knock sensor. Refer to <u>EM-114, "Exploded View"</u>.

### P0327, P0328, P0332, P0333 KS

### < DTC/CIRCUIT DIAGNOSIS >

### Component Inspection

[VQ35DE] INFOID:000000012891351

# 1.CHECK KNOCK SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect knock sensor harness connector.
- 3. Check resistance between knock sensor terminal as per the following. **NOTE:**

#### It is necessary to use an ohmmeter which can measure more than 10 $\text{M}\Omega.$

Knock	sensor		
+	-	Resistance	
Terminals			
 1	2	Approx. 532 - 588 kΩ [at 20°C (68°F)]	

#### CAUTION:

Never use any knock sensors that have been dropped or physically damaged. Use only new ones. Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning knock sensor. Refer to <u>EM-114, "Exploded View"</u>.

### < DTC/CIRCUIT DIAGNOSIS >

### P0335 CKP SENSOR (POS)

### DTC Description

### DTC DETECTION LOGIC

- The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of 1. engine cranking.
- The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is 2. running.
- The crankshaft position sensor (POS) signal is not in the normal pattern during engine running. 3.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition			
			Diagnosis condition	Start engine and let it idle		
P0335 CKP SEN/CIRCUIT (Crankshaft position sensor "A" cir- cuit)		Signal (terminal)	Voltage signal transmitted from crankshaft position sensor (POS) to ECM			
	1	Threshold	The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking			
		Diagnosis delay time	_			
			Diagnosis condition	Start engine and let it idle		
	CKP SEN/CIRCUIT		Signal (terminal)	Voltage signal transmitted from crankshaft position sensor (POS) to ECM		
		2	Threshold	The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running		
			Diagnosis delay time	—		
			Diagnosis condition	Start engine and let it idle		
		3	Signal (terminal)	Voltage signal transmitted from crankshaft position sensor (POS) to ECM		
			Threshold	The crankshaft position sensor (POS) signal is not in the normal pattern during engine run- ning		
			Diagnosis delay time	_		

### POSSIBLE CAUSE

- Harness or connectors [CKP sensor (POS) circuit is open or shorted.]
- Crankshaft position sensor (POS)
- Signal plate

# FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK DTC PRIORITY

If DTC P0335 is displayed with another DTC P0643, first perform the trouble diagnosis for DTC P0643. Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to EC-430, "DTC Description".

NO >> GO TO 2.

2.PRECONDITIONING

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

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

INFOID:000000012891352

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< DTC/CIRCUIT DIAGNOSIS >

### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

>> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and let it idle for at least 5 seconds. If engine does not start, crank engine for at least 2 seconds.
- 2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to <u>EC-330. "Diagnosis Procedure"</u>.

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

INFOID:000000012891353

### **1.**CHECK DTC PRIORITY

If DTC P0335 is displayed with another DTC P0643, first perform the trouble diagnosis for DTC P0643. <u>Is applicable DTC detected?</u>

YES >> Perform diagnosis of applicable. Refer to <u>EC-430, "DTC Description"</u>.

NO >> GO TO 2.

**2.**CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.

- 2. Turn ignition switch ON.
- 3. Check the voltage between CKP sensor (POS) harness connector and ground.

CKP sen	+ sor (POS)	_	Voltage (V)
Connector	Terminal	-	
F30	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF

2. Disconnect ECM harness connector.

3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sen	sor (POS)	E	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
F30	1	F78	28	Existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

#### 4.CHECK CKP SENSOR (POS) GROUND CIRCUIT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

CKP sen	sor (POS)	EC	М	Opentity it	-
Connector	Terminal	Connector	Terminal	Continuity	_
F30	2	F78	40	Existed	E
4. Also cheo	k harness for	short to groun	d and short t	o power.	
s the inspect	ion result norn	<u>nal?</u>			
	60 TO 5.				
					arness or connectors.
					EN AND SHORT
1. Check the	e continuity be	tween CKP se	ensor (POS) l	harness connec	tor and ECM harness connector.
CKP sen	sor (POS)	EC	M		-
Connector	Terminal	Connector	Terminal	Continuity	
F30	3	F78	36	Existed	-
2. Also cheo	k harness for	short to groun	d and short t	o power.	-
s the inspect	ion result norn	<u>nal?</u>			
	GO TO 6. Popair opop cir	cuit chart to c	round or sho	rt to power in b	arness or connectors.
<b>^</b>	• •	POSITION SE		•	amess of connectors.
					et lesse etient
	ion result norn		Refer to $EC-$	331, "Compone	nt inspection".
	60 TO 7.				
		shaft position s	ensor (POS)	. Refer to <u>EM-3</u>	8. "Exploded View".
<b>7</b> .CHECK G	EAR TOOTH				
Visually check	k for chipping	signal plate ge	ar tooth.		
	ion result norn				
-	NSPECTION E		r to EM 115	"Disassembly a	nd Accombly"
	-	-	1 to <u>LIVI-113,</u>		<u>nu Assembly</u> .
Jomponer	nt Inspectio	n			INFOID:000000012891354
<b>1.</b> снеск с	RANKSHAFT	POSITION SE	NSOR (POS	5)-I	
1. Loosen th	ne fixing bolt o	of the sensor.			
	ect crankshaft   the sensor.	position senso	r (POS) harn	ess connector.	
		sor for chipping	].		
s the inspect	ion result norn	nal?			
YES >> G	GO TO 2.	<b>.</b>			
	مرامية متماسية				
NO >> R	Replace cranks 8. "Exploded \		ensor (POS)	. Refer to <u>EM-</u>	
NO >> R	Replace cranks 8, "Exploded V		ensor (POS)	. Refer to <u>EM-</u>	
NO >> R			ensor (POS)	. Refer to <u>EM-</u>	
NO >> R			ensor (POS)	. Refer to <u>EM-</u>	

# $2. {\sf CHECK \ CRANKSHAFT \ POSITION \ SENSOR \ (POS)-II}$

Check the resistance between crankshaft position sensor (POS) terminals as per the following.

### < DTC/CIRCUIT DIAGNOSIS >

Crankshaft posit	ion sensor (POS)	
+	_	Resistance [at 25°C (77°F)]
Terminal	(Polarity)	
1	2	
·	3	Except 0 or $\infty \Omega$
2	3	

Is the inspection result normal?

YES >> INSPECTION END

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

#### < DTC/CIRCUIT DIAGNOSIS >

# P0340, P0345 CMP SENSOR (PHASE)

### DTC Description

### DTC DETECTION LOGIC

- 1. The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking.
- 2. The cylinder No. signal is not sent to ECM during engine running.
- 3. The cylinder No. signal is not in the normal pattern during engine running.

DTC	CONSULT screen terms (Trouble diagnosis content)		D	TC detection condition
			Diagnosis condition	<ul> <li>Start engine and let it idle</li> <li>Start engine and maintaining engine speed at more than 800 rpm</li> </ul>
	1	Signal (terminal)	Voltage signal transmitted from Camshaft po- sition sensor (PHASE) to ECM	
			Threshold	The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking
CMP SEN/CIRC-B1 (Camshaft position sensor "A" cir- cuit bank 1)		Diagnosis delay time	_	
		Diagnosis condition	<ul> <li>Start engine and let it idle</li> <li>Start engine and maintaining engine speed at more than 800 rpm</li> </ul>	
	(Camshaft position sensor "A" cir-	r- 2	Signal (terminal)	Voltage signal transmitted from Camshaft po- sition sensor (PHASE) to ECM
			Threshold	The cylinder No. signal is not sent to ECM during engine running
			Diagnosis delay time	
		Diagnosis condition	<ul> <li>Start engine and let it idle</li> <li>Start engine and maintaining engine speed at more than 800 rpm</li> </ul>	
		3	Signal (terminal)	Voltage signal transmitted from Camshaft po- sition sensor (PHASE) to ECM
			Threshold	The cylinder No. signal is not in the normal pattern during engine running
			Diagnosis delay time	_

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INFOID:000000012891355

#### < DTC/CIRCUIT DIAGNOSIS >

### [VQ35DE]

			Diagnosis condition	<ul> <li>Start engine and let it idle</li> <li>Start engine and maintaining engine speed at more than 800 rpm</li> </ul>
		1	Signal (terminal)	Voltage signal transmitted from Camshaft po- sition sensor (PHASE) to ECM
			Threshold	The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking
			Diagnosis delay time	_
			Diagnosis condition	<ul> <li>Start engine and let it idle</li> <li>Start engine and maintaining engine speed at more than 800 rpm</li> </ul>
P0345	CMP SEN/CIRC-B2 (Camshaft position sensor "A" cir-	2	Signal (terminal)	Voltage signal transmitted from Camshaft po- sition sensor (PHASE) to ECM
	cuit bank 2)		Threshold	The cylinder No. signal is not sent to ECM during engine running
			Diagnosis delay time	_
		3	Diagnosis condition	<ul> <li>Start engine and let it idle</li> <li>Start engine and maintaining engine speed at more than 800 rpm</li> </ul>
			Signal (terminal)	Voltage signal transmitted from Camshaft po- sition sensor (PHASE) to ECM
			Threshold	The cylinder No. signal is not in the normal pattern during engine running
			Diagnosis delay time	—

### POSSIBLE CAUSE

#### P0340

- · Harness or connectors
- CMP sensor (PHASE) circuit is open or shorted.
- APP sensor 2 circuit is shorted.
- EOP sensor circuit is shorted.
- Refrigerant pressure sensor is shorted.
- Camshaft position sensor (PHASE)
- · Camshaft (INT)
- Starter motor (Refer to <u>STR-6, "System Diagram"</u>.)
- Starting system circuit (Refer to STR-6, "System Diagram".)
- · Dead (Weak) battery
- Accelerator pedal position sensor (APP sensor 2)
- Engine oil pressure sensor
- Refrigerant pressure sensor

#### P0345

- Harness or connectors
- CMP sensor (PHASE) circuit is open or shorted.
- APP sensor 2 circuit is shorted.
- EOP sensor circuit is shorted.
- Refrigerant pressure sensor is shorted.
- Camshaft position sensor (PHASE)
- Camshaft (INT)
- Starter motor (Refer to <u>STR-6, "System Diagram"</u>.)
- Starting system circuit (Refer to <u>STR-6, "System Diagram"</u>.)
- Dead (Weak) battery
- Accelerator pedal position sensor (APP sensor 2)
- Engine oil pressure sensor
- Refrigerant pressure sensor

FAIL-SAFE Not applicable

		P0	340, P0	345 C	MP SENSO	R (PHASE)	
< DTC/CIF	RCUIT DIA	GNOSIS :	>				[VQ35DE]
DTC CON	IFIRMATI	ON PROC	EDURE				
1.PRECC	NDITION	NG					A
ing the nex 1. Turn ig 2. Turn ig		ch OFF an ch ON.	d wait at le	east 10 s	econds.	lways perform the following b	efore conduct- EC
TESTING	CONDITIO	N:				ery voltage is more than 10.	C 5 V with igni-
>:	> GO TO 2						
2.PERFO	RM DTC C	ONFIRMA	TION PRO	CEDUR	RE-I		_
lf engi	ngine and ne does no 1st trip DT	ot start, cra			s. st 2 seconds.		E
Is 1st trip E	•						F
	> Proceed		"Diagnosi	s Proced	<u>lure"</u> .		
	> GO TO 3	=			. – .		G
3.PERFO							
	1st trip D1		t more that	n 800 rpi	m for at least 5	seconds.	Н
<u>Is 1st trip D</u>	•						
NO-1 >:	> Proceed > To check > Confirma	malfunctio	n sympton	n before	repair: Refer to	GI-42. "Intermittent Incident"	. 1
Diagnos	is Proce	dure					INFOID:000000012891356
	STARTIN		1				J
Turn ignitic	on switch to	START po	osition.				K
Does the e			s the starte	er motor	operate?		
				r to <u>STF</u>	R-10, "Work Flo	<u>w (With GR8-1200 NI)"</u> or <u>S</u>	TR-10, "Work
<b>2.</b> CHECK			/	) SENSC	R (PHASE) PC	OWER SUPPLY	
					HASE) harnes		M
2. Turn ig	gnition swit	ch ON.	. ,		,	onnector and ground.	
	CME	P sensor (PH/	ASE)				Ν
DTC	Olvii	3011301 (1117	+	_	Voltage (V)		
	Bank	Connector	Terminal	-			0
P0340	1	F77	1	Ground	Amarov E		
P0345	2	F60	1	Ground	Approx. 5		Р
Is the insp							
	> GO TO 4 > GO TO 3						
•			ASE) POW	ER SUF	PLY CIRCUIT		
	nition swit		,				

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

### < DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

DTC	CM	P sensor (PH	ASE)	E	CM	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0340	1	F77	1	F79	92	Existed
P0345	2	F60	1	175	52	Existed

Is the inspection result normal?

YES >> Check sensor power supply 2 circuit. Refer to EC-558, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

**4.**CHECK CMP SENSOR (PHASE) GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

DTC	CMI	P sensor (PH	ASE)	ECM		Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0340	1	F77	2	F79	90	Existed
P0345	2	F60	2	1/9	90	LAISteu

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

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT

1. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

DTC	CM	P sensor (PH	ASE)	ECM		Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0340	1	F77	3	F79	84	Existed
P0345	2	F60	3	175	89	LAISted

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

Is the inspection result normal?

YES >> GO TO 6.

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

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

Check camshaft position sensor (PHASE). Refer to EC-337. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to <u>EM-45. "Exploded View"</u>.

**/**.CHECK CAMSHAFT (INT)

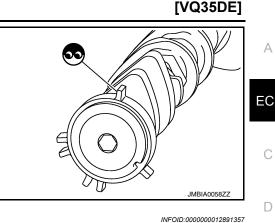
Check the following.

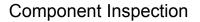
#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to <u>EM-79, "Removal and Installation"</u>.



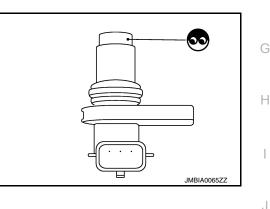


1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect camshaft position sensor (PHASE) harness connector.
- 4. Remove the sensor.
- 5. Visually check the sensor for chipping.

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-45, "Exploded View".



### **2.**CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check the resistance camshaft position sensor (PHASE) terminals as per the following.

n sensor (PHASE)	
_	Resistance [Ω at 25°C (77°F)]
(Polarity)	
2	
3	Except 0 or $\infty$
3	
	-

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-45, "Exploded View".

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### < DTC/CIRCUIT DIAGNOSIS >

### P0420, P0430 THREE WAY CATALYST FUNCTION

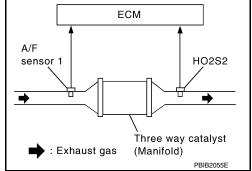
### DTC Description

### DTC DETECTION LOGIC

The ECM monitors the switching frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2.

A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.

When the frequency ratio of A/F sensor 1 and heated oxygen sensor 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



- 1. Three way catalyst (manifold) does not operate properly.
- 2. Three way catalyst (manifold) does not have enough oxygen storage capacity.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC	detection condition
			Diagnosis condition	-
			Signal (terminal)	-
		1	Threshold	Three way catalyst (manifold) does not oper- ate properly
P0420	TW CATALYST SYS-B1 (Catalyst system efficiency below		Diagnosis delay time	-
F0 <del>4</del> 20	threshold bank 1)		Diagnosis condition	-
			Signal (terminal)	_
		2	Threshold	Three way catalyst (manifold) does not have enough oxygen storage capacity
			Diagnosis delay time	-
			Diagnosis condition	-
		1	Signal (terminal)	-
			Threshold	Three way catalyst (manifold) does not oper- ate properly
P0430	TW CATALYST SYS-B2 (Catalyst system efficiency below threshold bank 2)		Diagnosis delay time	-
P0430		2	Diagnosis condition	-
			Signal (terminal)	-
			Threshold	Three way catalyst (manifold) does not have enough oxygen storage capacity
			Diagnosis delay time	-

### POSSIBLE CAUSE

P0420

- · Three way catalyst (manifold)
- Exhaust tube
- Intake air leakage
- Fuel injector
- Fuel injector leakage
- Spark plug
- Improper ignition timing

P0430

INFOID:000000012891358

P0420, P0430 THREE WAY CATALYST FUNCTION	
< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]	
<ul> <li>Three way catalyst (manifold)</li> <li>Exhaust tube</li> </ul>	А
Intake air leakage	
<ul><li>Fuel injector</li><li>Fuel injector leakage</li></ul>	
Spark plug	EC
<ul> <li>Improper ignition timing</li> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> </ul>	
<ul> <li>Fuel tank temperature sensor</li> </ul>	С
FAIL-SAFE	
Not applicable	D
DTC CONFIRMATION PROCEDURE	D
1.INSPECTION START	
Will CONSULT be used?	E
Will CONSULT be used?	
YES >> GO TO 2. NO >> GO TO 7.	F
2. PRECONDITIONING	
If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct-	G
ing the next test. 1. Turn ignition switch OFF and wait at least 10 seconds.	
2. Turn ignition switch ON.	Н
<ol><li>Turn ignition switch OFF and wait at least 10 seconds.</li></ol>	
Do not maintain engine speed for more than the specified minutes below.	
>> GO TO 3.	
3.PERFORM DTC CONFIRMATION PROCEDURE-I	J
With CONSULT <ol> <li>Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.</li> </ol>	
<ol><li>Start engine and warm it up to the normal operating temperature.</li></ol>	K
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>	
5. Turn ignition switch OFF and wait at least 10 seconds.	I
<ul><li>6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.</li><li>7. Let engine idle for 1 minute.</li></ul>	
<ol><li>Check that "COOLANT TEMP/S" indicates more than 70°C (158°F).</li></ol>	
If not, warm up engine and go to next step when "COOLANT TEMP/S" indication reaches 70°C (158°F). 9. Open engine hood.	Μ
10. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT.	
<ol> <li>Rev engine between 2,000 and 3,000 rpm and hold it for 3 consecutive minutes then release the acceler- ator pedal completely.</li> </ol>	Ν
12. Check the indication of "CATALYST".	
Which is displayed on CONSULT screen?	0
CMPLT >> GO TO 6. INCMP >> GO TO 4.	0
4. PERFORM DTC CONFIRMATION PROCEDURE-II	
1. Wait 5 seconds at idle.	Р
2. Rev engine between 2,000 and 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to	
"CMPLT" (It will take approximately 5 minutes).	
Does the indication change to "CMPLT"? YES >> GO TO 6.	
NO >> GO TO 5.	

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

5.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

- 1. Stop engine and cool it down to less than 70°C (158°F).
- 2. Perform DTC CONFIRMATION PROCEDURE again.

>> GO TO 3.

**6.**PERFORM DTC CONFIRMATION PROCEDURE-III

Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to <u>EC-340</u>, "Diagnosis Procedure".

NO >> INSPECTION END

7.PERFORM COMPONENT FUNCTION CHECK

#### Without CONSULT

- T. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Open engine hood.
- 8. Check the voltage between ECM harness connector terminals under the following conditions.

		ECM			
DTC	Connec-	+	-	Condition	Voltage (V)
	tor	Terminal	Terminal	*	
P0420		41			The voltage fluctuation cycle takes
P0430	F78	32	35	Keeping engine speed at 2,500 rpm constant under no load	more than 5 seconds. • 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0

#### Is the inspection result normal?

YES-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

- YES-2 >> Confirmation after repair: INSPECTION END
- NO >> Proceed to EC-340, "Diagnosis Procedure".

### Diagnosis Procedure

INFOID:000000012891359

### 1.CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dents.

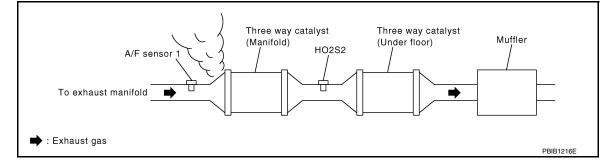
Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace malfunctioning part.

2. CHECK EXHAUST GAS LEAKAGE

- 1. Start engine and run it at idle.
- 2. Listen for an exhaust gas leakage before the three way catalyst (manifold).





			IREE WA	Y CATALYST FUNCTION	[VQ35DE]	
< DTC/CIRCU						
		ce malfunctioni	ng part.			А
3.CHECK IN	TAKE AIR LE	AKAGE				
Listen for an i	ntake air leaka	age after the ma	ass air flow	sensor.		EC
<u>Is intake air le</u>	akage detecte	ed?				
		ce malfunctioni	ng part.			С
NO >> G 4.CHECK IG	O TO 4.					
						D
Check idle spe For procedure		on timing. <u>158. "Work Pro</u>	<u>cedure"</u> .			_
For specificati	ion, refer to <u>E</u>	<u>C-576, "Idle Sp</u>	eed" and EC	2-576, "Ignition Timing".		_
Is the inspecti		nal?				E
	O TO 5.	158. "Work Pro	cedure".			
5.CHECK FL			<u> </u>			F
		urn ignition swit	ch ON.			
		een ECM harn		or terminals.		G
		014				-
	+	CM		 Voltage		Н
Connector	Terminal	Connector	Terminal	Voltage		П
	11		Terminar			
	12					
570	16		450			
F78	17	E32	152	Battery voltage		J
	21	-				
	22					
Is the inspecti		nal?				Κ
	OTO 6. erform EC-54	2, "Diagnosis P	rocedure"			
•		IGNITION COI				L
			<u> </u>			
Perform the f			ace with no	combustible objects and good ventil	ation.	M
1. Turn ignit	ion switch OF					

2. Remove fuel pump fuse in IPDM E/R to release fuel pressure.

NOTE:

Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following proce-

- 3. Start engine.
- 4. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 5. Turn ignition switch OFF.
- 6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- 7. Remove ignition coil and spark plug of the cylinder to be checked.
- 8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- 9. Connect spark plug and harness connector to ignition coil.

Ο

Ρ

### < DTC/CIRCUIT DIAGNOSIS >

- 10. Fix ignition coil using a rope etc. with gap of 13 17 mm (0.52 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
- 11. Crank engine for approximately 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

#### Spark should be generated.

#### **CAUTION:**

- During the operation, always stay 0.5 m (19.7 in) or more away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken. NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is mal-functioning.

Is the inspection result normal?

YES >> GO TO 10. NO >> GO TO 7.

7. CHECK FUNCTION OF IGNITION COIL-II

- 1. Turn ignition switch OFF.
- 2. Disconnect spark plug and connect a known-good spark plug.
- 3. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

### Spark should be generated.

Is the inspection result normal?

YES >> GO TO 8.

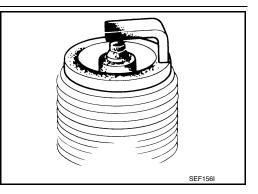
NO >> Check ignition coil, power transistor and their circuit. Refer to EC-545, "Diagnosis Procedure".

### **8.**CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

Is the inspection result normal?

- YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-137, "Spark Plug"</u>.
- NO >> Repair or clean spark plug. Then GO TO 9.



### 9.CHECK FUNCTION OF IGNITION COIL-III

- 1. Reconnect the initial spark plugs.
- 2. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

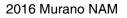
### Spark should be generated.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-137, "Spark</u> <u>Plug"</u>.

**10.**CHECK FUEL INJECTOR

1. Turn ignition switch OFF.



[VQ35DE]

13 - 17 mm

(0.52-0.66 in)

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(Cylinder head, cylinder block, etc.)

Grounded metal portion

< DTC/CIRCUIT DIAGNOSIS >	VQ35DE]
<ol> <li>Remove fuel injector assembly. Refer to <u>EM-49, "Removal and Installation"</u>. Keep fuel hose and all fuel injectors connected to fuel tube.</li> <li>Disconnect all ignition coil harness connectors.</li> <li>Reconnect all fuel injector harness connectors disconnected.</li> </ol>	A
<ol> <li>Turn ignition switch ON.</li> <li>Check that the fuel does not drip from fuel injector.</li> </ol>	EC
Does fuel drip from fuel injector?	
<ul> <li>YES &gt;&gt; Replace the fuel injector(s) from which fuel is dripping. Refer to <u>EM-49, "Removal ar</u> <u>tion"</u>.</li> <li>NO &gt;&gt; INSPECTION END</li> </ul>	nd Installa- C
	D
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#### < DTC/CIRCUIT DIAGNOSIS >

### P0441 EVAP CONTROL SYSTEM

### **DTC** Description

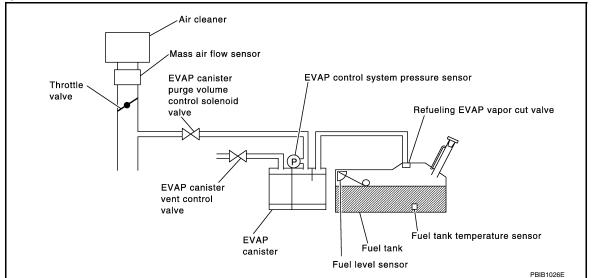
INFOID:000000012891360

IVQ35DE1

### DTC DETECTION LOGIC

In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a malfunction is determined.



EVAP control system does not operate properly, EVAP control system has a leakage between intake manifold and EVAP control system pressure sensor.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC	C detection condition
		Diagnosis condition	_
		Signal (terminal)	-
P0441	EVAP PURG FLOW/MON (Evaporative emission system incorrect purge flow)	Threshold	EVAP control system does not operate prop- erly, EVAP control system has a leakage be- tween intake manifold and EVAP control system pressure sensor
		Diagnosis delay time	—

#### POSSIBLE CAUSE

- · EVAP canister purge volume control solenoid valve stuck closed
- · EVAP control system pressure sensor and the circuit
- · Loose, disconnected or improper connection of rubber tube
- · Blocked rubber tube
- Cracked EVAP canister
- · EVAP canister purge volume control solenoid valve circuit
- · Accelerator pedal position sensor
- Blocked purge port
- · EVAP canister vent control valve

### FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

**1.**CHECK DTC PRIORITY

#### < DTC/CIRCUIT DIAGNOSIS >

If DTC P0441 is displayed with ble diagnosis for other DTC.	th other DTC such as P2122, P2123, P2127, P2128 or P2138, first perform trou-
Is applicable DTC detected?	
YES >> Perform diagnosi NO >> GO TO 2.	is of applicable. Refer to <u>EC-105, "DTC_Index"</u> .
2.INSPECTION START	
Will CONSULT be used?	
Will CONSULT be used?	
YES >> GO TO 3.	
NO >> GO TO 7.	
<b>3.</b> PRECONDITIONING	
ing the next test.	re has been previously conducted, always perform the following before conduct- and wait at least 10 seconds.
2. Turn ignition switch ON.	
	and wait at least 10 seconds.
TESTING CONDITION: Always perform test at a ter	mperature of 5°C (41°F) or more.
>> GO TO 4.	
4.PERFORM DTC CONFIRM	MATION PROCEDURE-I
<ol> <li>Turn ignition switch OFF</li> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF</li> <li>Start engine and let it idle</li> <li>Select "PURG FLOW POSULT.</li> <li>Touch "START".</li> <li><u>IS "COMPLETED" displayed of</u> YES &gt;&gt; GO TO 6. NO &gt;&gt; GO TO 5.</li> <li><b>5.</b>PERFORM DTC CONFIRITION</li> </ol>	441" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CON- on CONSULT screen?
Colostor lovor	
Selector lever VHCL SPEED SE	Suitable position
ENG SPEED	32 - 120 km/h (20 - 75 mph) 500 - 3,000 rpm
B/FUEL SCHDL	1.25 - 9.0 msec
COOLANT TEMP/S	More than 0°C (32°F)
CAUTION:	
Always drive vehicle at a sa If "TESTING" does not chan Is "COMPLETED" displayed of YES >> GO TO 6.	nge for a long time, retry from step 2. on CONSULT screen? ONFIRMATION PROCEDURE again. GO TO 3.
6.PERFORM DTC CONFIRM	
6.PERFORM DTC CONFIRM Touch "SELF-DIAG RESULTS	

#### < DTC/CIRCUIT DIAGNOSIS >

- OK-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- OK-2 >> Confirmation after repair: INSPECTION END
- NG >> Proceed to EC-346, "Diagnosis Procedure".

7.PERFORM COMPONENT FUNCTION CHECK

#### Without CONSULT

- 1. Lift up drive wheels.
- 2. Start engine (VDC switch OFF) and warm it up to normal operating temperature.
- 3. Turn ignition switch OFF, wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF, wait at least 10 seconds.
- 6. Start engine and wait at least 70 seconds.
- 7. Set voltmeter probes to ECM harness connector terminals under the following conditions.

ECM			
Connector	+	-	
Terminal			
E32	121	148	

8. Check EVAP control system pressure sensor value at idle speed and note it.

9. Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Head lamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than P, N or R

 Verify that EVAP control system pressure sensor value stays 0.1 V less than the value at idle speed (measured at step 6) for at least 1 second.

#### Is the inspection result normal?

YES-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

YES-2 >> Confirmation after repair: INSPECTION END

NO >> Proceed to <u>EC-346, "Diagnosis Procedure"</u>.

### **Diagnosis** Procedure

INFOID:000000012891361

### **1.**CHECK DTC PRIORITY

If DTC P0441 is displayed with other DTC such as P2122, P2123, P2127, P2128 or P2138, first perform trouble diagnosis for other DTC.

#### Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to EC-105, "DTC Index".

NO >> GO TO 2.

### 2.CHECK EVAP CANISTER

- 1. Turn ignition switch OFF.
- 2. Check EVAP canister for cracks.

#### Is the inspection result normal?

YES-1 >> With CONSULT: GO TO 3.

YES-2 >> Without CONSULT: GO TO 4.

NO >> Replace EVAP canister. Refer to <u>FL-19, "Removal and Installation"</u>.

**3.**CHECK PURGE FLOW

### With CONSULT

Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to <u>EC-45</u>, <u>"EVAPORATIVE EMISSION SYSTEM : System Description"</u>.

### EC-346

#### < DTC/CIRCUIT DIAGNOSIS >

2. Start engine and let it idle.

- 3. Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT.
- Touch "Qd" and "Qu" on CONSULT screen to adjust "PURG VOL C/V" opening and check vacuum existence.

			EC
PURG VOL C/V	Vacuum		
100%	Existed		
0%	Not existed		С
Is the inspection result normal?			
YES >> GO TO 8. NO >> GO TO 5.			D
<b>4.</b> CHECK PURGE FLOW			
2. Stop engine.	to normal operating temperature.		E
	n gauge. For the location of EVAP serv	ume control solenoid valve at EVAP ser- rice port, refer to <u>EC-45, "EVAPORATIVE</u>	F
<b>Do not depress accelerat</b> 5. Check vacuum gauge indic	ation before 60 seconds pass after sta	arting engine.	G
Vacuum should not ex	ist.		Н
6. Rev engine up to 2,000 rpm	n after 100 seconds pass after starting	g engine.	
Vacuum should exist.			I
Is the inspection result normal?			
YES >> GO TO 8. NO >> GO TO 5.			J
5. CHECK EVAP PURGE LINE			
	improper connection or disconnection ATIVE EMISSION SYSTEM : System		K
Is the inspection result normal?	-		L
YES >> GO TO 6.			
NO >> Repair EVAP purge			
6.CHECK EVAP PURGE HOS	E AND PURGE PORT		M
<ol> <li>Disconnect purge hoses co EVAP canister purge volum</li> <li>Blow air into each hose and</li> </ol>		EVAP service port	Ν
		EVAP canister purge volume control solenoid	0
		valve     Intake manifold SEF367U	Ρ

[VQ35DE]

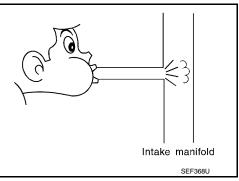
А

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

3. Check that air flows freely. <u>Is the inspection result normal?</u>

- YES-1 >> With CONSULT: GO TO 7.
- YES-2 >> Without CONSULT: GO TO 8.
- NO >> Repair or clean hoses and/or purge port.



7.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### With CONSULT

- 1. Start engine.
- 2. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.

#### Does engine speed vary according to the valve opening?

YES >> GO TO 9.

NO >> GO TO 8.

8. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Check EVAP canister purge volume control solenoid valve. Refer to EC-354. "Component Inspection".

#### Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>EC-15, "ENGINE CON-</u> <u>TROL SYSTEM : Component Parts Location"</u>.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

- 1. Disconnect EVAP control system pressure sensor harness connector.
- 2. Check that water is not inside connectors.

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-23</u>, "Removal and Installation".

10. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Check EVAP control system pressure sensor function. Refer to <u>EC-370, "DTC Description"</u> for DTC P0452, <u>EC-373, "DTC Description"</u> for DTC P0453.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace EVAP control system pressure sensor. Refer to FL-23, "Removal and Installation".

**11.**CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.

2. Check the rubber tube for clogging.

Is the inspection result normal?

YES >> GO TO 12.

NO >> Clean the rubber tube using an air blower.

12. CHECK EVAP CANISTER VENT CONTROL VALVE

Check EVAP canister vent control valve. Refer to <u>EC-359. "Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace EVAP canister vent control valve. Refer to <u>FL-22</u>, "Removal and Installation".

**13.**CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leakage. Refer to <u>EC-45</u>, "<u>EVAPORATIVE EMISSION SYSTEM</u> : <u>System Description</u>".

P0441 EVAP CONTROL SYSTEM	
< DTC/CIRCUIT DIAGNOSIS >	VQ35DE]
Is the inspection result normal?	
YES >> GO TO 14. NO >> Repair EVAP purge line.	A
14.CLEAN EVAP PURGE LINE	
Clean EVAP purge line (pipe and rubber tube) using air blower.	EC
>> INSPECTION END	С
	D
	Е
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### < DTC/CIRCUIT DIAGNOSIS >

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### DTC Description

INFOID:000000012891362

[VQ35DE]

### DTC DETECTION LOGIC

- 1. The canister purge flow is detected during the vehicle is stopped while the engine is running, even when EVAP canister purge volume control solenoid valve is completely closed.
- 2. The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
			Diagnosis condition	-
			Signal (terminal)	-
		1	Threshold	The canister purge flow is detected during the vehicle is stopped while the engine is run- ning, even when EVAP canister purge vol- ume control solenoid valve is completely closed
P0443	PURG VOLUME CONT/V (Evaporative emission system		Diagnosis delay time	-
	purge control valve circuit)	rcuit) 2	Diagnosis condition	-
			Signal (terminal)	-
			Threshold	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed
			Diagnosis delay time	-

### POSSIBLE CAUSE

DTC P0443 - 1

- EVAP control system pressure sensor
- EVAP canister purge volume control solenoid valve (The valve is stuck open.)
- EVAP canister vent control valve
- EVAP canister
- Hoses

(Hoses are connected incorrectly or clogged.)

DTC P0443 - 2

- EVAP control system pressure sensor
- EVAP canister purge volume control solenoid valve (The valve is stuck open.)
- EVAP canister vent control valve
- EVAP canister
- Hoses

(Hoses are connected incorrectly or clogged.)

FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

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

### **TESTING CONDITION:**

< DTC/CIRCU	IT DIAGNOSIS	>		[VQ35DE]	
vehicle is pla • Always perfo	aced on flat lev orm test at a te	el surface. mperature of {	5 to 60°C (41 t	the fuel level is between 1/4 and 3/4 full, and o 140°F). ecomes same level as ambient temperature.	A
<u>Do you have C</u>			•		EC
	) TO 2. ) TO 4.				
2.PERFORM					С
					0
<ol> <li>Turn ignitio</li> <li>Check that FUEL T/TM</li> </ol>		(32 - 95°F)			D
4. Check 1st	trip DTC.				Е
IS 1st trip DTC YES >> Pro			roooduro"		
	oceed to <u>EC-35</u> TO 3.	2, Diagnosis P	<u>iocedure</u> .		F
3.PERFORM	DTC CONFIRM	ATION PROCE	DURE 2		
2. Turn ignitio	e and warm it u n switch OFF a			ature.	G
	n switch ON. n switch OFF a	nd wait at least	10 seconds.		Н
<ol> <li>Turn ignitio</li> <li>Select "PU CONSULT.</li> <li>Touch "STA</li> </ol>	n switch ON. RG VOL CN/V ART".	P1444" of "EV	APORATIVE S	SYSTEM" in "DTC WORK SUPPORT" mode with	I
mately 10 s	seconds.) I <b>G" is not disp</b> I _F-DIAG RESU	<b>ayed after 5 m</b> LTS".		Γ changes to "COMPLETED". (It will take approxi- from step 2.	J
	SPECTION ENE beed to <u>EC-35</u>		rocoduro"		Κ
4.PERFORM		-			
With GST					L
1. Turn ignitio	n switch ON. ter probes to EC	CM harness cor	nnector termina	als.	M
	ECM +		Voltage (V)		
Connector		ninal	voltage (v)		Ν
E32	128	148	3.1 - 4.0	_	
<ol> <li>Start engine</li> <li>Check 1st i</li> </ol>	e and wait at lea trip DTC.	ast 60 seconds	•	_	0
Is 1st trip DTC					Р
	oceed to <u>EC-35</u> 0 TO 5.	2, "Diagnosis P	rocedure".		
5.PERFORM		ATION PROCE	DURE 2		
With GST	e and warm it u			ature.	

- Start engine and warm it up to normal operating temperature.
   Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.

#### < DTC/CIRCUIT DIAGNOSIS >

- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and let it idle for at least 20 seconds.
- 6. Check 1st trip DTC.

Is 1st trip DTC displayed?

#### YES >> Proceed to EC-352, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### Diagnosis Procedure

INFOID:000000012891363

IVQ35DE1

### 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

EVAP canister purge volume control solenoid valve		Ground	Voltage	
Connector	Terminal			
F16	F16 1		Battery voltage	

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for power supply circuit.

 $\mathbf{2}.\mathsf{CHECK}\ \mathsf{EVAP}\ \mathsf{CANISTER}\ \mathsf{PURGE}\ \mathsf{VOLUME}\ \mathsf{CONTROL}\ \mathsf{SOLENOID}\ \mathsf{VALVE}\ \mathsf{OUTPUT}\ \mathsf{SIGNAL}\ \mathsf{CIRCUIT}$ 

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.

EVAP canister purge volume con- trol solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F16	2	F78	54	Existed

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

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.

2. Check that water is not inside connectors.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace EVAP control system pressure sensor. Refer to FL-23, "Removal and Installation".

**4.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Check EVAP control system pressure sensor. Refer to EC-368, "Component Inspection".

Is the inspection result normal?

YES-1 >> With CONSULT: GO TO 5.

YES-2 >> Without CONSULT: GO TO 6.

NO >> Replace EVAP control system pressure sensor. Refer to FL-23. "Removal and Installation".

**5.**CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]	
<ol> <li>Turn ignition switch OFF.</li> <li>Reconnect harness connectors disconnected.</li> </ol>	А
3. Start engine.	
<ol> <li>Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.</li> </ol>	EC
Does engine speed vary according to the valve opening?	
YES >> GO TO 7.	C
NO >> GO TO 6.	C
6.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
Check EVAP canister purge volume control solenoid valve. Refer to EC-354. "Component Inspection".	D
Is the inspection result normal?	
YES >> GO TO 7. NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>EC-15, "ENGINE CON-</u>	Е
7.CHECK RUBBER TUBE FOR CLOGGING	F
1. Disconnect rubber tube connected to EVAP canister vent control valve.	1
<ol> <li>Check the rubber tube for clogging.</li> <li>Is the inspection result normal?</li> </ol>	
YES >> GO TO 8.	G
NO >> Clean the rubber tube using an air blower.	
8. CHECK EVAP CANISTER VENT CONTROL VALVE	Н
Check EVAP canister vent control valve. Refer to EC-359, "Component Inspection".	
Is the inspection result normal?	I
<ul> <li>YES &gt;&gt; GO TO 9.</li> <li>NO &gt;&gt; Replace EVAP canister vent control valve. Refer to <u>FL-22, "Removal and Installation"</u>.</li> </ul>	I
9. CHECK IF EVAP CANISTER IS SATURATED WITH WATER	1
Remove EVAP canister with EVAP canister vent control valve and	J
EVAP control system pressure sensor attached. Refer to <u>FL-19.</u>	
Does water drain from the EVAP canister?	Κ
YES >> GO TO 10.	
NO >> INSPECTION END	L
Water Water	B. 4
EVAP canister vent control valve	Μ
10.check evap canister	
Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor	Ν
attached.	
The weight should be less than 2.1 kg (4.6 lb).	0
<u>Is the inspection result normal?</u> YES >> INSPECTION END	
NO >> GO TO 11.	6
11. DETECT MALFUNCTIONING PART	Р

Check the following. • EVAP canister for damage

• EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-19. "Removal and Installation".

#### < DTC/CIRCUIT DIAGNOSIS >

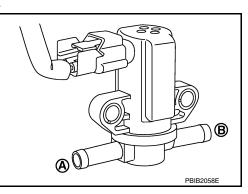
### Component Inspection

# 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### With CONSULT

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
- 4. Start engine.
- 5. Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT.
- Touch "Qd" and "Qu" on CONSULT screen to adjust "PURG VOL C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

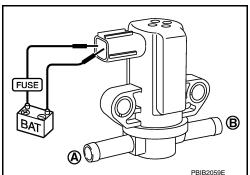
Condition (PURG VOL C/V value)	Air passage continuity between $(A)$ and $(B)$
100%	Existed
0%	Not existed



#### Without CONSULT

- 1. Turn ignition switch OFF.
- 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
- 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
- 4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between $$ and $$
12 V direct current supply between terminals 1 and 2	Existed
No supply	Not existed



Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>EC-15. "ENGINE CON-</u> <u>TROL SYSTEM : Component Parts Location"</u>.

INFOID:000000012891364

[VQ35DE]

< DTC/CIRCUIT DIAGNOSIS >

# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

# DTC Description

INFOID:000000012891365

[VQ35DE]

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### DTC DETECTION LOGIC

• An excessively low voltage signal is sent to ECM through the valve.

• An excessively high voltage signal is sent to ECM through the valve.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	Start engine and let it idle
PURG VOLUME CONT/V P0444 (Evaporative emission system purge control valve circuit open)	Signal (terminal)	Voltage signal transmitted from EVAP canis- ter purge volume control solenoid valve to ECM	
	Threshold	An excessively low voltage signal is sent to ECM through the valve	
		Diagnosis delay time	-
	PURG VOLUME CONT/V P0445 (Evaporative emission system purge	Diagnosis condition	Start engine and let it idle
P0445		Signal (terminal)	Voltage signal transmitted from EVAP canis- ter purge volume control solenoid valve to ECM
control valve circuit shorted)	Threshold	An excessively high voltage signal is sent to ECM through the valve	
		Diagnosis delay time	-

### POSSIBLE CAUSE

<ul> <li>DTC P0444</li> <li>Harness or connectors (The solenoid valve circuit is open or shorted.)</li> <li>EVAP canister purge volume control solenoid valve</li> </ul>	J
<ul> <li>DTC P0445</li> <li>Harness or connectors (The solenoid valve circuit is shorted.)</li> <li>EVAP canister purge volume control solenoid valve</li> </ul>	K
FAIL-SAFE Not applicable	
DTC CONFIRMATION PROCEDURE 1.CONDITIONING	Μ
If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct- ing the next test. 1. Turn ignition switch OFF and wait at least 10 seconds.	Ν
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>TESTING CONDITION:</li> </ol>	0
Before performing the following procedure, confirm battery voltage is more than 11 V at idle.	Ρ
>> GO TO 2. 2.PERFORM DTC CONFIRMATION PROCEDURE	

- 1. Start engine and let it idle for at least 13 seconds.
- 2. Check 1st trip DTC.

Is 1st trip DTC detected?

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

- YES >> Proceed to EC-356, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

INFOID:000000012891366

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY

1. Turn ignition switch OFF.

- 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

	rge volume control id valve	Ground	Voltage
Connector	Terminal		
F16 1		Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for power supply circuit.

2.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.

EVAP canister purge volume con- trol solenoid valve		E	Continuity	
Connector	Terminal	Connector Terminal		
F16	2	F78	54	Existed

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

Is the inspection result normal?

YES-1 >> With CONSULT: GO TO 3.

YES-2 >> Without CONSULT: GO TO 4.

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

3.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

### With CONSULT

T. Reconnect all harness connectors disconnected.

- 2. Start engine.
- 3. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.

Does engine speed vary according to the valve opening?

YES >> INSPECTION END

NO >> GO TO 4.

**4.**CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Check EVAP canister purge volume control solenoid valve. Refer to <u>EC-357</u>, "<u>Component Inspection</u>". <u>Is the inspection result normal?</u>

- YES >> INSPECTION END
- NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>EC-15. "ENGINE CON-</u> <u>TROL SYSTEM : Component Parts Location"</u>.

### < DTC/CIRCUIT DIAGNOSIS >

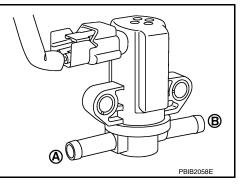
### **Component Inspection**

# 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### With CONSULT

- Turn ignition switch OFF. 1.
- 2. Reconnect all harness connectors disconnected.
- Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve. 3.
- 4. Start engine.
- Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. 5.
- 6. Touch "Qd" and "Qu" on CONSULT screen to adjust "PURG VOL C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL C/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed



### Without CONSULT

- Turn ignition switch OFF. 1.
- Disconnect EVAP canister purge volume control solenoid valve harness connector. 2.
- Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve. 3.
- Check air passage continuity of EVAP canister purge volume 4. control solenoid valve under the following conditions.

Condition	Air passage continuity between $\textcircled{A}$ and $\textcircled{B}$
12 V direct current supply between terminals 1 and 2	Existed
No supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

**Revision: December 2015** 

>> Replace EVAP canister purge volume control solenoid valve. Refer to EC-15. "ENGINE CON-NO TROL SYSTEM : Component Parts Location".

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[VQ35DE]

INFOID:000000012891367

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### P0447 EVAP CANISTER VENT CONTROL VALVE

### < DTC/CIRCUIT DIAGNOSIS >

# P0447 EVAP CANISTER VENT CONTROL VALVE

### DTC Description

INFOID:000000012891368

[VQ35DE]

### DTC DETECTION LOGIC

An improper voltage signal is sent to ECM through EVAP canister vent control valve.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Start engine and let it idle	
P0447	47 VENT CONTROL VALVE (Evaporative emission system vent control circuit open)	Signal (terminal)	Voltage signal transmitted from EVAP canis- ter vent control valve to ECM	
r 044 <i>1</i>		Threshold	An improper voltage signal is sent to ECM through EVAP canister vent control valve	
		Diagnosis delay time	—	

#### POSSIBLE CAUSE

- Harness or connectors
- (The valve circuit is open or shorted.)
- EVAP canister vent control valve
- Hoses

(Hoses are connected incorrectly or clogged.)

### FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

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

#### **TESTING CONDITION:**

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

>> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and wait at least 8 seconds.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-358, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

INFOID:000000012891369

### **1.**INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

#### With CONSULT

1. Turn ignition switch OFF and then ON.

	P0447	EVAP CAN	<b>NISTER</b>	VENT CONTROL VALVE
< DTC/CIRCUI	T DIAGNOSIS	S >		[VQ35DE
3. Touch "ON/	NT CONTROL OFF" on CON	SULT screen.	TEST" m	node with CONSULT.
Clicking	g sound shou	ld be heard.		
s the inspection	-			
YES >> GO				
		VENT CONTR		E POWER SUPPLY
<ol> <li>Disconnect</li> <li>Turn ignition</li> </ol>	n switch ON.			ess connector. ontrol valve harness connector and ground.
EVAP canister ve	ent control valve			
Connector	Terminal	Ground	Volta	ge
B31	1	Ground	Battery v	voltage
s the inspectior		?		
YES >> GO NO >> Per	-	le diagnosis fo	r nower s	upply circuit
		-	•	E OUTPUT SIGNAL CIRCUIT
<ol> <li>Check the onector.</li> </ol>			ess conne	ector and EVAP canister vent control valve harness con
<ol> <li>Check the onector.</li> </ol>	continuity betw ring Diagram.		ess conne	
<ul> <li>Check the c nector. Refer to Wi</li> <li>EVAP canister ve Connector</li> </ul>	continuity betw ring Diagram. ent control valve Terminal	ECM harn	Terminal	Continuity
<ul> <li>Check the connector.</li> <li>Refer to Wi</li> <li>EVAP canister vertication</li> <li>Connector</li> <li>B31</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2	ECM harn ECM Connector E32	Terminal	Continuity Existed
<ul> <li>Check the connector.</li> <li>Refer to Wi</li> <li>EVAP canister ve</li> <li>Connector</li> <li>B31</li> <li>Also check</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh	ECM harn ECM Connector E32 nort to ground a	Terminal	Continuity Existed
<ul> <li>Check the connector.</li> <li>Refer to Wi</li> <li>EVAP canister vertication</li> <li>Connector</li> <li>B31</li> <li>Also check</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh	ECM harn ECM Connector E32 nort to ground a	Terminal	Continuity Existed
<ul> <li>Check the connector.</li> <li>Refer to Wi</li> <li>EVAP canister vertice</li> <li>Connector</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal TO 5. pair open circu	ECM harn ECM Connector E32 nort to ground a I? it, short to grou	Terminal 141 and short und or sho	Continuity Existed
<ul> <li>Check the connector. Refer to Wi</li> <li>EVAP canister vertice</li> <li>Connector</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>CHECK RUE</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal 0 TO 5. Dair open circu 3BER TUBE F	ECM harn Connector E32 nort to ground a I? it, short to grou OR CLOGGIN	Terminal 141 and short und or sho	Continuity Existed to power. ort to power in harness or connectors.
<ul> <li>Check the connector. Refer to Wi</li> <li>EVAP canister vertication</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>CHECK RUE</li> <li>Disconnect</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal TO 5. Dair open circu 3BER TUBE F rubber tube co	ECM harn ECM Connector E32 nort to ground a 1? it, short to grou OR CLOGGIN onnected to EV	Terminal 141 and short und or sho	Continuity Existed to power.
<ul> <li>Check the connector. Refer to Wi</li> <li>EVAP canister vertication</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>CHECK RUE</li> <li>Disconnect</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal 0 TO 5. Dair open circu 3BER TUBE F rubber tube co	ECM harn ECM Connector E32 nort to ground a I? it, short to grou OR CLOGGIN Onnected to EV clogging.	Terminal 141 and short und or sho	Continuity Existed to power. ort to power in harness or connectors.
<ul> <li>B. Check the onector. Refer to Wi</li> <li>EVAP canister vertice</li> <li>Connector</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>D.CHECK RUE</li> <li>Disconnect</li> <li>Check the rist of the inspection</li> <li>YES &gt;&gt; GO</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal 0 TO 5. Dair open circu 3BER TUBE F rubber tube for n result normal 0 TO 6.	ECM harn ECM Connector E32 nort to ground a 1? it, short to grou OR CLOGGIN OR CLOGGIN OR CLOGGIN Connected to EV clogging. 1?	Terminal 141 and short und or sho G /AP canis	Continuity         Existed         to power.         ort to power in harness or connectors.         ter vent control valve.
<ul> <li>Check the connector. Refer to Wi</li> <li>EVAP canister vertice</li> <li>Connector</li> <li>B31</li> <li>Also check</li> <li>the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>CHECK RUE</li> <li>Disconnect</li> <li>Check the rest of the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Cleves</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal 0 TO 5. Dair open circu 3BER TUBE F rubber tube co ber tube for n result normal 0 TO 6. an the rubber	ECM harn ECM Connector E32 nort to ground a 1? it, short to grou OR CLOGGIN OR CLOGGIN Onnected to EV clogging. 1? tube using an a	Terminal 141 and short und or sho G /AP canis	Continuity Existed to power. ort to power in harness or connectors. ter vent control valve.
<ul> <li>B. Check the onector. Refer to Wi</li> <li>EVAP canister vertice</li> <li>Connector</li> <li>B31</li> <li>Also check</li> <li>a the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>CHECK RUE</li> <li>Check the rest of the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Check the rest of the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Cle</li> <li>CHECK EVA</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal TO 5. Dair open circu BBER TUBE F rubber tube for n result normal TO 6. an the rubber	ECM harn Connector E32 nort to ground a 1? it, short to grou OR CLOGGIN OR CLOGGIN OR CLOGGIN Clogging. 1? tube using an a VENT CONTR	Terminal 141 and short und or sho G /AP canis air blower	Continuity Existed to power. Out to power in harness or connectors. ter vent control valve.
<ul> <li>Check the connector. Refer to Wi</li> <li>EVAP canister vertice</li> <li>Connector</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>D.CHECK RUE</li> <li>Disconnect</li> <li>Check the rest of the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Cle</li> <li>CHECK EVAP cat</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal 0 TO 5. Dair open circu 3BER TUBE F rubber tube for n result normal 0 TO 6. an the rubber P CANISTER	ECM harn ECM Connector E32 nort to ground a 1? it, short to grou OR CLOGGIN OR CLOGGIN OR CLOGGIN OR CLOGGIN Connected to EV clogging. 1? tube using an a VENT CONTR htrol valve. Ref	Terminal 141 and short und or sho G /AP canis air blower	Continuity Existed to power. ort to power in harness or connectors. ter vent control valve.
<ul> <li>B. Check the connector. Refer to Wi</li> <li>EVAP canister very</li> <li>Connector</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>CHECK RUE</li> <li>Check the rest of the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Cle</li> <li>CHECK EVAP cases the inspection</li> <li>YES &gt;&gt; INS</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal TO 5. Dair open circu BBER TUBE F rubber tube for n result normal TO 6. an the rubber D CANISTER inister vent con n result normal D CANISTER	ECM harn ECM Connector E32 nort to ground a 1? it, short to grou OR CLOGGIN OR CLOG	Terminal 141 and short und or sho G /AP canis air blower ROL VALV fer to <u>EC-</u>	Continuity         Existed         to power.         ort to power in harness or connectors.         ter vent control valve.         .
<ul> <li>B. Check the connector. Refer to Wi</li> <li>EVAP canister very</li> <li>Connector</li> <li>B31</li> <li>B31</li> <li>B31</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>CHECK RUE</li> <li>Check the rest of the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Cle</li> <li>CHECK EVAP cases the inspection</li> <li>YES &gt;&gt; INS</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal TO 5. Dair open circu BBER TUBE F rubber tube for n result normal TO 6. an the rubber D CANISTER inister vent con n result normal D CANISTER	ECM harn ECM Connector E32 nort to ground a 1? it, short to grou OR CLOGGIN OR CLOG	Terminal 141 and short und or sho G /AP canis air blower ROL VALV fer to <u>EC-</u>	Continuity Existed to power. Out to power in harness or connectors. ter vent control valve.
<ul> <li>B. Check the connector. Refer to Wi</li> <li>EVAP canister vertice</li> <li>Connector</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>D.CHECK RUE</li> <li>Disconnect</li> <li>Check the rispection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Cle</li> <li>CHECK EVAP</li> <li>Check EVAP cases</li> <li>s the inspection</li> <li>YES &gt;&gt; INS</li> <li>NO &gt;&gt; Rep</li> <li>Check EVAP cases</li> <li>S the inspection</li> <li>YES &gt;&gt; INS</li> <li>NO &gt;&gt; Rep</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh n result normal 0 TO 5. Dair open circu 3BER TUBE F rubber tube for n result normal 0 TO 6. an the rubber of CANISTER inister vent con n result normal 0 PECTION EN Diace EVAP ca	ECM harn ECM Connector E32 nort to ground a 1? it, short to grou OR CLOGGIN OR CLOG	Terminal 141 and short und or sho G /AP canis air blower ROL VALV fer to <u>EC-</u>	Continuity         Existed         to power.         ort to power in harness or connectors.         ter vent control valve.         .
<ul> <li>Check the connector. Refer to Wi</li> <li>EVAP canister vertice</li> <li>Connector</li> <li>B31</li> <li>Also check</li> <li>s the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Rep</li> <li>CHECK RUE</li> <li>Disconnect</li> <li>Check the rest of the inspection</li> <li>YES &gt;&gt; GO</li> <li>NO &gt;&gt; Cle</li> <li>CHECK EVAP cases the inspection</li> <li>YES &gt;&gt; INS</li> </ul>	continuity betw ring Diagram. ent control valve Terminal 2 harness for sh result normal TO 5. Dair open circu BBER TUBE F rubber tube for Daresult normal TO 6. an the rubber P CANISTER inister vent con presult normal SPECTION EN Diace EVAP ca Inspection	ECM harn Connector E32 nort to ground a 12 it, short to grou OR CLOGGIN OR CLOGIN OR CLOGIN OR CLOGIN OR CLOGIN OR CLOGIN OR CLOGIN OR CLOGIN OR CLOGIN OR CLOCAN OR CLOCA	Terminal 141 and short und or sho G /AP canis air blower ROL VALV fer to <u>EC-</u>	Continuity         Existed         to power.         ort to power in harness or connectors.         ter vent control valve.         ter vent control valve.         * </th

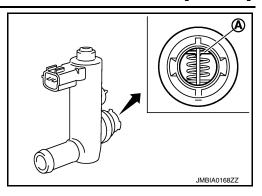
### P0447 EVAP CANISTER VENT CONTROL VALVE

### < DTC/CIRCUIT DIAGNOSIS >

2. Check portion (A) of EVAP canister vent control valve for rust.

### Is it rusted?

- YES >> Replace EVAP canister vent control valve. Refer to <u>FL-</u> <u>22, "Removal and Installation"</u>.
- NO >> GO TO 2.



[VQ35DE]

### 2.CHECK EVAP CANISTER VENT CONTROL VALVE-II

#### With CONSULT

- 1. Reconnect harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 4. Check air passage continuity and operation delay time.

### Check that new O-ring is installed properly.

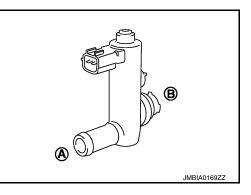
Condition VENT CONTROL/V	Air passage continuity between $(A)$ and $(B)$
ON	Not existed
OFF	Existed

#### Operation takes less than 1 second.

#### Without CONSULT

- 1. Disconnect EVAP canister vent control valve harness connector.
- 2. Check air passage continuity and operation delay time under the
- following conditions.

#### Check that new O-ring is installed properly.



Condition	Air passage continuity between $igta$ and $igbbb B$
12 V direct current supply between terminals 1 and 2	Not existed
OFF	Existed

#### Operation takes less than 1 second.

#### Is the inspection result normal?

YES >> INSPECTION END

**3.**CHECK EVAP CANISTER VENT CONTROL VALVE-III

#### (B) With CONSULT

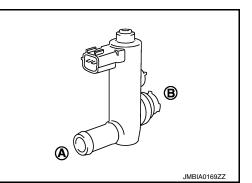
- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 3. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between $(A)$ and $(B)$
ON	No
OFF	Yes

Operation takes less than 1 second.

#### Without CONSULT

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Check air passage continuity and operation delay time under the following conditions.





#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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#### Check that new O-ring is installed properly.

Condition	Air passage continuity between $\textcircled{A}$ and $\textcircled{B}$
12 V direct current supply between terminals (1) and (2)	No
OFF	Yes
Operation takes less than 1 sec	and

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve. Refer to FL-22, "Removal and Installation".

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#### < DTC/CIRCUIT DIAGNOSIS >

# P0448 EVAP CANISTER VENT CONTROL VALVE

## DTC Description

INFOID:000000012891371

IVQ35DE1

#### DTC DETECTION LOGIC

EVAP canister vent control valve remains closed under specified driving conditions.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	—	
P0448 VENT CONTROL VALVE (Evaporative emission system vent control circuit shorted)	Signal (terminal)			
	Threshold	EVAP canister vent control valve remains closed under specified driving conditions		
		Diagnosis delay time	—	

#### POSSIBLE CAUSE

- · EVAP canister vent control valve
- EVAP control system pressure sensor and the circuit
- · Blocked rubber tube to EVAP canister vent control valve
- · EVAP canister is saturated with water

# FAIL-SAFE

Not applicable

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

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

#### >> GO TO 2.

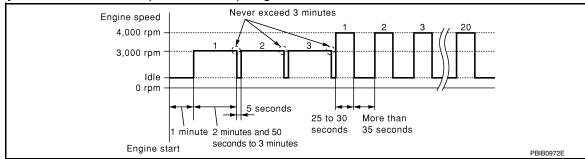
## 2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Turn ignition switch ON and wait at least 5 seconds.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 4. Start engine and let it idle for at least 1 minute.
- 5. Repeat next procedures 3 times.
- Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.

#### Never exceed 3 minutes.

- Fully released accelerator pedal and keep engine idle for about 5 seconds.
- 6. Repeat next procedure 20 times.
- Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.
- Fully released accelerator pedal and keep engine idle for at least 35 seconds.





< DTC/CIRCUIT DIAGNOSIS > [VQ35D]	)E1
7. Check 1st trip DTC.	
Is 1st trip DTC detected?	А
YES >> Proceed to EC-363, "Diagnosis Procedure".	
<ul> <li>NO-1 &gt;&gt; To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u>.</li> <li>NO-2 &gt;&gt; Confirmation after repair: INSPECTION END</li> </ul>	EC
Diagnosis Procedure	391372
1.CHECK RUBBER TUBE	С
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect rubber tube connected to EVAP canister vent control valve.</li> <li>Check the rubber tube for clogging.</li> </ol>	D
Is the inspection result normal?	
YES >> GO TO 2. NO >> Clean rubber tube using an air blower.	E
2. CHECK EVAP CANISTER VENT CONTROL VALVE	
Check EVAP canister vent control valve. Refer to <u>EC-364</u> , "Component Inspection".	F
Is he inspection result normal?	I
YES >> GO TO 3.	
NO >> Replace EVAP canister vent control valve. Refer to <u>FL-22, "Removal and Installation"</u> .	G
3.CHECK IF EVAP CANISTER SATURATED WITH WATER	
<ol> <li>Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sen attached. Refer to <u>FL-19</u>, "<u>Removal and Installation</u>".</li> </ol>	sor <sub>H</sub>
<ol> <li>Check if water will drain from the EVAP canister.</li> </ol>	
Does water drain from the EVAP canister?	
YES >> GO TO 4. NO >> GO TO 6.	r
	J
Water EVAP canister vent	K
control valve JMBIA11340	ЗВ
4.CHECK EVAP CANISTER	L
Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sen	sor
attached. The weight should be less than 2.1 kg (4.6 lb).	Μ
Is the inspection result normal?	1 1 1
YES >> GO TO 6.	
NO >> GO TO 5.	Ν
5.DETECT MALFUNCTIONING PART	
<ul><li>Check the following.</li><li>EVAP canister for damage</li><li>EVAP hose between EVAP canister and vehicle frame for clogging or poor connection</li></ul>	0
>> Repair hose or replace EVAP canister. Refer to <u>FL-19, "Removal and Installation"</u> .	Р
6.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
1. Disconnect EVAP control system pressure sensor harness connector.	
2. Check that water is not inside connectors.	
Is the inspection result normal?	

Is the inspection result normal?

YES >> GO TO 7.

#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Replace EVAP control system pressure sensor. Refer to FL-23. "Removal and Installation".

# 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Check EVAP control system pressure sensor. Refer to EC-368, "Component Inspection".

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor. Refer to FL-23, "Removal and Installation".

## Component Inspection

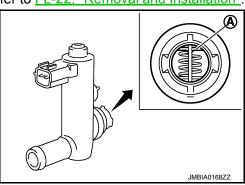
1. CHECK EVAP CANISTER VENT CONTROL VALVE-I

Remove EVAP canister vent control valve from EVAP canister. Refer to <u>FL-22, "Removal and Installation"</u>.

2. Check portion (A) of EVAP canister vent control valve for rust.

#### Is it rusted?

- YES >> Replace EVAP canister vent control valve. Refer to <u>FL-</u> <u>22. "Removal and Installation"</u>.
- NO >> GO TO 2.



# 2.CHECK EVAP CANISTER VENT CONTROL VALVE-II

#### With CONSULT

- 1. Reconnect harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 4. Check air passage continuity and operation delay time.

#### Check that new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between (A) and (B)
ON	Not existed
OFF	Existed

#### Operation takes less than 1 second.

#### Without CONSULT

- 1. Disconnect EVAP canister vent control valve harness connector.
- 2. Check air passage continuity and operation delay time under the following conditions.

#### Check that new O-ring is installed properly.

Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals 1 and 2	Not existed
OFF	Existed

#### Operation takes less than 1 second.

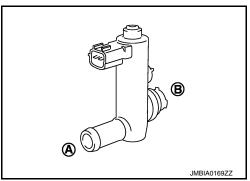
#### Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

#### With CONSULT

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.





INFOID:000000012891373

#### < DTC/CIRCUIT DIAGNOSIS >

3. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between $(A)$ and $(B)$
ON	No
OFF	Yes

Operation takes less than 1 second.

#### Without CONSULT

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Check air passage continuity and operation delay time under the following conditions. Check that new O-ring is installed properly.

Condition	Air passage continuity between (Å) and (B)
12 V direct current supply between terminals (1) and (2)	No
OFF	Yes
Operation takes less than 1 sec	cond.
s the inspection result normal?	

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve. Refer to FL-22, "Removal and Installation".

[VQ35DE]

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#### < DTC/CIRCUIT DIAGNOSIS >

# P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

## DTC Description

INFOID:000000012891374

[VQ35DE]

#### DTC DETECTION LOGIC

ECM detects a sloshing signal from the EVAP control system pressure sensor.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	—	
EVAP SYS PRES SEN (Evaporative emission system pressure sensor/switch range/performance)	Signal (terminal)	Voltage signal transmitted from EVAP control system pressure sensor to ECM		
	Threshold	ECM detects a sloshing signal from the EVAP control system pressure sensor		
		Diagnosis delay time	—	

#### POSSIBLE CAUSE

- Harness or connectors
- (EVAP control system pressure sensor circuit is shorted.)
- EVAP control system pressure sensor

#### FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

#### NOTE:

#### Never remove fuel filler cap during DTC confirmation procedure.

#### **1**.PRECONDITIONING

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

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

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

#### ()With CONSULT>>GO TO 2.

Without CONSULT>>GO TO 5.

2. PERFORM DTC CONFIRMATION PROCEDURE-1

#### (B) With CONSULT

1. Start engine and let it idle for least 40 seconds. **NOTE:** 

#### Do not depress accelerator pedal even slightly.

2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-367, "Diagnosis Procedure".
- NO >> GO TO 3.

# **3.**PERFORM DTC CONFIRMATION PROCEDURE-2

#### With CONSULT

- i. Select "EVAP DIAG READY" in "DATA MONITOR" mode of "ENGINE".
- Let it idle until "OFF" of "EVAP DIAG READY" changes to "ON". NOTE:

#### It will take at most 2 hours until "OFF" of "EVAP DIAG READY" changes to "ON".

3. Turn ignition switch OFF and wait at least 90 minutes. **NOTE:** 

#### Never turn ignition switch ON during 90 minutes.

4. Turn ignition switch ON.

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR	
< DTC/CIRCUIT DIAGNOSIS > [VQ3	5DE]
<ol> <li>Select "EVAP LEAK DIAG" in "DATA MONITOR" mode of "ENGINE".</li> <li>Check that "EVAP LEAK DIAG" indication.</li> </ol>	A
Which is displayed on CONSULT?	
CMPLT>> GO TO 4.	
YET >> 1. Perform DTC CONFIRMATION PROCEDURE again. 2. GO TO 1.	EC
4.PERFORM DTC CONFIRMATION PROCEDURE-3	
With CONSULT     Check 1st trip DTC.	C
Is 1st trip DTC detected?	D
YES >> Proceed to <u>EC-367. "Diagnosis Procedure"</u> .	
<ul> <li>NO-1 &gt;&gt; To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u>.</li> <li>NO-2 &gt;&gt; Confirmation after repair: INSPECTION END</li> </ul>	
5.PERFORM DTC CONFIRMATION PROCEDURE-4	E
<ul> <li>With GST</li> <li>1. Start engine and let it idle for least 40 seconds.</li> </ul>	F
NOTE: Do not depress accelerator pedal even slightly.	
2. Check 1st trip DTC.	G
Is 1st trip DTC detected?	0
YES >> Proceed to <u>EC-367. "Diagnosis Procedure"</u> . NO >> GO TO 6.	Н
6.PERFORM DTC CONFIRMATION PROCEDURE-5	
With GST	
<ol> <li>Let it idle for at least 2 hours.</li> <li>Turn ignition switch OFF and wait at least 90 minutes.</li> </ol>	
NOTE:	
Never turn ignition switch ON during 90 minutes.	J
<ol> <li>Turn ignition switch ON.</li> <li>Check 1st trip DTC.</li> </ol>	
Is 1st trip DTC detected?	K
YES >> Proceed to EC-367, "Diagnosis Procedure".	1.
<ul> <li>NO-1 &gt;&gt; To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u>.</li> <li>NO-2 &gt;&gt; Confirmation after repair: INSPECTION END</li> </ul>	
Diagnosis Procedure	0012891375
1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER	в л
1. Disconnect EVAP control system pressure sensor harness connector.	M
<ol> <li>Check that water is not inside connectors.</li> </ol>	
Is the inspection result normal?	Ν
YES >> GO TO 2.	
NO >> Repair or replace error-detected parts.	0
2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY	
<ol> <li>Turn ignition switch ON.</li> <li>Check the voltage between EVAP control system pressure sensor harness connector and ground.</li> </ol>	P
+	
EVAP control system pressure sensor – Voltage (V)	

EVAP control system pressure sensor		_	Voltage (V)
Connector	Terminal		
B36	3	Ground	Approx. 5

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

YES >> GO TO 4. NO >> GO TO 3.

 $\mathbf{3}$ . Check evap control system pressure sensor power supply circuit

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control system pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
B36	3	E32	125	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

4.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control system pressure sensor		ECM		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
B36	1	E32	148	Existed	

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

**5.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Check EVAP control system pressure sensor. Refer to EC-368, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-23</u>, "<u>Removal and Installation</u>".

## Component Inspection

INFOID:000000012891376

# 1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.

 Remove EVAP control system pressure sensor with its harness connector. Refer to <u>FL-23</u>, "<u>Removal and</u> <u>Installation</u>".

#### Always replace O-ring with a new one.

- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

ECM			Applied veguum kDa	
Connector	+ –		Applied vacuum kPa (kg/cm <sup>2</sup> , psi)	Voltage
Connector	Terminal	Terminal		
			Not applied	1.8 - 4.8 V
E32	121	148	-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value

#### CAUTION:

• Always calibrate the vacuum pump gauge when using it.

<ul> <li>D<sup>-</sup></li> </ul>		וח דוו		
< D	TC/CIRC	וט וונ	AGINU	212 >

< DTC/CIRCUIT DIAGNOSIS > [VQ35D	<b>_</b> ]
<ul> <li>Never apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cr 14.69 psi).</li> <li>Is the inspection result normal?</li> </ul>	m <sup>2</sup> , A
YES >> INSPECTION END NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-23. "Removal and Installation"</u> .	EC
	С
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#### < DTC/CIRCUIT DIAGNOSIS >

# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

## DTC Description

INFOID:000000012891377

[VQ35DE]

#### DTC DETECTION LOGIC

An excessively low voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
	EVAP SYS PRES SEN	Diagnosis condition	—	
EVAP SYS PRES SEN (Evaporative emission system pressure sensor/switch low)		Signal (terminal)	Voltage signal transmitted from EVAP control system pressure sensor to ECM	
	Threshold	An excessively low voltage from the sensor is sent to ECM		
	-	Diagnosis delay time	_	

#### POSSIBLE CAUSE

- Harness or connectors
- (EVAP control system pressure sensor circuit is open or shorted.)
- EVAP control system pressure sensor

### FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

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

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

#### **TESTING CONDITION:**

#### Always perform test at a temperature of 5°C (41°F) or more.

>> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Select "DATA MONITOR" mode with CONSULT.
- 7. Check that "FUEL T/TMP SE" is more than 0°C (32°F).
- 8. Start engine and wait at least 20 seconds.
- 9. Check 1st trip DTC.

#### With GST

- 1. Start engine and warm it up to normal operating temperature.
- 2. Set voltmeter probes to ECM harness connector terminals under the following conditions.

ECM					
Connector	+	_			
Connector	Terr	minal			
E32	128	148			

3. Check that the voltage is less than 4.2 V.

	P0452 EVA	P CONTROL	SYSTEMF	RESSURE S		
< DTC/CIRCUI	T DIAGNOSIS >	•			[VQ35DE]	
<ol> <li>Turn ignition</li> <li>Turn ignition</li> <li>Turn ignition</li> <li>Start engine</li> </ol>	n switch OFF and n switch ON. n switch OFF and and wait at leas	d wait at least 10				А
8. Check 1st ti	•					EC
Is 1st trip DTC c						
NO-1 >> To c	ceed to <u>EC-371.</u> check malfunction firmation after re	n symptom befor	re repair: Refer	to <u>GI-42, "Intermit</u>	ent Incident".	С
Diagnosis Pr	ocedure				INFOID:000000012891378	
1.CHECK CON	INECTOR					D
	EVAP control sy water is not insid		ensor harness c	connector.		Е
Is the inspection	result normal?					
YES >> GO						
-	air or replace ha					F
<b>Z</b> .CHECK EVA	P CONTROL SY	STEM PRESSU	IRE SENSOR P	OWER SUPPLY		
	n switch ON. oltage between	EVAP control sys	stem pressure s	ensor harness co	nnector and ground.	G
	+			-		Н
		_	Voltage (V)			
EVAP control syste	em pressure sensor		voltage (v)			
Connector	Terminal			_		
B36	3	Ground	Approx. 5	-		
Is the inspection YES >> GO NO >> GO <b>3.</b> CHECK EVA	TO 4. TO 3.	STEM PRESSU	IRE SENSOR P		CIRCUIT	J
2. Disconnect	•		l system pressu	ire sensor harnes	s connector and ECM har-	K
EVAP control syste	em pressure sensor	EC	CM	Continuity		M
Connector	Terminal	Connector	Terminal			
B36	3	E32	125	Existed		
Is the inspection	result normal?					Ν
NO >> Rep	PECTION END pair or replace ha P CONTROL SY			ROUND CIRCUI	-	0
<ol> <li>Disconnect</li> <li>Check the oness conne</li> </ol>					s connector and ECM har-	Ρ
				Continuity		

_	EVAP control syste	em pressure sensor	E	JNI	Continuity
	Connector	Terminal	Connector	Terminal	Continuity
	B36	1	E32	148	Existed

< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT

 Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control system pressure sensor		E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
B36	2	E32	121	Existed

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

Is the inspection result normal?

YES >> GO TO 6.

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

**6.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Check EVAP control system pressure sensor. Refer to EC-372, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-23, "Removal and Installation"</u>.

## Component Inspection

INFOID:000000012891379

[VQ35DE]

# 1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Remove EVAP control system pressure sensor with its harness connector. Refer to <u>FL-23, "Removal and</u> <u>Installation"</u>.

#### Always replace O-ring with a new one.

- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

ECM			Applied veguum kDe	
Connector	Connector + -		Applied vacuum kPa (kg/cm <sup>2</sup> , psi)	Voltage
Connector	Terminal	Terminal	(	
			Not applied	1.8 - 4.8 V
E32	121	148	-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value

#### **CAUTION:**

• Always calibrate the vacuum pump gauge when using it.

Never apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-23</u>, "Removal and Installation".

#### < DTC/CIRCUIT DIAGNOSIS >

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

## **DTC** Description

INFOID:000000012891380

[VQ35DE]

## DTC DETECTION LOGIC

An excessively high voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	וס	C detection condition
		Diagnosis condition	—
P0453	EVAP SYS PRES SEN	Signal (terminal)	Voltage signal transmitted from EVAP control system pressure sensor to ECM
F 0455	(Evaporative emission system pressure sensor/switch high)	Threshold	An excessively high voltage from the sensor is sent to ECM
		Diagnosis delay time	—
(EVAP con EVAP con EVAP can EVAP can	r connectors htrol system pressure sensor circu trol system pressure sensor ister vent control valve ister ister ise from EVAP canister vent contro		
Not applicab			
DTC CONF	IRMATION PROCEDURE		
1.PRECON	IDITIONING		
ing the next 1. Turn ign 2. Turn ign 3. Turn ign <b>TESTING C</b>	test. ition switch OFF and wait at least ition switch ON. ition switch OFF and wait at least	10 seconds. 10 seconds.	s perform the following before conduct-
>>	GO TO 2.		
-	M DTC CONFIRMATION PROCE	DURE	
With CON Start en Turn ign		erating temperature. 10 seconds. 10 seconds.	
<ol> <li>Check to the second seco</li></ol>	hat "FUEL T/TMP SE" is more tha gine and wait at least 20 seconds. st trip DTC.	n 0°C (32°F). erating temperature.	

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#### < DTC/CIRCUIT DIAGNOSIS >

Revision:	December 2015

	ECM	
Connector	+	_
Connector	Terr	minal
E32	128	148

3. Check that the voltage is less than 4.2 V.

- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Turn ignition switch OFF and wait at least 10 seconds.
- 7. Start engine and wait at least 20 seconds.
- 8. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-374, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

1.CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.

2. Check that water is not inside connectors.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace harness connector.

## 2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY

1. Turn ignition switch ON.

2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

	+		
EVAP control syste	em pressure sensor	_	Voltage (V)
Connector	Terminal		
B36	3	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. check evap control system pressure sensor power supply circuit

#### 1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control system pressure sensor		E	СМ	Continuity
Connector	Terminal	Connector	Terminal	Continuity
B36	3	E32	125	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair open circuit.

#### **4.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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#### < DTC/CIRCUIT DIAGNOSIS >

Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control system pressure sensor		E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
B36	1	E32	148	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

### 5.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT

1. Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control system pressure sensor		E	СМ	Continuity
Connector	Terminal	Connector	Terminal	Continuity
B36	2	E32	121	Existed

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

Is the inspection result normal?

YES >> GO TO 6.

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

#### **6.**CHECK RUBBER TUBE

1. Disconnect rubber tube connected to EVAP canister vent control valve.

2. Check the rubber tube for clogging.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Clean the rubber tube using an air blower, repair or replace rubber tube.

**I**.CHECK EVAP CANISTER VENT CONTROL VALVE

Check EVAP canister vent control valve. Refer to EC-376, "Component Inspection".	K
Is the inspection result normal?	
YES >> GO TO 8.	1
NO >> Replace EVAP canister vent control valve. Refer to <u>FL-22, "Removal and Installation"</u> .	L
8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR	

Check EVAP control system pressure sensor. Refer to EC-376, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-23, "Removal and Installation"</u>. N

**9.**CHECK IF EVAP CANISTER IS SATURATED WITH WATER

 Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-19</u>, "<u>Removal and Installation</u>".

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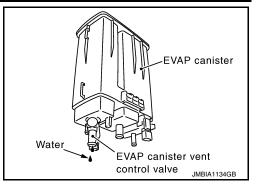
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#### < DTC/CIRCUIT DIAGNOSIS >

#### 2. Check if water will drain from the EVAP canister.

Does water drain from the EVAP canister?

YES >> GO TO 10. NO >> INSPECTION END



# **10.**CHECK EVAP CANISTER

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

### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-19, "Removal and Installation".

## Component Inspection

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[VQ35DE]

# 1.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Remove EVAP control system pressure sensor with its harness connector. Refer to <u>FL-23</u>, "<u>Removal and</u> <u>Installation</u>".

#### Always replace O-ring with a new one.

- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

ECM					
Connector	+	-	Applied vacuum kPa (kg/cm <sup>2</sup> , psi)	Voltage	
Connector	Terminal	Terminal	(((g) c)), (p))		
			Not applied	1.8 - 4.8 V	
E32	121	148	-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value	

#### **CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Never apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace EVAP control system pressure sensor. Refer to FL-23, "Removal and Installation".

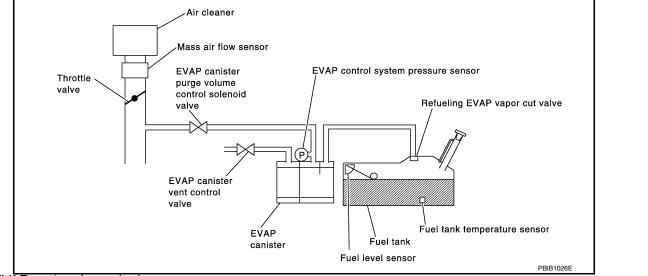
# P0456 EVAP CONTROL SYSTEM

## **DTC** Description

#### DTC DETECTION LOGIC

This diagnosis detects leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the negative pressure caused by decrease of fuel temperature in the fuel tank after turning ignition switch OFF.

If ECM judges there are no leaks, the diagnosis will be OK.



#### 1. EVAP system has a leak.

2. EVAP system does not operate properly.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition			
		Diagnosis condition	-		
		4	Signal (terminal)	—	
				Threshold	EVAP system has a leak
P0456	EVAP VERY SML LEAK		Diagnosis delay time	-	
P0450	[Evaporative emission system leak detected (very small leak)]		Diagnosis condition	-	
		2	Signal (terminal)	—	
			Threshold	Threshold	EVAP system does not operate properly
				Diagnosis delay time	—

#### **CAUTION:**

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

- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

#### POSSIBLE CAUSE

- · Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close.
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks
- EVAP purge line rubber tube bent
- Loose or disconnected rubber tube

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#### < DTC/CIRCUIT DIAGNOSIS >

- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Fuel tank temperature sensor
- · O-ring of EVAP canister vent control valve is missing or damaged
- EVAP canister is saturated with water
- EVAP control system pressure sensor
- Refueling EVAP vapor cut valve
- ORVR system leaks
- Fuel level sensor and the circuit
- Foreign matter caught in EVAP canister purge volume control solenoid valve

#### FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

#### Do you have CONSULT?

- YES >> GO TO 2.
- NO >> GO TO 4.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

#### With CONSULT

- Turn ignition switch ON and select "EVAP DIAG READY" in "DATA MONITOR" mode with CONSULT.
- 2. Start engine and wait at idle until "OFF" of "EVAP DIAG READY" changes to "ON". **NOTE:**

It will take at most 2 hours until "OFF" of "EVAP DIAG READY" changes to "ON".

3. Turn ignition switch OFF and wait at least 90 minutes. **NOTE:** 

#### Never turn ignition switch ON during 90 minutes.

- 4. Turn ignition switch ON and select "EVAP LEAK DIAG" in "DATA MONITOR" mode with CONSULT.
- 5. Check that "EVAP LEAK DIAG" indication.

#### Which is displayed on CONSULT?

CMPLT >> GO TO 3.

YET >> Perform DTC CONFIRMATION PROCEDURE again. GO TO 1.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

#### Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-379, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **4.**PERFORM DTC CONFIRMATION PROCEDURE

#### With GST

- 1. Start engine and wait engine idle for at least 2 hours.
- 2. Turn ignition switch OFF and wait at least 90 minutes. **NOTE:**

#### Never turn ignition switch ON during 90 minutes.

- 3. Turn ignition switch ON.
- 4. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-379, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

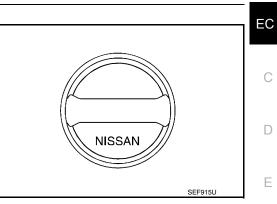
## EC-378

### < DTC/CIRCUIT DIAGNOSIS >

# Diagnosis Procedure

# 1. CHECK FUEL FILLER CAP DESIGN

- 1. Turn ignition switch OFF.
- 2. Check for genuine NISSAN fuel filler cap design.
- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Replace with genuine NISSAN fuel filler cap.



# 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Then retighten G until ratcheting sound is heard.

# **3.**CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.	Η
Is the inspection result normal?	
YES >> GO TO 5.	1
NO >> GO TO 4.	
4. CHECK FUEL TANK VACUUM RELIEF VALVE	
Refer to EC-382, "Component Inspection".	J
Is the inspection result normal?	
YES >> GO TO 5.	
NO >> Replace fuel filler cap with a genuine one.	K
<b>5.</b> CHECK FOR EVAP LEAK	
Refer to EC-571, "Work Procedure".	L
Is there any leak in EVAP line?	
YES >> Repair or replace.	
NO >> GO TO 6.	M
6.CHECK EVAP CANISTER VENT CONTROL VALVE	
Check the following.	Ν
EVAP canister vent control valve is installed properly.	IN
<ul> <li>Refer to <u>FL-22</u>, "<u>Removal and Installation</u>".</li> <li>EVAP canister vent control valve.</li> </ul>	
Refer to EC-359, "Component Inspection".	0
Is the inspection result normal?	
YES >> GO TO 7.	
NO >> Repair or replace EVAP canister vent control valve and O-ring.	Ρ
7. CHECK IF EVAP CANISTER SATURATED WITH WATER	

[VQ35DE]

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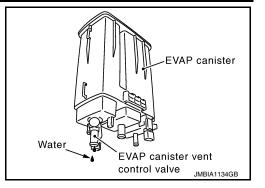
#### < DTC/CIRCUIT DIAGNOSIS >

## [VQ35DE]

- Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
   Check is under with the EVAP consister
- 2. Check if water will drain from the EVAP canister.

#### Does water drain from EVAP canister?

- YES >> GO TO 8.
- NO-1 >> With CONSULT: GO TO 10.
- NO-2 >> Without CONSULT: GO TO 11.



# 8. CHECK EVAP CANISTER

Weigh the EVAP canister assembly with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

#### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

YES-1 >> With CONSULT: GO TO 10. YES-2 >> Without CONSULT: GO TO 11. NO >> GO TO 9.

## **9.**DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

# 10. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

#### With CONSULT

- 1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
- 2. Start engine and let it idle.
- 3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode.
- 4. Touch "Qu" on CONSULT screen to increase "PURG VOL CONT/V" opening to 100%.
- 5. Check vacuum hose for vacuum.

#### Vacuum should exist.

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 12.

11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

#### Without CONSULT

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

- 2. Stop engine.
- 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
- 4. Start engine and let it idle for at least 80 seconds.
- 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

## Vacuum should exist.

Is the inspection result normal?

YES >> GO TO 13. NO >> GO TO 12.

12. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to <u>EC-45, "EVAPORATIVE EMISSION SYSTEM :</u> System Description".

P0456 EVAP CONTROL SYSTEM	
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
Is the inspection result normal?	A
YES >> GO TO 13. NO >> Repair or reconnect the hose.	A
13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
Refer to EC-354, "Component Inspection".	EC
Is the inspection result normal?	
YES >> GO TO 14.	С
NO >> Replace EVAP canister purge volume control solenoid valve. 14.CHECK FUEL TANK TEMPERATURE SENSOR	
Refer to EC-305, "Component Inspection".	D
Is the inspection result normal?	
YES >> GO TO 15.	_
NO >> Replace fuel level sensor unit.	E
15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR	
Refer to EC-368, "Component Inspection".	F
Is the inspection result normal?	
YES >> GO TO 16. NO >> Replace EVAP control system pressure sensor.	G
16. CHECK EVAP PURGE LINE	Ũ
Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper of	connection.
Refer to EC-45, "EVAPORATIVE EMISSION SYSTEM : System Description".	11
Is the inspection result normal?	
YES >> GO TO 17. NO >> Repair or reconnect the hose.	
17. CLEAN EVAP PURGE LINE	
Clean EVAP purge line (pipe and rubber tube) using air blower.	J
>> GO TO 18.	K
18. CHECK EVAP/ORVR LINE	N
Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and i	mproper con-
nection. For location, refer to <u>EC-31, "On Board Refueling Vapor Recovery (ORVR)"</u> . Is the inspection result normal?	L
YES >> GO TO 19.	
NO >> Repair or replace hoses and tubes.	M
19. CHECK RECIRCULATION LINE	
Check recirculation line between fuel filler tube and fuel tank for clogging, kink, cracks, lo	oseness and N
improper connection. <u>Is the inspection result normal?</u>	
YES >> GO TO 20.	
NO >> Repair or replace hose, tube or fuel filler tube.	0
20.CHECK REFUELING EVAP VAPOR CUT VALVE	
Refer to EC-554, "Component Inspection".	P
Is the inspection result normal?	
YES >> GO TO 21. NO >> Replace refueling EVAP vapor cut valve with fuel tank.	
21. CHECK FUEL LEVEL SENSOR	
Refer to <u>MWI-58, "Component Inspection"</u> .	

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Is the inspection result normal?

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

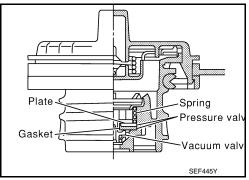
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YES >> INSPECTION END NO >> Replace fuel level sensor unit.

## Component Inspection

**1.**CHECK FUEL FILLER CAP

- 1. Turn ignition switch OFF.
- Remove fuel filler cap. Refer to <u>FL-11, "FWD : Exploded View"</u> (FWD models) or <u>FL-15, "AWD : Exploded View"</u> (AWD models.
- 3. Wipe clean valve housing.



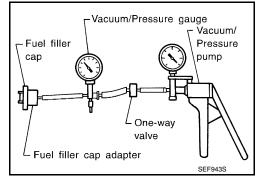
- 4. Install fuel filler cap adapter (commercial service tool) to fuel filler cap.
- 5. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END NO >> GO TO 2.



**2.**REPLACE FUEL FILLER CAP

Replace fuel filler cap. Refer to <u>FL-11</u>, "<u>FWD</u>: <u>Exploded View</u>" (FWD models) or <u>FL-15</u>, "<u>AWD</u>: <u>Exploded</u> <u>View</u>" (AWD models.

#### CAUTION:

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

>> INSPECTION END

# P0460 FUEL LEVEL SENSOR

## **DTC** Description

DTC DETECTION LOGIC

When the vehicle is parked, the fuel level in the fuel tank is naturally stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	Start engine and let it idle
		Signal (terminal)	Voltage signal transmitted from Fuel level sensor to ECM
P0460	P0460 FUEL LEV SEN SLOSH (Fuel level sensor "A" circuit)	Threshold	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM
	Diagnosis delay time	-	

#### POSSIBLE CAUSE

Harness or connectors     (The CAN communication line is open or shorted)	0
<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> </ul>	Н
FAIL-SAFE Not applicable	
DTC CONFIRMATION PROCEDURE	J
1.CHECK DTC PRIORITY	
If DTC P0460 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.	Κ
Is applicable DTC detected?         YES       >> Perform diagnosis of applicable.         • DTC UXXXX: Refer to EC-105, "DTC Index".         • DTC P0607: Refer to EC-425, "DTC Description".         NO       >> GO TO 2.	L
2.PRECONDITIONING	1 V 1
<ul> <li>If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.</li> <li>1. Turn ignition switch OFF and wait at least 10 seconds.</li> <li>2. Turn ignition switch ON.</li> <li>3. Turn ignition switch OFF and wait at least 10 seconds.</li> </ul>	N
>> GO TO 3.	0
3.PERFORM DTC CONFIRMATION PROCEDURE	Ρ
<ol> <li>Start engine and wait maximum of 2 consecutive minutes.</li> <li>Check 1st trip DTC.</li> <li><u>Is 1st trip DTC detected?</u></li> </ol>	

NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

NO-2 >> Confirmation after repair: INSPECTION END

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# Diagnosis Procedure

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[VQ35DE]

## **1.**CHECK DTC PRIORITY

If DTC P0460 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC UXXXX: Refer to EC-105, "DTC Index".
    - DTC P0607: Refer to EC-425, "DTC Description".

NO >> GO TO 2.

2. CHECK COMBINATION METER FUNCTION

Check combination meter function. Refer to MWI-20. "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to <u>MWI-57, "Diagnosis Procedure"</u>.

# P0461 FUEL LEVEL SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# P0461 FUEL LEVEL SENSOR

## **DTC** Description

#### DTC DETECTION LOGIC

Driving long distances naturally affect fuel gauge level.

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.

<ul> <li>Harness or connectors (The CAN communication line is open or shorted)</li> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> <li>FAIL-SAFE Not applicable</li> <li>DTC CONFIRMATION PROCEDURE</li> <li>1.CHECK DTC PRIORITY</li> <li>If DTC P0461 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.</li> <li>Is applicable DTC detected?</li> <li>YES &gt;&gt; Perform diagnosis of applicable.</li></ul>	DTC	CONSULT screen terms (Trouble diagnosis content)	D	TC detection condition
P0461       FUEL LEVEL SENSOR (Fuel level sensor "A" circuit range/per- formance)       Image (terminal)       sor to ECM         Threshold       Threshold       The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance         POSSIBLE CAUSE       Image within the specified range even though the vehicle has been driven a long distance         POSSIBLE CAUSE       Image within the specified range even though the vehicle has been driven a long distance         POSSIBLE CAUSE       Image within the specified range even though the vehicle has been driven a long distance         Image with the specified range even though the vehicle has been driven a long distance       Image within the specified range even though the vehicle has been driven a long distance         POSSIBLE CAUSE       Harness or connectors (The CAN communication line is open or shorted)       Image within the specified range even though the vehicle has been driven a long distance         Particular Second S			Diagnosis condition	_
P0461       (Fuel level sensor "A" circuit range/per- formance)       Threshold       Threshold       The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance         POSSIBLE CAUSE       Diagnosis delay time       —         POSSIBLE CAUSE       Diagnosis delay time       —         POSSIBLE CAUSE       Threshold       —         • Harness or connectors (The CAN communication line is open or shorted)       •       —         • Harness or connectors       (The eansor circuit is open or shorted)       •         • Combination meter       •       Fuel level sensor         • Fuel level sensor       FAIL-SAFE       •         Not applicable       DTC CONFIRMATION PROCEDURE       •         1.CHECK DTC PRIORITY       If DTC P0461 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.         Is applicable DTC detected?       *       >>         YES       >> Perform diagnosis of applicable. • DTC UXXXX: Refer to EC-105. "DTC Index". • DTC P0607: Refer to EC-425. "DTC Description". • DTC P0607: Refer to EC-425. "DTC Description". • NO       >> GO TO 2.         2.PRECONDITIONING       ************************************		Signal (terminal)		
POSSIBLE CAUSE • Harness or connectors (The CAN communication line is open or shorted) • Harness or connectors (The sensor circuit is open or shorted) • Combination meter • Fuel level sensor FAIL-SAFE Not applicable DTC CONFIRMATION PROCEDURE 1.CHECK DTC PRIORITY If DTC P0461 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607. Is applicable DTC detected? YES >> Perform diagnosis of applicable. • DTC UXXXX: Refer to EC-105, "DTC Index". • DTC P0607: Refer to EC-105, "DTC Index". • DTC P0607: Refer to EC-425, "DTC Description". NO >> GO TO 2. 2.PRECONDITIONING WARNING: When performing the following procedure, always observe the handling of the fuel. Refer to FL-2, "General Precaution". TES SO TO 2. 2.PRECONDITIONING WARNING: When performing the following procedure, always observe the handling fuel is required. Will CONSULT be used? YES >> GO TO 3, NO >> GO TO 4.	P0461	(Fuel level sensor "A" circuit range/per-	Threshold	does not change within the specified range even though the vehicle has been driven a
<ul> <li>Harness or connectors (The CAN communication line is open or shorted)</li> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> <li>FAIL-SAFE Not applicable</li> <li>DTC CONFIRMATION PROCEDURE</li> <li>1.CHECK DTC PRIORITY</li> <li>If DTC P0461 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.</li> <li>Is applicable DTC detected?</li> <li>YES &gt;&gt; Perform diagnosis of applicable. <ul> <li>DTC UXXXX: Refer to EC-105, "DTC Index".</li> <li>DTC P0607: Refer to EC-425, "DTC Description".</li> </ul> </li> <li>NO &gt;&gt; GO TO 2.</li> <li>2.PRECONDITIONING</li> <li>WARNING: When performing the following procedure, always observe the handling of the fuel. Refer to FL-2. "General Precaution".</li> <li>TESTING CONDITION: Before starting component function check, preparation of draining fuel and refilling fuel is required. Will CONSULT be used? YES &gt;&gt; GO TO 3. NO &gt;&gt; GO TO 4.</li> </ul>			Diagnosis delay time	
Not applicable DTC CONFIRMATION PROCEDURE 1. CHECK DTC PRIORITY If DTC P0461 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607. Is applicable DTC detected? YES >> Perform diagnosis of applicable. • DTC P0607: Refer to EC-105. "DTC Index". • DTC P0607: Refer to EC-425. "DTC Description". NO >> GO TO 2. 2. PRECONDITIONING WARNING: When performing the following procedure, always observe the handling of the fuel. Refer to FL-2, "General Precaution". TESTING CONDITION: Before starting component function check, preparation of draining fuel and refilling fuel is required. Will CONSULT be used? YES >> GO TO 3. NO >> GO TO 4.	<ul> <li>Harness o (The CAN</li> <li>Harness o (The sens)</li> <li>Combinati</li> </ul>	r connectors communication line is open or she r connectors or circuit is open or shorted) on meter	orted)	
1.CHECK DTC PRIORITY         If DTC P0461 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.         Is applicable DTC detected?         YES       >> Perform diagnosis of applicable. • DTC UXXXX: Refer to EC-105, "DTC Index". • DTC P0607: Refer to EC-425, "DTC Description". NO         NO       >> GO TO 2.         2.PRECONDITIONING         WARNING:         When performing the following procedure, always observe the handling of the fuel. Refer to FL-2, "General Precaution". TESTING CONDITION: Before starting component function check, preparation of draining fuel and refilling fuel is required. Will CONSULT be used? YES         YES       >> GO TO 3. NO         NO       >> GO TO 4.	FAIL-SAFE			
If DTC P0461 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607. Is applicable DTC detected? YES >> Perform diagnosis of applicable.	DTC CONF	IRMATION PROCEDURE		
UXXXX or P0607. Is applicable DTC detected? YES >> Perform diagnosis of applicable. • DTC UXXXX: Refer to EC-105. "DTC Index". • DTC P0607: Refer to EC-425. "DTC Description". NO >> GO TO 2. 2.PRECONDITIONING WARNING: When performing the following procedure, always observe the handling of the fuel. Refer to FL-2. "General Precaution". TESTING CONDITION: Before starting component function check, preparation of draining fuel and refilling fuel is required. Will CONSULT be used? YES >> GO TO 3. NO >> GO TO 4.	<b>1.</b> CHECK I	DTC PRIORITY		
YES       >> Perform diagnosis of applicable.         • DTC UXXXX: Refer to EC-105, "DTC Index".         • DTC P0607: Refer to EC-425, "DTC Description".         NO       >> GO TO 2.         2.PRECONDITIONING         WARNING:         When performing the following procedure, always observe the handling of the fuel. Refer to FL-2, "General Precaution".         TESTING CONDITION:         Before starting component function check, preparation of draining fuel and refilling fuel is required.         Will CONSULT be used?         YES       >> GO TO 3.         NO       >> GO TO 4.	UXXXX or F	0607.	X or P0607, first perfo	m the confirmation procedure for DTC
WARNING:         When performing the following procedure, always observe the handling of the fuel. Refer to FL-2, "General Precaution".         TESTING CONDITION:         Before starting component function check, preparation of draining fuel and refilling fuel is required.         Will CONSULT be used?         YES       >> GO TO 3.         NO       >> GO TO 4.	YES >>	<ul> <li>Perform diagnosis of applicable</li> <li>DTC UXXXX: Refer to <u>EC-105.</u></li> <li>DTC P0607: Refer to <u>EC-425.</u> "</li> </ul>	"DTC Index".	
When performing the following procedure, always observe the handling of the fuel. Refer to FL-2, "General Precaution". TESTING CONDITION: Before starting component function check, preparation of draining fuel and refilling fuel is required. <u>Will CONSULT be used?</u> YES $>>$ GO TO 3. NO $>>$ GO TO 4.	2.PRECON	DITIONING		
	When performed and the second	recaution". ONDITION: ting component function check <u>ILT be used?</u> GO TO 3.		
	<b>-</b>		FCK	

With CONSULT
NOTE:

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# Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30 $\ell$ (7-7/8 US gal, 6-5/8 lmp gal) in advance.

- 1. Prepare a fuel container and a spare hose.
- 2. Release fuel pressure from fuel line, refer to EC-571, "Work Procedure".
- 3. Remove the fuel feed hose on the fuel level sensor unit.
- 4. Connect a spare fuel hose where the fuel feed hose was removed.
- 5. Turn ignition switch OFF and wait at least 10 seconds then turn ON.
- 6. Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT.
- 7. Check "FUEL LEVEL SE" output voltage and note it.
- 8. Select "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT.
- 9. Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
- 10. Check "FUEL LEVEL SE" output voltage and note it.
- 11. Fill fuel into the fuel tank for 30  $\ell$  (7-7/8 US gal, 6-5/8 Imp gal).
- 12. Check "FUEL LEVEL SE" output voltage and note it.
- 13. Confirm whether the voltage changes more than 0.03 V during step 7 to 10 and 10 to 12.

#### Is the inspection result normal?

YES-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

- YES-2 >> Confirmation after repair: INSPECTION END
- NO >> Proceed to <u>EC-386</u>, "Diagnosis Procedure".

**4.**PERFORM COMPONENT FUNCTION CHECK

# Without CONSULT

# Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 $\ell$ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

- 1. Prepare a fuel container and a spare hose.
- 2. Release fuel pressure from fuel line. Refer to EC-162, "Work Procedure".
- 3. Remove the fuel feed hose on the fuel level sensor unit. Refer to <u>FL-5. "Removal and Installation"</u>.
- 4. Connect a spare fuel hose where the fuel feed hose was removed.
- 5. Turn ignition switch ON.
- 6. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
- 7. Confirm that the fuel gauge indication varies.
- 8. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
- 9. Confirm that the fuel gauge indication varies.

#### Is the inspection result normal?

YES-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

- YES-2 >> Confirmation after repair: INSPECTION END
- NO >> Proceed to <u>EC-386, "Diagnosis Procedure"</u>.

## Diagnosis Procedure

INFOID:000000012891389

## **1.**CHECK DTC PRIORITY

If DTC P0461 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC UXXXX: Refer to EC-105, "DTC Index".
  - DTC P0607: Refer to EC-425, "DTC Description".

NO >> GO TO 2.

## **2.**CHECK COMBINATION METER FUNCTION

Check combination meter function. Refer to <u>MWI-20, "CONSULT Function (METER/M&A)"</u>.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to <u>MWI-57, "Diagnosis Procedure"</u>.

# P0462, P0463 FUEL LEVEL SENSOR

## **DTC Description**

## DTC DETECTION LOGIC

• An excessively low voltage from the sensor is sent to ECM.

• An excessively high voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	Ignition switch ON
P0462	FUEL LEVL SEN/CIRC (Fuel level sensor "A" circuit low)	Signal (terminal)	Voltage signal transmitted from fuel level sen- sor to ECM
		Threshold	An excessively low voltage from the sensor is sent to ECM
		Diagnosis delay time	—
P0463	FUEL LEVL SEN/CIRC (Fuel level sensor "A" circuit high)	Diagnosis condition	Ignition switch ON
		Signal (terminal)	Voltage signal transmitted from fuel level sen- sor to ECM
		Threshold	An excessively high voltage from the sensor is sent to ECM
		Diagnosis delay time	_

# POSSIBLE CAUSE

<ul> <li>DTC P0462</li> <li>Harness or connectors (The CAN communication line is open or shorted)</li> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> </ul>	J
<ul> <li>DTC P0463</li> <li>Harness or connectors (The CAN communication line is open or shorted)</li> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> </ul>	K
FAIL-SAFE Not applicable	Μ
DTC CONFIRMATION PROCEDURE	Ν
1.CHECK DTC PRIORITY	
If DTC P0462 or P0463 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607. Is applicable DTC detected?	0
<ul> <li>YES &gt;&gt; Perform diagnosis of applicable.</li> <li>DTC UXXXX: Refer to <u>EC-105, "DTC Index"</u>.</li> <li>DTC P0607: Refer to <u>EC-425, "DTC Description"</u>.</li> <li>NO &gt;&gt; GO TO 2.</li> </ul>	Ρ
2.preconditioning	
If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct- ing the next test.	

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

# EC-387

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EC

## P0462, P0463 FUEL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

# 2. Turn ignition switch ON.

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

#### TESTING CONDITION:

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

>> GO TO 3.

**3.**PERFORM DTC CONFIRMATION PROCEDURE

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

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-388, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

INFOID:000000012891391

**1.**CHECK DTC PRIORITY

If DTC P0462 or P0463 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC UXXXX: Refer to EC-105, "DTC Index".
  - DTC P0607: Refer to <u>EC-425, "DTC Description"</u>.

NO >> GO TO 2.

2. CHECK COMBINATION METER FUNCTION

Check combination meter function. Refer to MWI-20. "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to <u>MWI-57, "Diagnosis Procedure"</u>.

# P0500 VSS

## Description

ECM receives vehicle speed signals from two different paths via CAN communication line: One is from the ABS actuator and electric unit (control unit) via the combination unit and the other is from TCM.

# DTC Description

# DTC DETECTION LOGIC

At 20 km/h (13 MPH), ECM detects the following status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a output speed sensor transmitted from TCM to ECM via CAN communication and the vehicle speed indicated on the combination meter exceeds 15km/h (10 MPH).

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	Start engine and shift the selector lever to D range and drive the vehicle at least 5 seconds at 20 km/h (13 MPH) or more
		Signal (terminal)	_
P0500	VEH SPEED SEN/CIRC (Vehicle speed sensor "A")	Threshold	At 20 km/h (13 MPH), ECM detects the fol- lowing status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a output speed sensor transmitted from TCM to ECM via CAN com- munication and the vehicle speed indicated on the combination meter exceeds 15km/h (10 MPH)
		Diagnosis delay time	—

#### POSSIBLE CAUSE

Harness or connector

- (The CAN communication line is open or shorted.)
- Combination meter
- ABS actuator and electric unit (control unit)
- Wheel sensor
- TCM
- Output speed sensor

#### FAIL-SAFE

	Engine operating condition in fail-safe mode	Ъ. <i>Л</i>
Fail safe mode	Vehicle behavior	IVI
Vehicle speed sensor	The cooling fan operates (Highest) while engine is running.	

## DTC CONFIRMATION PROCEDURE

## **1.**CHECK DTC PRIORITY

If DTC P0500 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC (UXXXX or P0607.

#### Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- DTC UXXXX: Refer to EC-105, "DTC Index"
- DTC P0607: Refer to EC-425, "DTC Description".

NO >> GO TO 2.

2.PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is 10 V or more at idle.

#### >> GO TO 3.

**3.**PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine.
- 2. Shift the selector lever to D range and wait at least for 2 seconds.
- 3. Drive the vehicle at least 5 seconds at 20 km/h (13 MPH) or more.

#### CAUTION: Always drive vehicle at a safe speed.

NOTE:

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

- 4. Check 1st trip DTC.
- Is 1st trip DTC detected?

YES >> Proceed to EC-390, "Diagnosis Procedure"

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42. "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

INFOID:000000012891394

# **1.**CHECK DTC PRIORITY

If DTC P0500 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC UXXXX: Refer to <u>EC-105</u>, "DTC Index".
  - DTC P0607: Refer to <u>EC-425, "DTC Description"</u>.
- NO >> GO TO 2.

2.CHECK DTC WITH TCM

Check DTC with TCM. Refer to <u>TM-42, "CONSULT Function"</u>.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble shooting relevant to DTC indicated.

 $\mathbf{3}$ . CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check DTC with ABS actuator and electric unit (control unit). Refer to BRC-39, "CONSULT Function".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble shooting relevant to DTC indicated.

**4.**CHECK DTC WITH COMBINATION METER

Check DTC with combination meter. Refer to MWI-20, "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble shooting relevant to DTC indicated.

**5.**CHECK OUTPUT SPEED SENSOR

Check output speed sensor. Refer to TM-172, "Diagnosis Procedure".

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Replace or replace error-detected parts.

heck Jre" (v	wheel sensor. Refer to <u>BRC-89, "Diagnosis Procedure"</u> (without ICC) or <u>BRC-284, "Diagnosis Pr</u> with ICC).	<u>'0ce-</u>
the ir	nspection result normal?	
YES NO	>> INSPECTION END >> Replace or replace error-detected parts.	

# P0506 ISC SYSTEM

# Description

INFOID:000000012891395

IVQ35DE1

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration and engine load (air conditioner, power steering and cooling fan operation, etc.).

# DTC Description

INFOID:000000012891396

## DTC DETECTION LOGIC

The idle speed is less than the target idle speed by 100 rpm or more.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
	ISC SYSTEM (Idle air control system RPM lower than expected)	Diagnosis condition	Start engine and let it idle
		Signal (terminal)	—
P0506		Threshold	The idle speed is less than the target idle speed by 100 rpm or more
		Diagnosis delay time	—

### POSSIBLE CAUSE

· Electric throttle control actuator

Intake air leakage

## FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

## **1.**CHECK DTC PRIORITY

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

#### Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-105, "DTC Index"</u>.

NO >> GO TO 2.

2. PRECONDITIONING

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

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

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

If the target idle speed is out of the specified value, perform <u>EC-154, "Description"</u>, before conducting DTC CONFIRMATION PROCEDURE.

#### **TESTING CONDITION:**

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

>> GO TO 3.

# **3.** PERFORM DTC CONFIRMATION PROCEDURE

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

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

# P0506 ISC SYSTEM

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< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Restart engine and run it for at least 1 minute at idle speed.</li> <li>Check 1st trip DTC.</li> </ol>		А
Is 1st trip DTC detected?		EC
YES >> Proceed to EC-393. "Diagnosis Procedure"		
<ul> <li>NO-1 &gt;&gt; To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u>.</li> <li>NO-2 &gt;&gt; Confirmation after repair: INSPECTION END</li> </ul>		С
Diagnosis Procedure	IFOID:000000012891397	
1.CHECK DTC PRIORITY		D
If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.		
Is applicable DTC detected? YES >> Perform diagnosis of applicable. Refer to <u>EC-105, "DTC Index"</u> .		Е
NO $>>$ GO TO 2.		
2. CHECK INTAKE AIR LEAKAGE		F
1. Start engine and let it idle.		1
2. Listen for an intake air leakage after the mass air flow sensor.		
Is intake air leakage detected? YES >> Discover air leakage location and repair.		G
NO >> Replace ECM. Refer to <u>EC-574, "Removal and Installation"</u> .		
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# P0507 ISC SYSTEM

# Description

INFOID:000000012891398

[VQ35DE]

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration and engine load (air conditioner, power steering and cooling fan operation, etc.).

# DTC Description

INFOID:000000012891399

## DTC DETECTION LOGIC

The idle speed is more than the target idle speed by 200 rpm or more.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
	ISC SYSTEM (Idle air control system RPM higher than expected)	Diagnosis condition	Start engine and let it idle
		Signal (terminal)	-
P0507		Threshold	The idle speed is more than the target idle speed by 200 rpm or more
		Diagnosis delay time	-

## POSSIBLE CAUSE

- · Electric throttle control actuator
- Intake air leakage
- PCV system

## FAIL-SAFE

Not applicable

## DTC CONFIRMATION PROCEDURE

## **1.**CHECK DTC PRIORITY

If DTC P0507is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

## Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to EC-105, "DTC Index".
- NO >> GO TO 2.

## 2.PRECONDITIONING

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

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

# If the target idle speed is out of the specified value, perform <u>EC-154, "Description"</u>, before conducting DTC Confirmation Procedure.

#### **TESTING CONDITION:**

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

- Always perform the test at a temperature above  $-10^{\circ}C(14^{\circ}F)$ .

>> GO TO 3.

 ${\it 3.}$  PERFORM DTC CONFIRMATION PROCEDURE

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

# **P0507 ISC SYSTEM**

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>	
<ol> <li>Restart engine and run it for at least 1 minute at idle speed.</li> <li>Check 1st trip DTC.</li> </ol>	
Is 1st trip DTC detected?         YES       >> Proceed to EC-395, "Diagnosis Procedure".         NO       >> INSPECTION END	
Diagnosis Procedure	INFOID:000000012891400
1.CHECK DTC PRIORITY	
If DTC P0507is displayed with other DTC, first perform the trouble diagnosis for the other DTC <u>Is applicable DTC detected?</u> YES >> Perform diagnosis of applicable. Refer to <u>EC-105, "DTC Index"</u> . NO >> GO TO 2.	
2. CHECK PCV HOSE CONNECTION	
Confirm that PCV hose is connected correctly.	
<u>Is the inspection result normal?</u> YES >> GO TO 3. NO >> Repair or replace malfunctioning part.	
<b>3.</b> CHECK INTAKE AIR LEAKAGE	
<ol> <li>Start engine and let it idle.</li> <li>Listen for an intake air leakage after the mass air flow sensor.</li> <li>Is intake air leakage detected?</li> </ol>	
YES >> Discover air leakage location and repair. NO >> Replace ECM. Refer to <u>EC-574, "Removal and Installation"</u> .	

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# P050A, P050E COLD START CONTROL

## Description

ECM controls ignition timing and engine idle speed when engine is started with pre-warming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

## DTC Description

INFOID:000000012891402

INFOID:000000012891401

## DTC DETECTION LOGIC

- ECM does not control engine idle speed properly when engine is started with pre-warming up condition.
- The temperature of the catalyst inlet does not rise to the proper temperature when the engine is started with
  pre-warming up condition.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
	COLD START CONTROL (Cold start idle air control system per- formance)	Diagnosis condition	—
		Signal (terminal)	—
P050A		Threshold	ECM does not control engine idle speed properly when engine is started with pre- warming up condition
		Diagnosis delay time	—
	COLD START CONTROL (Cold start engine exhaust temperature too low)	Diagnosis condition	—
		Signal (terminal)	—
P050E		Threshold	The temperature of the catalyst inlet does not rise to the proper temperature when the en- gine is started with pre-warming up condition
		Diagnosis delay time	—

## POSSIBLE CAUSE

P050A

- · Lack of intake air volume
- Fuel injection system
- ECM

P050B

- Lack of intake air volume
- Fuel injection system
- ECM

FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK DTC PRIORITY

If DTC P050A, P050E is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-105</u>, "DTC Index".

NO >> GO TO 2.

## 2. PRECONDITIONING

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

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

2. Turn ignition switch ON.

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

TESTING CONDITION:

# P050A, P050E COLD START CONTROL

[VQ35DE]

efore performing the following procedure, confirm that battery voltage is more than 11 V at idle.
>> GO TO 3.
PERFORM DTC CONFIRMATION PROCEDURE-I
With CONSULT
Turn ignition switch OFF and wait at least 10 seconds. Turn ignition switch ON.
Select "DATA MONITOR" mode with CONSULT.
Check the indication of "COOLANT TEMP/S".
With GST old with CONSULT above.
the value of "COOLANT TEMP/S" between 4°C (39°F) and 36°C (97°F)?
YES >> GO TO 4.
NO-1 [If it is below 4°C (39°F)]>>Warm up the engine until the value of "COOLANT TEMP/S" reaches 4°C
(39°F) or more. Retry from step 1. NO-2 [If it is above 36°C (97°F)]>>Cool engine down to less than 36°C (97°F). Retry from step 1.
PERFORM DTC CONFIRMATION PROCEDURE-II
With CONSULT
<ul> <li>Set the select lever in N range.</li> <li>Start the engine and warm up in idle with the value of "COOLANT TEMP/S" between 4°C (39°F) and 40°C</li> </ul>
(104°F) for more than 15 seconds.
Check 1st trip DTC.
With GST old with CONSULT above.
1st trip DTC detected?
YES >> Proceed to EC-397. "Diagnosis Procedure".
NO >> INSPECTION END
iagnosis Procedure
.CHECK DTC PRIORITY
DTC P050A, P050E is displayed with other DTC, first perform the trouble diagnosis for the other DTC.
applicable DTC detected?
YES >> Perform diagnosis of applicable. Refer to <u>EC-105, "DTC_Index"</u> . NO >> GO TO 2.
PERFORM IDLE AIR VOLUME LEARNING
erform EC-154, "Description".
Idle Air Volume Learning carried out successfully?
YES >> GO TO 3.
NO >> Follow the instruction of Idle Air Volume Learning.
CHECK INTAKE SYSTEM
heck for the cause of intake air volume lacking. Refer to the following.
Crushed intake air passage Intake air passage clogging
Clogging of throttle body
the inspection result normal?
YES >> GO TO 4.
NO >> Repair or replace malfunctioning part
CHECK FUEL INJECTION SYSTEM FUNCTION
erform DTC Confirmation Procedure for DTC P0171, P0174. Refer to EC-292, "DTC Description".
the inspection result normal?
YES >> GO TO 5.

< DTC/CIRCUIT DIAGNOSIS >

# P050A, P050E COLD START CONTROL

< DTC/CIRCUIT DIAGNOSIS >

NO >> Proceed to <u>EC-294. "Diagnosis Procedure"</u> for DTC P0171, P0174.

5.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC Confirmation Procedure. See <u>EC-396, "DTC Description"</u>.

Is the 1st trip DTC P050A, P050E displayed again?

- YES >> Replace ECM. Refer to EC-574, "Removal and Installation".
- NO >> INSPECTION END

# < DTC/CIRCUIT DIAGNOSIS >

# P0520 EOP SENSOR

# DTC Description

INFOID:000000012891404

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#### DTC DETECTION LOGIC

- 1. A voltage signal transmitted from the engine oil pressure sensor is lower than 0.26 V.
- 2. A voltage signal transmitted from the engine oil pressure sensor is higher than 4.9 V.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
			Diagnosis condition	Start engine and let it idle
P0520 (Engine		1	Signal (terminal)	Voltage signal transmitted from engine oil pressure sensor to ECM
			Threshold	A voltage signal transmitted from the engine oil pressure sensor is lower than 0.26 V
	EOP SENSOR/SWITCH (Engine oil pressure sensor/switch circuit)		Diagnosis delay time	5 seconds or more
		2	Diagnosis condition	Start engine and let it idle
			Signal (terminal)	Voltage signal transmitted from engine oil pressure sensor to ECM
			Threshold	A voltage signal transmitted from the engine oil pressure sensor is higher than 4.9 V
			Diagnosis delay time	5 seconds or more

<ul> <li>Harness or connectors         <ul> <li>(EOP sensor circuit is open or shorted)</li> <li>(APP sensor 2 circuit is shorted.)</li> <li>[CMP sensor (PAHSE) circuit is open or shorted.]</li> </ul> </li> </ul>	I
<ul> <li>(Refrigerant pressure sensor is shorted.)</li> <li>Engine oil temperature (EOP) sensor</li> <li>Accelerator pedal position sensor (APP sensor 2)</li> <li>Camshaft position (CMP) sensor (PHESE)</li> <li>Refrigerant pressure sensor</li> </ul>	J
FAIL-SAFE	
Not applicable	L
DTC CONFIRMATION PROCEDURE	
1.PRECONDITIONING	M
If DTC Confirmation Procedure has been previously conducted, always perform the following procedure	IVI
before conducting the next test. <ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>	
2. Turn ignition switch ON.	Ν
3. Turn ignition switch OFF and wait at least 10 seconds.	
>> GO TO 2.	0
2. CHECK ENGINE OIL LEVEL	
<ol> <li>Turn ignition switch OFF.</li> <li>Check engine oil level. Refer to <u>LU-8, "Inspection"</u>.</li> </ol>	Ρ
Is inspection result normal?	
YES >> GO TO 3.	
NO >> Check engine oil leak. Refer to <u>LU-8, "Inspection"</u> .	
3.PERFORM DTC CONFIRMATION PROCEDURE	
<ol> <li>Start engine and let it idle for at least 5 seconds.</li> </ol>	

#### < DTC/CIRCUIT DIAGNOSIS >

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-400, "Diagnosis Procedure".

NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u>.

NO-2 >> Confirmation after repair: INSPECTION END

#### Diagnosis Procedure

INFOID:000000012891405

[VQ35DE]

# 1.CHECK EOP SENSOR POWER SUPPLY-I

1. Turn ignition switch OFF.

2. Disconnect EOP sensor harness connector.

3. Turn ignition switch ON.

4. Check the voltage between EOP sensor harness connector terminals.

Connector	+	_	Voltage (Approx.)	
Connector	tern	ninal		
F87	3	1	5 V	

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 4.

2. CHECK EOP SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connectors.

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

EOP sensor		ECM		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F87	2	F78	14	Existed	

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK EOP SENSOR

Check EOP sensor. Refer to EC-401. "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

**4.**CHECK EOP SENSOR POWER SUPPLY-II

Check the voltage between EOP sensor harness connector terminal and ground.

	+		
EOP	sensor	_	Voltage (Approx.)
Connector	Terminal		, , , , , , , , , , , , , , , , , , ,
F87	3	Ground	5 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

**5.**CHECK EOP SENSOR POWER SUPPLY CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connectors.
- 3. Check the continuity between EOP sensor harness connector and ECM harness connector.

EOP sensor		E	Continuity	
Connector Terminal		Connector	Terminal	Continuity
F87	3	F78	18	Existed

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

#### Is the inspection result normal?

- YES >> Check sensor power supply 2 circuit. Refer to EC-558, "Diagnosis Procedure".
- NO >> Repair or replace error-detected parts.

#### 6.CHECK EOP SENSOR GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between EOP sensor harness connector and ECM harness connector.

EOP	sensor	E	СМ	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F87	1	F78	15	Existed	

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

# 7. CHECK ECM GROUND CIRCUIT

Check the continuity between ECM harness connector and ground.

EC	Μ		Continuity
Connector	Terminal		Continuity
	147		
E32	149	_	
	152	_	
F78	10	Ground	Existed
F70	55	_	
F79 -	105		
F19	110		

# Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

#### **Component Inspection**

# 1.CHECK EOP SENSOR

1. Turn ignition switch OFF.

2. Disconnect EOP sensor harness connector.

3. Check resistance between EOP sensor connector terminals.

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#### < DTC/CIRCUIT DIAGNOSIS >

EOF	' sensor		<b>D</b>
+	-	Condition	Resistance (kΩ)
Те	rminal		()
1	2	- None	4 – 10
I	3		2 – 8
	1		4 – 10
2	3		1 – 3
3	1		2 – 8
3	2		1 – 3

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Replace EOP sensor. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Component Parts Loca-</u> tion".

#### < DTC/CIRCUIT DIAGNOSIS >

# P0524 ENGINE OIL PRESSURE

# DTC Description

#### DTC DETECTION LOGIC

An EOP sensor signal voltage applied to ECM remains lower than the specified value continuously for 10 seconds or more when the engine speed is 1,000 rpm or more.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	-
		Signal (terminal)	Voltage signal transmitted from EOP sensor signal to ECM
P0524 ENGINE OIL PRESSURE (Engine oil pressure too low)	Threshold	An EOP sensor signal voltage applied to ECM remains lower than the specified value continuously when the engine speed is 1,000 rpm or more	
		Diagnosis delay time	10 seconds or more

#### POSSIBLE CAUSE

- Decrease in engine oil pressure
- Decrease in engine oil level
- Engine oil condition
- EOP sensor
- Engine body

#### FAIL-SAFE

Engine operating condition in fail-safe mode				
Fail safe mode	Vehicle behavior	-		
Engine oil pressure	<ul> <li>ECM illuminates oil pressure warning lamp on the combination meter.</li> <li>Engine speed will not rise more than 4,000 rpm due to the fuel cut.</li> <li>Fail-safe is canceled when ignition switch OFF → ON.</li> </ul>	J		

# DTC CONFIRMATION PROCEDURE

#### CAUTION:

If "EC-404, "Diagnosis Procedure"" is unfinished, be sure to perform Step 3 and 4.

#### **1.**PRECONDITIONING-1

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

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

2. Turn ignition switch ON.

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

#### TEST CONDITION: Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

2. PRECONDITIONING-2

#### Is "Diagnosis Procedure" of DTC P0524 finished?

YES >> GO TO 3.

NO >> GO TO 4.

# **3.**PERFORM DTC CONFIRMATION PROCEDURE

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

2. Maintain the following conditions for about 10 consecutive seconds.

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Selector lever	P or N position
Engine coolant temperature	70°C (158°F) or more
Engine speed	1,000 rpm or more

#### NOTE:

With engine speed set around 4,000 rpm, the phenomenon can be reproduced more easily.

3. Check DTC.

#### Is DTC detected?

YES >> Proceed to EC-404, "Diagnosis Procedure".

NO >> INSPECTION END

**4.**CHECK ENGINE OIL LEVEL

Check engine oil level. Refer to LU-8, "Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Proceed to <u>EC-404</u>, "Diagnosis Procedure".

**5.**CHECK ENGINE OIL PRESSURE

#### With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "DATA MONITOR" mode of "ENGINE" using CONSULT.
- 3. Start the engine and check that "EOP SENSOR" changes, according to engine speeds.

Monitor item	Condition		Value (Approx.)
	<ul> <li>Engine oil temperature: 80°C (176°F)</li> <li>Selector lever: P or N position</li> </ul>	Engine speed: Idle	1,450 mV or more
EOP SENSOR	<ul><li>Air conditioner switch: OFF</li><li>No load</li></ul>	Engine speed: 2,000 rpm	2,850 mV or more

Without CONSULT

Check engine oil pressure. Refer to LU-8, "Inspection".

Is the inspection result normal?

YES-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

- YES-2 >> Confirmation after repair: INSPECTION END
- NO >> Proceed to <u>EC-404. "Diagnosis Procedure"</u>.

#### **Diagnosis** Procedure

INFOID:000000012891408

**1.**CHECK ENGINE OIL LEVEL

1. Turn ignition switch OFF.

2. Check engine oil level. Refer to LU-8. "Inspection".

Is the inspection result normal?

YES >> GO TO 2. NO >> GO TO 4.

2. CHECK ENGINE OIL PRESSURE

#### With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "DATA MONITOR" mode of "ENGINE" using CONSULT.
- 3. Start the engine and check that "EOP SENSOR" changes, according to engine speeds.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Monitor item	Condition		Value (Approx.)
	<ul> <li>Engine oil temperature: 80°C (176°F)</li> <li>Selector lever: P or N position</li> </ul>	Engine speed: Idle	1,450 mV or more
EOP SENSOR	<ul><li>Air conditioner switch: OFF</li><li>No load</li></ul>	Engine speed: 2,000 rpm	2,850 mV or more
Without CONS	SULT level. Refer to <u>LU-8, "Inspection"</u> .		
Is the inspection	result normal?		
YES >> GO NO >> Cheo	TO 3. ck oil pump. Refer to <u>LU-12, "Rem</u>	oval and Installa	ation".
3. СНЕСК ЕОР			
	sor. Refer to <u>EC-405</u> , "Component	Inspection".	
	<u>result normal?</u> PECTION END air or replace error-detected parts.		
4.CHECK ENG	INE OIL LEAKAGE		
Check engine oil	leakage. Refer to LU-6, "Engine I	_ubrication Sys	<u>tem"</u> .
Is the inspection			
YES >> GO NO >> Repa	TO 5. air or replace error-detected parts.		
5.CHECK CAUS	SE OF ENGINE OIL CONSUMPTI	ON	
Check the follow	ing item.		

ieck the follov ig ne

Step	Inspection item	Equipment	Standard	Reference
1	PCV valve	EC-573, "Work Procedu	ıre"	
2	Exhaust front tube	Visual	<ul><li>No blocking</li><li>No abnormal sounds</li></ul>	_
3	Oil pump	LU-12, "Removal and Ir	nstallation"	
4	<ul><li>Piston</li><li>Piston pin</li><li>Piston ring</li></ul>	<ul> <li>Piston to piston pin o</li> <li>Piston ring side clear</li> <li>Piston ring end gap</li> </ul>		<u>EM-125</u>
5	Cylinder block	<ul><li>Cylinder block top su</li><li>Piston to cylinder bor</li></ul>		<u>EM-125</u>

>> Repair or replace error-detected parts.

# **Component Inspection**

# 1.CHECK EOP SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect EOP sensor harness connector.
- 3. Check resistance between EOP sensor connector terminals.

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#### < DTC/CIRCUIT DIAGNOSIS >

EOP sensor			Desistance
+	_	Condition	Resistance (kΩ)
Terr	minal		
1	2		4 – 10
I	3	None 2-8 4-10 1-3 2-8 1-3	2-8
2	1		4 – 10
2	3		1 – 3
3	1		2 – 8
3	2		1 – 3

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Replace EOP sensor. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Component Parts Loca-tion"</u>.

#### < DTC/CIRCUIT DIAGNOSIS >

# P052A, P052B, P052C, P052D INTAKE VALVE TIMING CONTROL

#### **DTC** Description

INFOID:000000012891410

#### DTC DETECTION LOGIC

There is a gap between the target phase angle and the detected phase angle when the engine is operating in cold conditions.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	—
	CAMPULATE DODITION TIMING DA	Signal (terminal)	—
P052A	CAMSHAFT POSITION TIMING B1 (Cold start "A" camshaft position timing over-advanced bank 1)	Threshold	There is a gap between the target phase an- gle and the detected phase angle when the engine is operating in cold conditions
		Diagnosis delay time	
		Diagnosis condition	—
	CAMSHAFT POSITION TIMING B1	Signal (terminal)	—
P052B	(Cold start "A" camshaft position timing over-retarded bank 1)	Threshold	There is a gap between the target phase an- gle and the detected phase angle when the engine is operating in cold conditions
		Diagnosis delay time	
		Diagnosis condition	—
	CAMSHAFT POSITION TIMING B2	Signal (terminal)	—
P052C	(Cold start "A" camshaft position timing over-advanced bank 2)	Threshold	There is a gap between the target phase an- gle and the detected phase angle when the engine is operating in cold conditions
		Diagnosis delay time	_
		Diagnosis condition	—
	CAMSHAFT POSITION TIMING B2	Signal (terminal)	—
P052D	(Cold start "A" camshaft position timing over-retarded bank 2)	Threshold	There is a gap between the target phase an- gle and the detected phase angle when the engine is operating in cold conditions
		Diagnosis delay time	—

#### POSSIBLE CAUSE

DTC P052A	M
Crankshaft position sensor	1 1 1
Camshaft position sensor	
Intake valve timing control solenoid valve	
<ul> <li>Intake valve timing intermediate lock control solenoid valve</li> </ul>	N
<ul> <li>Accumulation of debris to the signal pick-up portion of the camshaft</li> </ul>	
Timing chain installation	
• Foreign matter caught in the intake valve timing control (or intermediate lock control) solenoid valve	0
DTC P052B • Crankshaft position sensor	
Camshaft position sensor	Р
Intake valve timing control solenoid valve	Г
Intake valve timing intermediate lock control solenoid valve	
<ul> <li>Accumulation of debris to the signal pick-up portion of the camshaft</li> </ul>	

- Timing chain installation
- Foreign matter caught in the intake valve timing control (or intermediate lock control) solenoid valve

DTC P052C

Crankshaft position sensor

**Revision: December 2015** 



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< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

- · Camshaft position sensor
- Intake valve timing control solenoid valve
- · Intake valve timing intermediate lock control solenoid valve
- Accumulation of debris to the signal pick-up portion of the camshaft
- Timing chain installation
- Foreign matter caught in the intake valve timing control (or intermediate lock control) solenoid valve

DTC P052D

- Crankshaft position sensor
- Camshaft position sensor
- Intake valve timing control solenoid valve
- Intake valve timing intermediate lock control solenoid valve
- Accumulation of debris to the signal pick-up portion of the camshaft
- Timing chain installation
- Foreign matter caught in the intake valve timing control (or intermediate lock control) solenoid valve

FAIL-SAFE

Engine operating condition in fail-safe mode

Fail safe mode	Vehicle behavior
Intake valve timing intermediate lock control	

#### DTC CONFIRMATION PROCEDURE

#### **1.**CHECK DTC PRIORITY

If DTC P052A, P052B, P052C and P052D is displayed with DTC P0075 or P0081, first perform the confirmation procedure for DTC UXXXX or P0607.

#### Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC P0075: Refer to EC-213, "DTC Description".
  - DTC P0081: Refer to EC-213, "DTC Description".

NO >> GO TO 2.

### 2. PRECONDITIONING

#### **TESTING CONDITION:**

#### Before performing the following procedure, confirm that battery voltage is 10 V or more at idle. (B)With CONSULT

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. On the CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "COOLAN TEMP/S".
- 6. Check "COOLAN TEMP/S" indication value.

#### With GST

Follow the procedure "With CONSULT" above.

Is the value of "COOLAN TEMP/S"-5°C (23°F) and 45°C (113°F)?

- YES >> GO TO 3.
- NO-1 [if it is below 5°C (23°F)]>>Warm up the engine until the value of "COOLAN TEMP/S" indicates –5°C (23°F) and 45°C (113°F). And then GO TO 3.
- NO-2 [if it is above 45°C (113°F)]>>Cool the engine down to the value of "COOLAN TEMP/S" indicates –5°C (23°F) and 45°C (113°F). And then GO TO 3.

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

- 1. Turn ignition switch OFF and wait at 10 seconds.
- 2. Turn ignition switch ON.
- 3. Set the selector lever in N range.
- 4. Start the engine and let it idle for 20 seconds or more.
- 5. Check 1st trip DTC.

Is 1st trip DTC detected?

[VQ35DE1 < DTC/CIRCUIT DIAGNOSIS > YES >> Proceed to EC-409, "Diagnosis Procedure" NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident". А NO-2 >> Confirmation after repair: INSPECTION END Diagnosis Procedure INFOID:0000000012891411 EC 1. CHECK DTC PRIORITY If DTC P052A, P052B, P052C and P052D is displayed with DTC P0075 or P0081, first perform the confirmation procedure for DTC UXXXX or P0607. Is applicable DTC detected? YES >> Perform diagnosis of applicable. D DTC P0075: Refer to EC-213, "DTC Description". • DTC P0081: Refer to EC-213, "DTC Description". NO >> GO TO 2. Е 2.INSPECTION START

With CONSULT>>GO TO 3. Without CONSULT>>GO TO 4.

**3.**CHECK VTC POSITION

#### With CONSULT

- 1. Turn ignition switch ON.
- 2. On the CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "COOLAN TEMP/S".
- 3. Check that the "COOLAN TEMP/S" indication value is between –5°C (23°F) and 45°C (113°F).
- 4. Start engine and wait at least 5 seconds.
- 5. On the CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "INT/V TIM (B1)".
- 6. Check that the data monitor item indicates as follows:

Item	Value (°CA)
INT/V TIM (B1)	$10\pm2$
INT/V TIM (B2)	$10\pm2$

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

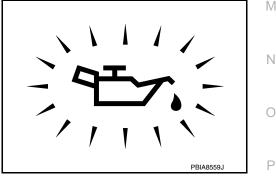
4. CHECK OIL PRESSURE WARNING LAMP

- 1. Start engine.
- 2. Check that oil pressure warning lamp is not illuminated.

Is oil pressure warning lamp illuminated?

YES >> Refer to <u>LU-8, "Inspection"</u>.

NO >> GO TO 6.



# 5.CHECK INTAKE VALVE TIMING INTERMEDIATE LOCK CONTROL SOLENOID VALVE

Perform Component Inspection of the intake valve timing intermediate lock control solenoid valve. Refer to EC-411, "Component Inspection (Intake Valve Timing Intermediate Lock Control Solenoid Valve)".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

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< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

#### 6.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Perform Component Inspection of the intake valve timing control solenoid valve. Refer to <u>EC-410, "Component Inspection (Intake Valve Timing Control Solenoid Valve)"</u>.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK CRANKSHAFT POSITION SENSOR

Perform Component Inspection of the crankshaft position sensor. Refer to <u>EC-412</u>, "Component Inspection <u>(Crankshaft Position sensor)</u>".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK CAMSHAFT POSITION SENSOR

Perform Component Inspection of the camshaft position sensor. Refer to <u>EC-412, "Component Inspection</u> (Camshaft position sensor)".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9.CHECK CAMSHAFT (INTAKE)

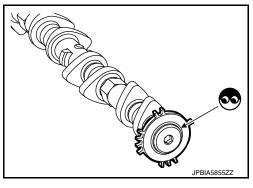
Check the following.

- 1. Accumulation of debris on the signal plate of camshaft front end
- 2. Chipping signal plate of camshaft front end

Is the inspection result normal?

YES >> GO TO 10.

NO >> Remove debris and clean the signal plate of camshaft front end or replace camshaft. Refer to <u>EM-79</u>, <u>"Removal and Installation"</u>.



# 10. CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misalignment. Are there any service records that may cause timing chain misalignment?

YES >> Check timing chain installation. Refer to EM-66, "Removal and Installation".

NO >> GO TO 11.

**11**.CHECK LUBRICATION CIRCUIT

Perform "Inspection of Camshaft Sprocket (INT) Oil Groove". Refer to <u>EM-87. "Inspection after Installation"</u>. <u>Is the inspection result normal?</u>

YES >> INSPECTION END

NO >> Clean lubrication line.

Component Inspection (Intake Valve Timing Control Solenoid Valve)

INFOID:000000012891412

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

3. Check resistance between intake valve timing control solenoid valve terminals as per the following.

<sup>1.</sup> Turn ignition switch OFF.

<sup>2.</sup> Disconnect intake valve timing control solenoid valve harness connector.

#### P052A, P052B, P052C, P052D INTAKE VALVE TIMING CONTROL IRCUIT DIAGNOSIS > [VQ35DE]

#### < DTC/CIRCUIT DIAGNOSIS >

Intake valve timing control solenoid valve Condition Resistance + Terminal 1 2 7.0 – 7.8 Ω 1 x Temperature 20°C (68°F) Ground (Continuity 2 should not exist)

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> <u>View</u>".

# 2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

- 1. Remove intake valve timing control solenoid valve. Refer to <u>EM-54</u>, "Exploded View".
- Provide 12 V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure.
   CAUTION: Never apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve. NOTE:

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

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-54</u>, "<u>Exploded</u> <u>View</u>".

# Component Inspection (Intake Valve Timing Intermediate Lock Control Solenoid Valve)

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

- 1. Turn ignition switch OFF.
- 2. Disconnect intake valve timing intermediate lock control solenoid valve harness connector.
- 3. Check resistance between intake valve timing intermediate lock control solenoid valve terminals as per the following.

Intake valve timing interme- diate lock control solenoid valve		Condition		Resistance	
+	_			recolocarioo	
Terr	minal				
1	2	7.0 – 7.		7.0 – 7.8 Ω	
1		Temperature	20°C (68°F) (Continui should not e	-	
2	Ground			(Continuity should not exist)	

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning intake valve timing intermediate lock control solenoid valve. Refer to <u>EM-</u> <u>54, "Exploded View"</u>.

**2.**CHECK INTAKE VALVE TIMING INTERMEDIATE LOCK CONTROL SOLENOID VALVE-II

1. Remove intake valve timing intermediate lock control solenoid valve. Refer to EM-54. "Exploded View".

#### < DTC/CIRCUIT DIAGNOSIS >

 Provide 12 V DC between intake valve timing intermediate lock control solenoid valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure. CAUTION:

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

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

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning intake valve timing intermediate lock control solenoid valve. Refer to <u>EM-54, "Exploded View"</u>.

Component Inspection (Crankshaft Position sensor)



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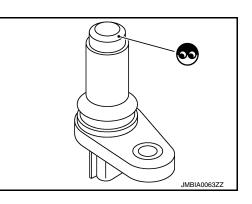
# 1.CHECK CRANKSHAFT POSITION SENSOR (POS)-1

- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect crankshaft position sensor (POS) harness connector.
- 4. Remove the sensor.
- 5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.

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



# 2. CHECK CRANKSHAFT POSITION SENSOR (POS)-2

Check the resistance between crankshaft position sensor (POS) terminals as per the following.

	Crankshaft position sensor (POS)		
Resistance [at 25°C (77°F)]	_	+	
	Terminal (Polarity)		
	2	1	
Except 0 or $\infty$ $\Omega$	3	I	
	3	2	

Is the inspection result normal?

YES >> INSPECTION END

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

Component Inspection (Camshaft position sensor)

INFOID:000000012891415

# 1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-1

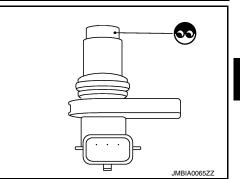
- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect camshaft position sensor (PHASE) harness connector.
- 4. Remove the sensor. Refer to EM-45, "Exploded View".

[VQ35DE]

- < DTC/CIRCUIT DIAGNOSIS >
- 5. Visually check the sensor for chipping.

Is the inspection result normal?

- >> GO TO 2. YES
- >> Replace camshaft position sensor (PHASE). NO



# 2. CHECK CAMSHAFT POSITION SENSOR (PHASE)-2

Check the resistance camshaft position sensor (PHASE) terminals as per the following.

Camshaft position	sensor (PHASE)	
+	_	Resistance [Ω at 25°C (77°F)]
Terminals (	(Polarity)	
1	2	
1	3	Except 0 or ∞
2	3	
Is the inspection resul	<u>lt normal?</u>	
YES >> INSPECT	ION END	

YES >> INSPECTION END

NO >> Replace camshaft position sensor (PHASE). Refer to EM-45, "Exploded View". С

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#### < DTC/CIRCUIT DIAGNOSIS >

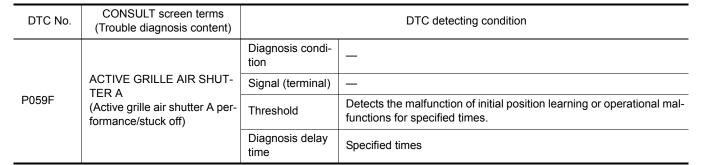
# P059F ACTIVE GRILLE SHUTTER

#### DTC Description

#### DTC DETECTION LOGIC

Active grille shutter normally stops within zone (A) which is defined by zone (B) ( $90^{\circ}\pm20^{\circ}$ ).

If the active grille shutter stops within zone  $\bigcirc$  stuck error is detected, and if the active grille shutter stops at position beyond zone  $\bigcirc$  overrun error is detected.



#### POSSIBLE CAUSE

- Harness or connectors
  - (Active grille shutter circuit is open or shorted.)
- Active grille shutter
- · Foreign objects interferes with active grille shutter

#### FAIL-SAFE

Engine operating condition in fail-safe mode		
Fail safe mode	Vehicle behavior	
Active grille shutter	<ul> <li>When a voltage and temperature related malfunction is detected, the active grille shutter stops at the position of detection.</li> <li>Except for the above case, operates the active grille shutter to fully opened position.</li> </ul>	

#### DTC CONFIRMATION PROCEDURE

#### **1.**CHECK DTC PRIORITY

If DTC P059F displayed with DTC UXXXX, P0116, P0117, P0118, P0125, P0196, P0197, P0198, P0500, P0607, P159F or P1720 first perform the trouble diagnosis for DTC UXXXX, P0116, P0117, P0118, P0125, P0196, P0197, P0198, P0500, P0607, or P159F.

#### Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to <u>EC-105, "DTC Index"</u>.
- NO >> GO TO 2.
- 2. PERFORM DIAGNOSIS PROCEDURE

#### NOTE:

Since this DTC is difficult to be confirmed, perform diagnosis procedure to judge the normality.

>> Proceed to EC-415, "Diagnosis Procedure".

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# **P059F ACTIVE GRILLE SHUTTER**

# < DTC/CIRCUIT DIAGNOSIS >

# Diagnosis Procedure

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# 1. CHECK DTC PRIORITY

<b>1.</b> CHECK D	TC PRIOR	ΤY					
	F or P1720	) first perfori	m the trouble dia			25, P0196, P0197, P0198, P0500, XXX, P0116, P0117, P0118, P0125,	EC
<u>Is applicable</u>	DTC detect	ted?					
		gnosis of ap	plicable. Refer to	0 <u>EC-10</u>	5. "DTC Inde	<u>×"</u> .	С
•	GO TO 2.		_				
2.CHECK A			R				D
	tion switch		e				
			rferes with active of active grille sh		nutter.		
Is the inspect							E
	GO TO 3.	<u></u>					
NO >> F	Repair or re	place the eri	or-detected part	S.			F
<b>3.</b> CHECK A	CTIVE GRI	LLE SHUTT	ER POWER SU	PPLY			
			narness connecto ve grille shutter h		connector an	d ground as follows.	G
+							
Active grill	le shutter	_	Condition	ו	Voltage (Approx.)		Н
Connector	Terminal				(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
E238	1	Ground	Ignition switch: ON	١	Battery volt- age		I
			Ignition switch: OF	F	0 V		
Is the inspect		ormal?					J
	GO TO 5. GO TO 4.						
							K
			ER POWER SU	PPLIC	IRCUIT		
	tion switch	OFF 'R harness c	onnector				
				r harnes	s connector a	and IPDM E/R harness connector.	L
			U U				
Active gr	rille shutter		IPDM E/R	0.	ation it i		ЪЛ
Connector	Terminal	Connec	tor Terminal		ontinuity		Μ
E238	1	F19	52	E	xisted		
Is the inspect	tion result n	ormal?					Ν
			is for power sup		it.		
_	•		or-detected part				
<b>D.</b> CHECK A	CTIVE GRI	LLE SHUTT	ER GROUND C	IRCUIT			0
	tion switch e continuity		ctive grille shutte	r harnes	s connector a	and ground.	Ρ
Active gr	rille shutter						
Connector	Terminal		Continuit	у			
E238	4	Groun	d Existed				
	*						

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

# P059F ACTIVE GRILLE SHUTTER

< DTC/CIRCUIT DIAGNOSIS >

#### YES >> GO TO 6.

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

6.CHECK ACTIVE GRILLE SHUTTER INPUT SIGNAL CIRCUIT

- 1. Disconnect ECM harness connector.
- 2. Check the continuity between ECM harness connector and active grille shutter harness connector.

	+		_	
ECM		Active grille shutter		Continuity
Connector	Terminal	Connector	Terminal	
F79	99	E238	3	Existed

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace the error-detected parts.

7.CHECK ACTIVE GRILLE SHUTTER

Check active grille shutter. Refer to EC-416, "Component Inspection (Active Grille Shutter)".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace active grille shutter. Refer to <u>EXT-32</u>, "Removal and Installation".

#### Component Inspection (Active Grille Shutter)

INFOID:000000012891418

#### **1.**CHECK ACTIVE GRILLE SHUTTER

With CONSULT

- 1. Start the engine.
- 2. Select "ACTIVE GRILLE SHUTTER" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.

3. Touch "CALIBRTN".

4. After the calibration completes, check the operation of active grille shutter as follows.

Condition	Active grille shutter
Select "CLOSE"	$Close \to Open$
Select "OPEN"	$Open \to Close$

**Without CONSULT** 

1. Turn ignition switch OFF.

2. Operate shutter by hands to close position.

3. Check the operation of active grille shutter as follows.

Condition	Active grille shutter
Ignition switch: ON	$Close \rightarrow Open$

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace active grille shutter. Refer to EXT-32, "Removal and Installation".

# P0603, P062F ECM

# < DTC/CIRCUIT DIAGNOSIS >

# P0603, P062F ECM

# DTC Description

· ECM back up system does not function properly.

• EEPROM (built-in microcomputer) system internal ECM does not function properly.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	Ignition switch ON
	ECM BACK UP/CIRCUIT	Signal (terminal)	-
P0603 [Internal Control Module Keep Alive Memory (KAM) Error]	Threshold	ECM back up system does not function prop- erly	
		Diagnosis delay time	-
	Diagnosis condition	Start engine and let it idle	
	CONTROL MODULE P062F (Internal control module EEPROM er- ror)	Signal (terminal)	-
P062F		Threshold	EEPROM (built-in microcomputer) system in- ternal ECM does not function properly
		Diagnosis delay time	_

#### POSSIBLE CAUSE

DTC P0603

- Harness or connectors
- [ECM power supply circuit is open or shorted.]
- ECM

DTC P062F

- Harness or connectors
- [ECM power supply circuit is open or shorted.]
- ECM

FAIL-SAFE

		Engine operating condition in fail-safe mode	
DTC	Fail safe mode	Vehicle behavior	L
P0603	ECM	Engine torque may be limited.	

## DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

Perform the following procedure before performing DTC Confirmation Procedure.

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

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P062F

- 1. Start engine and wait at least 10 seconds.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Repeat steps 1 and 2 for 4 times.
- 4. Turn ignition switch ON.
- 5. Erase DTC.
- 6. Turn ignition switch OFF and wait at least 10 seconds.
- 7. Start engine and wait at least 10 seconds.
- 8. Check 1st trip DTC.

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#### < DTC/CIRCUIT DIAGNOSIS >

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-418, "Diagnosis Procedure".
- NO >> GO TO 3.

**3.**PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0603

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON and wait at least 10 seconds.
- 3. Turn ignition switch OFF and wait at least 5 minutes.
- 4. Turn ignition switch ON and wait at least 10 seconds.
- 5. Repeat steps 3 and 4 for 5 times.
- 6. Turn ignition switch ON.
- 7. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-418, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### Diagnosis Procedure

**1.**INSPECTION START

Check that the battery negative terminal is not disconnected during ignition switch ON.

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.ERASE DTC

- 1. Start the engine and let it idle at least 10 seconds.
- 2. Turn ignition switch OFF.
- 3. Repeat steps 1 and 2 for 4 times.
- 4. Erase DTC.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start the engine and let it idle for 10 seconds.
- 7. Check 1st trip DTC.

#### Is DTC P062F detected again?

- YES >> Replace ECM. Refer to EC-574, "Removal and Installation".
- NO >> INSPECTION END

3.CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-184. "Diagnosis Procedure".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Repair or replace error-detected parts.

#### **4.**PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- Perform DTC confirmation procedure. Refer to <u>EC-417</u>, "DTC Description".
- Is the DTC P0603 or P062F detected again?
- YES >> Replace ECM. Refer to EC-574, "Removal and Installation".
- NO >> INSPECTION END

INFOID:000000012891420

# P0604 ECM

# < DTC/CIRCUIT DIAGNOSIS > P0604 ECM

# DTC Description

#### DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	D.	TC detection condition	(
		Diagnosis condition	Ignition switch ON	
P0604	14 [Internal control module random access —	Signal (terminal)	-	_
P0004		Threshold	Malfunction in the internal RAM of ECM	[
		Diagnosis delay time	-	_

#### POSSIBLE CAUSE

#### • ECM

#### FAIL-SAFE

Fail safe mode	Vehicle behavior
ECM	<ul> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>ASCD operation may be deactivated.</li> </ul>

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

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

#### TESTING CONDITION:

# Before performing the following procedure, confirm that battery voltage is 11 V or more with ignition switch ON.

#### >> GO TO 2.

# 2.PERFORM DTC CONFIRMATION PROCEDURE 1. Turn ignition switch ON (engine stopped) and wait least 20 minutes. M CAUTION: Never start engine during this procedure. N 2. Turn ignition switch OFF and wait at least 10 seconds. N 3. Turn ignition switch ON. Check 1st trip DTC. N 4. Check 1st trip DTC. Is 1st trip DTC detected? O YES >> Proceed to EC-419, "Diagnosis Procedure". N NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident". M

NO-2 >> Confirmation after repair: INSPECTION END

## **Diagnosis** Procedure

# 1.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC confirmation procedure. Refer to EC-419, "DTC Description".

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< DTC/CIRCUIT DIAGNOSIS >

Is the 1st trip DTC P0604 displayed again?

YES >> Replace ECM. Refer to EC-574, "Removal and Installation".

NO >> INSPECTION END

# P0605 ECM

# < DTC/CIRCUIT DIAGNOSIS > P0605 ECM

# DTC Description

#### DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		С
	[	Diagnosis condition	Ignition switch ON	
P0605	[Internal control module read only mem-	Signal (terminal)	-	D
P0005		Threshold	Malfunction in the internal ROM of ECM	
		Diagnosis delay time	-	
POSSIBLE	CAUSE			E

#### POSSIBLE CAUSE

#### ECM

#### FAIL-SAFE

Fail safe mode	Vehicle behavior
ECM	<ul> <li>NOTE: Fail-safe may not occur depending on malfunction type.</li> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>ASCD operation may be deactivated.</li> </ul>

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

2. Turn ignition switch ON.

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

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is 11 V or more with ignition switch ON.

#### >> GO TO 2. Μ 2.PERFORM DTC CONFIRMATION PROCEDURE 1. Turn ignition switch ON (engine stopped) and wait least 20 minutes. Ν **CAUTION:** Never start engine during this procedure. 2. Turn ignition switch OFF and wait at least 10 seconds. 3. Turn ignition switch ON. Ο 4. Check 1st trip DTC. Is 1st trip DTC detected? YES >> Proceed to EC-421, "Diagnosis Procedure". Ρ NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident". NO-2 >> Confirmation after repair: INSPECTION END **Diagnosis** Procedure INFOID:000000012891424 **1.INSPECTION START** 1. Turn ignition switch ON.

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< DTC/CIRCUIT DIAGNOSIS >

- 2. Erase DTC.
- 3. Perform DTC CONFIRMATION PROCEDURE. See <u>EC-421, "DTC Description"</u>.

Is the 1st trip DTC P0605 displayed again?

YES >> Replace ECM. Refer to EC-574, "Removal and Installation".

NO >> INSPECTION END

# P0606 ECM

# < DTC/CIRCUIT DIAGNOSIS >

# P0606 ECM

#### DTC Description

## DTC DETECTION LOGIC

(Trouble diagnosis content)	DTC detection condition		
	Diagnosis condition	-	
CONTROL MODULE	Signal (terminal)	_	
(Control module processor)	Threshold	Malfunction in ECM processor	
	Diagnosis delay time	—	
	CONTROL MODULE	CONTROL MODULE     Diagnosis condition       (Control module processor)     Threshold	CONTROL MODULE (Control module processor)     Diagnosis condition     —       Signal (terminal)     —       Threshold     Malfunction in ECM processor

#### POSSIBLE CAUSE

#### ECM

#### FAIL-SAFE

Fail safe mode	Vehicle behavior
ECM	<ul> <li>NOTE: Fail-safe may not occur depending on malfunction type.</li> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>ASCD operation may be deactivated.</li> </ul>

## DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

2. Turn ignition switch ON.

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

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is 11 V or more with ignition switch ON.

#### >> GO TO 2. Μ 2.PERFORM DTC CONFIRMATION PROCEDURE-I 1. Turn ignition switch ON (engine stopped) and wait at least 10 seconds. Ν **CAUTION:** Never start engine during this procedure. 2. Turn ignition switch OFF and wait at least 10 seconds. 3. Turn ignition switch ON. Ο 4. Check 1st trip DTC. Is 1st trip DTC detected? YES >> Proceed to EC-424, "Diagnosis Procedure". Ρ NO >> GO TO 3. 3.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Start engine.

- 2. Rev up the engine quickly to approximately 3,000 rpm under unloaded condition and completely release the accelerator pedal.
- Let the engine idle and wait at least 10 seconds. 3.

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#### < DTC/CIRCUIT DIAGNOSIS >

- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-424, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### **Diagnosis** Procedure

INFOID:000000012891426

# 1.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC confirmation procedure for 3 times. Refer to EC-423, "DTC Description".

Is the 1st trip DTC P0606 displayed again?

- YES >> Replace ECM. Refer to EC-574, "Removal and Installation".
- NO >> INSPECTION END

# < DTC/CIRCUIT DIAGNOSIS > P0607 ECM

## DTC Description

#### DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		С
		Diagnosis condition	Ignition switch ON	
P0607 ECM (Control module performa	FCM	Signal (terminal)	_	
	(Control module performance)	Threshold	ECM internal communication system is mal- functioning	D
		Diagnosis delay time	_	_

#### POSSIBLE CAUSE

• ECM

#### FAIL-SAFE

	Engine operating condition in fail-safe mode	
Fail safe mode	Vehicle behavior	G
ECM	Engine torque may be limited.	

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

#### TESTING CONDITION:

# Before performing the following procedure, confirm that battery voltage is 11 V or more with ignition $^{-\mathrm{J}}$ switch ON.

>> GO TO 2.	Κ
2.PERFORM DTC CONFIRMATION PROCEDURE	
<ol> <li>Turn ignition switch ON (engine stopped) and wait least 10 seconds.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> <li>Check 1st trip DTC.</li> </ol>	L
Is 1st trip DTC detected?	M
<ul> <li>YES &gt;&gt; Proceed to <u>EC-425, "Diagnosis Procedure"</u>.</li> <li>NO-1 &gt;&gt; To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u>.</li> <li>NO-2 &gt;&gt; Confirmation after repair: INSPECTION END</li> </ul>	Ν
Diagnosis Procedure	
1.PERFORM DTC CONFIRMATION PROCEDURE	0
<ol> <li>Turn ignition switch ON.</li> <li>Erase DTC.</li> </ol>	Р

3. Perform DTC confirmation procedure. Refer to EC-425, "DTC Description".

- Is the 1st trip DTC P0607 displayed again?
- YES >> Replace ECM. Refer to EC-574, "Removal and Installation".
- NO >> INSPECTION END

EC

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INFOID:000000012891427

# < DTC/CIRCUIT DIAGNOSIS > P060A ECM

# DTC Description

		Γ	
DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	Ignition switch ON
P060A	CONTROL MODULE (Internal control module monitoring pro- cessor performance)	Signal (terminal)	—
		Threshold	ECM internal monitoring processor is mal- functioning

Diagnosis delay time

#### POSSIBLE CAUSE

• ECM

Ρ

#### FAIL-SAFE

Engine operating condition in fail-safe mode			
Fail safe mode Vehicle behavior			
ECM	<ul> <li>NOTE: Fail-safe may not occur depending on malfunction type.</li> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>Engine torque may be limited.</li> <li>ASCD operation may be deactivated.</li> </ul>		

## DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

2. Turn ignition switch ON.

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is 11 V or more with ignition switch ON.

#### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and wait at least 10 seconds.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Repeat step 1 and 2 for 5 times.
- 4. Turn ignition switch ON.
- 5. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-426, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### **Diagnosis** Procedure

**1.**PERFORM DTC CONFIRMATION PROCEDURE

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# P060A ECM

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
<ol> <li>Turn ignition switch ON.</li> <li>Erase DTC.</li> <li>Perform DTC confirmation procedure. Refer to <u>EC-426. "DTC Description"</u>.</li> </ol>		А
Is the 1st trip DTC P060A displayed again?YES>> Replace ECM. Refer to EC-574, "Removal and Installation".NO>> INSPECTION END		EC
		С
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# < DTC/CIRCUIT DIAGNOSIS > P060B ECM

# DTC Description

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
P060B (Intern		Diagnosis condition	Ignition switch ON
	CONTROL MODULE (Internal control module A/D processing performance)	Signal (terminal)	-
		Threshold	ECM internal analog/digital conversion pro- cessing system is malfunctioning
		Diagnosis delay time	-

#### POSSIBLE CAUSE

• ECM

#### FAIL-SAFE

Engine operating condition in fail-safe mode		
Fail safe mode	Vehicle behavior	
ECM	<ul> <li>NOTE: Fail-safe may not occur depending on malfunction type.</li> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> <li>ASCD operation may be deactivated.</li> </ul>	

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

2. Turn ignition switch ON.

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is 11 V or more with ignition switch ON.

#### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON (engine stopped) and wait least 10 seconds.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Check 1st trip DTC.

Is 1st trip DTC detected?

#### YES >> Proceed to EC-428, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

#### **Diagnosis** Procedure

**1.**PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.

2. Erase DTC.

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# **P060B ECM**

	[VQ35DE]
< DTC/CIRCUIT DIAGNOSIS > 3. Perform DTC confirmation procedure. Refer to <u>EC-428</u> , "DTC Description".	
<u>Is the 1st trip DTC P060B displayed again?</u> YES >> Replace ECM. Refer to <u>EC-574, "Removal and Installation"</u> .	A
NO >> INSPECTION END	FO
	EC
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< DTC/CIRCUIT DIAGNOSIS >

# P0643 SENSOR POWER SUPPLY

# Description

ECM supplies a voltage of 5 V to some of the sensors systematically divided into 2 groups, respectively. Accordingly, when a short circuit develops in a sensor power source, a malfunction may occur simultaneously in the sensors belonging to the same group as the short-circuited sensor.

Sensor power supply 1

- Accelerator pedal position (APP) sensor 1
- Crankshaft position (CKP) sensor (POS)
- · Exhaust valve timing (EVT) control position sensor
- · Mass air flow (MAF) sensor
- Throttle position (TP) sensor

#### NOTE:

If sensor power supply 1 circuit is malfunctioning, DTC P0643 is displayed.

Sensor power supply 2

- · Accelerator pedal position (APP) sensor 2
- Camshaft position (CMP) sensor (PHASE)
- Engine oil pressure (EOP) sensor
- Refrigerant pressure sensor

# DTC Description

#### DTC DETECTION LOGIC

ECM detects a voltage of power source for sensor is excessively low or high

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
		Diagnosis condition	Start engine and let it idle
P0643	SENSOR POWER/CIRC (Sensor reference voltage "A" circuit high)	Signal (terminal)	Sensor power supply 1 circuit
		Threshold	ECM detects a voltage of power source for sensor is excessively low or high
		Diagnosis delay time	—

#### POSSIBLE CAUSE

- Sensor power supply 1 circuit
- Accelerator pedal position (APP) sensor 1
- Crankshaft position (CKP) sensor (POS)
- Exhaust valve timing (EVT) control position sensor
- Mass air flow (MAF) sensor
- Throttle position (TP) sensor

#### FAIL-SAFE

	Engine operating condition in fail-safe mode				
Fail safe mode	Vehicle behavior				
Sensor power supply	<ul> <li>ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>The position of the following components is fixed.</li> <li>Intake valve timing control solenoid valve</li> <li>Exhaust valve timing control solenoid valve</li> <li>Intake manifold runner control valve</li> </ul>				

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

INFOID:000000012891433

INFOID:000000012891434

# P0643 SENSOR POWER SUPPLY

< DTC/CIR	CUIT DIAGI	NOSIS	>				[VQ35DE]
1. Turn igi 2. Turn igi							
Turn igi	nition switch		nd wait at least	10 seconds.			
	ONDITION: forming the	follow	ing procedure	, confirm that batte	ery voltage is m	ore than 8 V	at idle.
	00 <b>T</b> 0 0						
	GO TO 2.		ATION PROCE				
Check I			lle for 1 second	J.			
DTC dete	cted?						
			<u>, "Diagnosis P</u>	<u>rocedure"</u> . efore repair: Refer to	GL42 "Intermit	tent Incident"	
			repair: INSPEC		<u>GI-42, Internit</u>		
iagnosis	s Procedu	re					INFOID:0000000012891435
0							
	SENSOR PO		SUPPLY 1				
	nition switch nect ECM ha		connector				
. Turn igi	nition switch	ON.					
Check 1	he voltage b	etween	ECM harness	connector and grou	nd.		
	+						
	ECM		_	_ Voltage _ (Approx.)			
Connecto		nal					
E32	146	6		5 V			
F78	28	;	Ground				
F79	98	5					
	ction result n						
	INSPECTIO GO TO 2.	N END					
		OWER	SUPPLY 1 CIR	CUIT			
.CHECK							
		OFF.					
. Turn igi . Disconr	nition switch nect following	g senso	or harness conr		<b>,</b> , , , , ,		
. Turn igi . Disconr	nition switch nect following	g senso		nector. ground, between the	following termir	als.	
. Turn igi . Disconr . Check l	nition switch nect following	g senso			following termir	als.	
. Turn igi . Disconr . Check l	nition switch nect following narness for s	g senso	power and to g	ground, between the	following termir	als.	
Turn igi Disconi Check l	nition switch nect following narness for s	g senso	power and to g	ground, between the Sensor			
Connector	nition switch nect following narness for s CM Terminal	g senso short to APP se	power and to g	ground, between the Sensor	Connector	Terminal	
. Turn igr Disconr Check l E Connector E32	nition switch nect following narness for s CM Terminal 146	g senso short to APP se	power and to g N ensor 1 ensor (POS)	ground, between the Sensor	Connector E31	Terminal 4	
. Turn igi . Disconi . Check l E Connector	nition switch nect following narness for s CM Terminal	APP se CKP se MAF se EVT co	power and to g N ensor 1 ensor (POS) ensor pontrol position sense	ground, between the Sensor ame sor (bank 1)	Connector E31 F30 F93 F31	Terminal 4 1	
. Turn igr Disconr Check l E Connector E32	nition switch nect following narness for s CM Terminal 146	APP se CKP se MAF se EVT co	power and to g N ensor 1 ensor (POS) ensor pontrol position sense pontrol position sense	ground, between the Sensor ame sor (bank 1)	Connector E31 F30 F93	Terminal 4 1 1	

NO >> Repair or replace error-detected parts.

3.CHECK COMPONENTS

Check the following.

# P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

- Accelerator pedal position (APP) sensor 1 (Refer to EC-507, "Component Inspection".)
- Crankshaft position (CKP) sensor (POS) (Refer to EC-331, "Component Inspection".)
- Exhaust valve timing (EVT) control position sensor [Refer to EC-205, "Component Inspection (Exhaust Valve Timing Control Position Sensor)".] • Mass air flow (MAF) sensor (Refer to EC-223, "Component Inspection".)
- Throttle position (TP) sensor (Refer to EC-243, "Component Inspection".)
- Is the inspection result normal?
- YES >> INSPECTION END
- NO >> Replace malfunctioning component.

# P0850 PNP SWITCH

## Description

When the selector lever position is P or N, park/neutral position (PNP) signal from the transmission range switch is sent to ECM.

## DTC Description

## DTC DETECTION LOGIC

The signal of the park/neutral position (PNP) signal does not change during driving after the engine is started.

DTC	CONSULT screen t (Trouble diagnosis co			DTC detection condition
			Diagnosis condition	—
	P-N POS SW/CIRCUIT		Signal (terminal)	The park/neutral position (PNP) signal circuit
P0850	(Park/Neutral switch input	circuit)	Threshold	The signal does not change during driving af- ter the engine is started
			Diagnosis delay time	—
[The park • TCM	or connectors <td>signal circu</td> <td>it is open or shorted.]</td> <td></td>	signal circu	it is open or shorted.]	
FAIL-SAFI Not applica				
	IFIRMATION PROCED	URE		
	TION START			
	ULT be used?			
	ULT be used?			
	> GO TO 2.			
~	> GO TO 5. NDITIONING			
			viously conducted alw	ays perform the following before conduct
ing the nex	t test.			ays perform the following before conduct
	nition switch OFF and w nition switch ON.	ait at least	10 seconds.	
	nition switch OFF and w	ait at least	10 seconds.	
•	> GO TO 3. EPNP SIGNAL			
2. Select	nition switch ON.	A MONITO	R" mode with CONSU	LT. Then check the "P/N POSI SW" signa
Pos	ition (Selector lever)	Kr	nown-good signal	-
N or P posit	ion		ON	-
<b>—</b>	ve position		OFF	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Proceed to EC-434, "Diagnosis Procedure".

[VQ35DE]

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# 4.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Maintain the following conditions for at least 50 consecutive seconds. CAUTION:

## Always drive vehicle at a safe speed.

ENG SPEED	1,100 - 6,375 rpm
COOLANT TEMP/S	More than 65°C (149°F)
B/FUEL SCHDL	2.2 - 31.8 msec
VHCL SPEED SE	More than 64 km/h (40 mph)
Selector lever	Suitable position

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-434, "Diagnosis Procedure".

NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

- 1. Turn ignition switch ON.
- 2. Check the voltage between ECM harness connector terminals.

	E	СМ				
+ –		-	Condition		Voltage	
Connector	Terminal	Connector	Terminal			
F79	83	E32	152	Selector lever	P or N	Approx. 0 V
175	00	LJZ	152	position	Except above	Battery voltage

#### Is the inspection result normal?

YES-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

YES-2 >> Confirmation after repair: INSPECTION END

NO >> Proceed to <u>EC-434. "Diagnosis Procedure"</u>.

## **Diagnosis** Procedure

INFOID:000000012891438

# 1. CHECK TRANSMISSION RANGE SWITCH POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect transmission range switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between transmission range switch harness connector and ground.

	+		
Transmission	range switch	_	Voltage
Connector	Connector Terminal		
F29	7	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

#### 2.CHECK TRANSMISSION RANGE SWITCH POWER SUPPLY CIRCUIT

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



# P0850 PNP SWITCH

## < DTC/CIRCUIT DIAGNOSIS >

F297F2463ExistedAlso check harness for short to ground. the inspection result normal?YES>> Perform the trouble diagnosis for power supply circuit. VOVO>> Repair or replace error-detected partsCHECK TRANSMISSION RANGE SWITCH SIGNAL CIRCUITTurn ignition switch OFF. Disconnect ECM harness connector. Check the continuity between transmission range switch harness connector and ECM harness connector. Check the continuity between transmission range switch harness connector and ECM harness connector.Transmission range switchECM ContinuityConnectorTerminal ConnectorF2910F7983ExistedAlso check harness for short to ground and to power. the inspection result normal?(FS>> GO TO 4. IOIO>> Repair or replace error-detected partsCHECK TRANSMISSION RANGE SWITCHteck the transmission range switch. Refer to TM-109, "Component Inspection". the inspection result normal?(FS>> INSPECTION END			1		1	
Connector         Terminal         Connector         Terminal           F29         7         F24         63         Existed           Also check harness for short to ground.         the inspection result normal?         (FS)         >> Perform the trouble diagnosis for power supply circuit.           IO         >> Repair or replace error-detected parts.         .         .         .           CHECK TRANSMISSION RANGE SWITCH SIGNAL CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.           Check the continuity between transmission range switch harness connector and ECM harness connector.         Continuity           Connector         Terminal         Connector         Terminal           F29         10         F79         83         Existed           Also check harness for short to ground and to power.         the inspection result normal?         .           VES         > GO TO 4.         .         .           IO         >> Repair or replace error-detected parts.         .           .CHECK TRANSMISSION RANGE SWITCH         .         .           text the transmission range switch. Refer to TM-109, "Component Inspection".         .           the inspection result normal?         .         .           VES         > INSPECTION END         .      .		range switch			Continuity	
Also check harness for short to ground.         the inspection result normal?         YES       >> Perform the trouble diagnosis for power supply circuit.         NO       >> Repair or replace error-detected parts.         .CHECK TRANSMISSION RANGE SWITCH SIGNAL CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.         Check the continuity between transmission range switch harness connector and ECM harness connector.         Check the continuity between transmission range switch harness connector and ECM harness connector.         Transmission range switch       ECM         Connector       Terminal         Continuity       ES         Also check harness for short to ground and to power.         the inspection result normal?         YES       >> GO TO 4.         VO       >> Repair or replace error-detected parts.         .CHECK TRANSMISSION RANGE SWITCH         neck the transmission range switch. Refer to TM-109, "Compon	Connector	Terminal	Connector	Terminal		
the inspection result normal?         YES       >> Perform the trouble diagnosis for power supply circuit.         YO       >> Repair or replace error-detected parts.         .CHECK TRANSMISSION RANGE SWITCH SIGNAL CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.         Check the continuity between transmission range switch harness connector and ECM harness connector.         Transmission range switch       ECM         Connector       Terminal         Connector       Terminal         Connector       Terminal         Connector       Terminal         Connector       Terminal         Connector       Terminal         Continuity         Also check harness for short to ground and to power.         the inspection result normal?         YES       >> GO TO 4.         VO       >> Repair or replace error-detected parts.         .CHECK TRANSMISSION RANGE SWITCH         The inspection result normal?         YES       >> INSPECTION END         VO       >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to TM-230.					Existed	
>> Perform the trouble diagnosis for power supply circuit.         NO       >> Repair or replace error-detected parts.         .CHECK TRANSMISSION RANGE SWITCH SIGNAL CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.         Check the continuity between transmission range switch harness connector and ECM harness connector.         Transmission range switch       ECM         Connector       Terminal         F29       10       F79         Also check harness for short to ground and to power.         the inspection result normal?         /ES       > GO TO 4.         NO       >> Repair or replace error-detected parts.         .CHECK TRANSMISSION RANGE SWITCH         teck the transmission range switch. Refer to TM-109, "Component Inspection".         the inspection result normal?         YES       >> INSPECTION END         NO       >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to TM-230.			-	round.		
NO       >> Repair or replace error-detected parts.         .CHECK TRANSMISSION RANGE SWITCH SIGNAL CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.         Check the continuity between transmission range switch harness connector and ECM harness connector.         Transmission range switch       ECM         Connector       Terminal         Connector       Terminal         F29       10       F79         83       Existed         Also check harness for short to ground and to power.         the inspection result normal?         YES       >> GO TO 4.         NO       >> Repair or replace error-detected parts.         .CHECK TRANSMISSION RANGE SWITCH         teck the transmission range switch. Refer to TM-109, "Component Inspection".         the inspection result normal?         YES       >> INSPECTION END         NO       >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to TM-230.	•					
.CHECK TRANSMISSION RANGE SWITCH SIGNAL CIRCUIT         Turn ignition switch OFF.         Disconnect ECM harness connector.         Check the continuity between transmission range switch harness connector and ECM harness connector.         Transmission range switch       ECM         Connector       Terminal         Connector       Connector         Connector       Te						rcuit.
Turn ignition switch OFF.         Disconnect ECM harness connector.         Check the continuity between transmission range switch harness connector and ECM harness connector.         Transmission range switch       ECM         Connector       Terminal         Construct       Continuity         Also check harness for short to ground and to power.         the inspection result normal?         (ES       >> GO TO 4.         NO       >> Repair or replace error-detected parts.         .CHECK TRANSMISSION RANGE SWITCH         neck the transmission range switch. Refer to TM-109, "Component Inspection".         the inspection result normal?         (ES       >> INSPECTION END         vO       >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to TM-230.		•		•		
Disconnect ECM harness connector. Check the continuity between transmission range switch harness connector and ECM harness connector. Transmission range switch ECM Continuity Connector Terminal Connector Terminal Continuity F29 10 F79 83 Existed Also check harness for short to ground and to power. the inspection result normal? (ES >> GO TO 4. NO >> Repair or replace error-detected parts. .CHECK TRANSMISSION RANGE SWITCH heck the transmission range switch. Refer to TM-109, "Component Inspection". the inspection result normal? (ES >> INSPECTION END NO >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to TM-230.	<b>J.</b> CHECK I	RANSMISS	SION RANGE	SWITCHS	SIGNAL CIRO	
Check the continuity between transmission range switch harness connector and ECM harness connector.         Transmission range switch       ECM       Continuity         Connector       Terminal       Connector       Terminal       Continuity         Gonnector       Terminal       Connector       Terminal       Continuity         F29       10       F79       83       Existed         Also check harness for short to ground and to power.       The inspection result normal?       CS       >> GO TO 4.         VO       >> Repair or replace error-detected parts.       CHECK TRANSMISSION RANGE SWITCH       Check the transmission range switch. Refer to TM-109, "Component Inspection".         the inspection result normal?       CS       >> INSPECTION END       Content Inspection result assembly. Refer to TM-230, NO         VES       >> INSPECTION END       So       >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to TM-230, NO						
Transmission range switchECMContinuityConnectorTerminalConnectorTerminalF2910F7983ExistedAlso check harness for short to ground and to power.the inspection result normal?'ES>> GO TO 4.IO>> Repair or replace error-detected partsCHECK TRANSMISSION RANGE SWITCHheck the transmission range switch. Refer to TM-109, "Component Inspection".the inspection result normal?'ES>> INSPECTION ENDIO>> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to TM-230.					anga awitah	cornect context and FCM bernade connector
Connector       Terminal       Connector       Terminal         F29       10       F79       83       Existed         Also check harness for short to ground and to power.       the inspection result normal?       F28       >> GO TO 4.         NO       >> Repair or replace error-detected parts.       .       .       .       .         .CHECK TRANSMISSION RANGE SWITCH       .       .       .       .       .         heck the transmission range switch. Refer to TM-109, "Component Inspection".       .       .       .       .         /ES       >> INSPECTION END       .       .       .       .       .         /ES       >> INSPECTION END       .       .       .       .       .         /ES       >> INSPECTION END       .       .       .       .       .         /O       >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to TM-230.       .       .	. Check Ir	le continuity	between tra	Institussion i	ange switch	lamess connector and ECM namess connector.
Connector       Terminal       Connector       Terminal         F29       10       F79       83       Existed         Also check harness for short to ground and to power.       the inspection result normal?       F28       >> GO TO 4.         NO       >> Repair or replace error-detected parts.       .       .       .       .         .CHECK TRANSMISSION RANGE SWITCH       .       .       .       .       .         heck the transmission range switch. Refer to TM-109, "Component Inspection".       .       .       .       .         /ES       >> INSPECTION END       .       .       .       .       .         /ES       >> INSPECTION END       .       .       .       .       .         /ES       >> INSPECTION END       .       .       .       .       .         /O       >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to TM-230.       .       .	Transmission	range switch	FC	<u> </u>	1	
F29       10       F79       83       Existed         Also check harness for short to ground and to power.       Also check harness for short to ground and to power.         the inspection result normal?       ////////////////////////////////////	1				Continuity	
Also check harness for short to ground and to power. <u>the inspection result normal?</u> (ES >> GO TO 4. NO >> Repair or replace error-detected parts. .CHECK TRANSMISSION RANGE SWITCH meck the transmission range switch. Refer to <u>TM-109, "Component Inspection"</u> . <u>the inspection result normal?</u> (ES >> INSPECTION END NO >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to <u>TM-230</u> ,					Evisted	
the inspection result normal? (ES >> GO TO 4. NO >> Repair or replace error-detected parts. .CHECK TRANSMISSION RANGE SWITCH neck the transmission range switch. Refer to <u>TM-109</u> , "Component Inspection". the inspection result normal? (ES >> INSPECTION END NO >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to <u>TM-230</u> ,						
<ul> <li>YES &gt;&gt; GO TO 4.</li> <li>NO &gt;&gt; Repair or replace error-detected parts.</li> <li>CHECK TRANSMISSION RANGE SWITCH</li> <li>The transmission range switch. Refer to <u>TM-109, "Component Inspection"</u>.</li> <li>the inspection result normal?</li> <li>YES &gt;&gt; INSPECTION END</li> <li>NO &gt;&gt; There is malfunction of transmission range switch. Replace transaxle assembly. Refer to <u>TM-230,</u></li> </ul>			0	round and t	o power.	
<ul> <li>NO &gt;&gt; Repair or replace error-detected parts.</li> <li>CHECK TRANSMISSION RANGE SWITCH</li> <li>neck the transmission range switch. Refer to <u>TM-109, "Component Inspection"</u>.</li> <li>the inspection result normal?</li> <li>YES &gt;&gt; INSPECTION END</li> <li>NO &gt;&gt; There is malfunction of transmission range switch. Replace transaxle assembly. Refer to <u>TM-230,</u></li> </ul>			ormal?			
CHECK TRANSMISSION RANGE SWITCH heck the transmission range switch. Refer to <u>TM-109</u> , "Component Inspection". the inspection result normal? (ES >> INSPECTION END NO >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to <u>TM-230</u> ,	-				-	
neck the transmission range switch. Refer to <u>TM-109, "Component Inspection"</u> . <u>the inspection result normal?</u> YES >> INSPECTION END NO >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to <u>TM-230</u> ,		•		•	S.	
the inspection result normal? YES >> INSPECTION END NO >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to <u>TM-230</u> ,	CHECK T	RANSMISS	SION RANGE	SWITCH		
<ul> <li>VES &gt;&gt; INSPECTION END</li> <li>NO &gt;&gt; There is malfunction of transmission range switch. Replace transaxle assembly. Refer to <u>TM-230</u>.</li> </ul>	heck the tra	ansmission	range switch	.Refer to 👖	<u>M-109, "Com</u>	ponent Inspection".
NO >> There is malfunction of transmission range switch. Replace transaxle assembly. Refer to <u>TM-230</u> ,	the inspec	tion result n	ormal?			
					range switch	. Replace transaxle assembly. Refer to $\underline{TM}$ -230,
	•	Removal ar	<u>io installation</u>	<u>1</u> .		

#### < DTC/CIRCUIT DIAGNOSIS >

# P1078, P1084 EVT CONTROL POSITION SENSOR

## DTC Description

INFOID:000000012891439

[VQ35DE]

#### DTC DETECTION LOGIC

An excessively high or low voltage from the sensor is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Start engine and let it idle	
P1078	EXH TIM SEN/CIRC-B1 [Exhaust valve timing (EVT) control po-	Signal (terminal)	Voltage signal transmitted from EVT control position sensor to ECM	
P1076	sition sensor (bank 1) circuit]	Threshold	An excessively high or low voltage from the sensor is sent to ECM	
		Diagnosis delay time	—	
		Diagnosis condition	Start engine and let it idle	
P1084	EXH TIM SEN/CIRC-B2	Signal (terminal)	Voltage signal transmitted from EVT control position sensor to ECM	
F 1004	[Exhaust valve timing (EVT) control po- sition sensor (bank 2) circuit]	Threshold	An excessively high or low voltage from the sensor is sent to ECM	
		Diagnosis delay time	—	

## POSSIBLE CAUSE

DTC P1078

- Harness or connectors [EVT control position sensor (bank 1) circuit is open or shorted.]
- EVT control position sensor
- Crankshaft position (CKP) sensor
- Camshaft position (CMP) sensor (bank 1)
- · Accumulation of debris to the signal pick-up portion of the camshaft

#### DTC P1084

- Harness or connectors [EVT control position sensor (bank 2) circuit is open or shorted.]
- EVT control position sensor (bank 2)
- · Each sensor, connected with sensor power supply 2 circuit
- · Accumulation of debris to the signal pick-up portion of the camshaft

#### DTC CONFIRMATION PROCEDURE

#### **1.**CHECK DTC PRIORITY

If DTC P1078 or P0184 is displayed with DTC P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0643.

#### Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to EC-430, "DTC Description".

NO >> GO TO 2.

## 2. PRECONDITIONING

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

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

>> GO TO 3.

# 3. PERFORM DTC CONFIRMATION PROCEDURE

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

			S4 EVI C	UNIROL	POSITIO	N SENSOR	
							[VQ35DE]
•	<u>TC detected</u>	_	anocio Proo	oduro"			
		<u>EC-437, "Dia</u> alfunction syr			fer to GI-42,	"Intermittent Incide	nt".
		n after repair					
iagnosis	s Procedu	re					INFOID:000000012891440
	DTC PRIOR						-
				<u></u>	<u> </u>	<u></u>	<u> </u>
DTC P107 s) for DTC		s displayed v	with DTC P0	643, first pei	form the con	firmation procedure	e (trouble diagno-
,	DTC detect	ted?					
YES >>		gnosis of app	olicable. Ref	er to <u>EC-430</u>	). "DTC Desc	cription".	
-	GO TO 2.						
.CHECK I	EXHAUST V	ALVE TIMIN	G (EVT) CO	NTROL PO	SITION SEN	SOR POWER SUF	PPLY
		ntrol position	sensor harn	ess connect	or.		
	nition switch		control nosi	tion sensor l	narness conr	nector and ground.	
Oncorr	ne voltage b					lector and ground.	
		+					
DTC	EVT d	control position	sensor	– Voltage (V)			
	Bank	Connector	Terminal				
P1078	1	F31	1	Ground	Approx. 5		
P1084	2	F70	1	Giouna	Appiox. 5		
Turn igr Disconr	nition switch nect ECM ha	rness conne	ctor.			CUIT	harness connec-
DTC	EVT o	control position	sensor	E	СМ	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P1078	1	F31	1	F78	28	Existed	
P1084	2	F70	1	170	20	Existed	
	ction result n						
	INSPECTIO		atactad part				
	•	place error-d	•				
			JN SENSOF	GROUND			
Disconr		rness conne		osition sense	or harness co	onnector and ECM	harness connec-
	T						
DTC		control position			СМ	Continuity	
5.40	Bank	Connector	Terminal	Connector	Terminal	-	
P1078	1	F31	2	F78	40	Existed	

F70 4. Also check harness for short to ground and short to power.

2

2

P1084

F78

40

Existed

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 5.

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

5. CHECK EVT CONTROL POSITION SENSOR INPUT SIGNAL CIRCUIT

 Check the continuity between exhaust valve timing control position sensor harness connector and ECM harness connector.

		+			-	
DTC	EVT control position sensor			ECM		Continuity
	Bank	Connector	Terminal	Connector	Terminal	
P1078	1	F31	3	F78	37	Existed
P1084	2	F70	3	170	39	LAISIEU

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

Is the inspection result normal?

YES >> GO TO 6.

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

 $\mathbf{6}$ . CHECK EVT CONTROL POSITION SENSOR

Check exhaust valve timing control position sensor. Refer to EC-438. "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace malfunctioning EVT control position sensor. Refer to EM-45, "Exploded View".

## 7.CHECK CKP SENSOR

Check Crankshaft position sensor. Refer to EC-331, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace crankshaft position sensor. Refer to EM-38, "Exploded View".

8. CHECK CMP SENSOR

Check camshaft position sensor. Refer to EC-337, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace malfunctioning camshaft position sensor. Refer to EM-45, "Exploded View".

**9.**CHECK CAMSHAFT (EXH)

Check the following.

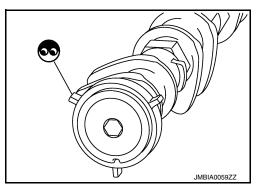
• Accumulation of debris to the signal plate of camshaft rear end

Chipping signal plate of camshaft rear end

Is the inspection result normal?

YES >> INSPECTION END

NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to EM-79, "Removal and Installation".



# Component Inspection

INFOID:000000012891441

[VQ35DE]

# 1. EXHAUST VALVE TIMING CONTROL POSITION SENSOR - 1

- 1. Turn ignition switch OFF.
- 2. Disconnect exhaust valve timing control position sensor harness connector.
- 3. Loosen the fixing bolt of the sensor.

Revision: December 2015

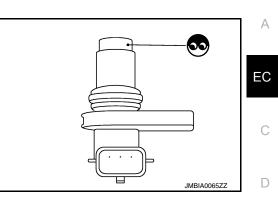


#### < DTC/CIRCUIT DIAGNOSIS >

- 4. Remove the sensor. Refer to <u>EM-45, "Exploded View"</u>.
- 5. Visually check the sensor for chipping.

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace malfunctioning exhaust valve timing control position sensor. Refer to <u>EM-45</u>, "Exploded View".



[VQ35DE]

# 2. EXHAUST VALVE TIMING CONTROL POSITION SENSOR - 2

Check resistance exhaust valve timing control position sensor terminals as follows.

	e timing control n sensor	Condition		
+	-			Resistance
Terr	minal			
1	2			
1	3	Temperature	25°C (77°F)	Except 0 $\Omega$ or $\infty$ $\Omega$
2	3			

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning exhaust valve timing control position sensor. Refer to <u>EM-45</u>, "<u>Exploded</u> <u>View</u>".

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# P1148, P1168 CLOSED LOOP CONTROL

## **DTC** Description

INFOID:000000012891442

[VQ35DE]

## DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	-	
		Signal (terminal)	-	
P1148	CLOSED LOOP-B1 (Closed loop bank 1)	Threshold	The closed loop control function for bank 1 does not operate even when vehicle is being driven in the specified condition	
		Diagnosis delay time	-	
		Diagnosis condition	—	
		Signal (terminal)	-	
P1168	CLOSED LOOP-B2 (Closed loop bank 2)	Threshold	The closed loop control function for bank 2 does not operate even when vehicle is being driven in the specified condition	
		Diagnosis delay time	-	

#### POSSIBLE CAUSE

- Harness or connectors
- (The A/F sensor 1 circuit is open or shorted.)
- A/F sensor 1
- A/F sensor 1 heater

## FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

# **1.**CHECK DTC PRIORITY

If DTC P1148 or P1168 is displayed with another DTC for A/F sensor 1, perform the trouble diagnosis for the corresponding DTC.

#### Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to <u>EC-105, "DTC Index"</u>.
- NO >> INSPECTION END

## P1212 TCS COMMUNICATION LINE

#### < DTC/CIRCUIT DIAGNOSIS >

# P1212 TCS COMMUNICATION LINE

## Description

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and "ABS actuator and electric unit (control unit)". Be sure to erase the malfunction information such as DTC not only for "ABS actuator and electric unit (control unit)" but also for ECM after TCS related repair.

## DTC Description

## DTC DETECTION LOGIC

Freeze frame data is not stored in the ECM for this self-diagnosis.

ECM cannot receive the information from "ABS actuator and electric unit (control unit)" continuously.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	Start engine and let it idle
		Signal (terminal)	CAN communication signal
P1212	TCS C/U FUNCTN (TCS control unit function)	Threshold	ECM cannot receive the information from "ABS actuator and electric unit (control unit)" continuously
		Diagnosis delay time	_
(The CAN	r connectors communication line is open or sl ator and electric unit (control unit)		
FAIL-SAFE			
DTC CONF	FIRMATION PROCEDURE		
1.CHECK	DTC PRIORITY		
		KX or P0607, first perfe	orm the confirmation procedure for DTC
UXXXX or F	20607. <u>e DTC detected?</u>		
	Perform diagnosis of applicabl	e.	
	<ul> <li>DTC UXXXX: Refer to <u>EC-105</u></li> <li>DTC P0607: Refer to <u>EC-425</u>, GO TO 2.</li> </ul>	<u>, "DTC Index"</u> .	
•	NDITIONING		
		eviously conducted. alwa	ays perform the following before conduct-
ing the next	test	•	
	nition switch OFF and wait at leas nition switch ON.	ST TU SECONDS.	
<ol><li>Turn iğr</li></ol>	nition switch OFF and wait at leas	st 10 seconds.	
	ONDITION: forming the following procedur	e, confirm that battery	voltage is more than 10.5 V at idle.
	5	-,	
<b>~</b>	GO TO 3.		
<b>3.</b> PERFOF	RM DTC CONFIRMATION PROC	EDURE	
	gine and let it idle for at least 10 Ist trip DTC.	seconds.	

Revision: December 2015

Is 1st trip DTC detected?

[VQ35DE]

INFOID:000000012891443

INFOID:000000012891444

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# P1212 TCS COMMUNICATION LINE

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Proceed to EC-442, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## **Diagnosis** Procedure

INFOID:000000012891445

**1.**CHECK DTC PRIORITY

If DTC P1212 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- DTC UXXXX: Refer to EC-105, "DTC Index".
- DTC P0607: Refer to EC-425, "DTC Description".

NO >> GO TO 2.

2.CHECK DTC WITH BRC

Perform the trouble diagnosis for BRC.

>> Proceed to <u>BRC-58, "Work Flow"</u> (without ICC) or <u>BRC-242, "Work Flow"</u> (with ICC).

# P1217 ENGINE OVER TEMPERATURE

#### < DTC/CIRCUIT DIAGNOSIS >

# P1217 ENGINE OVER TEMPERATURE

#### DTC Description

#### DTC DETECTION LOGIC

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 cindicated.

DTC	CONSULT screen terms (Trouble diagnosis content)		D	TC detection condition
			Diagnosis condition	—
			Signal (terminal)	
		1	Threshold	Cooling fan does not operate properly (Over- heat)
			Diagnosis delay time	
			Diagnosis condition	
			Signal (terminal)	_
		2	Threshold	Cooling fan system does not operate properly (Overheat)
P1217	ENG OVER TEMP		Diagnosis delay time	_
-1217	[Engine over temperature (Over- heat)]		Diagnosis condition	_
			Signal (terminal)	_
		3	Threshold	Engine coolant was not added to the system using the proper filling method
			Diagnosis delay time	_
			Diagnosis condition	-
			Signal (terminal)	
		4	Threshold	Engine coolant is not within the specified range
			Diagnosis delay time	

#### CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to <u>CO-10, "Changing Engine</u> <u>Coolant"</u>. Also, replace the engine oil. Refer to <u>LU-9, "Changing Engine Oil"</u>.

- 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 <u>MA-13</u>, "Engine Coolant Mixture Ratio".
- 2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

#### POSSIBLE CAUSE

Harness or connectors     (Cooling fan circuit is open or shorted.)	Ν
• IPDM E/R	
Cooling fan motor	0
Radiator hose	
Radiator	
Radiator cap	
Reservoir tank	Ρ
Water pump	
Thermostat	
Water control valve	
FAIL-SAFE	

## DTC CONFIRMATION PROCEDURE

INFOID:000000012891446

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[VQ35DE]

# **1.**CHECK DTC PRIORITY

If DTC P1217 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC UXXXX: Refer to <u>EC-105, "DTC Index"</u>.
  - DTC P0607: Refer to EC-425, "DTC Description".

NO >> GO TO 2.

2.PERFORM COMPONENT FUNCTION CHECK-I

#### WARNING:

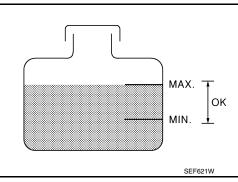
Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

Check the coolant level in the reservoir tank and radiator. Allow engine to cool before checking coolant level.

Is the coolant level in the reservoir tank and/or radiator below the proper range?

- YES >> Proceed to EC-444, "Diagnosis Procedure".
- NO >> GO TO 3.



## **3.**PERFORM COMPONENT FUNCTION CHECK-II

Confirm whether customer filled the coolant or not.

#### Did customer fill the coolant?

- YES >> Proceed to EC-444, "Diagnosis Procedure".
- NO >> GO TO 4.

**4.**PERFORM COMPONENT FUNCTION CHECK-III

#### With CONSULT

- Turn ignition switch ON.
- 2. Perform "FAN DUTY CONTROL" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
- 3. Check that cooling fan speed varies according to the percentage.

Without CONSULT

- 1. Activate IPDM E/R auto active test and check cooling fan motors operation. Refer to <u>PCS-9</u>, "<u>Diagnosis</u> <u>Description</u>".
- 2. Check that cooling fan operates.

#### Is the inspection result normal?

YES-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

- YES-2 >> Confirmation after repair: INSPECTION END
- NO >> Proceed to EC-444, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:000000012891447

## **1.**CHECK DTC PRIORITY

If DTC P1217 is displayed with DTC UXXXX or P0607, first perform the confirmation procedure for DTC UXXXX or P0607.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC UXXXX: Refer to <u>EC-105, "DTC Index"</u>.
  - DTC P0607: Refer to EC-425, "DTC Description".
- NO >> GO TO 2.

## EC-444

# **P1217 ENGINE OVER TEMPERATURE**

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		_	-		_	

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
2. CHECK COOLING FAN OPERATION	А
With CONSULT	A
<ol> <li>Turn ignition switch ON.</li> <li>Perform "FAN DUTY CONTROL" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.</li> <li>Check that cooling fan speed varies according to the percentage.</li> </ol>	EC
<ul> <li>Without CONSULT</li> <li>Activate IPDM E/R auto active test and check cooling fan motors operation. Refer to <u>PCS-9</u></li> <li><u>Description</u>".</li> </ul>	), "Diagnosis C
<ol> <li>Check that cooling fan operates.</li> </ol>	
Is the inspection result normal?	D
YES >> GO TO 3. NO >> Proceed to <u>EC-533, "Diagnosis Procedure"</u> .	
3. CHECK COOLING SYSTEM FOR LEAK-I	F
Check cooling system for leak. Refer to CO-8, "System Inspection".	
Is leakage detected?	
YES >> GO TO 4. NO >> GO TO 5.	F
4. CHECK COOLING SYSTEM FOR LEAK-II	
Check the following for leak.	G
<ul> <li>Hose (Refer to <u>CO-8, "System Inspection"</u>.)</li> <li>Radiator (Refer to <u>CO-8, "System Inspection"</u>.)</li> </ul>	
• Water pump (Refer to <u>CO-16, "Removal and Installation"</u> .)	Н
>> Denoir er renless melfunctioning part	
>> Repair or replace malfunctioning part. 5.CHECK RADIATOR CAP	I
Check radiator cap. Refer to <u>CO-8, "System Inspection"</u> .	
Is the inspection result normal?	J
YES >> GO TO 6.	
NO >> Replace radiator cap. Refer to <u>CO-12, "Exploded View"</u> .	L.
6.CHECK THERMOSTAT	K
Check thermostat. Refer to <u>CO-21, "Removal and Installation"</u> . <u>Is the inspection result normal?</u>	
YES >> GO TO 7.	L
NO >> Replace thermostat. Refer to <u>CO-21, "Removal and Installation"</u> .	
7.CHECK ENGINE COOLANT TEMPERATURE SENSOR	M
Refer to EC-237, "Component Inspection".	
<u>Is the inspection result normal?</u> YES >> GO TO 8.	Ν
NO >> Replace engine coolant temperature sensor. Refer to <u>CO-21, "Exploded View"</u> .	
8. OVERHEATING CAUSE ANALYSIS	
If the cause cannot be isolated, check the CO-4, "Troubleshooting Chart".	0
>> INSPECTION END	P

# P1220 FUEL PUMP CONTROL MODULE (FPCM)

## < DTC/CIRCUIT DIAGNOSIS >

# P1220 FUEL PUMP CONTROL MODULE (FPCM)

## DTC Logic

INFOID:000000012891448

IVQ35DE1

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1220	FPCM (Fuel pump control module)	During engine cranking, the signal voltage of the FPCM to the ECM is too low.	<ul> <li>Harness or connectors (FPCM circuit is open or shorted) (Fuel pump circuit is open or shorted)</li> <li>FPCM</li> </ul>

## DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

#### **TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is between 12 15 V at idle.
- Before performing the following procedure, check that the engine coolant temperature is -10°C (14°F) or more.

#### >> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and let it idle for at least 5 seconds.
- If engine does not start, crank engine for at least 5 seconds.
- 2. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-446, "Diagnosis Procedure".
- NO >> INSPECTION END

## **Diagnosis** Procedure

INFOID:000000012891449

# 1. CHECK FUEL PUMP CONTROL MODULE POWER SUPPLY CIRCUIT-I

- 1. Turn ignition switch OFF.
- 2. Disconnect Fuel pump control module harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between Fuel pump control module harness connector and ground.

Fuel pump c	ontrol module	Ground	Voltage
Connector	Terminal	Ground	voltage
B37	6	Ground	Battery voltage

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

## 2.CHECK FUEL PUMP CONTROL MODULE POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.

- 2. Disconnect IPDM E/R harness connector.
- Check the continuity between IPDM E/R harness connector and Fuel pump control module harness connector.

# P1220 FUEL PUMP CONTROL MODULE (FPCM)

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

IPDM	1 E/R	Fuel pump co	ontrol module						
Connector	Terminal	Connector	Terminal	Continuity					
E121	15	B37	6	Existed					
Also che s the inspec YES >> 0 NO >> 1 CHECK II Check intern s the inspec YES >> 1 NO >> 1 CHECK F . Turn ign Check the check	eck harness ation result n GO TO 3. Repair open NTERMITTE nittent incide ation result n Replace IPD Repair open FUEL PUMP ition switch	for short to g ormal? circuit, short ENT INCIDEN ormal? OM E/R. Refe circuit, short CONTROL OFF. between Fu	t to ground and s t to ground a NT GI-42, "Inter t to <u>PCS-36</u> t to ground a MODULE G	short to powe or short to po <u>mittent Incid</u> <u>5. "Removal a</u> or short to po ROUND CIF ntrol module	ent". and Installati ower in harne CUIT FOR (	on". ess or coni OPEN ANI	nectors. D SHORT		- -
0011100101	Terrin								
B37 . Also che	3 eck harness tion result n	for short to p	round ower.	Existed					
B37 Also che the inspec YES >> ( NO >>   CHECK F . Disconn	eck harness ation result n GO TO 5. Repair open UEL PUMP ect ECM ha	for short to p ormal? circuit or sho CONTROL I rness connect	ower. ort to power MODULE If ctor.	in harness c NPUT AND C	UTPUT CIR	RCUITS FO		AND SHORT	-
B37 Also che the inspec YES >> ( NO >>   CHECK F . Disconn	eck harness ation result n GO TO 5. Repair open UEL PUMP ect ECM ha ne continuity	for short to p ormal? circuit or sho CONTROL I rness connect	ower. ort to power MODULE If ctor. el pump col	n in harness of NPUT AND Control module	UTPUT CIR	RCUITS FO			-
B37 Also che the inspec YES >> ( NO >>   O.CHECK F Disconn Check th	eck harness ation result n GO TO 5. Repair open UEL PUMP ect ECM ha ne continuity	for short to p ormal? circuit or sho CONTROL I rness connec between Fu	ower. ort to power MODULE If ctor. el pump col	in harness c NPUT AND C	UTPUT CIR	RCUITS FO			-
B37 Also che the inspec YES >> 0 NO >> 1 CHECK F Disconn Check th Fuel pump cc	eck harness ation result n GO TO 5. Repair open UEL PUMP ect ECM ha ne continuity	for short to p ormal? circuit or sho CONTROL ness connec between Fu	ower. ort to power MODULE If ctor. el pump col	n in harness of NPUT AND Control module	UTPUT CIR	RCUITS FO			-
B37 Also che the inspec YES >> 0 NO >> 1 D.CHECK F Disconn Check th Fuel pump cc Connector B37 Also che s the inspec YES >> 0 NO >> 1	eck harness etion result n GO TO 5. Repair open UEL PUMP ect ECM han re continuity ontrol module Terminal 5 4 eck harness etion result n GO TO 6. Repair open	for short to p ormal? circuit or sho CONTROL connector E32 for short to g ormal? circuit, short	ower. Dort to power MODULE IN Ctor. el pump col CM Terminal 136 130 round and so t to ground and so	in harness of NPUT AND Control module Continuity Existed Short to powe	OUTPUT CIR harness con	RCUITS FO	I ECM harr		
B37 Also che the inspec YES >> 0 NO >> 1 CHECK F Disconn Connector B37 Also che the inspec YES >> 0 NO >> 1 CHECK F Disconn ChECK F Disconn ChECK F	eck harness etion result n GO TO 5. Repair open UEL PUMP ect ECM han re continuity ontrol module Terminal 5 4 eck harness etion result n GO TO 6. Repair open UEL PUMP ect "fuel leve	for short to p ormal? circuit or sho CONTROL connector E32 for short to g ormal? circuit, short CONTROL	ower. Dort to power MODULE IN Ctor. el pump col CM Terminal 136 130 round and so t to ground and so CIRCUIT For t' harness co	in harness of NPUT AND Control module Continuity Existed Short to power OR OPEN Alton Connector.	OUTPUT CIR harness con er. wer in harne	RCUITS FO	ECM harr		_
B37 Also che the inspec YES >> 0 OCHECK F Disconn Check th Fuel pump cc Connector B37 Also che the inspec YES >> 0 CHECK F OCHECK F	eck harness etion result n GO TO 5. Repair open UEL PUMP ect ECM harnes tect ECM harnes ontrol module Terminal 5 4 eck harness etion result n GO TO 6. Repair open UEL PUMP ect "fuel leven he continuity connector.	for short to p ormal? circuit or sho CONTROL connector E32 for short to g ormal? circuit, short CONTROL	ower. Dot to power MODULE IN Ctor. el pump col CM Terminal 136 130 round and s t to ground and s t to ground and s cIRCUIT For uel pump col col col col col col col col	r in harness of NPUT AND Control module Continuity Existed Short to powe or short to powe OR OPEN At connector.	OUTPUT CIR harness con er. wer in harne	RCUITS FO	ECM harr	ness connecto	_
B37 Also che the inspec YES >> 0 O.CHECK F Disconn Check th Fuel pump cc Connector B37 Also che the inspec YES >> 0 O.CHECK F Disconn CHECK F Disconn Check th harness	eck harness etion result n GO TO 5. Repair open UEL PUMP ect ECM harnes tect ECM harnes ontrol module Terminal 5 4 eck harness etion result n GO TO 6. Repair open UEL PUMP ect "fuel leven he continuity connector.	for short to p ormal? circuit or sho CONTROL I rness connector between Fu EC Connector E32 for short to g ormal? circuit, short CONTROL el sensor unit between Fu	ower. Dot to power MODULE IN Ctor. el pump col CM Terminal 136 130 round and s t to ground and s t to ground and s cIRCUIT For uel pump col col col col col col col col	in harness of NPUT AND Control module Continuity Existed Short to power OR OPEN Alton Connector.	OUTPUT CIR harness con er. wer in harne	RCUITS FO	ECM harr	ness connecto	_
B37 Also che the inspec YES >> 0 NO >> 1 CHECK F Disconn Check th Fuel pump cc Connector B37 Also che the inspec YES >> 0 NO >> 1 CHECK F Disconn Check th harness Fuel pump cc	eck harness ation result n GO TO 5. Repair open FUEL PUMP ect ECM han be continuity ontrol module Terminal 5 4 eck harness ation result n GO TO 6. Repair open FUEL PUMP ect "fuel leven he continuity connector.	for short to p ormal? circuit or sho CONTROL I rness connector between Fu Connector E32 for short to g ormal? circuit, short CONTROL el sensor unit between Fu	ower. Dort to power MODULE IN Ctor. el pump col CM Terminal 136 130 round and so t to ground CIRCUIT Fe t" harness co uel pump col sensor unit	r in harness of NPUT AND Control module Continuity Existed Short to powe or short to powe OR OPEN At connector.	OUTPUT CIR harness con er. wer in harne	RCUITS FO	ECM harr	ness connecto	_

Is the inspection result normal?

YES >> GO TO 7.

# P1220 FUEL PUMP CONTROL MODULE (FPCM)

< DTC/CIRCUIT DIAGNOSIS >

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

7.CHECK FUEL PUMP

Check fuel pump. Refer to EC-448, "Component Inspection(Fuel Pump)".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace fuel pump.Refer to <u>FL-5</u>, "Removal and Installation".

8. CHECK FUEL PUMP CONTROL MODULE

Check Fuel pump control module. Refer to EC-448, "Component Inspection (Fuel Pump Control Module)".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace fuel pump.Refer to <u>FL-5, "Removal and Installation"</u>.

9. CHECK INTERMITTENT INCIDENT

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

>> Repair or replace malfunctioning part.

# Component Inspection(Fuel Pump)

INFOID:000000012891450

[VQ35DE]

**1.**CHECK FUEL PUMP

- 1. Turn ignition switch OFF.
- 2. Disconnect "fuel level sensor unit and fuel pump" harness connector.
- 3. Check resistance between "fuel level sensor unit and fuel pump" terminals as follows.

Terminals	Resistance ( $\Omega$ )
4 and 6	0.2 - 5.0 [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace "fuel level sensor unit and fuel pump". Refer to <u>FL-5</u>, "<u>Removal and Installation</u>".

# Component Inspection (Fuel Pump Control Module)

INFOID:000000012891451

# 1. CHECK FUEL PUMP CONTROL MODULE

1. Check the voltage between Fuel pump control module terminals under the following conditions.

FUEL PUM	IP CONTRO	L MODULE		
Connector	+	_	Condition	Voltage
Connector	Terminal	Terminal		
			For 1 second after turning ignition switch ON	Approx. 8.8 V
B37	1	2	More than 1 second after turning ignition switch ON	Approx. 0 V
			Idle speed	Approx. 8.8 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace Fuel pump control module. Refer to EC-575. "Removal and Installation".

# **P1225 TP SENSOR**

## < DTC/CIRCUIT DIAGNOSIS >

# P1225 TP SENSOR

# **DTC Description**

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)		OTC detection condition
		Diagnosis condition	Ignition switch ON
	CTP LEARNING-B1	Signal (terminal)	Electric throttle control actuator signal
P1225	(Closed throttle position learning performance)	Threshold	Closed throttle position learning value is excessively low
		Diagnosis delay time	—
Electric th	E CAUSE hrottle control actuator or 1 and 2)		
AIL-SAFI			
TC CON	FIRMATION PROCEDURE		
.PRECO	NDITIONING		
DTC Cor	nfirmation Procedure has been prev	viously conducted, alwa	ys perform the following before conduct
	· · · · ·	•	
		10	
. Turn ig	nition switch OFF and wait at least	10 seconds.	
I. Turn ig 2. Turn ig 3. Turn ig	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least		
2. Turn ig 3. Turn ig FESTING (	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least <b>CONDITION:</b>	10 seconds.	voltage is more than 10 V at idle.
I. Turn ig 2. Turn ig 3. Turn ig F <b>ESTING (</b>	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least <b>CONDITION:</b>	10 seconds.	voltage is more than 10 V at idle.
I. Turn ig 2. Turn ig 3. Turn ig FESTING ( Before per	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least CONDITION: forming the following procedure > GO TO 2.	10 seconds. •, confirm that battery	voltage is more than 10 V at idle.
. Turn ig 2. Turn ig 3. Turn ig <b>ESTING (</b> <b>Before pe</b>	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least CONDITION: forming the following procedure	10 seconds. •, confirm that battery	voltage is more than 10 V at idle.
I. Turn ig 2. Turn ig 3. Turn ig <b>TESTING (</b> <b>Before per</b> <b>2.</b> PERFO 1. Turn ig	nition switch OFF and wait at least nition switch ON. prition switch OFF and wait at least <b>CONDITION:</b> forming the following procedure GO TO 2. RM DTC CONFIRMATION PROCE	10 seconds. e, confirm that battery	voltage is more than 10 V at idle.
I. Turn ig 2. Turn ig 3. Turn ig FESTING ( Before per 2.PERFO I. Turn ig 2. Turn ig	<ul> <li>Inition switch OFF and wait at least prition switch ON.</li> <li>Inition switch OFF and wait at least CONDITION:</li> <li>Informing the following procedure</li> <li>GO TO 2.</li> <li>RM DTC CONFIRMATION PROCE</li> <li>Inition switch ON.</li> <li>Inition switch OFF and wait at least</li> </ul>	10 seconds. e, confirm that battery	voltage is more than 10 V at idle.
1. Turn ig 2. Turn ig 3. Turn ig <b>FESTING</b> 3. <b>Turn ig</b> 2. PERFO 1. Turn ig 2. Turn ig 3. Turn ig	nition switch OFF and wait at least nition switch ON. prition switch OFF and wait at least <b>CONDITION:</b> forming the following procedure GO TO 2. RM DTC CONFIRMATION PROCE	10 seconds. e, confirm that battery	voltage is more than 10 V at idle.
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I. Turn ig 2. Turn ig 3. Turn ig <b>TESTING (</b> <b>Before per</b> <b>2.</b> PERFO I. Turn ig 2. Turn ig 3. Turn ig 4. Check <u>s 1st trip E</u> YES >>	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least <b>CONDITION:</b> forming the following procedure GO TO 2. RM DTC CONFIRMATION PROCE nition switch ON. nition switch OFF and wait at least nition switch ON. 1st trip DTC.	10 seconds. <b>c, confirm that battery</b> EDURE 10 seconds. <u>rocedure"</u> .	
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I. Turn ig 2. Turn ig 3. Turn ig <b>TESTING (</b> <b>Before per</b> <b>2.</b> PERFO I. Turn ig 2. Turn ig 3. Turn ig 4. Check <u>s 1st trip E</u> YES >> NO-1 >> NO-2 >>	prition switch OFF and wait at least prition switch ON. prition switch OFF and wait at least <b>CONDITION:</b> forming the following procedure > GO TO 2. RM DTC CONFIRMATION PROCE prition switch ON. prition switch OFF and wait at least prition switch ON. 1st trip DTC. <u>OTC detected?</u> > Proceed to <u>EC-449. "Diagnosis Pression</u> "	10 seconds. <b>c, confirm that battery</b> EDURE 10 seconds. <u>rocedure"</u> . efore repair: Refer to <u>G</u>	-42, "Intermittent Incident".
I. Turn ig 2. Turn ig 3. Turn ig <b>TESTING (</b> <b>Before per</b> <b>2.</b> PERFO I. Turn ig 2. Turn ig 3. Turn ig 4. Check <u>s 1st trip E</u> YES >> NO-1 >> NO-2 >> <b>Diagnosi</b>	<pre>inition switch OFF and wait at least inition switch OFF and wait at least CONDITION: forming the following procedure &gt; GO TO 2. RM DTC CONFIRMATION PROCE inition switch ON. inition switch OFF and wait at least inition switch ON. 1st trip DTC. <u>OTC detected?</u> &gt; Proceed to <u>EC-449. "Diagnosis Proced to EC-449. "Diagnosis Proced to EC-449."</u> &gt; To check malfunction symptom be &gt; Confirmation after repair: INSPEC is Procedure</pre>	10 seconds. <b>confirm that battery</b> <b>EDURE</b> 10 seconds. <u>rocedure"</u> . efore repair: Refer to <u>G</u> CTION END	-42, "Intermittent Incident".
Turn ig Turn ig Turn ig TeSTING ( Before per PERFO Turn ig Turn ig	<pre>inition switch OFF and wait at least inition switch OFF and wait at least CONDITION: forming the following procedure &gt; GO TO 2. RM DTC CONFIRMATION PROCE inition switch ON. inition switch OFF and wait at least inition switch OFF and wait at least inition switch ON. 1st trip DTC. <u>OTC detected?</u> &gt; Proceed to <u>EC-449. "Diagnosis Plate</u> &gt; To check malfunction symptom be &gt; Confirmation after repair: INSPEC is Procedure ELECTRIC THROTTLE CONTRO</pre>	10 seconds. <b>c, confirm that battery</b> EDURE 10 seconds. <u>rocedure"</u> . efore repair: Refer to <u>G</u> CTION END	-42, "Intermittent Incident".
I. Turn ig 2. Turn ig 3. Turn ig <b>FESTING</b> 3. Turn ig 3. Turn ig 3. Turn ig 3. Turn ig 4. Check 5. 1st trip E YES NO-1 >> NO-2 >> Diagnosi 1.CHECK 1. Turn ig	<pre>inition switch OFF and wait at least inition switch OFF and wait at least CONDITION: forming the following procedure &gt; GO TO 2. RM DTC CONFIRMATION PROCE inition switch ON. inition switch OFF and wait at least inition switch ON. 1st trip DTC. <u>OTC detected?</u> &gt; Proceed to <u>EC-449. "Diagnosis Proced to EC-449. "Diagnosis Proced to EC-449."</u> &gt; To check malfunction symptom be &gt; Confirmation after repair: INSPEC is Procedure</pre>	10 seconds. <b>a</b> , <b>confirm that battery</b> <b>EDURE</b> 10 seconds. <b>rocedure''</b> . efore repair: Refer to <u>G</u> CTION END L ACTUATOR VISUAL	<u>-42, "Intermittent Incident"</u> . ™FOID:00000001289145

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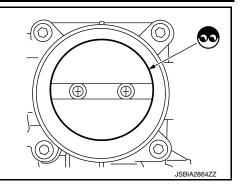
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3. Check if foreign matter is caught between the throttle valve and the housing.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to <u>EC-153</u>, "<u>Description</u>".



# $2. {\tt Replace electric throttle control actuator}$

- 1. Replace electric throttle control actuator. Refer to EM-28, "Removal and Installation".
- 2. Go to EC-154, "Description".

>> INSPECTION END

# P1226 TP SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# P1226 TP SENSOR

# **DTC Description**

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#### INFOID:000000012891454

[VQ35DE]

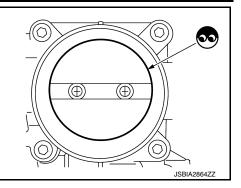
## DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DT	C detection condition
		Diagnosis condition	Ignition switch ON
	CTP LEARNING-B1	Signal (terminal)	Electric throttle control actuator signal
P1226	(Closed throttle position learning perfor- mance)	Threshold	Closed throttle position learning is not per- formed successfully, repeatedly
		Diagnosis delay time	—
	ECAUSE rottle control actuator or 1 and 2)		
AIL-SAFE			
TC CON	FIRMATION PROCEDURE		
.PRECO	NDITIONING		
f DTC Conf ng the next			perform the following before conduct-
I. Turn igr 2. Turn igr 3. Turn igr	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least		
I. Turn igr 2. Turn igr 3. Turn igr FESTING C Before perf	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least CONDITION: forming the following procedure	10 seconds.	oltage is more than 10 V at idle.
I. Turn igr 2. Turn igr 3. Turn igr FESTING C Before perf	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least CONDITION: forming the following procedure GO TO 2.	10 seconds. •, confirm that battery vo	oltage is more than 10 V at idle.
1. Turn igr 2. Turn igr 3. Turn igr FESTING C Before perf >> 2.PERFOF	hition switch OFF and wait at least hition switch ON. hition switch OFF and wait at least CONDITION: forming the following procedure GO TO 2. RM DTC CONFIRMATION PROCE	10 seconds. •, confirm that battery vo	oltage is more than 10 V at idle.
I. Turn igr 2. Turn igr 3. Turn igr FESTING C Before perf Sefore perf 2. PERFOF I. Turn igr 2. Turn igr 3. Turn igr 4. Repeat	nition switch OFF and wait at least nition switch ON. nition switch OFF and wait at least CONDITION: forming the following procedure GO TO 2.	10 seconds. <b>confirm that battery vo</b> DURE	oltage is more than 10 V at idle.
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I. Turn igr 2. Turn igr 3. Turn igr <b>FESTING C</b> <b>Before perf</b> <b>2.</b> PERFOF 1. Turn igr 2. Turn igr 3. Turn igr 4. Repeat 5. Check 5. Check 5. S 1st trip D YES >> NO-1 >>	hition switch OFF and wait at least hition switch ON. hition switch OFF and wait at least CONDITION: forming the following procedure GO TO 2. RM DTC CONFIRMATION PROCE hition switch ON. hition switch OFF and wait at least hition switch ON. steps 2 and 3 for 32 times. 1st trip DTC. TC detected?	10 seconds. <b>confirm that battery vo</b> DURE 10 seconds. <u>rocedure"</u> . efore repair: Refer to <u>GI-4</u>	
Turn igr Turn igr Turn igr TESTING C Before perf PERFOF Turn igr Turn igr NO-1 >> NO-2 >>	hition switch OFF and wait at least hition switch ON. hition switch OFF and wait at least CONDITION: forming the following procedure GO TO 2. RM DTC CONFIRMATION PROCE hition switch ON. hition switch OFF and wait at least hition switch ON. steps 2 and 3 for 32 times. 1st trip DTC. TC detected? Proceed to <u>EC-451, "Diagnosis Pl</u> To check malfunction symptom be	10 seconds. <b>confirm that battery vo</b> DURE 10 seconds. <u>rocedure"</u> . efore repair: Refer to <u>GI-4</u>	
Turn igr Turn igr Turn igr TESTING C Before perf S PERFOF Turn igr Turn igr S Turn igr S Turn igr S Turn igr S Turn igr S Turn igr S Turn igr S Turn igr S S Turn igr S S S Turn igr S S S Turn igr S	hition switch OFF and wait at least hition switch ON. hition switch OFF and wait at least CONDITION: forming the following procedure GO TO 2. RM DTC CONFIRMATION PROCE hition switch ON. hition switch OFF and wait at least hition switch ON. steps 2 and 3 for 32 times. 1st trip DTC. TC detected? Proceed to EC-451, "Diagnosis Pro- To check malfunction symptom be Confirmation after repair: INSPEC	10 seconds. <b>confirm that battery vo</b> DURE 10 seconds. <u>rocedure"</u> . efore repair: Refer to <u>GI-4</u> CTION END	2, "Intermittent Incident".

3. Check if foreign matter is caught between the throttle valve and the housing.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to <u>EC-153</u>, "<u>Description</u>".



# $2. {\tt Replace electric throttle control actuator}$

- 1. Replace electric throttle control actuator. Refer to EM-28, "Removal and Installation".
- 2. Go to EC-154, "Description".

>> INSPECTION END

# P1564 ASCD STEERING SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

# P1564 ASCD STEERING SWITCH

## DTC Description

## DTC DETECTION LOGIC

- 1. An excessively high voltage signal from the ASCD steering switch is sent to ECM.
- 2. ECM detects that input signal from the ASCD steering switch is out of the specified range.
- 3. ECM detects that the ASCD steering switch is stuck ON.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition		
			Diagnosis condition	—	
			Signal (terminal)	ASCD steering switch signal	
		1	Threshold	An excessively high voltage signal from the ASCD steering switch is sent to ECM	
			Diagnosis delay time	—	
			Diagnosis condition	-	
	ASCD SW		Signal (terminal)	ASCD steering switch signal	
P1564	(ASCD steering switch)	2	Threshold	ECM detects that input signal from the ASCD steering switch is out of the specified range	
			Diagnosis delay time	-	
			Diagnosis condition	—	
			Signal (terminal)	ASCD steering switch signal	
		3	Threshold	ECM detects that the ASCD steering switch is stuck ON	
			Diagnosis delay time	—	

# POSSIBLE CAUSE Harness or connectors (The switch circuit is open or shorted.) ASCD steering switch ECM FAIL-SAFE

Not applicable

## DTC CONFIRMATION PROCEDURE

**1.**CHECK DTC PRIORITY

If DTC P1564 is displayed with DTC P0605, first perform the confirmation procedure for DTC P0605. Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-421, "DTC Description"</u>.

NO >> GO TO 2.

2. PRECONDITIONING

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

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

>> GO TO 3.

# 3. perform dtc confirmation procedure

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

2. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.

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# P1564 ASCD STEERING SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

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- 3. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 5. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 6. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-454, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## **Diagnosis** Procedure

INFOID:000000012891457

## **1.**CHECK DTC PRIORITY

If DTC P1564 is displayed with DTC P0605, first perform the confirmation procedure for DTC P0605. Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-421, "DTC Description"</u>.

NO >> GO TO 2.

2. CHECK ASCD STEERING SWITCH CIRCUIT

#### () With CONSULT

- Turn ignition switch ON.
- Select "MAIN SW", "CANCEL SW", "RESUME/ACC SW" and "SET SW" in "DATA MONITOR" mode with CONSULT.
- 3. Check each item indication under the following conditions.

Monitor item	Condition		Indication
MAIN SW	ON/OFF (MAIN)	Pressed	ON
MAIN SW	switch	Released	OFF
CANCEL SW	CANCEL switch	Pressed	ON
CANCLE SW	CANCEL SWICH	Released	OFF
RESUME/ACC SW	ACCEL/RES switch	Pressed	ON
RESUME/ACC SW	ACCEL/INEO SWICH	Released	OFF
SET SW	COAST/SET switch	Pressed	ON
321 300	COAST/SET SWICH	Released	OFF

#### **Without CONSULT**

Turn ignition switch ON.

2. Check the voltage between ECM harness connector terminals under the following conditions.

ECM					
Con-	+	_	Condition	Voltage (V)	
nector	Terminal	Terminal			
	134       135       ON/OFF (MAIN) switch: Pressed         CANCEL switch: Pressed       COAST/SET switch: Pressed         ACCEL/RES switch: Pressed       All ASCD steering switches: Release		ON/OFF (MAIN) switch: Pressed	Approx. 0	
			CANCEL switch: Pressed	Approx. 1	
E32		COAST/SET switch: Pressed	Approx. 2		
			ACCEL/RES switch: Pressed	Approx. 3	
			All ASCD steering switches: Released	Approx. 4	

Is the inspection result normal?

YES >> INSPECTION END

 $\mathbf{3}$ .CHECK ASCD STEERING SWITCH GROUND CIRCUIT

1. Turn ignition switch OFF.

# P1564 ASCD STEERING SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

2. Disconnect ECM harness connector.

- 3. Disconnect combination switch harness connector M149.
- 4. Check the continuity between combination switch and ECM harness connector.

Combination switch	E	CM	Continuity
Terminal	Connector	Terminal	Continuity
18	E32	135	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

## 4.CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT

#### 1. Check the continuity between combination switch and ECM harness connector.

Combination switch	E	Continuity	
Terminal	Connector	Terminal	Continuity
15	E32	134	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

#### **5.**CHECK ASCD STEERING SWITCH

Check ASCD steering switch. Refer to EC-455, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch. Refer to ST-30, "Removal and Installation".

## Component Inspection

## 1.CHECK ASCD STEERING SWITCH

1. Turn ignition switch OFF.

2. Disconnect combination switch (spiral cable) harness connector.

3. Check resistance between combination switch harness connector terminals as per the following.

Combination switch		Condition	Basistanas (O)	
Connector	Terminals	Condition	Resistance ( $\Omega$ )	
		ON/OFF (MAIN) switch: Pressed	Approx. 0	
	15 and 18		CANCEL switch: Pressed	Approx. 250
M149		COAST/SET switch: Pressed	Approx. 660	
		ACCEL/RES switch: Pressed	Approx. 1,480	
		All ASCD steering switches: Released	Approx. 4,000	

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch. Refer to <u>ST-30, "Removal and Installation"</u>.

[VQ35DE]

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INFOID:000000012891458

# P1564 ICC STEERING SWITCH

## DTC Description

INFOID:000000012891459

[VQ35DE]

## DTC DETECTION LOGIC

- 1. An excessively high voltage signal from the ICC steering switch is sent to ECM.
- 2. ECM detects that input signal from the ICC steering switch is out of the specified range.
- 3. ECM detects that the ICC steering switch is stuck ON.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
			Diagnosis condition	-
			Signal (terminal)	ICC steering switch signal
		1	Threshold	An excessively high voltage signal from the ICC steering switch is sent to ECM
			Diagnosis delay time	-
	ASCD SW (ICC steering switch)		Diagnosis condition	—
			Signal (terminal)	ICC steering switch signal
P1564		2	Threshold	ECM detects that input signal from the ICC steering switch is out of the specified range
			Diagnosis delay time	-
		3	Diagnosis condition	—
			Signal (terminal)	ICC steering switch signal
			Threshold	ECM detects that the ICC steering switch is stuck ON
			Diagnosis delay time	-

## POSSIBLE CAUSE

- Harness or connectors
- (The switch circuit is open or shorted.)
- ICC steering switch
- ECM

FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK DTC PRIORITY

If DTC P1564 is displayed with DTC P0605, first perform the confirmation procedure for DTC P0605. Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-421, "DTC Description"</u>.

NO >> GO TO 2.

## 2. PRECONDITIONING

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

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

>> GO TO 3.

# **3.** PERFORM DTC CONFIRMATION PROCEDURE

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

2. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.



# P1564 ICC STEERING SWITCH

IVQ35DE1 < DTC/CIRCUIT DIAGNOSIS > 3. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 sec-4. А onds. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds. Press DISTANCE switch for at least 10 seconds, then release it and wait at least 10 seconds. EC Check DTC. Is DTC detected? >> Proceed to EC-457, "Diagnosis Procedure". YES NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident". NO-2 >> Confirmation after repair: INSPECTION END Diagnosis Procedure INEOID:000000012891460 D 1. CHECK DTC PRIORITY If DTC P1564 is displayed with DTC P0605, first perform the confirmation procedure for DTC P0605. E Is applicable DTC detected? YES >> Perform diagnosis of applicable. Refer to EC-421, "DTC Description". NO >> GO TO 2. CHECK ICC STEERING SWITCH CIRCUIT 1. Turn ignition switch ON. 2. Check the voltage between ECM harness connector terminals under the following conditions. ECM Н + Condition Voltage (V) \_ Connector Terminal MAIN (ON/OFF) switch: Pressed Approx. 5.0 CANCEL switch: Pressed Approx. 0.3 **DISTANCE** switch: Pressed Approx. 0.7 E32 134 135 SET/COAST switch: Pressed Approx. 1.3 **RESUME/ACCELERATE switch: Pressed** Approx. 2.4 All ICC steering switches: Released Approx. 0 Κ Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

 $\mathbf{3}$ .check icc steering switch ground circuit

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Disconnect combination switch harness connector M149.

4. Check the continuity between combination switch and ECM harness connector.

Combination switch	E	CM	Continuity		
Terminal	Connector	Terminal	Continuity		
18	E32	135	Existed		

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK ICC STEERING SWITCH INPUT SIGNAL CIRCUIT

1. Check the continuity between combination switch and ECM harness connector.

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# P1564 ICC STEERING SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

Combination switch	E	СМ	Continuity
Terminal	Connector	Terminal	Continuity
15	E32	134	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

**5.**CHECK ICC STEERING SWITCH

Check ICC steering switch. Refer to EC-458, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ICC steering switch. Refer to <u>EC-15. "ENGINE CONTROL SYSTEM : Component Parts</u> <u>Location"</u>.

# Component Inspection

INFOID:000000012891461

1. CHECK ICC STEERING SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect combination switch (spiral cable) harness connector M303.
- 3. Check resistance between combination switch harness connector terminals under the following conditions.

Combination switch		Condition	Posistanoo (O)	
Connector	Terminals	Condition	Resistance (Ω)	
	M149 13 and 16	MAIN (ON/OFF) switch: Pressed	Approx. 0	
		CANCEL switch: Pressed	Approx. 309	
M140		DISTANCE switch: Pressed	Approx. 741	
101149		SET/COAST switch: Pressed	Approx. 1,406	
		RESUME/ACCELERATE switch: Pressed	Approx. 2,586	
		All ICC steering switches: Released	Approx. 5,456	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ICC steering switch. Refer to <u>ST-30, "Removal and Installation"</u>.

# P1568 ICC FUNCTION

## < DTC/CIRCUIT DIAGNOSIS >

# P1568 ICC FUNCTION

# **DTC Description**

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INFOID:000000012891462

[VQ35DE]

## DTC DETECTION LOGIC

ECM detects a difference between signals from ADAS control unit is out of specified range.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	_
		Signal (terminal)	ADAS control unit signal
P1568	ICC COMMAND VALUE (ICC function)	Threshold	ECM detects a difference between signals from ADAS control unit is out of specified range
		Diagnosis delay time	_
<ul><li>ADAS con</li><li>ECM</li></ul>	or connectors (The CAN commun ntrol unit	ication line is open or s	shorted.)
FAIL-SAFE Not applica			
DTC CON	FIRMATION PROCEDURE		
1.снеск	DTC PRIORITY		
YES >> NO >> 2.PRECO	e DTC detected? Perform diagnosis of applicabl • DTC UXXXX: Refer to <u>EC-105</u> • DTC P0605: Refer to <u>EC-421</u> , • DTC P0607: Refer to <u>EC-425</u> , • GO TO 2. NDITIONING	i, "DTC Index". "DTC Description". "DTC Description".	
before cond 1. Turn ig 2. Turn ig 3. Turn ig	nfirmation Procedure has been ducting the next test. nition switch OFF and wait at leas nition switch ON. nition switch OFF and wait at leas CONDITION:	st 10 seconds.	always perform the following procedure
	be conducted with the drive w d to be easier, it is unnecessary		p or by driving the vehicle. If a road test
•	GO TO 3.		
3.PERFOR	RM DTC CONFIRMATION PROC	EDURE	
<ol> <li>Press M</li> <li>Drive the CAUTI Always</li> </ol>	s drive vehicle at a safe speed. SET/COAST switch.		

5. Check DTC.

## Is DTC detected?

YES >> Proceed to EC-460, "Diagnosis Procedure".

# P1568 ICC FUNCTION

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

NO-1 >> To check malfunction symptom before repair: Refer to GI-42. "Intermittent Incident".

NO-2 >> Confirmation after repair: INSPECTION END

## **Diagnosis** Procedure

INFOID:000000012891463

## **1.**CHECK DTC PRIORITY

If DTC P1568 is displayed with DTC UXXXX, P0605 or P0607, first perform the confirmation procedure for DTC UXXXX, P0605 or P0607.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC UXXXX: Refer to EC-105, "DTC Index".
  - DTC P0605: Refer to EC-421, "DTC Description".
  - DTC P0607: Refer to EC-425, "DTC Description".

NO >> GO TO 2.

2.REPLACE ADAS CONTROL UNIT

1. Replace ADAS control unit.

2. Perform DAS-33, "Work Procedure".

3. Check DTC of ADAS control unit. Refer to <u>DAS-11, "CONSULT Function (ICC/ADAS)"</u>.

>> INSPECTION END

#### < DTC/CIRCUIT DIAGNOSIS >

# P1572 ASCD BRAKE SWITCH

## Description

When the brake pedal is depressed, brake pedal position switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal). Refer to <u>EC-40</u>, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description" for the ASCD function.

DTC Description

## DTC DETECTION LOGIC

#### NOTE:

This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

- 1. When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the brake pedal position switch are sent to the ECM at the same time.
- 2. Brake pedal position switch signal is not sent to ECM for extremely long time while the vehicle is driving.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition		
	ASCD BRAKE SW (Brake pedal position switch)		Diagnosis condition	-	
			Signal (terminal)	<ul><li>Brake pedal position switch signal</li><li>Stop lamp switch signal</li></ul>	
		1	Threshold	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the brake pedal position switch are sent to the ECM at the same time	
P1572			Diagnosis delay time	-	
			Diagnosis condition	-	
			Signal (terminal)	Brake pedal position switch signal	
		2	Threshold	Brake pedal position switch signal is not sent to ECM for extremely long time while the ve- hicle is driving	
			Diagnosis delay time	Extremely long time	

## POSSIBLE CAUSE

DTC P1572 - 1 • Harness or connectors	M
<ul> <li>(The stop lamp switch circuit is shorted.)</li> <li>Harness or connectors (The brake pedal position switch circuit is shorted.)</li> <li>Stop lamp switch</li> </ul>	Ν
<ul> <li>Brake pedal position switch</li> <li>Incorrect stop lamp switch installation</li> <li>Incorrect brake pedal position switch installation</li> <li>ECM</li> </ul>	0
<ul> <li>DTC P1572 - 2</li> <li>Harness or connectors (The stop lamp switch circuit is shorted.)</li> <li>Harness or connectors (The brake pedal position switch circuit is shorted.)</li> <li>Stop lamp switch</li> <li>Brake pedal position switch</li> <li>Incorrect stop lamp switch installation</li> </ul>	Ρ

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INFOID:000000012891465

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· Incorrect brake pedal position switch installation

• ECM

FAIL-SAFE Not applicable

DTC CONFIRMATION PROCEDURE

**1.**CHECK DTC PRIORITY

If DTC P1572 is displayed with DTC P0605, first perform the confirmation procedure for DTC P0605. <u>Is applicable DTC detected?</u>

YES >> Perform diagnosis of applicable. Refer to <u>EC-421, "DTC Description"</u>.

NO >> GO TO 2.

2.INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

YES >> GO TO 3.

NO >> GO TO 6.

3. PRECONDITIONING

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

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

>> GO TO 4.

**4.**PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION 1-I

- 1. Start engine (VDC switch OFF).
- 2. Select "DATA MONITOR" mode with CONSULT.
- 3. Press MAIN switch and make sure that CRUISE lamp lights up.
- 4. Drive the vehicle for at least 5 consecutive seconds under the following conditions. CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position

5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-463, "Diagnosis Procedure".

NO >> GO TO 5.

**5.**PERFORM DTC CONFIRMATION PROCEDURE 1-II

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

**CAUTION:** 

Always drive vehicle at a safe speed.

NOTE:

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

VHCL SPEED SE More than 30 km/h (19 mph)

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

. 010/		DIAGING	7313 -			[: 4000 -]
Selector	r lever		Suitable p	osition		
Driving I	location		five secon		al for more than o come off from chicle speed.	
2. Che	eck 1st tri	p DTC.			<u> </u>	
	ip DTC de					
YES			, "Diagnosis Proc	edure".		
	-	ECTION				
			ENT FUNCTION C	CHECK		
	n ignition eck the vo		N. ween ECM harne	ss connecte	ors.	
	ECM					
Con-	+	_	Conditio	n	Voltage	
nector	Terminal	Terminal				
E32	140	152	Braka nadal	Slightly depressed	Approx. 0 V	-
EJZ	140	152	Brake pedal	Fully re- leased	Battery voltage	-
ls the ir	spection	result noi	rmal?	11		
Check t	he voltage	e betwee	n ECM harness c	onnectors.		
	ECM					
Con-	+	_	Conditio	n	Voltage	
nector	Terminal	Terminal				-
E32	139	152	Brake pedal	Slightly depressed	Battery voltage	_
				Fully re- leased	Approx. 0 V	_
	spection					
	2 >> Conf	irmation a	unction symptom after repair: INSPI , "Diagnosis Proc	ECTION ÉN		-42, "Intermittent Incident".
			-			
Diagn	osis Pro	ceaure	2			INFOID:000000012891466
	CK DTC					
				, first perfor	m the confirmation	ation procedure for DTC P0605.
	cable DTC					Description
YES NO	>> Perfo >> GO 1		osis of applicable	$\mathbf{R}$ . Refer to $\mathbf{E}$	<u>-0-421, "DIC</u>	
-		-	NCTION-I			
Ē) \\/;+⊾		т				

- 2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT.
- 3. Check "BRAKE SW1" indication under the following conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

Monitor item	Conditior	Indication	
BRAKE SW1	Brake pedal	Slightly depressed	OFF
		Fully released	ON

#### **Without CONSULT**

1. Turn ignition switch ON.

2. Check the voltage between ECM harness connectors.

	ECM					
Connector	+ –		Condition		Voltage	
	Tern	ninal				
E32	140 152		Brake pedal	Slightly depressed	Approx. 0 V	
LJZ	140	152	Diake peudi	Fully released	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3. NO >> GO TO 4.

3.CHECK OVERALL FUNCTION-II

#### With CONSULT

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

Monitor item	Conditio	Indication	
BRAKE SW2	Brake pedal	Slightly depressed	ON
		Fully released	OFF

#### **Without CONSULT**

Check the voltage between ECM harness connectors.

	ECM					
Connector	+ –		Condition		Voltage	
	Terr	ninal				
E32	139 152		Brake pedal	Slightly depressed	Battery voltage	
L32	139	152	Blake pedal	Fully released	Approx. 0 V	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 7.

**4.**CHECK BRAKE PEDAL POSITION SWITCH POWER SUPPLY

1. Turn ignition switch OFF.

- 2. Disconnect brake pedal position switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between brake pedal position switch harness connector and ground.

Brake pedal	position switch	Ground	Voltage	
Connector	Connector Terminal		vollage	
E72	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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# 5. CHECK BRAKE PEDAL POSITION SWITCH INPUT SIGNAL CIRCUIT

#### 1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between brake pedal position switch harness connector and ECM harness connector.

	sition switch	EC	М	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E72	2	E32	140	Existed
Also cheo	ck harness fo	or short to g	pround and s	short to power.
s the inspect	ion result nor	mal?		
	GO TO 6.			
<b>^</b>	• •		-	or short to power in harness or connectors.
O.CHECK B				
			efer to EC-4	465. "Component Inspection (Brake Pedal Position Switch)".
Is the inspect		<u>mal?</u>		
	60 TO 7. Penlace brake	e nedal nos	sition switch	. Refer to <u>BR-20, "Removal and Installation"</u> .
<b>7.</b> CHECK S	-		and a switch.	. Noter to <u>Brt 29. Nemoval and installation</u> .
			400 10	
s the inspect	-		<u>-466, Comp</u>	ponent Inspection (Stop Lamp Switch)".
	NSPECTION			
			h. Refer to <mark>E</mark>	3R-20, "Removal and Installation".
Componer	nt Inspectio	on (Brak	e Pedal F	Position Switch)
	•	,		,
1				
1.снеск в	RAKE PEDA	L POSITIC	N SWITCH-	-1
1. Turn ignit	tion switch O	FF.		
1. Turn ignil 2. Disconne	tion switch Olect brake ped	FF. al position	switch harne	ess connector.
1. Turn ignil 2. Disconne	tion switch Olect brake ped	FF. al position	switch harne	
1. Turn ignil 2. Disconne	tion switch Olect brake ped	FF. al position	switch harne	ess connector.
<ol> <li>Turn ignit</li> <li>Disconne</li> <li>Check the</li> <li>Terminals</li> </ol>	tion switch Olect brake ped ect brake ped e continuity b	FF. al position between bra	switch harno ake pedal po	ess connector. osition switch terminals under the following conditions.
<ol> <li>Turn ignit</li> <li>Disconne</li> <li>Check the</li> </ol>	tion switch Olect brake ped	FF. lal position between bra	switch harno ake pedal po sed	ess connector. osition switch terminals under the following conditions.
<ol> <li>Turn ignit</li> <li>Disconne</li> <li>Check the</li> <li>Terminals</li> </ol>	tion switch Olect brake ped e continuity b Brake pedal	FF. lal position between bra Condition Fully relea Slightly de	switch harno ake pedal po sed	ess connector. osition switch terminals under the following conditions.
1. Turn ignit 2. Disconne 3. Check th Terminals 1 and 2 Is the inspect YES >> II	tion switch Olect brake ped e continuity b Brake pedal ion result nor	FF. lal position between bra Condition Fully relea Slightly de rmal?	switch harno ake pedal po sed	ess connector. osition switch terminals under the following conditions.
1. Turn ignit 2. Disconne 3. Check the Terminals 1 and 2 Is the inspect YES >> II NO >> C	tion switch Olect brake ped e continuity b Brake pedal ion result nor NSPECTION GO TO 2.	FF. lal position between bra Condition Fully relea Slightly de rmal? END	switch harne ake pedal po sed pressed	ess connector. osition switch terminals under the following conditions. Continuity Existed Not existed
1. Turn ignit 2. Disconne 3. Check th Terminals 1 and 2 Is the inspect YES >> II	tion switch Olect brake ped e continuity b Brake pedal ion result nor NSPECTION GO TO 2.	FF. lal position between bra Condition Fully relea Slightly de rmal? END	switch harne ake pedal po sed pressed	ess connector. osition switch terminals under the following conditions. Continuity Existed Not existed

2. Check the continuity between brake pedal position switch terminals under the following conditions.

Terminals		Condition	Continuity
1 and 2	Brake pedal	Fully released	Existed
T and Z	Drake pedal	Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake pedal position switch. Refer to <u>BR-20, "Removal and Installation"</u>.

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#### < DTC/CIRCUIT DIAGNOSIS >

## Component Inspection (Stop Lamp Switch)

INFOID:000000012891468

[VQ35DE]

1.CHECK STOP LAMP SWITCH-I

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

Terminals		Condition	
1 and 2	Brake pedal	Fully released	Not existed
	Brake pedal	Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-13, "Adjustment".

2. Check harness continuity between stop lamp switch terminals under the following conditions.

Terminals	(	Continuity	
1 and 2	Brake pedal	Fully released	Not existed
	Diake pedal	Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-20, "Removal and Installation"</u>.

# P1572 ICC BRAKE SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

## P1572 ICC BRAKE SWITCH

**DTC** Description

#### DTC DETECTION LOGIC

#### NOTE:

This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

- 1. When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the brake pedal position switch (ICC brake switch) are sent to the ECM at the same time.
- 2. brake pedal position switch (ICC brake switch) signal is not sent to ECM for extremely long time while the vehicle is driving.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC	detection condition
			Diagnosis condition	-
P1572		1	Signal (terminal)	<ul><li>Brake pedal position switch signal</li><li>Stop lamp switch signal</li></ul>
	ASCD BRAKE SW		Threshold	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the brake pedal position switch are sent to the ECM at the same time
	(ICC brake switch)		Diagnosis delay time	-
			Diagnosis condition	-
			Signal (terminal)	Brake pedal position switch signal
		2	Threshold	Brake pedal position switch signal is not sent to ECM for extremely long time while the ve- hicle is driving
			Diagnosis delay time	Extremely long time

#### POSSIBLE CAUSE

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<ul> <li>DTC P1572 - 1</li> <li>Harness or connectors (The stop lamp switch circuit is shorted.)</li> <li>Harness or connectors (The brake nodel position switch circuit is shorted.)</li> </ul>	L
<ul> <li>(The brake pedal position switch circuit is shorted.)</li> <li>Stop lamp switch</li> <li>Brake pedal position switch</li> <li>ICC brake hold relay</li> </ul>	M
<ul> <li>Incorrect stop lamp switch installation</li> <li>Incorrect brake pedal position switch installation</li> <li>ECM</li> </ul>	Ν
<ul> <li>DTC P1572 - 2</li> <li>Harness or connectors (The stop lamp switch circuit is shorted.)</li> <li>Harness or connectors</li> </ul>	0
<ul> <li>The brake pedal position switch circuit is shorted.)</li> <li>Stop lamp switch</li> <li>Brake pedal position switch</li> </ul>	Ρ
<ul> <li>ICC brake hold relay</li> <li>Incorrect stop lamp switch installation</li> <li>Incorrect brake pedal position switch installation</li> <li>ECM</li> </ul>	

• ECM

INFOID:000000012891469

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# P1572 ICC BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

#### Not applicable

#### DTC CONFIRMATION PROCEDURE

## **1.**CHECK DTC PRIORITY

If DTC P1572 is displayed with DTC P0605, first perform the confirmation procedure for DTC P0605.

#### Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-421. "DTC Description"</u>.

NO >> GO TO 2.

# 2. PRECONDITIONING

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

#### NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

#### >> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE 1-I

- 1. Start engine (VDC switch OFF).
- 2. Select "DATA MONITOR" mode with CONSULT.
- 3. Press MAIN switch and make sure that CRUISE lamp lights up.
- 4. Drive the vehicle for at least 5 consecutive seconds under the following conditions.
- CAUTION:

# Always drive vehicle at a safe speed. NOTE:

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

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position

5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-469, "Diagnosis Procedure".

NO >> GO TO 4.

**4.**PERFORM DTC CONFIRMATION PROCEDURE 1-II

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

CAUTION:

Always drive vehicle at a safe speed. NOTE:

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

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-469, "Diagnosis Procedure".

NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

NO-2 >> Confirmation after repair: INSPECTION END

### < DTC/CIRCUIT DIAGNOSIS >

## [VQ35DE]

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# 1. CHECK DTC PRIORITY

**Diagnosis** Procedure

If DTC	If DTC P1572 is displayed with DTC P0605, first perform the confirmation procedure for DTC P0605.					
<u>Is appli</u>	cable DTC detected?					
YES	>> Perform diagnosis of applicable. Refer to <u>EC-421, "DTC Description"</u> .					
NO	>> GO TO 2.					

2. CHECK OVERALL FUNCTION-I

#### With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT.
- 3. Check "BRAKE SW1" indication under the following conditions.

Monitor item	(	Indication	
BRAKE SW1	Brake pedal	Slightly depressed	OFF
(ICC brake switch)	Brake pedal	Fully released	ON

#### **Without CONSULT**

1. Turn ignition switch ON.

2	Check the voltage	between ECM harness	connector terminals	under the fol	lowing conditions
<u> </u>	Oncon the voltage				nowing conditions.

	ECM				
Connector	+	-		Condition Voltage	
Connector	Terminal	Terminal			
E32	140	152	Brake pedal	Slightly depressed	Approx. 0
EJZ	140	152	Brake pedal	Fully released	Battery voltage
Is the insp	ection result normal?				
YES >	> GO TO 3.				
NO >	> GO TO 4.				

**3.**CHECK OVERALL FUNCTION-II

### (I) With CONSULT

Select "BRAKE SW2" and check indication under the following conditions.

Monitor item	(	Indication	
BRAKE SW2	Brake pedal	Slightly depressed	ON
(Stop lamp switch)	Diake pedal	Fully released	OFF

### **Without CONSULT**

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

ECM						
Connector	+	_	Condition Voltage		Voltage (V)	
Connector	Terminal	Terminal				
E32	139	152	Brake	Slightly depressed	Battery voltage	
LJZ	155	152	pedal	Fully released	Approx. 0	

#### Is the inspection result normal?

YES >> INSPECTION END NO >> GO TO 7.

### < DTC/CIRCUIT DIAGNOSIS >

### 4.CHECK BRAKE PEDAL POSITION SWITCH POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect brake pedal position switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between brake pedal position switch harness connector and ground.

Brake pedal position switch		Ground	Voltage	
Connector	Terminal	Ground	voltage	
E72	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform the trouble diagnosis for power supply circuit.

5.CHECK BRAKE PEDAL POSITION SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between brake pedal position switch harness connector and ECM harness connector.

Brake pedal	position switch	E	СМ	Continuity
Connector	Terminal	Connector Terminal		Continuity
E72	2	E32	140	Existed

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

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

### 6.CHECK BRAKE PEDAL POSITION SWITCH

Check brake pedal position switch. Refer to EC-471, "Component Inspection (ICC Brake Switch)".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake pedal position switch. Refer to <u>BR-20, "Removal and Installation"</u>.

7.CHECK STOP LAMP SWITCH POWER SUPPLY

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

3. Disconnect ICC brake hold relay harness connector.

4. Check the voltage between stop lamp switch harness connector and ground.

Stop lan	np switch	Ground	Voltage
Connector	Connector Terminal		Voltage
E38	1	Ground	Battery voltage

#### 5. Check the voltage between ICC brake hold relay harness connector and ground.

ICC brake	hold relay	Ground	Voltage
Connector	Connector Terminal		voltage
E75	5	Ground	Battery voltage

### Is the inspection result normal?

YES >> GO TO 8.

NO >> Perform the trouble diagnosis for power supply circuit.

 ${f 8}.$ CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

#### 1. Disconnect ECM harness connector.

2. Check the continuity between stop lamp switch harness connector and ECM harness connector.

Stop lamp switch		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
E38	2	E32	139	Existed

3. Check the continuity between ICC brake hold relay harness connector and ECM harness connector.

ICC brake hold relay		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
E75	3	E32	139	Existed

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

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

### **9.**CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to EC-472, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES	>> GO TO 10.
NO	>> Replace stop lamp switch. Refer to BR-20, "Removal and Installation".

<b>10.</b> CHECK ICC BRAKE HOLD RELAY
---------------------------------------

Check ICC brake hold relay. Refer to EC-472. "Component Inspection (ICC Brake Hold Relay)".
Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ICC brake hold relay.

### Component Inspection (ICC Brake Switch)

## 1. CHECK BRAKE PEDAL POSITION SWITCH-I

- 1. Turn ignition switch OFF.
- 2. Disconnect brake pedal position switch harness connector.

3. Check the continuity between brake pedal position switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	2 Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

	•
YES	>> INSPECTION END

NO >> GO TO 2.

## **2.**CHECK BRAKE PEDAL POSITION SWITCH-II

1. Adjust brake pedal position switch installation. Refer to BR-13. "Adjustment".

2. Check the continuity between brake pedal position switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2 Br	Brake pedal	Fully released	Existed
	biake pedai	Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake pedal position switch. Refer to <u>BR-20, "Removal and Installation"</u>.

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### < DTC/CIRCUIT DIAGNOSIS >

## Component Inspection (Stop Lamp Switch)

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1.CHECK STOP LAMP SWITCH-I

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

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

- 1. Adjust stop lamp switch installation. Refer to BR-13, "Adjustment".
- 2. Check harness continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-20. "Removal and Installation"</u>.

## Component Inspection (ICC Brake Hold Relay)

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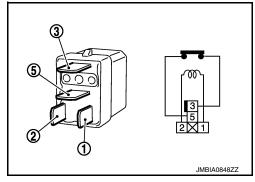
- 1. CHECK ICC BRAKE HOLD RELAY
- 1. Turn ignition switch OFF.
- 2. Remove ICC brake hold relay.
- 3. Check the continuity between ICC brake hold relay terminals under the following conditions.

Terminals	nals Condition	
3 and 5	12V direct current supply between terminals 1 and 2	Existed
5 810 5	No current supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ICC brake hold relay



## P1574 ASCD VEHICLE SPEED SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# P1574 ASCD VEHICLE SPEED SENSOR

## Description

The ECM receives two vehicle speed signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to <u>EC-40, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description"</u> for ASCD functions.

## DTC Description

### DTC DETECTION LOGIC

The difference the between two vehicle speed signals is out of the specified range.

CONSULT screen terms Е DTC DTC detection condition (Trouble diagnosis content) Start engine and drive the vehicle at more Diagnosis condition than 40 km/h (25 MPH) Signal (terminal) \_\_\_\_ ASCD VHL SPD SEN P1574 (ASCD vehicle speed sensor) The difference the between two vehicle Threshold speed signals is out of the specified range Diagnosis delay time

### POSSIBLE CAUSE

- Harness or connectors
- (The CAN communication line is open or shorted.)
- Combination meter
- ABS actuator and electric unit (control unit)
- Wheel sensor
- TCM
- ECM

FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK DTC PRIORITY

If DTC P1574 is displayed with DTC UXXXX, P0500, P0605 or P0607, first perform the confirmation procedure for DTC UXXXX, P0500, P0605 or P0607.

#### Is applicable DTC detected?

YES	>> Perform diagnosis of applicable.	M
	DTC UXXXX: Refer to EC-105, "DTC Index".	
	<ul> <li>DTC P0500: Refer to <u>EC-389, "Description"</u>.</li> </ul>	
	<ul> <li>DTC P0605: Refer to <u>EC-421, "DTC Description"</u>.</li> </ul>	NI
	<ul> <li>DTC P0607: Refer to <u>EC-425, "DTC Description"</u>.</li> </ul>	Ν
NO	>> GO TO 2.	
2.PR	ECONDITIONING	
-		0
If DTC	Confirmation Procedure has been previously conducted, always perform the following before conduct-	
ing the	e next test.	
1. Tu	urn ignition switch OFF and wait at least 10 seconds.	D
2. Tu	urn ignition switch ON.	Γ
3. Tu	urn ignition switch OFF and wait at least 10 seconds.	
	>> GO TO 3.	

3. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine (VDC switch OFF).

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Drive the vehicle at more than 40 km/h (25 MPH).
 CAUTION:
 Always drive vehicle at a safe speed.
 NOTE:
 This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle.
 If a road test is expected to be easier, it is unnecessary to lift the vehicle.

Check DTC.

- Is DTC detected?
- YES >> Proceed to EC-474, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## **Diagnosis** Procedure

INFOID:000000012891476

## **1.**CHECK DTC PRIORITY

If DTC P1574 is displayed with DTC UXXXX, P0500, P0605 or P0607, first perform the confirmation procedure for DTC UXXXX, P0500, P0605 or P0607.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC UXXXX: Refer to EC-105, "DTC Index".
  - DTC P0500: Refer to EC-389, "Description".
  - DTC P0605: Refer to <u>EC-421, "DTC Description"</u>.
  - DTC P0607: Refer to EC-425, "DTC Description".

NO >> GO TO 2.

2. СНЕСК DTC WITH TCM

Check DTC with TCM. Refer to TM-42, "CONSULT Function".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble shooting relevant to DTC indicated.

 $\mathbf{3}$ . CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check DTC with ABS actuator and electric unit (control unit). Refer to BRC-39, "CONSULT Function".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning part.

**4.**CHECK COMBINATION METER FUNCTION

Check combination meter function. Refer to MWI-20, "CONSULT Function (METER/M&A)".

>> INSPECTION END

# P1574 ICC VEHICLE SPEED SENSOR

# Description

The ECM receives two vehicle speed signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ICC control. Refer to <u>CCS-11</u>, "System Description" for ICC functions.

## DTC Description

### DTC DETECTION LOGIC

The difference the between two vehicle speed signals is out of the specified range.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	Start engine and drive the vehicle at more than 40 km/h (25 MPH)
P1574	ASCD VHL SPD SEN	Signal (terminal)	_
F 1574	(ICC vehicle speed sensor)	Threshold	The difference the between two vehicle speed signals is out of the specified range
		Diagnosis delay time	—
(The CAN • Combinat	or connectors I communication line is open or s tion meter ator and electric unit (control unit		
FAIL-SAFE Not applica			
	FIRMATION PROCEDURE		
	74 is displayed with DTC UXXX C UXXXX, P0500, P0605 or P06		607, first perform the confirmation proce-
	e DTC detected?		
YES >>	<ul> <li>Perform diagnosis of applicab</li> <li>DTC UXXXX: Refer to <u>EC-10</u></li> <li>DTC P0500: Refer to <u>EC-389</u></li> </ul>	5, "DTC Index".	
NO >>	<ul> <li>DTC P0605: Refer to EC-421.</li> <li>DTC P0607: Refer to EC-425.</li> <li>GO TO 2.</li> </ul>	"DTC Description".	
•	NDITIONING		
If DTC Con ing the nex 1. Turn ig 2. Turn ig	firmation Procedure has been pr	st 10 seconds.	ays perform the following before conduct-
	00 10 2		
•	• GO TO 3. RM DTC CONFIRMATION PROC	EDURE	

1. Start engine (VDC switch OFF).

2. Drive the vehicle at more than 40 km/h (25 MPH).

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#### **CAUTION:**

Always drive vehicle at a safe speed. NOTE: This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

Check DTC. 3.

Is DTC detected?

>> Proceed to EC-476, "Diagnosis Procedure". YES

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## **Diagnosis** Procedure

INFOID:000000012891479

### CHECK DTC PRIORITY

If DTC P1574 is displayed with DTC UXXXX, P0500, P0605 or P0607, first perform the confirmation procedure for DTC UXXXX, P0500, P0605 or P0607.

#### Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- DTC UXXXX: Refer to EC-105, "DTC Index".
- DTC P0500: Refer to <u>EC-389</u>, "<u>Description</u>".
  DTC P0605: Refer to <u>EC-421</u>, "<u>DTC Description</u>".
- DTC P0607: Refer to EC-425, "DTC Description".

NO >> GO TO 2.

2.check dtc with tcm

Check DTC with TCM. Refer to TM-42, "CONSULT Function".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble shooting relevant to DTC indicated.

 ${f 3.}$  CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check DTC with ABS actuator and electric unit (control unit). Refer to <u>BRC-39</u>, "CONSULT Function". Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning part.

4.CHECK COMBINATION METER FUNCTION

Check combination meter function. Refer to MWI-20, "CONSULT Function (METER/M&A)".

>> INSPECTION END

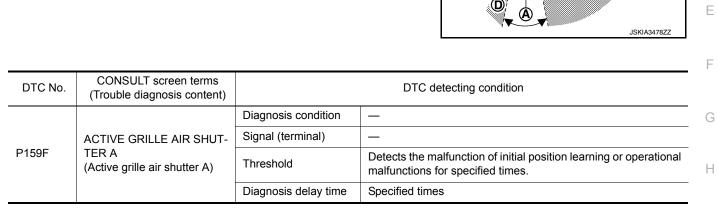
# P159F ACTIVE GRILLE SHUTTER

### **DTC** Description

### DTC DETECTION LOGIC

Active grille shutter normally stops within zone (A) which is defined by zone (B) ( $90^{\circ}\pm20^{\circ}$ ).

If the active grille shutter stops within zone  $\bigcirc$  stuck error is detected, and if the active grille shutter stops at position beyond zone  $\bigcirc$  overrun error is detected.



### POSSIBLE CAUSE

· Foreign objects interferes with active grille shutter

### FAIL-SAFE

Not applicable

#### DTC CONFIRMATION PROCEDURE

### **1.**CHECK DTC PRIORITY

If DTC P059F displayed with DTC UXXXX, P0116, P0117, P0118, P0125, P0196, P0197, P0198, P0500, P0607, or P1720 first perform the trouble diagnosis for DTC UXXXX, P0116, P0117, P0118, P0125, P0196, P0197, P0198, P0500, or P0607.

#### Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to EC-105. "DTC Index".

NO >> GO TO 2.

2.PRECONDITIONING

If another DTC Confirmation Procedure is conducted just before this procedure, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test. TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 11V and 16V with ignition switch ON.

With CONSULT >>GO TO 3. Without CONSULT>>GO TO 4.

# **3.** DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Turn ignition switch OFF and wait 10 seconds or more.
- 2. Turn ignition switch ON.
- 3. Select "ACTIVE GRILLE SHUTTER" in "ACTIVE TEST" of "ENGINE" using CONSULT.
- 4. Touch "CALIBRTN" at least 30 seconds.

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## **P159F ACTIVE GRILLE SHUTTER**

< DTC/CIRCUIT DIAGNOSIS >

5. Check 1st trip DTC.

Is 1st trip DTC is detected?

YES >> Proceed to EC-478, "Diagnosis Procedure".

NO >> INSPECTION END

**4.**DTC CONFIRMATION PROCEDURE

- 1. Drive the vehicle at 30 km/h (19 MPH) or more for at least 30 seconds.
- 2. Check DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-478, "Diagnosis Procedure"

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

INFOID:000000012891481

## **1.**CHECK DTC PRIORITY

If DTC P059F displayed with DTC UXXXX, P0116, P0117, P0118, P0125, P0196, P0197, P0198, P0500, P0607, or P1720 first perform the trouble diagnosis for DTC UXXXX, P0116, P0117, P0118, P0125, P0196, P0197, P0198, P0500, or P0607.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to EC-105. "DTC Index".
- NO >> GO TO 2.

2. CHECK ACTIVE GRILL SHUTTER

- 1. Turn ignition switch OFF.
- 2. Check if any foreign objects interferes with active grille shutter.
- 3. Check the installation condition of active grille shutter.
- Is the inspection result normal?
- YES >> INSPECTION END
- NO >> Repair or replace the error-detected parts.

# P1700 CVT CONTROL SYSTEM

### Description

This DTC is displayed with other DTC regarding TCM. Perform the trouble diagnosis for corresponding DTC. Refer to <u>EC-105. "DTC Index"</u>. When this DTC is detected, the ASCD control is canceled.

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# P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

### < DTC/CIRCUIT DIAGNOSIS >

# P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

## Description

ECM receives input speed sensor signal from TCM via the CAN communication line. ECM uses this signal for engine control.

# DTC Description

INFOID:000000012891484

INFOID:000000012891483

## DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
	IN PULY SPEED [Input speed sensor (Primary speed sensor) (TCM output)]	Diagnosis condition	Start engine and drive the vehicle at more than 50 km/h (31 MPH)
P1715		Signal (terminal)	<ul><li>Input speed sensor signal</li><li>Output speed sensor signal</li><li>Engine rpm signal</li></ul>
P1715		Threshold	Input speed sensor signal is different from the theoretical value calculated by ECM from output speed sensor signal and engine rpm signal
		Diagnosis delay time	—

## POSSIBLE CAUSE

- Harness or connectors
- (The CAN communication line is open or shorted)
- Harness or connectors
- (Input speed sensor circuit is open or shorted)
- TCM

### FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK DTC PRIORITY

If DTC P1574 is displayed with DTC UXXXX, P0340, P0345, P0605 or P0607, first perform the confirmation procedure for DTC UXXXX, P0340, P0345, P0605 or P0607.

### Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC UXXXX: Refer to EC-105, "DTC Index".
  - DTC P0340: Refer to EC-333, "DTC Description".
  - DTC P0345: Refer to EC-333, "DTC Description".
  - DTC P0605: Refer to <u>EC-421, "DTC Description"</u>.
  - DTC P0607: Refer to <u>EC-425</u>, "DTC Description".
- NO >> GO TO 2.

## 2. PRECONDITIONING

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

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

>> GO TO 3.

# 3. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine.
- 2. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.

Revision: December 2015

### EC-480

[VQ35DE]

# P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

< DTC/CIRCUIT DIAGNOSIS > [VQ35	DE]
3. Check 1st trip DTC.	
Is 1st trip DTC detected?	А
<ul> <li>YES &gt;&gt; Proceed to <u>EC-481. "Diagnosis Procedure"</u>.</li> <li>NO-1 &gt;&gt; To check malfunction symptom before repair: Refer to <u>GI-42. "Intermittent Incident"</u>.</li> <li>NO-2 &gt;&gt; Confirmation after repair: INSPECTION END</li> </ul>	EC
Diagnosis Procedure	12891485
1. CHECK DTC PRIORITY	С
If DTC P1574 is displayed with DTC UXXXX, P0340, P0345, P0605 or P0607, first perform the confirmation procedure for DTC UXXXX, P0340, P0345, P0605 or P0607.	ation
Is applicable DTC detected?	D
YES >> Perform diagnosis of applicable.	
<ul> <li>DTC UXXXX: Refer to <u>EC-105, "DTC Index"</u>.</li> </ul>	E
<ul> <li>DTC P0340: Refer to <u>EC-333, "DTC Description"</u>.</li> <li>DTC P0345: Refer to <u>EC-333, "DTC Description"</u>.</li> </ul>	
<ul> <li>DTC P0605: Refer to EC-421, "DTC Description".</li> </ul>	_
<ul> <li>DTC P0607: Refer to <u>EC-425, "DTC Description"</u>.</li> <li>NO &gt;&gt; GO TO 2.</li> </ul>	F
2. CHECK DTC WITH TCM	
Check DTC with TCM. Refer to TM-58, "DTC Index".	G
Is the inspection result normal?	
YES >> Replace TCM. Refer to <u>TM-201, "Removal and Installation"</u> .	Н
NO >> Perform trouble shooting relevant to DTC indicated.	
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## P1800 VIAS CONTROL SOLENOID VALVE 1

### < DTC/CIRCUIT DIAGNOSIS >

# P1800 VIAS CONTROL SOLENOID VALVE 1

## DTC Description

INFOID:000000012891486

IVQ35DE1

### DTC DETECTION LOGIC

An excessively low or high voltage signal is sent to ECM through the VIAS control solenoid valve 1.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
	Diagnosis condition	Start engine and let it idle	
		Signal (terminal)	VIAS control solenoid valve 1 signal
P1800 VIAS S/V CIRC-B1 (VIAS solenoid valve circuit bank 1)	Threshold	An excessively low or high voltage signal is sent to ECM	
		Diagnosis delay time	-

#### POSSIBLE CAUSE

- · Harness or connectors
- (Input speed sensor circuit is open or shorted)
- VIAS control solenoid valve 1

### FAIL-SAFE

Not applicable

### DTC CONFIRMATION PROCEDURE

### 1.CONDITIONING

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

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

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

#### **TESTING CONDITION:**

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

>> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and let it idle for at least 5 seconds.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-482, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

INFOID:000000012891487

# 1. CHECK VIAS CONTROL SOLENOID VALVE 1 POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between VIAS control solenoid valve 1 harness connector and ground.

VIAS control s	olenoid valve 1	Ground	Voltage	
Connector	Terminal	Ground	vollage	
F63	1	Ground	Battery voltage	

Is the inspection result normal?

# P1800 VIAS CONTROL SOLENOID VALVE 1

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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NO >> Repair open circuit, short to ground or short to power in harness or connectors. 2.CHECK VIAS CONTROL SOLENOID VALVE 1 OUTPUT SIGNAL CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between VIAS control solenoid valve 1 harness connector and ECM harness connector.

VIAS control sole	noid valve 1	E	ECM	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F63	2	F79	108	Existed	
Also check h	arness for sho	t to ground a	ind short to powe	er.	
s the inspection	esult normal?				
YES >> GO 1					
		-	ind or short to po	ower in harness o	or connectors.
<b>3.</b> CHECK VIAS	CONTROL SC	LENOID VAI	_VE 1		
		lve 1. Refer t	o <u>EC-483, "Com</u>	ponent Inspectio	<u>n"</u> .
s the inspection					
	ECTION END		alvo 1. Doforito [		CONTROL SYSTEM : Compo-
	Parts Location			<u>-C-15, ENGINE</u>	CONTROL STSTEM : Compo-
Component Ir		-			
	ispection				INFOID:000000012891488
CHECK VIAS	CONTROL SC	LENOID VAI	_VE 1		
With CONSUL	т				
. Turn ignition					
	l harness conn		nnected. VIAS control sol	enoid valve 1	
L. Turn ignition			VIAO CONTION SON		
			node with CONS		
<ol> <li>Check air past following con</li> </ol>		y and operati	ion delay time un	der the	
lonowing con					
Condition	Air passag	ge continuity	Air passage contin	uity	
(VIAS S/V-1)	between	(A) and (B)	between (A) and (	Ĉ	
ON	Ex	isted	Not existed		
OFF	Not e	existed	Existed		TICS (
					B
					JMBIA0180ZZ

- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Disconnect vacuum hoses connected to VIAS volume control solenoid valve 1.

Ο

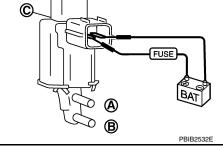
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# P1800 VIAS CONTROL SOLENOID VALVE 1

#### < DTC/CIRCUIT DIAGNOSIS >

4. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between $(A)$ and $(B)$	Air passage continuity between $\textcircled{A}$ and $\textcircled{C}$
12 V direct current supply between terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VIAS control solenoid valve 1. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Compo-</u> nent Parts Location".

## P1801 VIAS CONTROL SOLENOID VALVE 2

### < DTC/CIRCUIT DIAGNOSIS >

# P1801 VIAS CONTROL SOLENOID VALVE 2

## **DTC** Description

INFOID:000000012891489

[VQ35DE]

### DTC DETECTION LOGIC

An excessively low or high voltage signal is sent to ECM through the VIAS control solenoid valve 2.

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	Start engine and let it idle
		Signal (terminal)	VIAS control solenoid valve 2 signal
P1801	VIAS S/V CIRC-B2 (VIAS solenoid valve circuit bank 2)	Threshold	An excessively low or high voltage signal is sent to ECM
		Diagnosis delay time	—
(The soler • VIAS cont FAIL-SAFE	or connectors noid valve 2 circuit is open or sho trol solenoid valve 2 E	rted.)	
Not applical			
1.condit			
			ays perform the following before conduct-
3. Turn iai	nition switch OFF and wait at leas	t 10 seconds.	
TESTING C Before per	nition switch OFF and wait at leas CONDITION: forming the following procedur		tage is more than 11 V at idle.
TESTING C Before per	CONDITION: forming the following procedur · GO TO 2.	e, confirm battery vo	tage is more than 11 V at idle.
TESTING C Before per >> 2.PERFOF	CONDITION: forming the following procedur GO TO 2. RM DTC CONFIRMATION PROC	e, confirm battery vo EDURE	tage is more than 11 V at idle.
TESTING C Before per >> 2.PERFOF 1. Start er 2. Check	CONDITION: forming the following procedur GO TO 2. RM DTC CONFIRMATION PROC ngine and let it idle for at least 5 so 1st trip DTC.	e, confirm battery vo EDURE	tage is more than 11 V at idle.
TESTING C Before per 2.PERFOF 1. Start er 2. Check Is 1st trip D YES >> NO-1 >>	CONDITION: forming the following procedur GO TO 2. RM DTC CONFIRMATION PROC	e, confirm battery vol EDURE econds. Procedure". efore repair: Refer to <u>(</u>	
TESTING C Before per 2.PERFOF 1. Start er 2. Check Is 1st trip D YES >> NO-1 >> NO-2 >>	CONDITION: forming the following procedur GO TO 2. RM DTC CONFIRMATION PROC ngine and let it idle for at least 5 so 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-485. "Diagnosis F</u> To check malfunction symptom b	e, confirm battery vol EDURE econds. Procedure". efore repair: Refer to <u>(</u>	
TESTING C Before per 2.PERFOF 1. Start er 2. Check Is 1st trip D YES >> NO-1 >> NO-2 >> Diagnosis	CONDITION: forming the following procedur GO TO 2. RM DTC CONFIRMATION PROC ngine and let it idle for at least 5 so 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-485. "Diagnosis F</u> To check malfunction symptom b Confirmation after repair: INSPE	e, confirm battery vol EDURE econds. Procedure". efore repair: Refer to <u>C</u> CTION END	<u>61-42, "Intermittent Incident"</u> .
TESTING C Before per 2.PERFOF 1. Start er 2. Check Is 1st trip D YES >> NO-1 >> NO-2 >> Diagnosis 1.CHECK 1. Turn igu 2. Disconu 3. Turn igu	CONDITION: forming the following procedur GO TO 2. RM DTC CONFIRMATION PROC ngine and let it idle for at least 5 se 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-485, "Diagnosis F</u> To check malfunction symptom b Confirmation after repair: INSPEC	e, confirm battery vol EDURE econds. Procedure". efore repair: Refer to <u>CTION END</u> LVE 2 POWER SUPPL 2 harness connector.	<u>GI-42, "Intermittent Incident"</u> . INFOID:000000012891490

VIAS control s	olenoid valve 2	Ground	Voltage
Connector	Terminal	Ground Vollage	
F65	1	Ground	Battery voltage

Is the inspection result normal?



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# P1801 VIAS CONTROL SOLENOID VALVE 2

< DTC/CIRCUIT DIAGNOSIS >

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

2. CHECK VIAS CONTROL SOLENOID VALVE 2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between VIAS control solenoid valve 2 harness connector and ECM harness connector.

VIAS control solenoid valve 2		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F65	2	F79	102	Existed

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

#### Is the inspection result normal?

YES >> GO TO 3.

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

### **3.**CHECK VIAS CONTROL SOLENOID VALVE 2

Check VIAS control solenoid valve 2. Refer to EC-486, "Component Inspection".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace VIAS control solenoid valve 2. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Component Parts Location"</u>.

## Component Inspection

INFOID:000000012891491

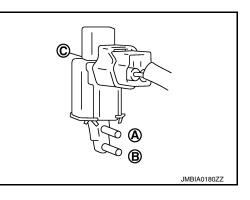
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## 1. CHECK VIAS CONTROL SOLENOID VALVE 2

### With CONSULT

- Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect vacuum hoses connected to VIAS control solenoid valve 2.
- 4. Turn ignition switch ON.
- 5. Select "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT.
- 6. Check air passage continuity and operation delay time under the following conditions.

Condition (VIAS S/V-2)	Air passage continuity between $\textcircled{A}$ and $\textcircled{B}$	Air passage continuity between $\textcircled{A}$ and $\textcircled{C}$
ON	Existed	Not existed
OFF	Not existed	Existed



### **Without CONSULT**

- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 2 harness connector.
- 3. Disconnect vacuum hoses connected to VIAS volume control solenoid valve 2.

# P1801 VIAS CONTROL SOLENOID VALVE 2

#### < DTC/CIRCUIT DIAGNOSIS >

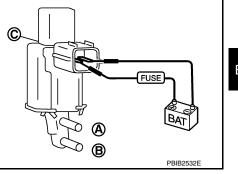
4. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between $\textcircled{A}$ and $\textcircled{B}$	Air passage continuity between $\textcircled{A}$ and $\textcircled{C}$
12 V direct current supply between terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VIAS control solenoid valve 2. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Component Parts Location"</u>.



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# P1805 BRAKE SWITCH

## Description

Brake switch signal is applied to the ECM via the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driven.

## DTC Description

INFOID:000000012891493

INFOID:000000012891492

### DTC DETECTION LOGIC

A brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
	Diagnosis condition	-	
	P1805 BRAKE SW/CIRCUIT (Stop lamp switch circuit)	Signal (terminal)	Stop lamp switch signal
P1805		Threshold	A brake switch signal is not sent to ECM while the vehicle is driving
		Diagnosis delay time	Extremely long time

### POSSIBLE CAUSE

- Harness or connectors
- (Stop lamp switch circuit is open or shorted.)
- Stop lamp switch

### FAIL-SAFE

Engine operating condition in fail-safe mode			
Fail safe mode	Vehicle behavior		
	ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.		
Brake switch	Vehicle condition	Driving condition	
	When engine is idling	Normal	
	When accelerating	Poor acceleration	

### DTC CONFIRMATION PROCEDURE

# 1.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Fully depress the brake pedal for at least 5 seconds.
- 3. Erase the DTC with CONSULT.
- 4. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-488, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## **Diagnosis** Procedure

# **1.**CHECK STOP LAMP SWITCH CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Check the stop lamp when depressing and releasing the brake pedal.

Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

INFOID:000000012891494

# P1805 BRAKE SWITCH

< DTC/CIRC					
,	CUIT DIAGN	IOSIS >		[VQ35DE]	
s the inspec	tion result n	ormal?			
	INSPECTIO	N END			
	GO TO 2.				
CHECK S	STOP LAMP	SWITCH S	IGNAL CIRC	CUIT-I	
	ition switch (				
	stop lamp s		lamn switch	harness connector and ground.	
. Oncor u	ic voltage b				
	F				
Stop lam	p switch	_	Voltage		
Connector	Terminal		Ū		
E38	1	Ground	Battery volta	ge	
	tion result n			<u></u>	
	GO TO 3.				
		circuit, sho	rt to ground o	or short to power in harness or connectors.	
.CHECK S	STOP LAMP	SWITCH S	IGNAL CIRC	:UIT-II	
				ch harness connector and ECM harness connector.	
	lo continuity	500000000			
Stop lam	p switch	ECM			
Connector	Terminal	Connector	Terminal	Continuity	
E38	2	E32	139	Existed	
Also che	ck harness	for short to	pround and s	short to power.	
	tion result n				
s the inspec	lion result n	ormar?			
	GO TO 4.	<u>ormar :</u>			
YES >> (	GO TO 4.		t to ground o	or short to power in harness or connectors.	
YES >> ( NO >>	GO TO 4.	circuit, sho	rt to ground c	or short to power in harness or connectors.	
YES >> 0 NO >> 1	GO TO 4. Repair open STOP LAMP	circuit, sho SWITCH		·	
YES >> 0 NO >> 1 CHECK S	GO TO 4. Repair open STOP LAMP	circuit, sho SWITCH Refer to <u>EC</u>		or short to power in harness or connectors.	
YES >> ( NO >> I CHECK S heck stop I the inspec YES >> I	GO TO 4. Repair open STOP LAMP amp switch. tion result n INSPECTIO	circuit, sho SWITCH Refer to <u>EC</u> ormal? N END	<u>-489, "Com</u> p	oonent Inspection (Stop Lamp Switch)"	
YES >> ( NO >> I CHECK S heck stop I the inspec YES >> I	GO TO 4. Repair open STOP LAMP amp switch. tion result n INSPECTIO	circuit, sho SWITCH Refer to <u>EC</u> ormal? N END	<u>-489, "Com</u> p	·	
YES >> 0 NO >> 1 CHECK S heck stop 1 the inspec YES >> 1 NO >> 1	GO TO 4. Repair open STOP LAMP amp switch. tion result n INSPECTIO Replace stop	circuit, sho SWITCH Refer to <u>EC</u> ormal? N END p lamp switc	<u>-489, "Com</u> p	oonent Inspection (Stop Lamp Switch)". BR-20. "Removal and Installation".	
YES >> 0 NO >> 1 CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 Ompone	GO TO 4. Repair open TOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspec	circuit, sho SWITCH Refer to <u>EC</u> ormal? N END p lamp switc tion (Stop	- <u>489, "Com</u> r h. Refer to <u>F</u>	oonent Inspection (Stop Lamp Switch)". BR-20. "Removal and Installation".	
YES >> 0 NO >> 1 CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 Ompone	GO TO 4. Repair open STOP LAMP amp switch. tion result n INSPECTIO Replace stop	circuit, sho SWITCH Refer to <u>EC</u> ormal? N END p lamp switc tion (Stop	- <u>489, "Com</u> r h. Refer to <u>F</u>	oonent Inspection (Stop Lamp Switch)". BR-20. "Removal and Installation".	
YES >> 0 NO >> 1 .CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 Ompone .CHECK S Turn ign	GO TO 4. Repair open TOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspect TOP LAMP	circuit, sho SWITCH Refer to <u>EC</u> ormal? N END p lamp switc tion (Stop SWITCH-I OFF.	c-489, "Comp ch. Refer to <u>E</u> Lamp Sw	Donent Inspection (Stop Lamp Switch)". BR-20, "Removal and Installation". Vitch)	
YES >> 0 NO >> 1 .CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 Ompone .CHECK S Turn ign Disconn	GO TO 4. Repair open TOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspect TOP LAMP ition switch o ect stop lam	circuit, sho SWITCH Refer to <u>EC</u> ormal? N END p lamp switc tion (Stop SWITCH-I OFF. p switch ha	-489, "Comp th. Refer to <u>F</u> Lamp Sw	bonent Inspection (Stop Lamp Switch)". 3R-20. "Removal and Installation". vitch) INFOID:000000012891495 ctor.	
YES >> 0 NO >> 1 .CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 OMPONE .CHECK S Turn ign Disconn	GO TO 4. Repair open TOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspect TOP LAMP ition switch o ect stop lam	circuit, sho SWITCH Refer to <u>EC</u> ormal? N END p lamp switc tion (Stop SWITCH-I OFF. p switch ha	-489, "Comp th. Refer to <u>F</u> Lamp Sw	oonent Inspection (Stop Lamp Switch)". BR-20, "Removal and Installation". /itch)	
YES >> 0 NO >> 1 .CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 OMPONE .CHECK S Turn ign Disconn Check h	GO TO 4. Repair open TOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspect TOP LAMP ition switch o ect stop lam	circuit, sho SWITCH Refer to <u>EC</u> ormal? N END p lamp switc tion (Stop SWITCH-I OFF. p switch has inuity betwe	c-489, "Comp ch. Refer to <u>F</u> Lamp Sw mess connect en stop lamp	SR-20, "Removal and Installation".         Vitch)         INFOID:000000012891495         ctor.         o switch terminals under the following conditions.	
YES >> 0 NO >> 1 .CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 Ompone .CHECK S Turn ign Disconn	GO TO 4. Repair open TOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspect TOP LAMP ition switch o ect stop lam	circuit, shor SWITCH Refer to <u>EC</u> ormal? N END p lamp switc tion (Stop SWITCH-I OFF. p switch har inuity betwe Condition	th. Refer to E Lamp Sw	SR-20. "Removal and Installation".         vitch)         vitch:         Continuity	
YES >> 0 NO >> 1 .CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 Ompone .CHECK S Turn ign Disconn Check h	GO TO 4. Repair open TOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspect TOP LAMP ition switch o ect stop lam	circuit, shor SWITCH Refer to EC ormal? N END p lamp switc tion (Stop SWITCH-I OFF. p switch har inuity betwe Condition Fully re	c-489, "Comp ch. Refer to E Lamp Sw mess connect en stop lamp	Donent Inspection (Stop Lamp Switch)".         3R-20. "Removal and Installation".         vitch)         vitch)         oswitch terminals under the following conditions.         Continuity         Not existed	
YES >> 0 NO >> 1 CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 COMPONE CHECK S . Turn ign Disconn . CHECK S . Turn ign . Check h Terminals 1 and 2	GO TO 4. Repair open STOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspect STOP LAMP ition switch of ect stop lam arness conti	circuit, shor SWITCH Refer to EC ormal? N END p lamp switc tion (Stop SWITCH-I OFF. p switch har inuity betwe Condition Fully re Slightly	th. Refer to E Lamp Sw	SR-20. "Removal and Installation".         vitch)         vitch:         Continuity	
YES >> 0 NO >> 1 CHECK S heck stop 1 the inspec YES >> 1 NO >> 1 COMPONE CHECK S . Turn ign . CHECK S . Turn ign . CHECK S . Turn ign . Check h Terminals 1 and 2	GO TO 4. Repair open STOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspect STOP LAMP ition switch of ect stop lam arness conti Brake pedal	circuit, shor SWITCH Refer to EC ormal? N END p lamp switc tion (Stop SWITCH-I OFF. p switch har inuity betwe Condition Fully re Slightly ormal?	c-489, "Comp ch. Refer to E Lamp Sw mess connect en stop lamp	Donent Inspection (Stop Lamp Switch)".         3R-20. "Removal and Installation".         vitch)         vitch)         oswitch terminals under the following conditions.         Continuity         Not existed	
YES >> ( NO >> I .CHECK S check stop I sthe inspec YES >> I NO >> I COMPONE .CHECK S . Turn ign . CHECK S . Turn ign . Check h Terminals 1 and 2 sthe inspec YES >> I	GO TO 4. Repair open STOP LAMP amp switch. tion result n INSPECTIO Replace stop nt Inspect STOP LAMP ition switch of ect stop lam arness conti	circuit, shor SWITCH Refer to EC ormal? N END p lamp switc tion (Stop SWITCH-I OFF. p switch har inuity betwe Condition Fully re Slightly ormal?	c-489, "Comp ch. Refer to E Lamp Sw mess connect en stop lamp	Donent Inspection (Stop Lamp Switch)".         3R-20. "Removal and Installation".         vitch)         vitch)         oswitch terminals under the following conditions.         Continuity         Not existed	

2. Check harness continuity between stop lamp switch terminals under the following conditions.

# P1805 BRAKE SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

Terminals	Condition		Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed		
	Diake pedal	Slightly depressed	Existed		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-20, "Removal and Installation"</u>.

## P2096, P2097, P2098, P2099 A/F SENSOR 1

### < DTC/CIRCUIT DIAGNOSIS >

# P2096, P2097, P2098, P2099 A/F SENSOR 1

### **DTC** Description

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	-
	POST CAT FUEL TRIM SYS B1	Signal (terminal)	-
P2096	(Post catalyst fuel trim system too lean bank 1)	Threshold	The output voltage computed by ECM from the A/F sensor 1 signal is shifts to the lean side for a specified period
		Diagnosis delay time	—
		Diagnosis condition	-
	POST CAT FUEL TRIM SYS B1	Signal (terminal)	-
	(Post catalyst fuel trim system too rich	Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is shifts to the rich side for a specified period
		Diagnosis delay time	—
		Diagnosis condition	_
	POST CAT FUEL TRIM SYS B2	Signal (terminal)	-
P2098	(Post catalyst fuel trim system too lean bank 2)	Threshold	The output voltage computed by ECM from the A/F sensor 1 signal is shifts to the lean side for a specified period
		Diagnosis delay time	_
		Diagnosis condition	-
		Signal (terminal)	-
P2099	POST CAT FUEL TRIM SYS B2 (Post catalyst fuel trim system too rich bank 2)	Threshold	The A/F signal computed by ECM from the A/ F sensor 1 signal is shifts to the rich side for a specified period
		Diagnosis delay time	—

### POSSIBLE CAUSE

#### DTC P2096

- A/F sensor 1 (bank 1)
- A/F sensor 1 heater
- Heated oxygen sensor 2 (bank 1)Fuel pressure
- Fuel pressure
  Fuel injector
- Intake air leaks
- Exhaust gas leaks

#### DTC P2097

- A/F sensor 1 (bank 1)
- A/F sensor 1 heater
- Heated oxygen sensor 2 (bank 1)
- Fuel pressure
- Fuel injector
- Intake air leaks
- Exhaust gas leaks

#### DTC P2098

- A/F sensor 1 (bank 2)
- A/F sensor 1 heater
- Heated oxygen sensor 2 (bank 2)

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- Fuel pressure
- Fuel injector
- Intake air leaks
- Exhaust gas leaks

DTC P2099

- A/F sensor 1 (bank 2)
- A/F sensor 1 heater
- Heated oxygen sensor 2 (bank 2)
- Fuel pressure
- Fuel injector
- Intake air leaks
- Exhaust gas leaks

FAIL-SAFE Not applicable

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

#### **TESTING CONDITION:**

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Clear the mixture ratio self-learning value. Refer to EC-156, "Description".
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
- 8. Check 1st trip DTC.

### Is 1st trip DTC detected?

- YES >> Proceed to EC-492, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

### **Diagnosis** Procedure

INFOID:000000012891497

### **1**.RETIGHTEN A/F SENSOR 1 AND HEATED OXYGEN SENSOR 2

Loosen and retighten the A/F sensor 1 and heated oxygen sensor 2. Refer to <u>EM-33</u>, "<u>Removal and Installa-</u> tion (bank 2)", <u>EM-35</u>, "<u>Removal and Installation (bank 1)</u>".

### >> GO TO 2.

2. CHECK FOR EXHAUST GAS LEAK

1. Start engine and run it at idle.

2. Listen for an exhaust gas leak before the three way catalyst 2.

#### Is exhaust gas leak detected?

YES >> Repair or replace.

NO >> GO TO 3.

3.CHECK FOR INTAKE AIR LEAKAGE

# P2096 P2097 P2098 P2099 Δ/F SENSOR 1

		P209	96, P209	97, P20	98, P209	99 A/F S	ENSOR 1		
< DTC/CII	RCUIT DI	AGNOSIS	>					[VQ35DE]	
		d run it at id ake air leak		the mass	air flow sei	nsor			А
		detected?	age aller			1301.			A
	> GO TO								
	•	or replace r TURE RAT		• •					EC
					fer to <u>EC-1</u>	56 "Docoriu	ation"		
		at least 10				bo, Descri			С
Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?									
YES >		trouble di tion" or <u>EC-</u>				174 or P01	72, P0175. Refer to	• <u>EC-292. "DTC</u>	D
_	> GO TÓ	5.							
5.CHECK	K HARNES	SS CONNE	CTOR						Е
	gnition sw	itch OFF. sensor 1 h	arness co	nnector					
		connector f							F
Wa	ater shoul	d not exit.							
		ult normal?	,						G
YES >	> GO TO	6.	-						0
~	•	or replace h							Н
		sensor 1 h			OWER SUP	PLI			11
2. Turn i	gnition sw	itch ON.							
3. Check	the voltag	ge betweer	n A/F sens	or 1 harn	less connec	ctor and gro	ound.		I
		A/F sensor							
DTC	Bank	Connector	Terminal	Ground	Voltage	e (V)			J
P2096 P2097	1	F12	1						
P2097	2	F61	1	Ground	Battery v	oltage			Κ
P2099	2	F61	1						
	<u>ection res</u> > GO TO	<u>ult normal?</u> 8	<u>.</u>						L
	> GO TO								
7.CHECK	K AIR FUE	L RATIO (A	∿F) SENS	SOR 1 PC	OWER SUP	PLY CIRC	JIT		M
	gnition sw	itch OFF. M E/R harn		ootor					
					arness conn	ector and l	PDM E/R harness co	nnector.	Ν
DTC	D	-	ensor 1	erminal	IPDM Connector		Continuity		0
P2096					Connector	Terminal			-
P2097		1 F	-12	1	F19	52	Existed		Р
P2098 P2099		2 F	-61	1		53			Γ.
		ult normal?	<u> </u>						
					er supply ci	rcuit.			
NO >	> Repair (	or replace e	enor-detec	leu paris					

>> Repair or replace error-detected parts. NO

 $\mathbf{8}_{\text{.}\text{CHECK}}$  A/F sensor 1 input signal circuit for open and short

# P2096, P2097, P2098, P2099 A/F SENSOR 1

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC	A/F sensor 1			E	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P2096	1	F12	3		66	
P2097	P2097	1 112	4	F79	67	Existed
P2098	C	E61	3	F79	76	
P2099		2 F61 4	4		77	

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

DTC	A/F sensor 1			Ground	Continuity
DIC	Bank	Connector	Terminal	Ground	Continuity
P2096	1	F12	3		
P2097	I	1 12	4	Ground	Not existed
P2098	C	E61	3	Ground	NOI EXISIEU
P2099	2	2 F61	4	-	

DTC	E	CM	Ground	Continuity	
DIC	Connector Terminal		Ground	Continuity	
P2096		66			
P2097	F79	67	Ground	Not existed	
P2098 P2099		76			
		77			

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

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

**9.**CHECK A/F SENSOR 1 HEATER

Check A/F sensor 1 heater. Refer to EC-209, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 12.

**10.**CHECK HEATED OXYGEN SENSOR 2

Check heated oxygen sensor 2. Refer to EC-212, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2.

**11.**REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to EM-33. "Removal and Installation (bank 2)", EM-35. "Removal and Installation (bank 1)".

Do you have CONSULT?

YES >> GO TO 12.

NO >> GO TO 13.

12.CONFIRM A/F ADJUSTMENT DATA

# P2096, P2097, P2098, P2099 A/F SENSOR 1

F2030, F2037, F2030, F2033 A/T SENSOR T		
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
<ul> <li>With CONSULT</li> <li>1. Turn ignition switch ON.</li> <li>2. Select "A/F ADJ-B1" and "A/F ADJ-B2" in "DATA MONITOR" mode with CONSULT.</li> <li>3. Make sure that "0.000" is displayed on CONSULT screen.</li> </ul>		А
Is "0.000" displayed? YES >> INSPECTION END NO >> GO TO 13.		EC
13. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE		С
Clear the mixture ratio self-learning value. Refer to EC-156, "Description".		
Do you have CONSULT? YES >> GO TO 14. NO >> INSPECTION END		D
<b>14.</b> CONFIRM A/F ADJUSTMENT DATA		Е
<ul> <li>With CONSULT</li> <li>1. Turn ignition switch ON.</li> <li>2. Select "A/F ADJ-B1" and "A/F ADJ-B2" in "DATA MONITOR" mode with CONSULT.</li> <li>3. Make sure that "0.000" is displayed on CONSULT screen.</li> </ul>		F
>> INSPECTION END		G
		Н
		I
		J
		K
		L
		M
		Ν
		0
		Ρ

## P2100, P2103 THROTTLE CONTROL MOTOR RELAY

### < DTC/CIRCUIT DIAGNOSIS >

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

## DTC Description

INFOID:000000012891498

[VQ35DE]

### DTC DETECTION LOGIC

- ECM detects that the voltage of power source for throttle control motor is excessively low.
- ECM detects that the throttle control motor relay is stuck ON.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Start engine and let it idle	
	ETC MOT PWR-B1	Signal (terminal)	Throttle control motor circuit	
P2100	(Throttle actuator "A" control motor cir- cuit/open)	Threshold	ECM detects that the voltage of power source for throttle control motor is excessively low	
		Diagnosis delay time	_	
		Diagnosis condition	Ignition switch ON	
	ETC MOT PWR-B1	Signal (terminal)	Throttle control motor circuit	
P2103	(Throttle actuator "A" control motor cir- cuit high)	Threshold	ECM detects that the throttle control motor re- lay is stuck ON	
		Diagnosis delay time	—	

### POSSIBLE CAUSE

DTC P2100

- Harness or connectors
- (Throttle control motor relay circuit is open)
- Throttle control motor relay

DTC P2103

- Harness or connectors
- (Throttle control motor relay circuit is shorted)
- Throttle control motor relay

#### FAIL-SAFE

Engine operating condition in fail-safe mode			
Fail safe mode	Vehicle behavior		
Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.		

### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

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

#### TESTING CONDITION:

#### Before performing the following procedure, confirm that battery voltage is more than 8 V.

#### Witch DTC is detected?

P2100 >> GO TO 2.

P2103 >> GO TO 3.

# **2.**PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P2100

1. Turn ignition switch ON and wait at least 2 seconds.

- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.



# D2400 D2402 TUDOTTI E CONTROL MOTOR DEL AV

	P2100	, P2103 TI	HROTTLE	CONTROL MOTOR RELAY		
< DTC/CIRC	UIT DIAGNC	SIS >			[VQ35DE]	
Is DTC detect						А
	VSPECTION	<u>-497, "Diagno</u> END	osis Procedure	<u>e"</u> .		A
3.PERFORM	I DTC CONF	IRMATION PI	ROCEDURE	FOR DTC P2103		
1. Turn ignit	tion switch ON	N and wait at I			<u> </u>	EC
2. Check D <sup>-</sup> Is DTC detect						
		-497, "Diagno	osis Procedur	e".		С
NO-1 >> T	o check malfu	unction sympton	om before rep	pair: Refer to GI-42, "Intermittent Incident"	<u>.</u> .	
		fter repair: IN	SPECTIONE			D
Diagnosis	Procedure				INFOID:000000012891499	
<b>1.</b> CHECK TH	HROTTLE CO	ONTROL MOT	FOR RELAY F	POWER SUPPLY CIRCUIT		Е
-	tion switch OF		_			
		ess connector harness conn				F
4. Check the	e continuity b	etween IPDM	E/R harness	connector and ECM harness connector.		
IPDN	/IE/R	E	ECM			G
Connector	Terminal	Connector	Terminal	Continuity		G
F19	57	F78	2	Existed		
		r short to grou	ind and short	to power.		Н
Is the inspect		mal?				
	GO TO 2. Repair open ci	rcuit, short to	ground or she	ort to power in harness or connectors.		
<b>2.</b> CHECK TH	HROTTLE CO	ONTROL MOT	FOR RELAY I	NPUT SIGNAL CIRCUIT		
1. Check the	e continuity b	etween IPDM	E/R harness	connector and ECM harness connector.		J
			~ /			
Connector	/I E/R Terminal	Connector	CM Terminal	Continuity		K
F24	65	F78	8	Existed		
2. Also cheo	ck harness for	r short to grou	ind and short			L
Is the inspect						
		ouble diagnos		upply circuit. ort to power in harness or connectors.		M
			ground of one			IVI
						Ν
						0

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

### < DTC/CIRCUIT DIAGNOSIS >

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

## DTC Description

INFOID:000000012891500

[VQ35DE]

## DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
P2101	ETC FNCTN/CIRC-B1 (Throttle actuator "A" control motor cir- cuit range/performance)	Diagnosis condition	Start engine and let it idle	
		Signal (terminal)		
		Threshold	Electric throttle control function does not op- erate properly	
		Diagnosis delay time	—	

### POSSIBLE CAUSE

- Harness or connectors
- (Throttle control motor circuit is open or shorted)
- Electric throttle control actuator

### FAIL-SAFE

Engine operating condition in fail-safe mode				
Fail safe mode	Vehicle behavior			
Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.			

### DTC CONFIRMATION PROCEDURE

## **1.**CHECK DTC PRIORITY

If DTC P2101 is displayed with DTC P2100 or P2119, first perform the confirmation procedure for DTC P2100 or P2119.

#### Is applicable DTC detected?

- YES >> Perform diagnosis of applicable.
  - DTC P2100: Refer to EC-496, "DTC Description".
  - DTC P2119: Refer to <u>EC-503</u>, "DTC Description".

NO >> GO TO 2.

## 2.PRECONDITIONING

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

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

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

>> GO TO 3.

# **3.** PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

#### Is DTC detected?

- YES >> Proceed to <u>EC-499</u>, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END



# **P2101 ELECTRIC THROTTLE CONTROL FUNCTION**

## 

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Diagnosis Procedure						INFOID:000000012891501
1.снеск	DTC PRI	ORITY				
	101 is disp	layed with	DTC P21	00 or P2119, first	perform the confi	irmation procedure for DTC P2100
or P2119.		to stad 2				
	le DTC de	m diagnos	is of appli	cable		
123 2				496, "DTC Descrip	otion".	
			er to EC-5	503, "DTC Descrip	tion".	
	> GO TO 2			OR RELAY INPU		
Check	the voltag	je betweei	h ECM ha	rness connector te	erminals.	
	EC	CM				
-	+		_	Condition	Voltage	
Connector	Terminal	Condition	Terminal	-		
570	<u> </u>	500	450	Ignition switch OFF	Approx. 0 V	
F78	8	E32	152	Ignition switch ON	Battery voltage	
the insp	ection resu	ult normal?	2			
	> GO TO :					
	> GO TO (					
			ROLMOI	OR RELAY POW	ER SUPPLY CIR	
	gnition swi	tch OFF. I harness (	connector			
		A E/R harr				
. Check	the contir	nuity betwe	en IPDM	E/R harness conr	nector and ECM h	narness connector.
	PDM E/R	vinal C	EC	(	Continuity	
Connecto				Terminal		
F19	5		F78	2	Existed	
		ult normal?	-	nd and short to po	ower.	
	> GO TO 4		<u> </u>			
			t, short to	ground or short to	power in harnes	s or connectors.
.CHECK	THROTT	LE CONT	ROL MOT	OR RELAY INPU	T SIGNAL CIRCU	TIL
. Check	the contir	nuity betwe	en IPDM	E/R harness conr	nector and ECM h	narness connector.
IF	PDM E/R		EC	CM	Continuity	
Connecto	r Term	ninal C	onnector	Terminal		
F24	6	_	F78	8	Existed	
			-	nd and short to po	ower.	
		<u>ult normal?</u>	_	· •		
				is for power supply ground or short to		s or connectors
-	•	•		•	•	OR OPEN OR SHORT
				UR UUIPUI SIG	INAL CIRCUIT F	
Turn ig	nition swi	tch OFF.		-4		

2. Disconnect electric throttle control actuator harness connector.

3. Disconnect ECM harness connector.

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

### < DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F50	1	F78	1	Not existed
			3	Existed
			1	Existed
			3	Not existed

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

Is the inspection result normal?

YES >> GO TO 6.

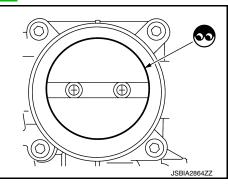
NO >> Repair or replace malfunctioning part.

 $\mathbf{6}$ .CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Remove the intake air duct. Refer to EM-26, "Removal and Installation".
- 2. Check if foreign matter is caught between the throttle valve and the housing.

### Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, refer to <u>EM-28</u>, "<u>Removal and Installation</u>", and then perform throttle valve closed position learning. Refer to <u>EC-153</u>, "<u>Description</u>".



# 7. CHECK THROTTLE CONTROL MOTOR

Check throttle control motor. Refer to EC-500, "Component Inspection".

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace electric throttle control actuator. Refer to <u>EM-28, "Removal and Installation"</u>.

### Component Inspection

INFOID:000000012891502

[VQ35DE]

## 1. CHECK THROTTLE CONTROL MOTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect electric throttle control actuator harness connector.
- 3. Check resistance between electric throttle control actuator terminals as per the following.

Terminals	Resistance
1 and 2	Approx. 1 - 15 Ω [at 25°C (77°F)]

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator. Refer to EM-28. "Removal and Installation".

## P2118 THROTTLE CONTROL MOTOR

### < DTC/CIRCUIT DIAGNOSIS >

# P2118 THROTTLE CONTROL MOTOR

## **DTC** Description

### DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Start engine and let it idle	
P2118	ETC MOT-B1 (Throttle actuator control motor current range/performance)	Signal (terminal)	Throttle control motor circuit	
		Threshold	ECM detects short in both circuits between ECM and throttle control motor	
		Diagnosis delay time	_	

### POSSIBLE CAUSE

- Harness or connectors
   (Throttle control motor circuit is shorted.)
- Electric throttle control actuator (Throttle control motor)

#### FAIL-SAFE

	Engine operating condition in fail-safe mode
Fail safe mode	Vehicle behavior
Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
DTC CONFIRMATION PRO	OCEDURE
1.PRECONDITIONING	
If DTC Confirmation Procedur ing the next test.	e has been previously conducted, always perform the following before conduct-
	and wait at least 10 seconds.
2. Turn ignition switch ON.	
3. Turn ignition switch OFF a	and wait at least 10 seconds.
>> GO TO 2.	
2. PERFORM DTC CONFIRM	ATION PROCEDURE
	nd wait at least 2 seconds.
<ol> <li>Start engine and let it idle</li> <li>Check DTC.</li> </ol>	for 5 seconds.
Is DTC detected?	
	1, "Diagnosis Procedure".
	tion symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u> . repair: INSPECTION END
Diagnosis Procedure	INFOID:000000012891504
1. CHECK THROTTLE CON	ROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol> <li>Disconnect electric throttle</li> <li>Disconnect ECM harness</li> </ol>	e control actuator harness connector. connector.

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

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# P2118 THROTTLE CONTROL MOTOR

### < DTC/CIRCUIT DIAGNOSIS >

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F50	1		1	Not existed
	2	F78	3	Existed
		170	1	Existed
			3	Not existed

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace malfunctioning part.

# 2. CHECK THROTTLE CONTROL MOTOR

Check throttle control motor. Refer to EC-502, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator. Refer to EM-28. "Removal and Installation".

## Component Inspection

INFOID:000000012891505

# 1. CHECK THROTTLE CONTROL MOTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect electric throttle control actuator harness connector.
- 3. Check resistance between electric throttle control actuator terminals as per the following.

Terminals	Resistance
1 and 2	Approx. 1 - 15 Ω [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator. Refer to EM-28. "Removal and Installation".

## P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

### < DTC/CIRCUIT DIAGNOSIS >

# P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

## **DTC** Description

### DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)		DT	C detection condition
P2119			Diagnosis condition	-
			Signal (terminal)	—
		1	Threshold	Electric throttle control actuator does not function properly due to the return spring mal- function
	ETC ACTR-B1 (Throttle actuator control throttle body range/performance)		Diagnosis delay time	-
			Diagnosis condition	-
		2	Signal (terminal)	-
			Threshold	Throttle valve opening angle in fail-safe mode is not in specified range
			Diagnosis delay time	—
		3	Diagnosis condition	-
			Signal (terminal)	—
			Threshold	ECM detects that the throttle valve is stuck open
			Diagnosis delay time	-

### POSSIBLE CAUSE

Electric throttle control actuator

### FAIL-SAFE

	Engine operating condition in fail-safe mode	
Fail safe mode	Vehicle behavior	Κ
	(When electric throttle control actuator does not function properly due to the return spring mal- function:) ECM controls the electric throttle actuator by regulating the throttle opening around the idle posi- tion. The engine speed will not rise more than 2,000 rpm.	L
Electric throttle control actuator	(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.	M
	<ul> <li>(When ECM detects the throttle valve is stuck open:)</li> <li>While the vehicle is being driven, it slows down gradually because of fuel cut. After the vehicle stops, the engine stalls.</li> <li>The engine can restart in the N or P position, and engine speed will not exceed 1,000 rpm or more.</li> </ul>	Ν

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

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

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#### INFOID:000000012891506

## P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

### < DTC/CIRCUIT DIAGNOSIS >

 $\overline{2}$ . PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION 1 AND 2

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Shift selector lever to the D position and wait at least 3 seconds.
- 3. Shift selector lever to the P position.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON and wait at least 1 second.
- 6. Shift selector lever to the D position and wait at least 3 seconds.
- 7. Shift selector lever to the P position.
- 8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
- 9. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-504, "Diagnosis Procedure".
- NO >> GO TO 3.

## **3.** PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION 3

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Shift selector lever to the D position and wait at least 3 seconds.
- 3. Shift selector lever to the N or P position.
- 4. Start engine and let it idle for 3 seconds.
- 5. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-504, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

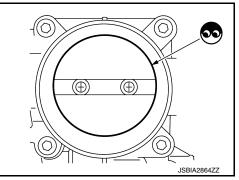
### **Diagnosis** Procedure

## 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Turn ignition switch OFF.
- 2. Remove the intake air duct. Refer to EM-26, "Removal and Installation".
- Check if foreign matter is caught between the throttle valve and the housing.

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to <u>EC-153</u>, "<u>Description</u>".



## 2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- 1. Replace electric throttle control actuator. Refer to EM-28, "Removal and Installation".
- 2. Go to EC-154, "Description".

>> INSPECTION END

[VQ35DE]

INFOID:000000012891507

# **DTC Description**

### DTC DETECTION LOGIC

• An excessively low voltage from the APP sensor 1 is sent to ECM.

• An excessively high voltage from the APP sensor 1 is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Start engine and let it idle	
P2122	APP SEN 1/CIRC (Throttle/Pedal position sensor/switch	Signal (terminal)	Voltage signal transmitted from APP sensor 1 to ECM	
	"D" circuit low)	Threshold	An excessively low voltage is sent to ECM	
		Diagnosis delay time	—	
		Diagnosis condition	Start engine and let it idle	
P2123	APP SEN 1/CIRC (Throttle/Pedal position sensor/switch	Signal (terminal)	Voltage signal transmitted from APP sensor 1 to ECM	
"D" circuit high)	Threshold	An excessively high voltage is sent to ECM		
		Diagnosis delay time	—	

### POSSIBLE CAUSE

### DTC P2122

- Harness or connectors
- (APP sensor 1 circuit is open or shorted.)
- Accelerator pedal position sensor (APP sensor 1)

### DTC P2123

- Harness or connectors
- (APP sensor 1 circuit is open or shorted.)
- Accelerator pedal position sensor
- (APP sensor 1)

### FAIL-SAFE

	Engine operating condition in fail-safe mode				
Fail safe mode	Vehicle behavior				
Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.				

## DTC CONFIRMATION PROCEDURE

# **1.**CHECK DTC PRIORITY

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Is applicable DTC detected?

## YES >> Perform diagnosis of applicable. Refer to <u>EC-430, "DTC Description"</u>.

NO >> GO TO 2.

2. PRECONDITIONING

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

EC-505

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

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< DTC/CIRCUIT DIAGNOSIS >

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

>> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.

2. Check DTC.

Is DTC detected?

YES >> Proceed to EC-506, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# Diagnosis Procedure

INFOID:000000012891509

# **1.**CHECK DTC PRIORITY

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to EC-430, "DTC Description".

NO >> GO TO 2.

**2.**CHECK APP SENSOR 1 POWER SUPPLY

- 1. Disconnect accelerator pedal position (APP) sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between APP sensor harness connector and ground.

	+		Voltage (Approx.)	
APP	sensor	_		
Connector	Connector Terminal			
E31	4	Ground	5 V	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF

2. Disconnect ECM harness connector.

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

APP	sensor	E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E31	4	E32	146	Existed

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

**4.**CHECK APP SENSOR 1 GROUND CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

APP	sensor	E	СМ	Continuity
Connector	Connector Terminal		Terminal	Continuity
E31	2	E32	151	Existed

< DTC/CIRC	UIT DIAGNO		122,1212			[VQ35DE]	
4. Also che	ck harness fo	or short to gro	und and sho	rt to power.			
Is the inspect	ion result no	rmal?					А
	GO TO 5.						
_			•	hort to power in harr	ness or connectors.		EC
<b>5.</b> CHECK A	PP SENSOR	1 INPUT SIG	SNAL CIRCL	ЛТ			
1. Check th	e continuity b	between APP	sensor harn	ess connector and E	CM harness connec	tor.	
							С
	sensor	EC		Continuity			
Connector	Terminal	Connector	Terminal				D
E31	3	E32	150	Existed			D
		or short to gro	und and sho	rt to power.			
<u>Is the inspect</u> YES >> 0	<u>ion result noi</u> 30 TO 6.	<u>rmal?</u>					Е
		circuit, short to	around or s	hort to power in harr	ness or connectors.		
6.CHECK A			0	·			F
		to <u>EC-507</u> , "0	Component li	aspection"			Г
Is the inspect				<u>ispection</u> .			
	NSPECTION						G
-			assembly. Re	efer to <u>ACC-3, "Rem</u>	oval and Installation	<u>"</u> .	
Componer	nt Inspecti	on				INFOID:000000012891510	ш
	•						Н
<b>1</b> .CHECK A	CCELERATO	OR PEDAL PO	DSITION SEI	NSOR			
		s connectors of	disconnected	I.			
	tion switch O		arness conne	ector terminals unde	r the following condit	tions	
o. oncer in	e voltage bei				The following condi-		
	E	CM					J
	+		-	Cor	ndition	Voltage (V)	
Connector		Terminal		_			Κ
					Fully released	0.5 - 1.0	
	150		151		Fully depressed	4.2 - 4.8	
E32				Accelerator pedal	Fully released	0.25 - 0.50	L
	143		144		Fully depressed	2.0 - 2.5	
Is the inspect	ion result no	rmal?					M
YES >> I	NSPECTION	END					
NO >> F	Replace acce	lerator pedal	assembly. Re	efer to <u>ACC-3, "Rem</u>	oval and Installation	<u>.</u>	
							Ν
							0
							<u> </u>
							Ρ

# DTC Description

[VQ35DE]

INFOID:000000012891511

### DTC DETECTION LOGIC

• An excessively low voltage from the APP sensor 2 is sent to ECM.

An excessively high voltage from the APP sensor 2 is sent to ECM.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
		Diagnosis condition	Start engine and let it idle	
P2127	APP SEN 2/CIRC (Throttle/Pedal position sensor/switch	Signal (terminal)	Voltage signal transmitted from APP sensor 2 to ECM	
	"E" circuit low)	Threshold	An excessively low voltage is sent to ECM	
		Diagnosis delay time	—	
		Diagnosis condition	Start engine and let it idle	
P2128	APP SEN 2/CIRC (Throttle/Pedal position sensor/switch	Signal (terminal)	Voltage signal transmitted from APP sensor 2 to ECM	
	"E" circuit high)	Threshold	An excessively high voltage is sent to ECM	
		Diagnosis delay time	-	

### POSSIBLE CAUSE

### DTC P2127

- Harness or connectors

   (APP sensor 2 circuit is open or shorted.)
   [CMP sensor (PHASE) circuit is open or shorted.]
   (EOP sensor circuit is shorted.)
   (Refrigerant pressure sensor is shorted.)
- Accelerator pedal position sensor (APP sensor 2)
- · Camshaft position sensor (PHASE)
- Engine oil pressure sensor
- · Refrigerant pressure sensor

### DTC P2128

- Harness or connectors

   (APP sensor 2 circuit is open or shorted.)
   [CMP sensor (PHASE) circuit is open or shorted.]
   (EOP sensor circuit is shorted.)
   (Refrigerant pressure sensor is shorted.)
- Accelerator pedal position sensor (APP sensor 2)
- Camshaft position sensor (PHASE)
- Engine oil pressure sensor
- Refrigerant pressure sensor

FAIL-SAFE

### < DTC/CIRCUIT DIAGNOSIS >

# [VQ35DE]

Fail safe mode		ating condition in fail-s				
Fail safe mode	(Mhon clastric threat		chicle behavior			
	function:) ECM controls the el	ectric throttle actuator	es not function properly due to the return spring mal- by regulating the throttle opening around the idle posi-			
Electric throttle control actuator	(When throttle valve	tion. The engine speed will not rise more than 2,000 rpm. (When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.				
	While the vehicle is stops, the engine st	alls.	tuck open:) down gradually because of fuel cut. After the vehicle on, and engine speed will not exceed 1,000 rpm or			
OTC CONFIRMATION PF	OCEDURE					
1.PRECONDITIONING						
	ure has been previo	ously conducted a	always perform the following before conduct-			
ing the next test.		-				
<ol> <li>Turn ignition switch OFF</li> <li>Turn ignition switch ON.</li> </ol>	and wait at least 1	0 seconds.				
<ol><li>Turn ignition switch OFF</li></ol>	and wait at least 1	0 seconds.				
TESTING CONDITION:			on voltage is more than 0.1/ stight			
	owing procedure,		ery voltage is more than 8 V at idle.			
>> GO TO 2.						
2. PERFORM DTC CONFIF	RMATION PROCED	URE				
1. Start engine and let it id						
2. Check DTC.						
Is DTC detected?						
YES >> Proceed to EC- NO-1 >> To check malfur			o GI-42, "Intermittent Incident".			
NO-2 >> Confirmation aft	er repair: INSPECT	ION END	<u>GI-42, Internittent incident</u> .			
Diagnosis Procedure			INFOID:000000012891512			
			NA OL.00000012031312			
<b>1.</b> CHECK APP SENSOR 2	POWER SUPPLY					
1. Disconnect accelerator		) sensor harness	connector.			
<ol> <li>Turn ignition switch ON.</li> <li>Check the voltage between</li> </ol>		rness connector a	nd around			
+	_	Voltage (V)				
+ APP sensor						
APP sensor	Ground	Approx. 5				
APP sensor Connector Terminal E31 5		Approx. 5				
APP sensorConnectorTerminalE315Is the inspection result normYES>> GO TO 3.		Approx. 5				
APP sensorConnectorTerminalE315Is the inspection result normYES>> GO TO 3.NO>> GO TO 2.	al?					
APP sensor       Connector     Terminal       E31     5       Is the inspection result norm       YES     >> GO TO 3.	al? POWER SUPPLY					

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

### < DTC/CIRCUIT DIAGNOSIS >

APP	sensor	E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E31	5	E32	142	Existed

Is the inspection result normal?

YES >> Check sensor power supply 2 circuit. Refer to EC-558, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

**3.**CHECK APP SENSOR 2 GROUND CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

APP	sensor	E	Continuity	
Connector	Connector Terminal		Terminal	Continuity
E31	1	E32	144	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

4. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT

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

APP :	sensor	E	Continuity	
Connector	Connector Terminal		Terminal	Continuity
E31	6	E32	143	Existed

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

### Is the inspection result normal?

YES >> GO TO 5.

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

### **5.**CHECK APP SENSOR

Check APP sensor. Refer to EC-510, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal assembly. Refer to ACC-3, "Removal and Installation".

# Component Inspection

INFOID:000000012891513

# 1. CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

2. Turn ignition switch ON.

3. Check the voltage between ECM harness connector terminals under the following conditions.

ECM						
Connector	+	_	Condition		Voltage (V)	
Connector	Terminal					
	150	151	Accelerator pedal	Fully released	0.5 - 1.0	
E32	150	151		Fully depressed	4.2 - 4.8	
E32	143			Fully released	0.25 - 0.50	
	143	144		Fully depressed	2.0 - 2.5	

< DTC	/CIRCUIT DIAGNOSIS >	[VQ35DE]
	nspection result normal?	
YES	>> INSPECTION END	A
NO	>> Replace accelerator pedal assembly. Refer to <u>ACC-3. "Removal and Installation"</u> .	
		Fo
		EC
		С
		0
		D
		E
		F
		G
		Н
		11
		J
		K
		L
		L
		M
		Ν
		0
		Р
		P

## < DTC/CIRCUIT DIAGNOSIS >

# P2135 TP SENSOR

# DTC Description

INFOID:000000012891514

[VQ35DE]

### DTC DETECTION LOGIC

Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition		
	TP SENSOR-B1 (Throttle/Pedal position sensor/switch "A" / "B" voltage correlation)	Diagnosis condition	Start engine and let it idle	
		Signal (terminal)	TP sensor 1 signal and TP sensor 2 signal	
P2135		Threshold	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2	
		Diagnosis delay time	—	

### POSSIBLE CAUSE

- Harness or connector (TP sensor 1 or 2 circuit is open or shorted.)
- Electric throttle control actuator (TP sensor 1 or 2)

### FAIL-SAFE

Engine operating condition in fail-safe mode				
Fail safe mode	Vehicle behavior			
Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.			

## DTC CONFIRMATION PROCEDURE

# **1.**CHECK DTC PRIORITY

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.

### Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to <u>EC-430, "DTC Description"</u>.

NO >> GO TO 2.

## 2.PRECONDITIONING

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

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

2. Turn ignition switch ON.

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

### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

### >> GO TO 3.

# **3.** PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.

# 2. Check DTC.

### Is DTC detected?

YES >> Proceed to EC-513, "Diagnosis Procedure".

- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

# P2135 TP SENSOR

#### IVQ35DE < DTC/CIRCUIT DIAGNOSIS > **Diagnosis** Procedure INFOID:000000012891515 А 1. CHECK DTC PRIORITY If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. EC Is applicable DTC detected? YES >> Perform diagnosis of applicable. Refer to EC-430, "DTC Description". NO >> GO TO 2. 2.check throttle position sensor power supply 1. Disconnect electric throttle control actuator harness connector. 2. Turn ignition switch ON. D 3. Check the voltage between electric throttle control actuator harness connector and ground. + Ε Electric throttle control actuator Voltage (Approx.) Connector Terminal F50 5 5 V Ground Is the inspection result normal? YES >> GO TO 4. NO >> GO TO 3. ${f 3.}$ CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT Н 1. Turn ignition switch OFF. 2. Disconnect ECM harness connector. Check the continuity between electric throttle control actuator harness connector and ECM harness con-3. nector. Electric throttle control actuator ECM Continuity Terminal Connector Terminal Connector F50 F79 5 98 Existed Is the inspection result normal? Κ YES >> INSPECTION END NO >> Repair or replace error-detected parts. ${f 4}$ . CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT L 1. Turn ignition switch OFF. Disconnect ECM harness connector. 2. Check the continuity between electric throttle control actuator harness connector and ECM harness con-3. M nector. ECM Electric throttle control actuator Ν Continuity Connector Terminal Connector Terminal F50 F79 4 75 Existed Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 5. Ρ NO >> Repair open circuit, short to ground or short to power in harness or connectors.

 ${f 5}.$ CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT

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

# P2135 TP SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

Electric throttle control actuator		ECM		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F50	3	F79	72	Existed	
F30	6	175	71	LAISIEU	

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

Is the inspection result normal?

YES >> GO TO 6.

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

6.CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to EC-514, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator. Refer to EM-28, "Removal and Installation".

# Component Inspection

INFOID:000000012891516

# 1. CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform <u>EC-153, "Description"</u>.
- 4. Turn ignition switch ON.
- 5. Shift selector lever position to D.

6. Check the voltage between ECM harness connector terminals under the following conditions.

ECM						
Connector	+	_	Condition		Voltage	
Connector	Terr	ninal				
	71 75		Accelerator pedal	Fully released	More than 0.36 V	
F79		75		Fully depressed	Less than 4.75 V	
F79	72	75	Accelerator pedal	Fully released	Less than 4.75 V	
	12	72		Fully depressed	More than 0.36 V	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator. Refer to EM-28, "Removal and Installation".

# < DTC/CIRCUIT DIAGNOSIS >

# P2138 APP SENSOR

# **DTC Description**

INFOID:000000012891517

[VQ35DE]

## DTC DETECTION LOGIC

Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.

DTC	CONSULT screen terms (Trouble diagnosis content)	1	DTC detection condition
		Diagnosis condition	Start engine and let it idle
	APP SENSOR (Throttle/Pedal position sensor/switch "D" / "E" voltage correlation)	Signal (terminal)	APP sensor 1 signal and APP sensor 2 signal
P2138		Threshold	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2
		Diagnosis delay time	

### POSSIBLE CAUSE

larness or connector
APP sensor 1 or 2 circuit is open or shorted.)
CMP sensor (PHASE) circuit is open or shorted.]
EOP sensor circuit is shorted.)
Refrigerant pressure sensor is shorted.)

- Accelerator pedal position sensor
- (APP sensor 1 or 2)
- Camshaft position sensor (PHASE)
- Engine oil pressure sensor
- Refrigerant pressure sensor

### FAIL-SAFE

Engine operating condition in fail-safe mode				
Fail safe mode	Vehicle behavior			
Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.			

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK DTC PRIORITY

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to EC-430, "DTC Description".
- NO >> GO TO 2.

# 2.PRECONDITIONING

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

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

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

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

### >> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.

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## < DTC/CIRCUIT DIAGNOSIS >

2. Check DTC.

Is DTC detected?

YES >> Proceed to EC-516. "Diagnosis Procedure".

NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-42, "Intermittent Incident"</u>.

NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

INFOID:000000012891518

**1.**CHECK DTC PRIORITY

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to EC-430, "DTC Description".

NO >> GO TO 2.

2.CHECK APP SENSOR 1 POWER SUPPLY

1. Disconnect accelerator pedal position (APP) sensor harness connector.

2. Turn ignition switch ON.

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

APP sensor –	
	Voltage Approx.)
Connector Terminal	FF - 7
E31 4 Ground	5 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E31	4	E32	146	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

**4.**CHECK APP SENSOR 2 POWER SUPPLY

1. Turn ignition switch ON.

2. Check the voltage between APP sensor harness connector and ground.

	+		
APP :	sensor	_	Voltage (Approx.)
Connector	Terminal		
E31	5	Ground	5 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

**5.**CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

### < DTC/CIRCUIT DIAGNOSIS >

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

APP	APP sensor		ECM		
Connector	Terminal	Connector	Terminal	Continuity	
E31	5	E32	142	Existed	

Is the inspection result normal?

- YES >> Check sensor power supply 2 circuit. Refer to <u>EC-558, "Diagnosis Procedure"</u>.
- NO >> Repair or replace error-detected parts.

**6.**CHECK APP SENSOR GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E31	1	E32	144	Existed
EST	2	E32	151	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

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

7.CHECK APP SENSOR INPUT SIGNAL CIRCUIT

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

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E31	3	E32	150	Existed
201	6	LJZ	143	LAISIEU

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

Is the inspection result normal?

YES >> GO TO 8.

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

## 8. CHECK APP SENSOR

Check APP sensor. Refer to EC-517, "Component Inspection".		M
Is the inspection result normal?		
YES >> INSPECTION END NO >> Replace accelerator pedal assembly. Refer to <u>ACC-3, "Removal and Installation"</u> .		Ν
Component Inspection	INFOID:000000012891519	
1. CHECK ACCELERATOR PEDAL POSITION SENSOR		0
<ol> <li>Reconnect all harness connectors disconnected.</li> <li>Turn ignition switch ON.</li> <li>Check the voltage between ECM harness connector terminals under the following condition</li> </ol>	ns.	Ρ

### < DTC/CIRCUIT DIAGNOSIS >

	ECM				
Connector	+	-	Cond	dition	Voltage (V)
Connector	Terr	minal			
	143	144		Fully released	0.25 - 0.50
E32	145	144	A applarator padal	Fully depressed	2.0 - 2.5
E32	150	151	Accelerator pedal	Fully released	0.5 - 1.0
	150	101		Fully depressed	4.2 - 4.8

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal assembly. Refer to <u>ACC-3</u>, "Removal and Installation".

### < DTC/CIRCUIT DIAGNOSIS >

# P219A, P219B AIR FUEL RATIO

# **DTC** Description

DTC	CONSULT screen terms (Trouble diagnosis content)		DTC detection condition
		Diagnosis condition	-
	AIR FUEL RATIO IMBALANCE B1	Signal (terminal)	-
P219A	(Air-fuel ratio imbalance bank 1)	Threshold	ECM detects a lean/rich air fuel ratio state in any cylinder for a specified length of time
		Diagnosis delay time	-
		Diagnosis condition	_
	AIR FUEL RATIO IMBALANCE B2	Signal (terminal)	_
P219B	(Air-fuel ratio imbalance bank 2)	Threshold	ECM detects a lean/rich air fuel ratio state in any cylinder for a specified length of time
		Diagnosis delay time	-

# POSSIBLE CAUSE

DTC P219A • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure	Н
<ul> <li>Mass air flow sensor</li> <li>Intake air leaks</li> <li>Lack of fuel</li> <li>Incorrect PCV hose connection</li> </ul>	I
<ul> <li>Improper spark plug</li> <li>Insufficient compression</li> <li>The fuel injector circuit is open or shorted</li> </ul>	J
<ul> <li>Ignition coil</li> <li>The ignition signal circuit is open or shorted</li> </ul>	Κ
DTC P219B • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure	L
<ul> <li>Mass air flow sensor</li> <li>Intake air leaks</li> <li>Lack of fuel</li> <li>Intake according to the sense time</li> </ul>	Μ
<ul> <li>Incorrect PCV hose connection</li> <li>Improper spark plug</li> <li>Insufficient compression</li> <li>The fuel injector circuit is open or shorted</li> <li>Ignition coil</li> </ul>	Ν
The ignition signal circuit is open or shorted FAIL-SAFE	0
Not applicable DTC CONFIRMATION PROCEDURE <b>1.</b> CHECK DTC PRIORITY	Ρ
If DTC P219A or P219B is displayed with other DTC, first perform the trouble diagnosis for the other DTC. Is applicable DTC detected?	

YES >> Perform diagnosis of applicable. Refer to <u>EC-105. "DTC Index"</u>.

NO >> GO TO 2.

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< DTC/CIRCUIT DIAGNOSIS >

# 2. PRECONDITIONING-1

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

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

### NOTE:

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

>> GO TO 3.

**3.**PRECONDITIONING-2

- 1. Turn ignition switch ON.
- 2. Clear the mixture ratio self-learning value. Refer to EC-156, "Description".

### Will CONSULT be used?

YES >> GO TO 4.

NO >> GO TO 7.

**4.**PERFORM DTC CONFIRMATION PROCEDURE-1

- 1. Turn ignition switch ON.
- 2. Select "COOLAN TEMP/S" in "DATA MONITOR" mode of "ENGINE" using CONSULT.
- 3. Start engine.
- 4. Make sure that "COOLAN TEMP/S" indicates more than 65°C (149°F).

>> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-2

### (B) With CONSULT

- 1. Select "SYSTEM 1 DIAGNOSIS B B1" and "SYSTEM 1 DIAGNOSIS A B1" in "DATA MONITOR" mode of "ENGINE" using CONSULT.
- 2. Drive vehicle under the following conditions for at least 5 consecutive seconds.
  - CAUTION:
  - Always drive vehicle at a safe speed.

ENG SPEED	1,000 – 1,600rpm
COOLAN TEMP/S	More than 65°C (149°F)
B/FUEL SCHDL	5 – 12 msec
Selector lever	D position
SYSTEM 1 DIAGNOSIS B B1	PRSENT

### NOTE:

- Drive the vehicle at approximately 88 km/h (55MPH) allows easy diagnosis.
- · Keep the accelerator pedal as possible during crusing.
- 3. Check "SYSTEM 1 DIAGNOSIS A B1" indication.

Is "CMPLT" displayed?

YES >> GO TO 6.

NO >> GO TO 3.

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

Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-521, "Diagnosis Procedure".

NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

NO-2 >> Confirmation after repair: INSPECTION END

#### < DTC/CIRCUIT DIAGNOSIS > 7. PERFORM DTC CONFIRMATION PROCEDURE-4 А Without CONSULT 1. Start the engine and warm it up to normal operating temperature. Drive vehicle under the following conditions for at least 5 consecutive seconds. EC CAUTION: Always drive vehicle at a safe speed. Engine speed 1,000 - 1,600 rpm Calculated load value 27 - 63 % Selector lever D position D NOTE: Drive the vehicle at approximately 88 km/h (55MPH) allows easy diagnosis. Keep the accelerator pedal as possible during crusing. Ε Check 1st trip DTC. Is 1st trip DTC detected? YES >> Proceed to EC-521, "Diagnosis Procedure". >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident". NO-1 NO-2 >> Confirmation after repair: INSPECTION END Diagnosis Procedure INFOID:000000012891521 1. CHECK DTC PRIORITY Н If DTC P219A or P219B is displayed with other DTC, first perform the trouble diagnosis for the other DTC. Is applicable DTC detected? YES >> Perform diagnosis of applicable. Refer to EC-105, "DTC Index". NO >> GO TO 2. 2.CHECK FOR INTAKE AIR LEAK Stop engine and check the following for connection. 1. Air duct Vacuum hoses PCV hose Κ Intake air passage between air duct to intake manifold 2. Start engine and let it idle. Listen for an intake air leak after the mass air flow sensor. 3. Is the inspection result normal? YES >> GO TO 3. NO >> Repair or replace error-detected parts. Μ 3.CHECK EXHAUST GAS LEAK 1. Stop engine and visually check exhaust tube, three way catalyst and muffler for dents connection. 2. Start engine and let it idle. Ν 3. Listen for an exhaust gas leak before three way catalyst (manifold). Three way catalyst 1 Three way catalyst 2 Muffler A/F sensor 1 HO2S2 Ρ To exhaust

Is the inspection result normal?

: Exhaust gas

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

manifold

PBIB1922E

[VQ35DE]

< DTC/CIRCUIT DIAGNOSIS >

# **4.**CHECK FUEL PRESSURE

- 1. Release fuel pressure to zero. Refer to EC-162, "Work Procedure".
- 2. Check fuel pressure. Refer to <u>EC-162, "Work Procedure"</u>.

### Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 10.

5. CHECK MASS AIR FLOW SENSOR

### ()With CONSULT

Check "MASS AIR FLOW" in "DATA MONITOR" mode of "ENGINE" using CONSULT.

For specification, refer to EC-576, "Mass Air Flow Sensor".

With GST

Check mass air flow sensor signal in Service \$01 using GST.

For specification, refer to EC-576. "Mass Air Flow Sensor".

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or grounds. Refer to <u>EC-222, "Diagnosis Procedure"</u>.

**6.**CHECK FUNCTION OF FUEL INJECTOR-1

### With CONSULT

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

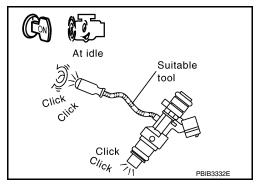
### **Without CONSULT**

- 1. Let engine idle.
- 2. Listen to each fuel injector operating sound.

### Clicking noise should be heard.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Perform trouble diagnosis for fuel injector, refer to <u>EC-</u> <u>543, "Component Inspection"</u>.



# 7. CHECK FUNCTION OF FUEL INJECTOR-2

### CAUTION:

### Perform the following procedure in a place with no combustible objects and good ventilation.

- 1. Turn ignition switch OFF.
- 2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- 3. Disconnect all fuel injector harness connectors.
- 4. Remove fuel tube assembly. Refer to <u>EM-49</u>, "Removal and Installation".
- Keep fuel hose and all fuel injectors connected to fuel tube.
- 5. Disconnect all ignition coil harness connectors.
- 6. Prepare pans or saucers under each fuel injector.

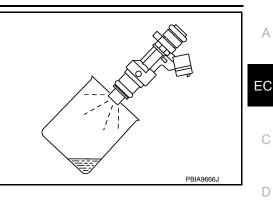
### < DTC/CIRCUIT DIAGNOSIS >

#### 7. Crank engine for approximately 3 seconds.

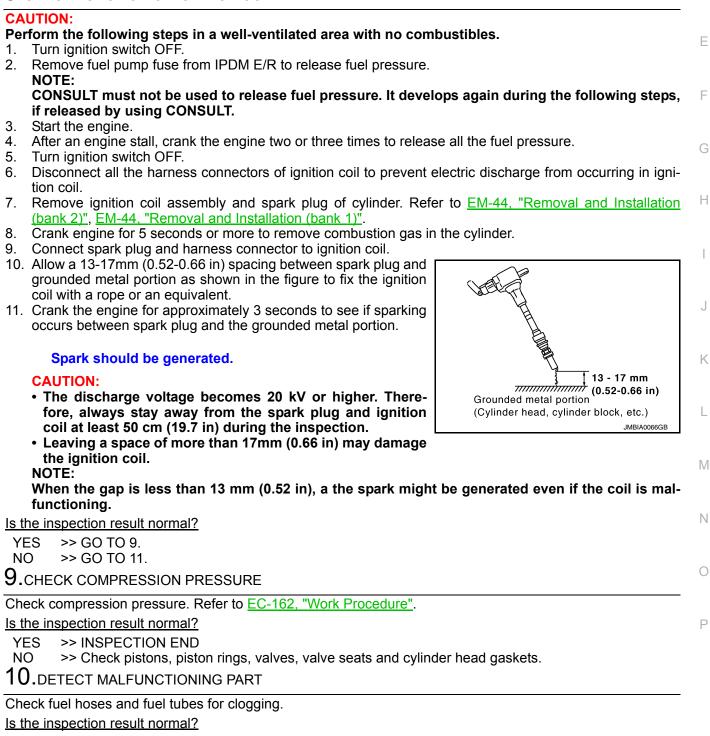
### Fuel should be sprayed evenly for each fuel injector. · Fuel must not drip from the tip of fuel injector.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace fuel injector. Refer to EM-49, "Removal and Installation".



8. CHECK FUNCTION OF IGNITION COIL-1



YES >> Replace fuel filter and fuel pump assembly. Refer to FL-5, "Removal and Installation".



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< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

### NO >> Repair or replace error-detected parts.

11. CHECK FUNCTION OF IGNITION COIL-2

- 1. Turn ignition switch OFF.
- 2. Disconnect spark plug and connect a non-malfunctioning spark plug.
- 3. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

### Spark should be generated.

Is the inspection result normal?

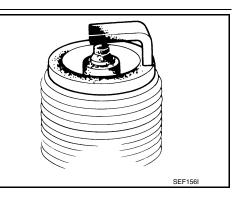
- YES >> GO TO 12.
- NO >> Check ignition coil, power transistor and their circuits. Refer to <u>EC-545. "Component Function</u> Check".

# 12.CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

### Is the inspection result normal?

- YES >> 1. Repair or clean spark plug. Refer to <u>EM-18</u>, <u>"Removal and Installation"</u>.
  - 2. GO TO 13.
- NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-18</u>, "<u>Removal and Installa-tion</u>".



# **13.**CHECK FUNCTION OF IGNITION COIL-3

- 1. Reconnect the initial spark plugs.
- 2. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

### Spark should be generated.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-137, "Spark</u> <u>Plug"</u>.

### < DTC/CIRCUIT DIAGNOSIS >

# P2610 ECM INTERNAL TIMER

# Description

This ECM contains a timer and measures time between an ignition switch OFF and the next ignition switch ON. This enables the judging of the state of engine cooling at an engine start.

# DTC Description

INFOID:000000012891523

INFOID:000000012891522

# DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)		D	TC detection condition
			Diagnosis condition	_
			Signal (terminal)	—
		1	Threshold	ECM internal engine off timer is malfunction- ing
	ECM/PCM INTERNAL ENG OFF		Diagnosis delay time	_
P2610	TIMER		Diagnosis condition	_
P2010	(ECM/PCM internal engine off timer		Signal (terminal)	—
performance)		2	Threshold	The time calculated by ECM based on a de- scent allowance of engine coolant tempera- tures during ignition switch OFF is extremely shorter than the time counted by the Engine internal OFF timer
			Diagnosis delay time	
YES >> NO >>	ary to erase permanent DTC? GO TO 4. GO TO 2.			
2.PRECO	NDITIONING			
<ol> <li>Turn iği</li> <li>Turn iği</li> </ol>	nition switch OFF and wait at le nition switch ON. nition switch OFF and wait at le CONDITION:			
Before per		ure	e, confirm that battery	/ voltage is 12 V or more under ignition
-	GO TO 3.			
3.PERFOF	RM DTC CONFIRMATION PRO	DCE	DURE-I	
1. Turn iai	nition switch ON and wait at lea	st	190 seconds.	

1. Turn ignition switch ON and wait at least 190 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to <u>EC-526. "Diagnosis Procedure"</u>.

NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".

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# **P2610 ECM INTERNAL TIMER**

< DTC/CIRCUIT DIAGNOSIS >

### NO-2 >> Confirmation after repair: INSPECTION END

### 4.PRECONDITIONING

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- **TESTING CONDITION:**
- Before performing the following procedure, confirm that battery voltage is 12 V or more under ignition switch OFF condition.
- Before performing the following procedure, check that fuel level is between 2/8 and 7/8.

>> GO TO 5.

**5.**PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Turn ignition switch ON and wait at least 190 seconds.
- 2. Check 1st trip DTC.

### Is 1st trip DTC detected?

YES >> Proceed to EC-526, "Diagnosis Procedure".

NO >> GO TO 6.

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

### CAUTION:

To start this self-diagnosis, the conditions listed bellow are required to be satisfied. Perform the following steps to satisfy the conditions.

- Engine coolant temperature decrease by 55°C (131°F) or more during the time between an ignition switch OFF (after engine warm-up) and the second ignition switch ON.
- A fuel temperature at the second ignition switch ON is -5°C (23°F) or more and less than 35°C (95°F).
  The temperature difference between engine coolant and fuel is 5°C (41°F) or more.

NOTE:

This self-diagnosis is not performed if the distance traveled is extremely short.

- 1. Turn ignition switch ON.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Turn ignition switch OFF and soak the vehicle for at least 12 hours. CAUTION:
  - Never turn ON the ignition switch during soaking.
  - Never open the fuel filler cap and perform refueling during soaking.
- 4. Turn ignition switch ON and wait at least 190 seconds.
- 5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to EC-526, "Diagnosis Procedure".
- NO-1 >> To check malfunction symptom before repair: Refer to GI-42, "Intermittent Incident".
- NO-2 >> Confirmation after repair: INSPECTION END

## Diagnosis Procedure

INFOID:000000012891524

**1.**CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to EC-184, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT

Check that DTCs related to the fuel system and the cooling system are not detected.

Is the inspection result normal?

YES >> Check the DTC. Refer to <u>EC-70, "CONSULT Function"</u>.

NO >> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE

# **P2610 ECM INTERNAL TIMER**

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
<ol> <li>Erase DTC.</li> <li>Perform DTC Confirmation Procedure again. Refer to <u>EC-105, "DTC Index"</u>.</li> </ol>	A
Is the 1st trip DTC P2610 displayed again?	
YES >> Replace ECM. Refer to <u>EC-574, "Removal and Installation"</u> . NO >> INSPECTION END	EC
	C
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# < DTC/CIRCUIT DIAGNOSIS >

# ASCD INDICATOR

# **Component Function Check**

INFOID:000000012891525

[VQ35DE]

### 1. CHECK ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	СО	NDITION	SPECIFICATION
CRUISE	Ignition switch: ON	MAIN switch: Pressed at the 1st time →at the 2nd time	$ON\toOFF$

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-528, "Diagnosis Procedure".

# Diagnosis Procedure

INFOID:000000012891526

# 1.CHECK DTC

Check that DTC UXXXX is not displayed.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for DTC UXXXX.

2. CHECK COMBINATION METER FUNCTION

Check combination meter function. Refer to <u>MWI-20, "CONSULT Function (METER/M&A)"</u>.

### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning part.

**3**.CHECK INTERMITTENT INCIDENT

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

Is the inspection result normal?

YES >> Replace combination meter. Refer to <u>MWI-72, "Removal and Installation"</u>.

NO >> Repair or replace error-detected parts.

< DTC/CIR(	CUIT DIAGNO			DAL POSITIO		[VQ35DE]
BRAKE	PEDAL PC	SITIC	ON SWI	ТСН		
Compone	ent Function	Check	ζ			INFOID:000000012891529
<b>1.</b> снеск і	BRAKE PEDAL	POSITI	ON SWIT	CH FUNCTION		
2. Select "	nition switch ON BRAKE SW1" i	n "DATA		R" mode with COI e following conditi		
Monitor iter	n	Condition		Indication		
		Slightl	y depressed	OFF		
BRAKE SW1	Brake pedal	Fully r	eleased	ON		
	nition switch ON		M harness	connector termir	als.	-
Connector	+	_	C	Condition	Voltage	
	Terminal					-
E32	140	152 E	Brake pedal	Slightly depressed Fully released	Approx. 0 V Battery voltage	-
	INSPECTION I					
NO >> Diagnosis .CHECK I . Turn igr . Disconr	Proceed to <u>EC</u> S Procedure BRAKE PEDAL nition switch OF nect brake peda	- <u>529, "Di</u> . POSITI F. Il positiol	ON SWITC	rocedure". CH POWER SUP		INFOID:000000012891530
NO >> Diagnosis .CHECK I . Turn igr . Disconr . Turn igr . Check t	Proceed to <u>EC</u> S Procedure BRAKE PEDAL nition switch OF nect brake peda nition switch ON he voltage betw	-529, "Di POSITI F. Il position I.	ON SWITC	CH POWER SUP		
NO >> Diagnosis .CHECK I . Turn igr . Disconr . Turn igr . Check t	Proceed to <u>EC</u> S Procedure BRAKE PEDAL nition switch OF nect brake peda nition switch ON	-529, "Di POSITI F. Il position I.	ON SWITC	CH POWER SUP arness connector. position switch har		
NO >> Diagnosis .CHECK F . Turn igr . Disconr . Turn igr . Check t Brake pedal Connector E72	Proceed to EC S Procedure BRAKE PEDAL ition switch OF inect brake peda ition switch ON he voltage betw I position switch Terminal 1	<u>-529, "Di</u> POSITI F. Il position I. veen bra Ground Ground	ON SWITC n switch ha ke pedal p	CH POWER SUP arness connector. position switch har		
NO >> Diagnosis CHECK F CHECK F Disconr Check t Brake pedal Connector E72 Sthe inspec YES >> NO >> CHECK F CHECK F Disconr	Proceed to EC S Procedure BRAKE PEDAL inition switch OF hect brake peda inition switch ON he voltage betw I position switch Terminal 1 ction result norr GO TO 3. GO TO 3. GO TO 2. BRAKE PEDAL inition switch OF hect fuse block he continuity be	<u>-529, "Di F.</u> Il position J. veen bra Ground <u>Ground</u> <u>nal?</u> . POSITI F. (J/B) har	ON SWITC n switch ha ke pedal p Volta Battery v ON SWITC	CH POWER SUP arness connector. hosition switch har ge oltage	ness connector a	
NO >> Diagnosis CHECK I CHECK I Disconre Turn igr Check t Brake pedal Connector E72 Sthe inspec YES >> NO >> CHECK I Disconre Check t Disconre Check t	Proceed to EC S Procedure BRAKE PEDAL nition switch OF nect brake peda nition switch ON he voltage betw I position switch I position switch I position result norr GO TO 3. GO TO 2. BRAKE PEDAL nition switch OF nect fuse block he continuity be tor.	<u>-529, "Di F.</u> Il position J. veen bra Ground Ground <u>Ground</u> <u>nal?</u> . POSITI F. (J/B) har etween b	ON SWITC n switch ha ke pedal p Volta Battery v ON SWITC mess conn rake peda	CH POWER SUP arness connector. hosition switch har ge oltage CH POWER SUP hector.	ness connector a	and ground.
NO >> Diagnosis I.CHECK I I. Turn igr Disconr I. Disconr Brake pedal Connector E72 Sthe inspec YES >> NO >> I. Turn igr CHECK I I. Turn igr Check t Connect	Proceed to EC S Procedure BRAKE PEDAL inition switch OF hect brake peda inition switch ON he voltage betw I position switch Terminal 1 ction result norr GO TO 3. GO TO 3. GO TO 2. BRAKE PEDAL inition switch OF hect fuse block he continuity be	<u>-529, "Di F.</u> Il position J. veen bra Ground Ground <u>Ground</u> <u>nal?</u> . POSITI F. (J/B) har etween b	ON SWITC n switch ha ke pedal p Volta Battery v ON SWITC mess conn rake peda	CH POWER SUP arness connector. hosition switch har ge oltage CH POWER SUP hector. I position switch h	ness connector a	and ground.

Is the inspection result normal?

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

# **BRAKE PEDAL POSITION SWITCH**

< DTC/CIRCUIT DIAGNOSIS >

### NO >> Repair or replace error-detected parts.

# ${f 3}.$ CHECK BRAKE PEDAL POSITION SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between brake pedal position switch harness connector and ECM harness connector.

Brake pedal p	position switch	E	CM	Continuity	
Connector	Terminal	Connector Terminal		Continuity	
E72	2	E32	140	Existed	

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

### Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK BRAKE PEDAL POSITION SWITCH

Check brake pedal position switch. Refer to <u>EC-530</u>, "Component Inspection (Brake Pedal Position Switch)". Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
- NO >> Replace brake pedal position switch. Refer to <u>BR-20, "Removal and Installation"</u>.

## Component Inspection (Brake Pedal Position Switch)

INFOID:000000012891531

## **1.**CHECK BRAKE PEDAL POSITION SWITCH-I

- 1. Turn ignition switch OFF.
- 2. Disconnect BRAKE pedal position switch harness connector.
- 3. Check the continuity between BRAKE pedal position switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
T and 2	Drake pedal	Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

**2.**CHECK BRAKE PEDAL POSITION SWITCH-II

- 1. Adjust BRAKE pedal position switch installation. Refer to <u>BR-13, "Adjustment"</u>.
- 2. Check the continuity between BRAKE pedal position switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2 B	Brake pedal	Fully released	Existed
	Diake pedai	Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace BRAKE pedal position switch. Refer to <u>BR-20, "Removal and Installation"</u>.

# < DTC/CIRCUIT DIAGNOSIS >

# ICC BRAKE SWITCH

**Component Function Check** 

**1**. CHECK BRAKE PEDAL POSITION SWITCH FUNCTION

# With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT.
- 3. Check "BRAKE SW1" indication under the following conditions.

Monitor item	Co	ondition	Indication
BRAKE SW1	Brake pedal	Slightly depressed	OFF
(ICC brake switch)	Blake pedal	Fully released	ON

# **Without CONSULT**

 $\check{1}$ . Turn ignition switch ON.

2. Check the voltage between ECM harness connector terminals.

	ECM							
Connector	+	_	Condition Voltage		Condition Voltage			
	Terminal							
E32	140	152	Brake pedal	Slightly depressed	Approx. 0 V	-		
LUZ	140	102		Fully released	Battery voltage			
s the inspec	tion result no	rmal?						
-				)				
	Proceed to E		<u>Jiagnosis P</u>	<u>rocedure"</u> .				
)iagnosis	Procedure	e				INFOID:000000012891533		
				CH POWER SUPP				
	ition switch O		on switch h	arness connector.				
	ition switch O							
			ake pedal p	position switch har	ness connector a	nd ground.		
. Check th	ne voltage bet		ake pedal p	oosition switch har	ness connector a	nd ground.		
Brake pedal	ne voltage bet				ness connector a	nd ground.		
Brake pedal	ne voltage bet	ween bra	Volta	age	ness connector a	nd ground.		
. Check th Brake pedal	ne voltage bet	tween bra	Volta	age	ness connector a	nd ground.		
Brake pedal Connector E72	ne voltage bet position switch Terminal 1 tion result no	Ground	Volta	age	ness connector a	nd ground.		
Brake pedal Connector E72 Sthe inspec YES >>0	position switch Terminal 1 tion result no GO TO 3.	Ground	Volta	age	ness connector a	nd ground.		
Brake pedal Connector E72 Sthe inspector YES >> 0 NO >> 0	position switch Terminal 1 tion result no GO TO 3. GO TO 2.	Ground Ground Ground	Volta Battery v	ige voltage		nd ground.		
. Check th Brake pedal Connector E72 Sthe inspector YES >> 0 NO >> 0	position switch Terminal 1 tion result no GO TO 3. GO TO 2.	Ground Ground Ground	Volta Battery v	age		nd ground.		
Check the Brake pedal Connector E72 Sthe inspector YES >> 0 NO >> 0 CHECK E Turn ign	position switch Terminal 1 tion result no GO TO 3. GO TO 2.	Ground Ground <u>Ground</u> <u>Ground</u> <u>Ground</u> <u>Ground</u> <u>Ground</u> <u>FF.</u>	Volta Battery v	age voltage CH POWER SUPF		nd ground.		

 Check the continuity between brake pedal position switch harness connector and fuse block (J/B) connector.

Brake pedal	position switch	Fuse block (J/B)		Continuity	
Connector	Terminal	Connector Terminal		Continuity	
E72	1	M68	2R	Existed	

Is the inspection result normal?

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

# EC-531

INFOID:000000012891532

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# ICC BRAKE SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

### NO >> Repair or replace error-detected parts.

# ${f 3}.$ CHECK BRAKE PEDAL POSITION SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between brake pedal position switch harness connector and ECM harness connector.

Brake pedal p	position switch	E	CM	Continuity	
Connector	Terminal	Connector Terminal		Continuity	
E72	2	E32	140	Existed	

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

### Is the inspection result normal?

YES >> GO TO 4.

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

### **4.**CHECK BRAKE PEDAL POSITION SWITCH

Check brake pedal position switch. Refer to EC-532, "Component Inspection (ICC Brake Switch)".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake pedal position switch. Refer to <u>BR-20, "Removal and Installation"</u>.

## Component Inspection (ICC Brake Switch)

INFOID:000000012891534

# **1.**CHECK BRAKE PEDAL POSITION SWITCH-I

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

Terminals	Condition		Continuity
1 and 2	2 Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK BRAKE PEDAL POSITION SWITCH-II

- 1. Adjust brake pedal position switch installation. Refer to <u>BR-13, "Adjustment"</u>.
- 2. Check the continuity between brake pedal position switch terminals under the following conditions.

Terminals	Condition		Continuity	
1 and 2	Brake pedal	Fully r		Existed
i anu z		Slightly depressed	Not existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake pedal position switch. Refer to <u>BR-20. "Removal and Installation"</u>.

	<u>.</u>				А
Component Functior	n Check			INFOID:000000012891535	
1.CHECK COOLING FAM	N FUNCTIO	N			EC
<ul> <li>With CONSULT</li> <li>1. Turn ignition switch O</li> <li>2. Perform "COOLING F</li> <li>3. Touch "LOW", "MID", "</li> <li>4. Check that cooling far</li> </ul>	AN" in "ACT "HI" on the (			GINE" using CONSULT.	С
<ul> <li>Without CONSULT</li> <li>Activates IPDM E/R a <u>Description</u>".</li> <li>Check that cooling far</li> </ul>		est and check c	cooling fan	motors operation, refer to PCS-9, "Diagnosis	D
Is the inspection result nor         YES       >> INSPECTION         NO       >> Proceed to EC	r <u>mal?</u> END	gnosis Procedur	<u>e"</u> .		E F
Diagnosis Procedure	9			INFOID:000000012891536	
1.CHECK COOLING FAM		OWER SUPPLY	CIRCUIT		G
<ol> <li>Turn ignition switch O</li> <li>Disconnect cooling fail</li> <li>Turn ignition switch O</li> <li>Check the voltage bet</li> </ol>	n relays-2, - N.		-3 harness	connectors and ground.	Η
+					
Cooling fan rela	ay		Voltag	9	
Connector	Terminal				J
E42 (cooling fan relay-2)	2 5	Ground	Battery vo	tage	
E41 (cooling fan relay-3)	2 5		,, <b>,</b>		K
Is the inspection result nor YES >> GO TO 2. NO >> Perform troub		s for power supp	ly circuit.		L
2. CHECK COOLING FAM	N RELAY O	UTPUT SIGNAL			Μ
<ol> <li>Turn ignition switch O</li> <li>Disconnect IPDM E/R</li> <li>Check the continuity b tor.</li> </ol>	harness co		, -3 harnes	ss connectors and IPDM E/R harness connec-	Ν
+		-			0
Cooling fan relay		IPDM E/F	<b>ર</b>	Continuity	

Continuity	IPDM E/R		Cooling fan relay		
	Terminal	Connector	Terminal	Connector	
Existed	27	E119	1	E42 (cooling fan relay-2)	
Existed	39	LIIJ	1	E41 (cooling fan relay-3)	

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

Is the inspection result normal?

YES >> GO TO 3.

Revision: December 2015

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< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

# ${\it 3.}$ check cooling fan motor power supply circuit

1. Disconnect cooling fan motor-1 harness connector.

2. Check the voltage between cooling fan motor-1 harness connector and ground.

Cooling fa	+ an motor-1		Voltage
Connector	Cooling fan motor-1 Connector Terminal		voluge
E236	1 2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for power supply circuit.

**4.**CHECK COOLING FAN MOTOR CIRCUIT-1

- 1. Disconnect cooling fan motor-2 harness connector.
- 2. Check the continuity between cooling fan relay-2, -3 harness connectors and cooling fan motor-1, -2 harness connectors.

+		-		
Cooling fan relay		Cooling fan motor		Continuity
Connector	Terminal	Connector	Terminal	
E42	3	E237 (Cooling fan motor-2)	2	
(cooling fan relay-2)	7	E236 (Cooling fan motor-1)	3	Existed
E41 (cooling fan relay-3)	3	E237 (Cooling fan motor-2)	1	LXISIEU
	7	E236 (Cooling fan motor-1)	4	

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

**5.**CHECK COOLING FAN MOTOR CIRCUIT-2

 Check the continuity between IPDM E/R harness connector and cooling fan motor-1, -2 harness connector.

	+	-		
IPDN	/IE/R	Cooling fan motor		Continuity
Connector	Terminal	Connector	Terminal	
E120	4	E236 (Cooling fan motor-1)	4	Existed
L120	6	E237 (Cooling fan motor-2)	1	LAISIEU

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

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

**6.**CHECK COOLING FAN MOTOR CIRCUIT-3

### < DTC/CIRCUIT DIAGNOSIS >

1. Check the continuity between cooling fan relay-2, -3 harness connectors and ground.

				_
+				-
Cooling fan	relay	-	Continuity	
Connector	Terminal			
E42 (cooling fan relay-2)	6	Ground	Existed	-
E41 (cooling fan relay-3)	6			_
2. Also check harn		o ground and	d to power.	
Is the inspection res				
YES >> GO TO NO >> Repair of	7. or replace erro	r-detected p	arts	
7. CHECK COOLIN	•			
				nnector and ground.
	fully between	cooling fail i		
+				
Cooling fan mot	or-2	_	Continuity	
_	Terminal		-	
	3			
E237	4	Ground	Existed	
2. Also check harn	ess for short to	o ground and	d to power.	
Is the inspection res		U	•	
YES >> GO TO	-			
<b>^</b>	or replace erro		arts.	
8.CHECK COOLIN	G FAN RELAY	′-2 AND -3		
Refer to <u>EC-536, "Co</u>		<u>pection (Coo</u>	<u>ling Fan Relay)"</u> .	
Is the inspection res				
YES >> GO TO S NO >> Replace	9. malfunctionin	a coolina fa	a rolav	
9.CHECK COOLIN			•	
Refer to <u>EC-535, "Co</u>		<u>pection (Coo</u>	<u>ling Fan Motor)"</u> .	
Is the inspection resiver YES >> GO TO				
	-	g cooling fai	n motor. Refer to C	0-14, "Removal and Installation".
10. CHECK INTER			_	
Perform .GI-42, "Inte				
Is the inspection res				
YES >> Replace	IPDM E/R. R		36, "Removal and	nstallation".
	or replace erro			
Component Insp	pection (Co	oling Fan	Motor)	INFOID:000000012891537
1.CHECK COOLIN	G FAN MOTO	R		
1. Turn ignition swi	itch OFF.			
2. Disconnect cool			nector.	

Supply cooling fan motor terminals with battery voltage and check operation.

## < DTC/CIRCUIT DIAGNOSIS >

Cooling		
Terr	Condition	
+	_	
1	3 and 4	
2	3 and 4	Δ
1 and 2	3	A
1 and 2	4	
1, 2	3, 4	В

Check that cooling fan speed of condition B is higher than that of A.

Is the inspection result normal?

YES >> INSPECTION END

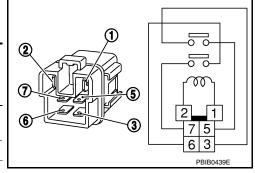
NO >> Replace cooling fan motor. Refer to <u>CO-14, "Removal and Installation"</u>.

# Component Inspection (Cooling Fan Relay)

# 1. CHECK COOLING FAN RELAYS

- 1. Turn ignition switch OFF.
- 2. Remove cooling fan relay-2, -3.
- 3. Check the continuity between cooling fan relay-2, -3 terminals as per the following conditions.

_				
	Cooling far	n relay-2, -3		
_	+	_	Conditions	Continuity
	Terr	ninal		
	5 3		12V direct current supply between termi- nals 1 and 2	Existed
			No current supply	Not existed
	7 6		12V direct current supply between termi- nals 1 and 2	Existed
			No current supply	Not existed



## Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace cooling fan relay.

INFOID:000000012891538

# **ELECTRICAL LOAD SIGNAL**

# < DTC/CIRCUIT DIAGNOSIS >

# ELECTRICAL LOAD SIGNAL

# Description

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred via the CAN communication.

# Component Function Check

# 1. CHECK REAR WINDOW DEFOGGER SWITCH FUNCTION

- 1. Turn ignition switch ON.
- 2. Connect CONSULT and select "DATA MONITOR" mode.
- 3. Select "LOAD SIGNAL" and check indication under the following conditions.

Monitor item	Condition	Condition		
LOAD SIGNAL	AL Rear window defogger switch		ON	
LUAD SIGNAL	Iteal window delogger switch	OFF	OFF	
Is the inspection result normal?				

TES	>> GU TU Z.
NO	>> Proceed to EC-537, "Diagnosis Procedure".

# 2.check lighting switch function

Check "LOAD SIGNAL" indication under the following conditions.

Monitor item	Co	Indication	
LOAD SIGNAL	Lighting switch	ON at 2nd position	ON
LOAD SIGNAL	Lighting Switch	OFF	OFF

Is the inspection result normal?

YES	>> GO TO 3.
NO	>> Proceed to <u>EC-537, "Diagnosis Procedure"</u> .

# 3. CHECK HEATER FAN CONTROL SWITCH FUNCTION

# Select "HEATER FAN SW" and check indication under the following conditions.

Monitor item	Condition		Indication
HEATER FAN SW	Heater fan control switch	ON	ON
HEATERTAN OW		OFF	OFF

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-537, "Diagnosis Procedure".

# **Diagnosis** Procedure

# **1**.INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to <u>EC-537, "Compo-nent Function Check"</u>.

Which circuit is related to the incident?

Rear window defogger>>GO TO 2.

Headlamp>>GO TO 3.

Heater fan>>GO TO 4.

2.CHECK REAR WINDOW DEFOGGER SYSTEM

Check rear window defogger system. Refer to DEF-17, "Work Flow".

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INFOID:000000012891539

INFOID:000000012891540

# ELECTRICAL LOAD SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

**3.**CHECK HEADLAMP SYSTEM

>> INSPECTION END

Check headlamp system. Refer to <u>EXL-68, "Work Flow"</u> (LED headlamp) or <u>EXL-189, "Work Flow"</u> (halogen headlamp).

>> INSPECTION END

**4**.CHECK HEATER FAN CONTROL SYSTEM

Check heater fan control system. Refer to HAC-36, "Work Flow".

>> INSPECTION END

# ELECTRONIC CONTROLLED ENGINE MOUNT

< DTC/CIRCUIT DIAGNOSIS >

# ELECTRONIC CONTROLLED ENGINE MOUNT

[VQ35DE]

#### А **Component Function Check** INFOID:000000012891542 1. CHECK OVERALL FUNCTION EC 1. Start engine and warm it up to normal operating temperature. Shift selector position is D while depressing the brake pedal and parking brake pedal. 2. Disconnect electronic controlled engine mount control solenoid valve harness connector. 3. Check that body vibration increases compared to the condition of step 2 above (with vehicle stopped). 4. Is the inspection result normal? >> INSPECTION END YES D NO >> EC-539, "Diagnosis Procedure". Diagnosis Procedure INFOID:000000012891543 Ε **1.**CHECK VACUUM SOURCE 1. Turn ignition switch OFF. 2. Reconnect electronic controlled engine mount control solenoid valve harness connector. 3. Disconnect vacuum hose connected to electronic controlled engine mount. Start engine and let it idle. 4. Check vacuum hose for vacuum existence. 5. Vacuum should exist. Н Is the inspection result normal? YES >> GO TO 7. NO >> GO TO 2. 2.CHECK VACUUM HOSES AND VACUUM GALLERY 1. Turn ignition switch OFF. Check vacuum hoses and vacuum gallery for clogging, cracks or improper connection. Refer to EC-42. 2. "ELECTRONIC CONTROLLED ENGINE MOUNT : System Description". Is the inspection result normal? YES >> GO TO 3. Κ NO >> Repair or replace vacuum hoses and vacuum gallery. $\mathbf{3}$ . CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE POWER SUPPLY L 1. Disconnect electronic controlled engine mount control solenoid valve harness connector. Turn ignition switch ON. 2. Check the voltage between front electronic controlled engine mount harness connector and ground. 3. M Electronic controlled engine mount control solenoid valve Ground Voltage Connector Terminal Ν F64 Ground 1 Battery voltage Is the inspection result normal? YES >> GO TO 4. NO >> Repair open circuit, short to ground or short to power in harness connectors. ${f 4}.$ CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE OUTPUT SIG-NAL CIRCUIT FOR OPEN AND SHORT Disconnect ECM harness connector. 1. Check the continuity between ECM harness connector and electronic controlled engine mount control 2. solenoid valve harness connector.

# ELECTRONIC CONTROLLED ENGINE MOUNT

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

E	СМ	Electronic controlled engine mount control solenoid valve		Continuity
Connector	Terminal	Connector	Terminal	
F78	49	F64	2	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

Check electronic controlled engine mount control solenoid valve. Refer to <u>EC-540, "Component Inspection"</u>. Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace electronic controlled engine mount control solenoid valve. Refer to <u>EC-15. "ENGINE</u> <u>CONTROL SYSTEM : Component Parts Location"</u>.

# **6.**CHECK ELECTRONIC CONTROLLED ENGINE MOUNT

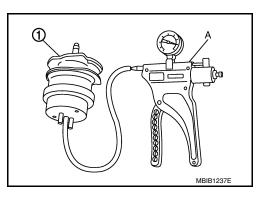
## 1. Turn ignition switch OFF.

- Install vacuum pump (A) to electronic controlled engine mount
   1.
- Check that a vacuum is maintained when applying the vacuum of -40 kPa (-0.41 kg/cm<sup>2</sup>, -5.8 psi) to electronic controlled engine mount.
- 4. Also visually check electronic controlled engine mount.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace electronic controlled engine mount.



# 7. CHECK INTERMITTENT INCIDENT

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

Is the inspection result normal?

- YES >> Replace intake manifold collector. Refer to <u>EM-28, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected parts.

# Component Inspection

INFOID:000000012891544

# 1. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

## With CONSULT

- 1. Turn ignition switch OFF.
- 2. Reconnect electronic controlled engine mount control solenoid valve harness connector.
- 3. Disconnect vacuum hoses connected to electronic controlled engine mount control solenoid valve.
- 4. Turn ignition switch ON.
- 5. Select "ENGINE MOUNTING" in "ACTIVE TEST" mode with CONSULT.
- Check air passage continuity and operation delay time under the following conditions.

Condition (ENGINE MOUNTING)	Air passage continuity between (A) and (B)	Air passage continuity between $\textcircled{A}$ and $\textcircled{C}$
TRVL	Existed	Not existed
IDLE	Not existed	Existed

### **Without CONSULT**

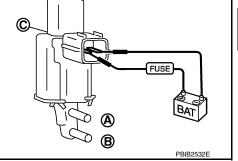
1. Turn ignition switch OFF.

# ELECTRONIC CONTROLLED ENGINE MOUNT

#### < DTC/CIRCUIT DIAGNOSIS >

- 2. Disconnect electronic controlled engine mount control solenoid valve harness connector.
- 3. Disconnect vacuum hoses connected to electronic controlled engine mount control solenoid valve.
- 4. Check air passage continuity and operation delay time under the
- following conditions.

Condition	Air passage continuity between $\textcircled{A}$ and $\textcircled{B}$	Air passage continuity between $\textcircled{A}$ and $\textcircled{C}$
12 V direct current supply be- tween terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed



[VQ35DE]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electronic controlled engine mount control solenoid valve. Refer to <u>EC-15, "ENGINE</u> <u>CONTROL SYSTEM : Component Parts Location"</u>.

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Revision: December 2015

# < DTC/CIRCUIT DIAGNOSIS >

# FUEL INJECTOR

# **Component Function Check**

# **1.**INSPECTION START

Turn ignition switch to START.

Are any cylinders ignited?

YES >> GO TO 2.

NO >> Proceed to EC-542, "Diagnosis Procedure".

2. CHECK FUEL INJECTOR FUNCTION

# BWith CONSULT

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

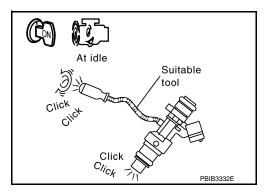
# Without CONSULT

- 1. Start engine.
- 2. Listen to each fuel injector operating sound.

# Clicking sound should be heard.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to EC-542, "Diagnosis Procedure".



# Diagnosis Procedure

INFOID:000000012891546

# 1. CHECK FUEL INJECTOR POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect fuel injector harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between fuel injector harness connector and ground.

	Fuel injector	Ground	Voltage	
Cylinder	Connector	Terminal	Ground	voltage
1	F42	1		
2	F18	1		
3	F41	1	Ground	Battery voltage
4	F20	1	Giouna	
5	F21	1		
6	F22	1		

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between fuel injector harness connector and IPDM E/R harness connector.

# **FUEL INJECTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

	Fuel injector		IPDN	IE/R	Q 11 11	
Cylinder	Connector	Terminal	Connector	Terminal	Continuity	
1	F42	1		54		
2	F18	1		60		
3	F41	1	<b>F</b> 40	54		
4	F20	1	F19	60	Existed	
5	F21	1	-	54		
6	F22	1	-	60		
YES >> NO >>	ction result no Perform the t Repair or rep FUEL INJECT	rouble diagr lace error-d	etected parts.		uit. OPEN AND SH	ORT
. Disconr	nition switch C nect ECM har he continuity	ness conneo		ness connect	or and ECM ha	ness connector.
	Fuel injector		EC	CM	Opentia it	
Cylinder	Connector	Terminal	Connector	Terminal	Continuity	
1	F42	2		17		
2	F18	2	-	16		
3	F41	2		22	E. Sata d	
4	F20	2	F78	12	Existed	
5	F21	2	-	11		
6	F22	2	-	21		
YES >> NO >> CHECK I heck fuel in the inspec YES >> NO >>	FUEL INJECT njector. Refer ction result no GO TO 5. Replace malf	circuit, short FOR to <u>EC-543,</u> ormal? functioning f	"Component uel injector. R	Inspection".	er in harness or 9, "Removal an	
	NTERMITTE					
neck interr	nittent incide		<u>-42, "Interm</u>	littent incider	<u>IT"</u> .	
					d Installation".	
the inspec YES >>	Replace IPD Repair or rep	lace error-d	etected parts.	•		
the inspect YES >> NO >>			etected parts.			INFOID:00000001289154
the inspec YES >> NO >>	Repair or rep	ion	etected parts.			INFOID:00000001289154

Turn ignition switch OFF.
 Disconnect fuel injector harness connector.

# **FUEL INJECTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

# [VQ35DE]

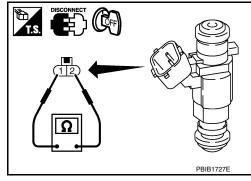
3. Check resistance between fuel injector terminals as per the following.

Terminals	Resistance
1 and 2	11.1 - 14.5 Ω [at 10 - 60°C (50 - 140°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector. Refer to <u>EM-49</u>. <u>"Removal and Installation"</u>.



< DTC/CIRCUIT DIAGNOSIS >	•

**Component Function Check** 

# **1**.INSPECTION START

Turn ignition switch OFF, and restart engine.

#### Does the engine start?

YES-1 >> With CONSULT: GO TO 2.

YES-2 >> Without CONSULT: GO TO 3.

NO >> Proceed to <u>EC-545</u>, "Diagnosis Procedure".

2. CHECK IGNITION SIGNAL FUNCTION

#### With CONSULT

- 1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 2. Check that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to EC-545, "Diagnosis Procedure".

3. CHECK IGNITION SIGNAL FUNCTION

#### **Without CONSULT**

1. Let engine idle.

2. Read the voltage signal between ECM harness connector terminals with an oscilloscope.

ECM							
	+	-	-	Voltage signal			
Connector	Terminal	Connector	Terminal				
	103						
	104						
<b>F70</b>	106	F00	450				
F79	107	E32	152				
	113						
	114			2V/div JMBIA0035GB			

#### NOTE:

The pulse cycle changes depending on rpm at idle.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to EC-545, "Diagnosis Procedure".

# Diagnosis Procedure

**1.**CHECK ECM POWER SUPPLY

- 1. Turn ignition switch OFF, wait at least 10 seconds and then turn it ON.
- 2. Check the voltage between ECM harness connector terminals.

	Voltage			
Connector	Terminal	Connector	Terminal	vollage
F79	86	E32	152	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refer to EC-184, "Diagnosis Procedure".

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#### < DTC/CIRCUIT DIAGNOSIS >

# 2.CHECK CONDENSER-1 POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect condenser-1 harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between condenser-1 harness connector and ground.

Conde	enser-1	Ground	Voltage	
Connector	Terminal	Ground	voltage	
F26	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

**3.**CHECK CONDENSER-1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between IPDM E/R harness connector and condenser-1 harness connector.

IPDM E/R		Conde	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F19	55	F26	1	Existed

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

Is the inspection result normal?

YES >> Refer to EC-184, "Diagnosis Procedure".

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

#### **4.**CHECK CONDENSER-1 GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Check the continuity between condenser-1 harness connector and ground.

Conde	enser-1	Ground	Continuity	
Connector	Terminal	Ground	Continuity	
F26	2	Ground	Existed	

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK CONDENSER-1

Check condenser-1. Refer to EC-549, "Component Inspection (Condenser-1)"

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace condenser-1.

 $\mathbf{6}.$ CHECK IGNITION COIL POWER SUPPLY

- 1. Reconnect all harness connectors disconnected.
- 2. Disconnect ignition coil harness connector-1.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ignition coil harness connector and ground.

# < DTC/CIRCUIT DIAGNOSIS >

	Ignition coil		Ground	Voltage		
der	Connector	Terminal	Cround	voitage		
1	F47	3				
2	F8	3				
3	F48	3	Ground	Pottonuvolto	<b>a</b> 0	
4	F9	3	Giouna	Battery volta	ye	
5	F49	3				
6	F10	3				
YES >> ( NO >> F CHECK I( Turn igni	GNITION CC	blace harnes DIL GROUN DFF.		FOR OPEN A	AND SHORT	
	Ignition	coil		<b>a</b>	<b>0</b>	
Cylinder	Connec	tor Te	rminal	Ground Continuity		
1	F47		2			
2	F8		2			
3	F48		2	Cround	round Existed	
4	F9		2	Ground		
5	F49		2			
6	F10		2			
s the inspec YES >> 0 NO >> F CHECK 10	GNITION CC	ormal? circuit or sh DL OUTPU <sup>-</sup> ness conne	ort to power F SIGNAL CI ctor.	RCUIT FOR	r connectors. OPEN AND ctor and ECM	
	Ignition coil		E	СМ	0 1 1	
	Connector	Terminal	Connector	Terminal	Continuity	
Cylinder	F47	1		113		
Cylinder 1			1	106		
-	F8	1		1		
1	F8 F48	1	<b>F7</b> 0	103		
1 2			F79	103 114	Existed	
1 2 3	F48	1	- F79		Existed	

YES >> GO TO 9.

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

**9.**CHECK IGNITION COIL WITH POWER TRANSISTOR

Check ignition coil with power transistor. Refer to <u>EC-548</u>, "Component Inspection (Ignition Coil with Power <u>Transistor</u>)".

#### < DTC/CIRCUIT DIAGNOSIS >

#### Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
- NO >> Replace malfunctioning ignition coil with power transistor. Refer to <u>EM-44</u>. "Removal and Installation (bank 2)", <u>EM-44</u>. "Removal and Installation (bank 1)".

#### Component Inspection (Ignition Coil with Power Transistor)

INFOID:000000012891550

# 1. CHECK IGNITION COIL WITH POWER TRANSISTOR-I

- 1. Turn ignition switch OFF.
- 2. Disconnect ignition coil harness connector.
- 3. Check resistance between ignition coil terminals as per the following.

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning ignition coil with power transistor. Refer to <u>EM-44, "Removal and Installa-</u> tion (bank 2)", <u>EM-44</u>, "Removal and Installation (bank 1)".

#### **2.**CHECK IGNITION COIL WITH POWER TRANSISTOR-II

#### CAUTION:

#### Perform the following procedure in a place with no combustible objects and good ventilation.

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
  - NOTE:

Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

- 4. Start engine.
- 5. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 6. Turn ignition switch OFF.
- 7. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- 8. Remove ignition coil and spark plug of the cylinder to be checked.
- 9. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- 10. Connect spark plug and harness connector to ignition coil.
- 11. Fix ignition coil using a rope etc. with gap of 13 17 mm (0.52 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
- 12. Crank engine for approximately 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

#### Spark should be generated.

#### CAUTION:

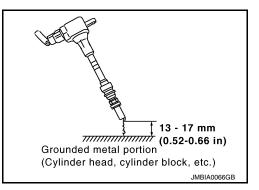
• During the operation, always stay 0.5 m (19.7 in) or more away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.

• It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken. NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is mal-functioning.

#### Is the inspection result normal?

YES >> INSPECTION END



< DTC/CIRCU	JIT DIAGNOSIS >	[VQ35DE]
NO >> Re tic	eplace malfunctioning ignition coil with power transistor. Re on (bank 2)", EM-44, "Removal and Installation (bank 1)".	fer to EM-44, "Removal and Installa-
Component	t Inspection (Condenser-1)	INFOID:000000012891551
1.снеск со	DNDENSER-1	EC
2. Disconneo	on switch OFF. ct condenser-1 harness connector. istance between condenser-1 terminals as per the following	g. C
Terminals	Resistance	D
1 and 2	Above 1 MΩ [at 25C° (77C°)]	
YES >> IN	on result normal? ISPECTION END eplace condenser-1.	E
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< DTC/CIRCUIT DIAGNOSIS >

# INFORMATION DISPLAY (ASCD)

**Component Function Check** 

1. CHECK INFORMATION DISPLAY

#### 1. Start engine.

- 2. Press MAIN switch on ASCD steering switch.
- 3. Drive the vehicle at more than 40 km/h (25 MPH). CAUTION:

#### Always drive vehicle at a safe speed.

- 4. Press SET/COAST switch.
- 5. Check that the reading of the speedometer shows the same value as the set speed indicated in the information display while driving the vehicle on a flat road.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to EC-550. "Diagnosis Procedure".

# Diagnosis Procedure

# **1**.CHECK DTC

Check that DTC UXXXX, P0500 or P1574 is not displayed.

- Is the inspection result normal?
- YES >> GO TO 2.
- NO-1 >> Perform trouble diagnosis for DTC UXXXX.
- NO-2 >> Perform trouble diagnosis for DTC P0500. Refer to EC-389, "DTC Description".
- NO-3 >> Perform trouble diagnosis for DTC P1574. Refer to EC-473, "DTC Description".

# 2. CHECK DTC WITH COMBINATION METER

Refer to MWI-20, "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for DTC indicated.

**3**.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace combination meter. Refer to <u>MWI-72, "Removal and Installation"</u>.
- NO >> Repair or replace.

INFOID:000000012891552

# MALFUNCTION INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
MALFUNCTION INDICATOR LAMP	[140022]
Component Function Check	INFOID:000000012891554
1.CHECK MIL FUNCTION	E
<ol> <li>Turn ignition switch ON.</li> <li>Check that MIL illuminates.</li> <li>Is the inspection result normal?</li> <li>YES &gt;&gt; INSPECTION END</li> <li>NO &gt;&gt; Proceed to EC-551, "Diagnosis Procedure".</li> </ol>	
Diagnosis Procedure	INFOID:000000012891555
1.снеск дтс	
Check that DTC UXXXX is not displayed. Is the inspection result normal? YES >> GO TO 2. NO >> Perform trouble diagnosis for DTC UXXXX. 2.CHECK COMBINATION METER FUNCTION	
Check combination meter function. Refer to <u>MWI-20, "CONSULT Function (METER/M&amp;A)"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 3. NO >> Repair or replace. <b>3.</b> CHECK INTERMITTENT INCIDENT	
Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u> . <u>Is the inspection result normal?</u> YES >> Replace combination meter. Refer to <u>MWI-72, "Removal and Installation"</u> .	
NO >> Repair or replace error-detected parts.	

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< DTC/CIRCUIT DIAGNOSIS >

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

# **Component Function Check**

# **1.**CHECK ORVR FUNCTION

Check whether the following symptoms are present.

- Fuel odor from EVAP canister is strong.
- Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

#### Are any symptoms present?

YES >> Proceed to EC-552, "Diagnosis Procedure".

NO >> INSPECTION END

# **Diagnosis** Procedure

# **1.**INSPECTION START

Check whether the following symptoms are present.

A: Fuel odor from EVAP canister is strong.

B: Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

#### <u>A or B</u>

A >> GO TO 2.

B >> GO TO 7.

2. CHECK EVAP CANISTER

- Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-19</u>. "<u>Removal and Installation</u>".
- 2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

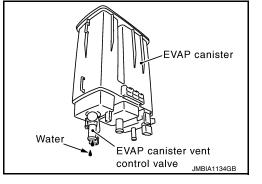
YES >> GO TO 3. NO >> GO TO 4.

3.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Check if water will drain from EVAP canister

Does water drain from the EVAP canister?

YES >> GO TO 4. NO >> GO TO 6.



# **4.**REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to FL-19, "Removal and Installation".

#### >> GO TO 5.

# 5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose. Refer to <u>FL-19, "Exploded View"</u>.

#### **6.**CHECK REFUELING EVAP VAPOR CUT VALVE

Check refueling EVAP vapor cut valve. Refer to EC-554, "Component Inspection".

# EC-552

INFOID:000000012891556

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

< DTC/CIRCUIT DIAGNOSIS > [VG002]	
Is the inspection result normal?	
YES >> INSPECTION END	А
NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to <u>FL-11, "FWD : Removal and</u>	
Installation" (FWD models) or <u>FL-15. "AWD : Removal and Installation"</u> (AWD models).	
7.CHECK EVAP CANISTER	EC
1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor	
attached. Refer to FL-19, "Removal and Installation".	C
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.	С
The weight should be less than 2.1 kg (4.6 lb).	
Is the inspection result normal?	D
YES >> GO TO 8.	
NO >> GO TO 9.	
<b>8.</b> CHECK IF EVAP CANISTER IS SATURATED WITH WATER	E
Check if water will drain from EVAP canister.	
Does water drain from the EVAP canister?	F
YES >> GO TO 6.	
NO >> GO TO 11.	
	G
	L
Water EVAP canister vent	ŀ
control valve JMBIA1134GB	
9. REPLACE EVAP CANISTER	I
Replace EVAP canister with a new one. Refer to FL-19, "Removal and Installation".	
>> GO TO 10.	J
10. DETECT MALFUNCTIONING PART	
	K
Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.	I.V
>> Repair or replace EVAP hose. Refer to <u>FL-19, "Exploded View"</u> .	
11.CHECK VENT HOSES AND VENT TUBES	L
Check hoses and tubes between EVAP canister and refueling control valve for clogging, kinks, looseness and	
improper connection.	N
Is the inspection result normal?	IV
YES >> GO TO 12.	
NO >> Repair or replace hoses and tubes.	Ν
12.CHECK FILLER NECK TUBE	
Check recirculation line for clogging, dents and cracks.	
Is the inspection result normal?	C
YES >> GO TO 13.	
NO >> Replace filler neck tube.	F
13. CHECK REFUELING EVAP VAPOR CUT VALVE	F
Check refueling EVAP vapor cut valve. Refer to EC-554, "Component Inspection".	
Is the inspection result normal?	
YES >> GO TO 14.	
NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to FL-11, "FWD : Removal and	
Installation" (FWD models) or <u>FL-15, "AWD : Removal and Installation"</u> (AWD models).	

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

# **14.**CHECK FUEL FILLER TUBE

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

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> Replace fuel filler tube. Refer to <u>FL-11, "FWD : Exploded View"</u> (FWD models) or <u>FL-15, "AWD :</u> <u>Exploded View"</u> (AWD models).

# 15.CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

#### Is the inspection result normal?

- YES >> GO TO 16.
- NO >> Repair or replace one-way fuel valve with fuel tank. Refer to <u>FL-11, "FWD : Removal and Installa-</u> tion" (FWD models) or <u>FL-15, "AWD : Removal and Installation"</u> (AWD models).

# 16.CHECK ONE-WAY FUEL VALVE-II

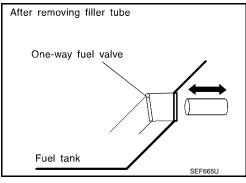
- 1. Check that fuel is drained from the tank.
- Remove fuel filler tube and hose. Refer to <u>FL-11, "FWD : Exploded View"</u> (FWD models) or <u>FL-15, "AWD</u> : <u>Exploded View"</u> (AWD models).
- 3. Check one-way fuel valve for operation as per the following. When a stick is inserted, the valve should open, when removing stick it should close.

#### Do not drop any material into the tank.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel filler tube or replace one-way fuel valve with fuel tank. Refer to <u>FL-11, "FWD : Exploded View"</u> (FWD models) or <u>FL-15, "AWD : Exploded View"</u> (AWD models).



INFOID:000000012891558

# **Component Inspection**

**1.**INSPECTION START

## Will CONSULT be used?

Will CONSULT be used?

YES >> GO TO 2.

NO >> GO TO 3.

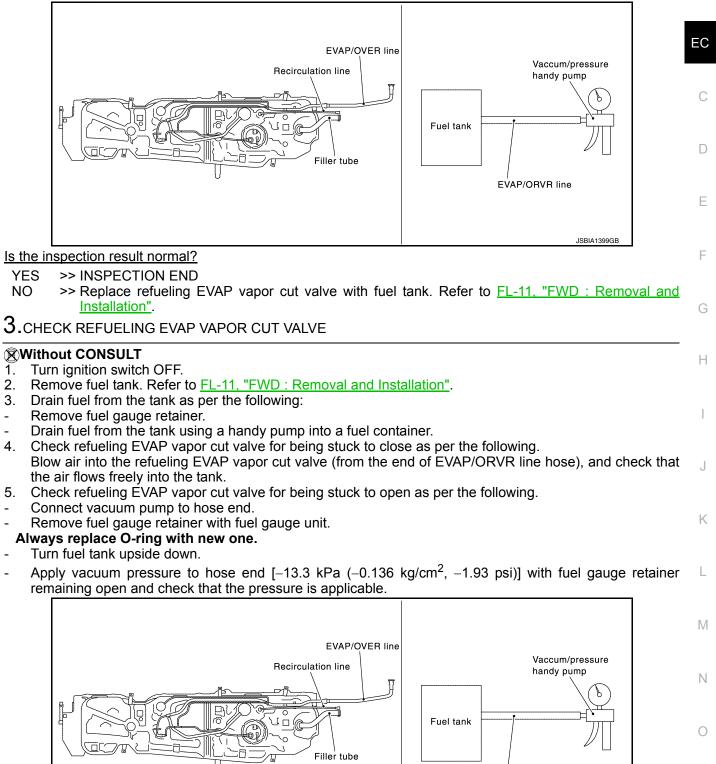
**2.**CHECK REFUELING EVAP VAPOR CUT VALVE

#### With CONSULT

- 1. Turn ignition switch OFF.
- 2. Remove fuel tank. Refer to FL-11, "FWD : Removal and Installation".
- 3. Drain fuel from the tank as per the following:
- Remove fuel feed hose located on the fuel gauge retainer. Refer to FL-5. "Removal and Installation".
- Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
- Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT.
- 4. Check refueling EVAP vapor cut valve for being stuck to close as per the following. Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
- 5. Check refueling EVAP vapor cut valve for being stuck to open as per the following.
- Connect vacuum pump to hose end.
- Remove fuel gauge retainer with fuel gauge unit.
- Always replace O-ring with new one.
- Turn fuel tank upside down.

#### < DTC/CIRCUIT DIAGNOSIS >

- Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>2</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to <u>FL-11, "FWD : Removal and</u> <u>Installation"</u>.

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EVAP/ORVR line

[VQ35DE]

А

# **REFRIGERANT PRESSURE SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

# REFRIGERANT PRESSURE SENSOR

# **Component Function Check**

1. CHECK REFRIGERANT PRESSURE SENSOR FUNCTION

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn A/C switch and blower fan switch ON.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

Connector	+	_	Voltage (V)
Connector	Terr	ninal	
F78	20	1.0 - 4.0	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to <u>EC-556</u>, "Diagnosis Procedure".

# **Diagnosis** Procedure

INFOID:000000012891560

# 1.CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY

- 1. Disconnect refrigerant pressure sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between refrigerant pressure sensor harness connector and ground.

	+		
Refrigerant pr	essure sensor	_	Voltage (V)
Connector	Terminal		
E244 1		Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

# 2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

Refrigerant pr	ressure sensor	E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E244	1	F78	18	Existed

#### Is the inspection result normal?

YES >> Check sensor power supply 2 circuit. Refer to <u>EC-558, "Diagnosis Procedure"</u>.

NO >> Repair or replace error-detected parts.

# ${f 3.}$ CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

# **REFRIGERANT PRESSURE SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Connector	essure sensor	EC	M	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
E244	3	F78	25	Existed	
<u>the inspecti</u> ′ES >> G	<u>on result nor</u> O TO 4.			o power.	
.CHECK RE	EFRIGERAN		SENSOR IN	PUT SIGNAL CIRCUIT FOR OPEN e sensor harness connector and E	
Refrigerant pre	Secure concor	EC	ΝΛ.		
Connector	Terminal	Connector	Terminal	Continuity	
E244	2	F78	20	Existed	
		r short to grou			
	on result nor	-			
	O TO 5.				
		ace error-dete	cted parts.		
		. Refer to <u>GI-4</u>	<u>42, "Intermitte</u>	<u>nt Incident"</u> .	
	<u>on result nor</u> eplace refriq		sensor Ref	r to UA 40 "Domoval and Installati	on"
NO K	epair or repla	ace error-dete		r to <u>HA-40, "Removal and Installati</u>	<u>011</u> .
0 K	epair or repla				<u>orr</u> .
10 K	epair or repla				<u>on</u> .
	epair or repla			n to <u>mA-40. Removal and installat</u>	<u>on .</u>
	epair or repla			n to <u>mA-40. Removal and installat</u>	<u>orr</u> .
VU K	epair or repla			n to <u>mA-40. Removal and installat</u>	<u>on .</u> .
10 K	epair or repla			n to <u>mA-40. Removal and installat</u>	<u>on .</u> .
10 K	epair or repla			n to <u>mA-40. Removal and installat</u>	<u>orr</u> .
VU K	epair or repla			no <u>mA-40. Removal and installat</u>	<u>on .</u> .
NO K	epair or repla			no <u>mA-40. Removal and installat</u>	<u>on .</u> .
10 K	epair or repla			no <u>ma-40. Removal and installat</u>	<u>UII</u> .
	epair or repla			no <u>ma-40. Removal and installa</u> t	<u>on .</u> .
	epair or repla			no <u>ma-40. Removal and installat</u>	<u>on .</u>
NO K	epair or repla				<u>on .</u> .
NU K	epair or repla				<u>on .</u>
	epair or repla				<u>on .</u> .

# SENSOR POWER SUPPLY2 CIRCUIT

# Description

ECM supplies a voltage of 5 V to some of the sensors systematically divided into 2 groups, respectively. Accordingly, when a short circuit develops in a sensor power source, a malfunction may occur simultaneously in the sensors belonging to the same group as the short-circuited sensor.

Sensor power supply 1

- Accelerator pedal position (APP) sensor 1
- Crankshaft position (CKP) sensor (POS)
- Exhaust valve timing (EVT) control position sensor
- Mass air flow (MAF) sensor
- Throttle position (TP) sensor

#### NOTE:

If sensor power supply 1 circuit is malfunctioning, DTC P0643 is displayed.

Sensor power supply 2

- Accelerator pedal position (APP) sensor 2
- Camshaft position (CMP) sensor (PHASE)
- Engine oil pressure (EOP) sensor
- Refrigerant pressure sensor

# Diagnosis Procedure

# **1.**CHECK SENSOR POWER SUPPLY 2

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connectors
- 3. Turn ignition switch ON.
- 4. Check the voltage between ECM harness connector and ground.

	+ CM		Voltage (Approx.)	
Connector	Connector Terminal		(	
E32	142			
F78	18	Ground	5 V	
F79	92			

#### Is the inspection result normal?

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

NO >> GO TO 2.

# 2.CHECK SENSOR POWER SUPPLY 2 CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect following sensors harness connector.
- 3. Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor			
Connector	Terminal	Name	Connector	Terminal	
E32	142	APP sensor 2	E31	5	
F78	18	Refrigerant pressure sensor	E244	1	
Γ/Ο	10	EOP sensor	F87	3	
F79	92	CMP sensor (PHASE) (bank 1)	F77	1	
F/9	92	CMP sensor (PHASE) (bank 2)	F60	1	

Is the inspection result normal?

YES >> GO TO 3.

INFOID:000000012891561

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# SENSOR POWER SUPPLY2 CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
NO >> Repair or replace error-detected parts.		
3. CHECK COMPONENTS		А
<ul> <li>Check the following.</li> <li>Accelerator pedal position (APP) sensor 2 (Refer to <u>EC-507, "Component Inspection".</u>)</li> <li>Camshaft position sensor (PHASE) (bank 1) (Refer to <u>EC-337, "Component Inspection".</u>)</li> <li>Camshaft position sensor (PHASE) (bank 2) (Refer to <u>EC-337, "Component Inspection".</u>)</li> <li>Engine oil pressure (EOP) sensor (Refer to <u>EC-401, "Component Inspection".</u>)</li> </ul>		EC
<ul> <li>Refrigerant pressure sensor (Refer to <u>EC-556, "Diagnosis Procedure"</u>.)</li> </ul>		С
Is the inspection result normal?		
YES >> Perform <u>GI-42, "Intermittent Incident"</u> . NO >> Replace malfunctioning component.		D
		E
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#### < DTC/CIRCUIT DIAGNOSIS >

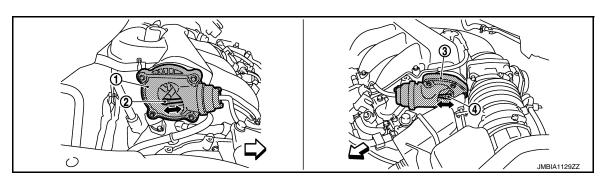
# VARIABLE INDUCTION AIR SYSTEM

# **Component Function Check**

# 1.CHECK OVERALL FUNCTION-I

#### With CONSULT

- T. Start engine and warm it up to the normal operating temperature.
- 2. Perform "VIAS S/V-1" in "ACTIVE TEST" mode with CONSULT.
- 3. Turn VIAS control solenoid valve 1 "ON" and "OFF", and check that power valve actuator 1 rod moves.



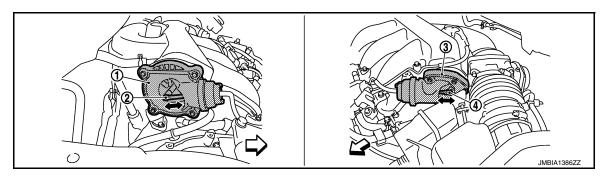
- (1) Power valve actuator 1
- (2) Power valve actuator 1 rod
- Power valve actuator 2

3

- (4) Power valve actuator 2 rod
- $\triangleleft$ : Vehicle front

#### **Without CONSULT**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Rev engine quickly up to approximately 5,000 rpm.
- 3. Check that power valve actuator 1 rod moves.



- (1) Power valve actuator 1
- Power valve actuator 1 rod
- (3) Power valve actuator 2

∠ : Vehicle front

(4)

#### Is the inspection result normal?

Power valve actuator 2 rod

YES >> GO TO 2.

NO >> <u>EC-561, "Diagnosis Procedure"</u>.

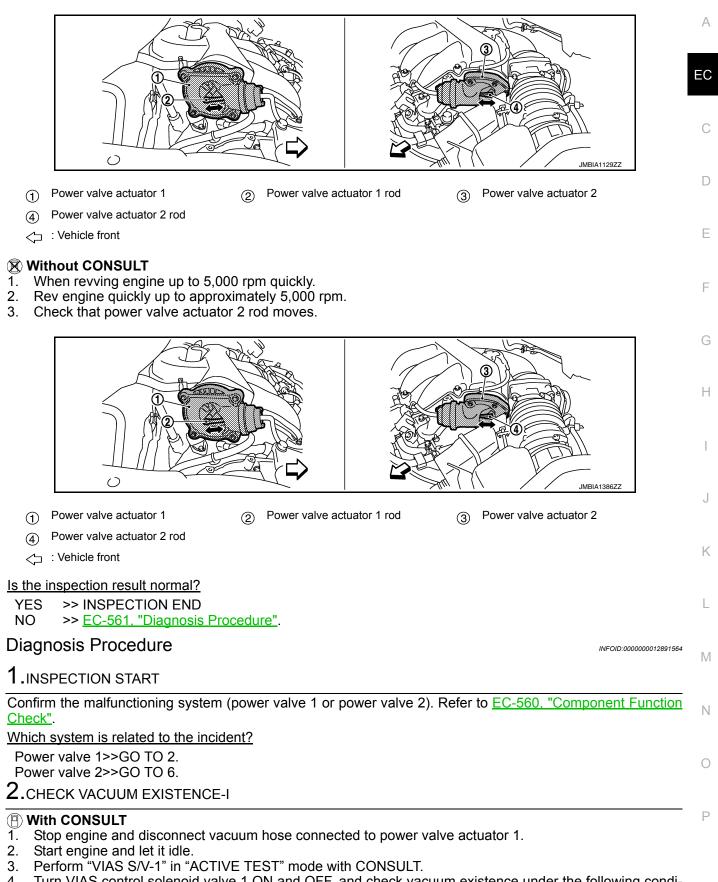
2. CHECK OVERALL FUNCTION-II

#### (I) With CONSULT

- 1. Perform "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT.
- 2. Turn VIAS control solenoid valve 2 "ON" and "OFF", and check that power valve actuator 2 rod moves.

#### < DTC/CIRCUIT DIAGNOSIS >

#### [VQ35DE]



4. Turn VIAS control solenoid valve 1 ON and OFF, and check vacuum existence under the following conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

VIAS S/V-1	Vacuum
ON	Existed
OFF	Not existed

#### **Without CONSULT**

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 1.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Start engine.
- 4. Rev engine quickly up to approximately 5,000 rpm.
- 5. Check vacuum existence under the following conditions.

Condition	Vacuum
Idle	Existed
Rev engine quickly up to approximately 5,000 rpm	Not existed

#### Is the inspection result normal?

- YES >> Repair or replace power valve actuator 1. Refer to <u>EC-15. "ENGINE CONTROL SYSTEM : Component Parts Location"</u>.
- NO >> GO TO 3.

# 3. CHECK VACUUM TANK

- 1. Stop engine and disconnect vacuum hose connected to intake manifold collector.
- 2. Start engine and let it idle.
- 3. Check vacuum existence from intake manifold collector.

Does vacuum existence from the intake manifold collector?

YES >> GO TO 4.

NO >> Replace intake manifold collector. Refer to EM-28, "Removal and Installation".

# 4. CHECK VACUUM HOSE

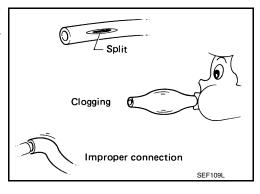
1. Stop engine.

 Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to <u>EC-53</u>, <u>"VARIABLE INDUCTION AIR</u> <u>SYSTEM : System Description"</u>.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair hoses or tubes.



# 5. CHECK VIAS CONTROL SOLENOID VALVE 1

Check VIAS control solenoid valve 1. Refer to EC-483. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace VIAS control solenoid valve 1. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Compo-</u> nent Parts Location".

# 6.CHECK VACUUM EXISTENCE-II

#### With CONSULT

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 2.
- 2. Start engine and let it idle.
- 3. Perform "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT.
- Turn VIAS control solenoid valve 2 ON and OFF, and check vacuum existence under the following conditions.

< DTC/CIRCUIT DIAGNOSIS >

VIAS S/V 2	Vacuum
ON	Existed
OFF	Not existed

#### **Without CONSULT**

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 2.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Start engine.
- 4. Rev engine quickly up to approximately 5,000 rpm.
- 5. Check vacuum existence under the following conditions.

Condition	Operation
Idle	Existed
Rev engine quickly up to approximately 5,000 rpm	Not existed

#### Is the inspection result normal?

YES >> Repair or replace power valve actuator 2. Refer to <u>EC-15. "ENGINE CONTROL SYSTEM : Com-</u> ponent Parts Location".

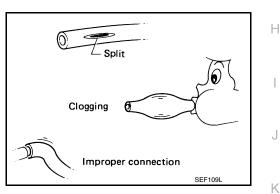
NO >> GO TO 7.

# 7. CHECK VACUUM HOSE

- 1. Stop engine.
- Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to <u>EC-53</u>, "VARIABLE INDUCTION AIR <u>SYSTEM : System Description"</u>.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Repair hoses or tubes.



# 8. CHECK VIAS CONTROL SOLENOID VALVE 2

	/IAS control solenoid valve 2. Refer to <u>EC-486, "Component Inspection"</u> .	
YES	>> Check intermittent incident. Refer to GI-42, "Intermittent Incident".	_
NO	>> Replace VIAS control solenoid valve 2. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Compo- nent Parts Location"</u> .	Μ
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#### < SYMPTOM DIAGNOSIS >

[VQ35DE]

# SYMPTOM DIAGNOSIS ENGINE CONTROL SYSTEM SYMPTOMS

# Symptom Table

INFOID:000000012891565

# SYSTEM — BASIC ENGINE CONTROL SYSTEM

							S	MPT	ОМ						
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDRE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page
Warrant	y symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	<u>EC-446</u>
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			<u>EC-162</u>
	Fuel injector circuit	1	1	2	3	2		2	2			2			<u>EC-542</u>
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			<u>EC-45</u>
Air	Positive crankcase ventilation sys- tem	3	3	4	4	4	4	4	4	4		4	1		<u>EC-30</u>
	Incorrect idle speed adjustment						1	1	1	1		1			<u>EC-158</u>
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<u>EC-498,</u> <u>EC-503</u>
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			<u>EC-158</u>
	Ignition circuit	1	1	2	2	2		2	2			2			<u>EC-545</u>
Power s	supply and ground circuit	2	2	3	3	3		3	3		2	3			<u>EC-184</u>
Mass ai	r flow sensor circuit	1			2										<u>EC-221,</u> <u>EC-226</u>
Engine	coolant temperature sensor circuit						3			3					<u>EC-238,</u> <u>EC-244</u>
Air fuel	ratio (A/F) sensor 1 circuit		1	2	3	2		2	2			2			EC-252, EC-256, EC-259, EC-285, EC-491
Throttle	position sensor circuit						2			2					EC-241, EC-315, EC-449, EC-451, EC-512
Accelera	ator pedal position sensor circuit			3	2	1									EC-430, EC-505, EC-508, EC-515

#### < SYMPTOM DIAGNOSIS >

#### [VQ35DE]

						S١	(MPT)	OM							А
	(A)				TION					E HIGH					A
	(EXCP. HA)		SPOT		ELERA.					RATURE	TION	NO	RGE)		EC
			HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	Щ	TING		N TO IDLE	OVERHEATS/WATER TEMPERATURE	CONSUMPTION	OIL CONSUMPTION	DEAD (UNDER CHARGE)	Reference page	С
	HARD/NO START/RESTART	STALL	rion/surg	KNOCK/DE	F POWER/I	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	DLING VIBRATION	SLOW/NO RETURN TO IDLE	EATS/WATE	EXCESSIVE FUEL	SIVE OIL CO			D
	HARD/N	ENGINE STALL	HESITA <sup>-</sup>	SPARK	LACK O	HIGH ID	ROUGH	IDLING'	SLOW/N	OVERHI	EXCES	EXCESSIVE	BATTERY		Ε
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Knock sensor circuit			2								3			<u>EC-326</u>	F
Engine oil temperature sensor			4		2						3			<u>EC-309,</u> <u>EC-313</u>	0
Crankshaft position sensor (POS) circuit	2	2												<u>EC-329</u>	G
Camshaft position sensor (PHASE) circuit	3	2												<u>EC-333</u>	
Vehicle speed signal circuit		2	3		3						3			<u>EC-389</u>	Н
ECM	2	2	3	3	3	3	3	3	3	3	3			<u>EC-417,</u> <u>EC-421</u>	
Intake valve timing control solenoid valve cir- cuit		3	2		1	3	2	2	3		3			<u>EC-213</u>	I
Intake valve timing intermediate lock control solenoid valve circuit														<u>EC-407</u>	J
Exhaust valve timing control solenoid valve		3	2		1	3	2	2	3		3			<u>EC-218</u>	
PNP signal circuit			3		3		3	3			3			EC-433	
VIAS control solenoid valve 1 circuit					1									<u>EC-482</u>	K
VIAS control solenoid valve 2 circuit					1									<u>EC-485</u>	
Refrigerant pressure sensor circuit		2				3			3		4			<u>EC-556</u>	L
Electrical load signal circuit							3							<u>EC-537</u>	
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	<u>HAC-36</u>	
ABS actuator and electric unit (control unit)			4											<u>BRC-58,</u> BRC-242	M

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

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

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#### < SYMPTOM DIAGNOSIS >

# [VQ35DE]

							S	YMPT	ОМ						
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page
Warranty s	ymptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank Fuel piping	5		5	5	5		5	5			5			<u>FL-10</u>
	Vapor lock		5												_
	Valve deposit														_
	Poor fuel (Heavy weight gasoline, Low octane)	5		5	5	5		5	5			5			_
Air	Air duct														<u>EM-26</u>
	Air cleaner														<u>EM-26</u>
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)		5	5		5		5	5			5			<u>EM-26</u>
	Electric throttle control actuator	5			5		5			5					EM-28
	Air leakage from intake manifold/ Collector/Gasket														<u>EM-28,</u> EM-31
Cranking	Battery Generator circuit	1	1	1		1		1	1			1		1	PG-103 CHG-9 (With EXP- 800 NI or GR8-1200 NI)*, <u>CHG- 12</u> (Without EXP-800 NI or GR8- 1200 NI)*
	Starter circuit	3													<u>STR-10</u> (With GR8- 1200 NI)*, <u>STR-14</u> (Without GR8-1200 NI)*
	Signal plate	6													<u>EM-125</u>
	PNP signal	4													<u>EC-433</u>

#### < SYMPTOM DIAGNOSIS >

#### [VQ35DE]

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		IA)				TION					E HIGH					A
		CP. H		DT		LERA					ATURI	NO	z	(GE)		EC
		ц ЕХ		AT SF	NO	CCE				щ	PER/	MPTI	PTIO	CHARGE)		
		HARD/NO START/RESTART (EXCP. HA)		HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	DLE	NIING	z	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	CONSUMPTION	UNDER (	Reference page	С
		O START/	STALL	ION/SUR	NOCK/DI	POWER	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	O RETUR	ATS/WAT	IVE FUEI	oIL	BATTERY DEAD (UNDER		D
		HARD/N(	ENGINE STALL	HESITAT	SPARK K	LACK OF	HIGH IDI	ROUGH	IDLING V	SLOW/N	OVERHE	EXCESS	EXCESSIVE	BATTER		Ε
Warranty s	symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	+	
Engine	Cylinder head	-	-	-	-	-		-	-			~			EM 07	F
	Cylinder head gasket	5	5	5	5	5		5	5		4	5	3		<u>EM-97</u>	
	Cylinder block															G
	Piston												4			0
	Piston ring	•	0		0	_		•	•			0			EN 405	
	Connecting rod	6	6	6	6	6		6	6			6			<u>EM-125</u>	Н
	Bearing															
	Crankshaft															1
Valve	Timing chain														<u>EM-66</u>	1
mecha- nism	Camshaft														<u>EM-87</u>	
morn	Intake valve timing control	5	F	5	5	F		5	5			F			<u>EM-66</u>	J
	Exhaust valve timing control	Э	5	5	5	5		Э	Э			5			<u>EM-66</u>	
	Intake valve												3		EM 07	K
	Exhaust valve												3		<u>EM-97</u>	N
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			<u>EM-33</u> , <u>EM-33</u> , <u>EX-</u>	L
	Three way catalyst														<u>4</u>	
Lubrica- tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			<u>EM-38</u> , <u>EM-40</u> , <u>LU-</u> <u>12</u> , <u>LU-15</u> , <u>LU-6</u>	Μ
	Oil level (Low)/Filthy oil														<u>LU-8</u>	N.I.
Cooling	Radiator/Hose/Radiator filler cap														<u>CO-12,</u> <u>CO-8</u>	Ν
	Thermostat	1								5	1				<u>CO-21</u>	0
	Water pump	5	5	5	5	5		5	5		4	5			<u>CO-16</u>	0
	Water gallery	5	5	5	5	5		5	5		4	5			<u>CO-6</u>	
	Cooling fan														<u>CO-14</u>	Ρ
	Coolant level (Low)/Contaminat- ed coolant									5					<u>CO-8</u>	
NVIS (NIS NATS)	SAN Vehicle Immobilizer System —	1 finci	1												<u>SEC-55</u>	

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

\*: For the details of the EXP-800 NI or GR8-1200 NI, refer to STR-3. "Special Service Tool".

# NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

# NORMAL OPERATING CONDITION

# Description

INFOID:000000012891566

FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 2,000 rpm under no load (for example, the selector lever position is P or N and engine speed is over 2,000 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 1,100 rpm, then fuel cut will be cancelled. **NOTE:** 

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, <u>EC-36.</u> <u>"MULTIPORT FUEL INJECTION SYSTEM : System Description"</u>.

# < PERIODIC MAINTENANCE > PERIODIC MAINTENANCE IDLE SPEED

# Work Procedure 1.CHECK IDLE SPEED Image: Check idle speed in "DATA MONITOR" mode with CONSULT.

With GST
 Check idle speed with Service \$01 of GST.

>> INSPECTION END

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[VQ35DE]

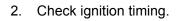
# < PERIODIC MAINTENANCE >

# **IGNITION TIMING**

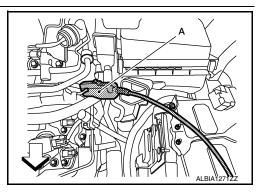
# Work Procedure

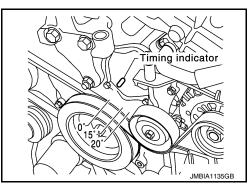
# 1. CHECK IGNITION TIMING

- 1. Attach timing light to loop wires as shown.
  - (A) : Timing light



>> INSPECTION END





# **EVAP LEAK CHECK**

# < PERIODIC MAINTENANCE >

# EVAP LEAK CHECK

# Work Procedure

#### **CAUTION:**

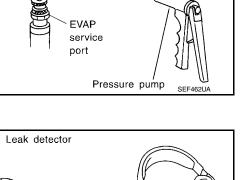
- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.

#### NOTE:

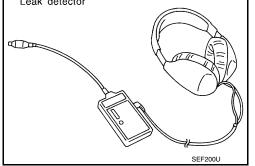
- · Do not start engine.
- Improper installation of EVAP service port adapter (commercial service tool) to the EVAP service port may cause a leakage.

#### (I) WITH CONSULT

- 1. To locate the EVAP leakage, install EVAP service port adapter (commercial service tool) and pressure pump to EVAP service port.
- 2. Turn ignition switch ON.
- Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT.
- 4. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
- 5. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
- Remove EVAP service port adapter (commercial service tool) and hose with pressure pump.
- Locate the leakage using a leakage detector (commercial service tool). Refer to <u>EC-45</u>, "EVAPORATIVE EMISSION SYS-<u>TEM : System Description</u>".

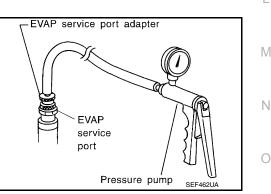


EVAP service port adapter



#### **WITHOUT CONSULT**

- 1. To locate the EVAP leakage, install EVAP service port adapter (commercial service tool) and pressure pump to EVAP service port.
- 2. Apply battery voltage between the terminals of EVAP canister vent control valve to make a closed EVAP system.
- To locate the leakage, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm<sup>2</sup>, 0.2 to 0.4 psi).
- 4. Remove EVAP service port adapter (commercial service tool) and hose with pressure pump.



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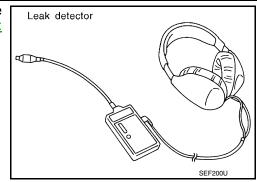
EC

[VQ35DE]

# **EVAP LEAK CHECK**

#### < PERIODIC MAINTENANCE >

 Locate the leakage using a leak detector (commercial service tool). Refer to <u>EC-45</u>, "EVAPORATIVE EMISSION SYSTEM : <u>System Description</u>".



#### [VQ35DE]

#### < PERIODIC MAINTENANCE >

# POSITIVE CRANKCASE VENTILATION

### Work Procedure

# 1. CHECK PCV VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace PCV valve.

[VQ35DE]

INFOID:000000012891570

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# REMOVAL AND INSTALLATION ECM

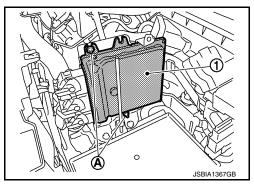
Removal and Installation

#### CAUTION:

#### Perform ADDITIONAL SERVICE WHEN REPLACING ECM. Refer to EC-150, "Description".

REMOVAL

- 1. Remove front air duct. Refer to EM-26, "Removal and Installation".
- 2. Remove battery. Refer to PG-112, "Removal and Installation".
- 3. Disconnect ECM harness connectors. Refer to PG-10. "Harness Connector".
- 4. Remove ECM mounting nuts (A), and then remove ECM (1).



INSTALLATION Install in the reverse order of removal.

# < REMOVAL AND INSTALLATION >

# FUEL PUMP CONTROL MODULE

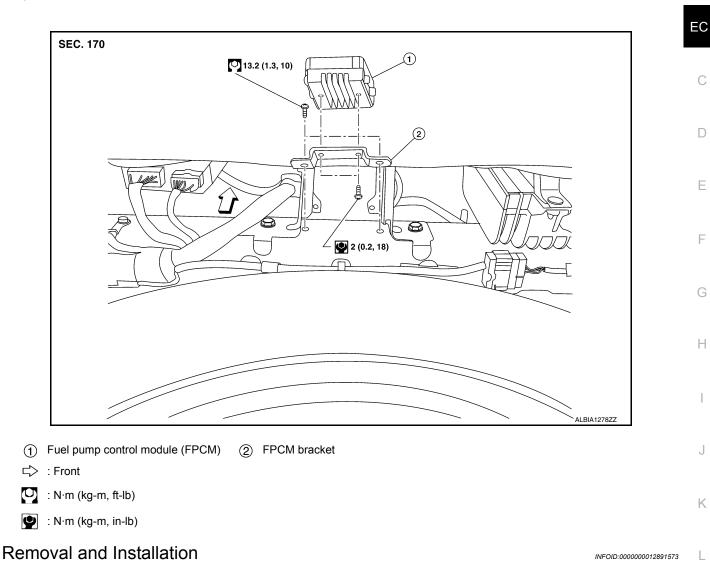
# **Exploded View**

INFOID:000000012891572

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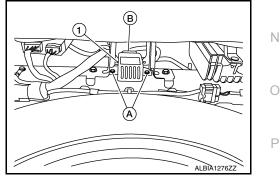
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[VQ35DE]



#### REMOVAL

- 1. Lift luggage floor rear finisher and locate fuel pump control module (FPCM) behind luggage mask.
- 2. Remove bolts (A) from the bracket.
- 3. Disconnect the harness connector (B) from the fuel pump control module (1) and then remove fuel pump control module.



INSTALLATION Install in the reverse order of removal.

# SERVICE DATA AND SPECIFICATIONS (SDS)

### < SERVICE DATA AND SPECIFICATIONS (SDS)

# SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

# Idle Speed

INFOID:000000012891574

[VQ35DE]

Condition	Specification
No load* (in P or N position)	$625\pm50~\text{rpm}$

\*: Under the following conditions

• A/C switch: OFF

• Electric load: OFF (Lights, heater fan & rear window defogger)

• Steering wheel: Kept in straight-ahead position

# Ignition Timing

INFOID:000000012891575

Condition	Specification
No load* (in P or N position)	$12 \pm 2^{\circ} BTDC$

\*: Under the following conditions

• A/C switch: OFF

• Electric load: OFF (Lights, heater fan & rear window defogger)

Steering wheel: Kept in straight-ahead position

# Calculated Load Value

INFOID:000000012891576

Condition	Specification (Using CONSULT or GST)
At idle	10 – 35 %
At 2,500 rpm	10 – 35 %

# Mass Air Flow Sensor

INFOID:000000012891577

Supply voltage	Battery voltage (11 – 14 V)
Output frequency at idle (in N position)	4,100 – 4,700 Hz*
Mass air flow (Using CONSULT or GST)	2.0 – 6.0 g/s at idle* 7.0 – 20.0 g/s at 2,500 rpm*

\*: Engine is warmed up to normal operating temperature and running under no load.