

ECK

SECTION

ENGINE CONTROL SYSTEM (K9K)

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PRECAUTION

PRECAUTIONS

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

INFOID:0000000010505754

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never 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:

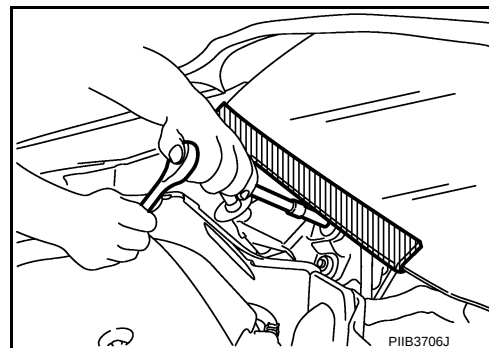
Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000010289577

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precautions for Removing Battery Terminal

INFOID:0000000010505757

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.

PRECAUTIONS

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< PRECAUTION >

- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing "How to disconnect 12V battery terminal" described below.

NOTE:

Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

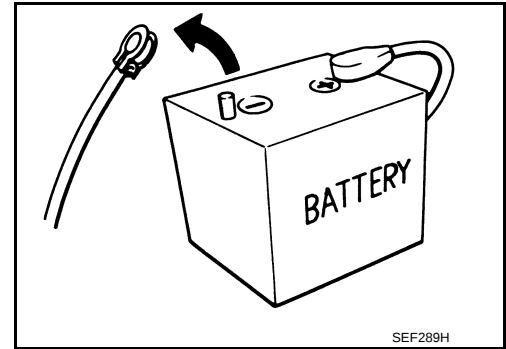
NOTE:

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

NOTE:

The removal of 12V battery may cause a DTC detection error.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.

For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

- Open the hood.
- Turn key switch to the OFF position with the driver side door opened.
- Get out of the vehicle and close the driver side door.
- Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:

While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

- Remove 12V battery terminal.

CAUTION:

After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

- Unlock the door with intelligent key or remote keyless entry.

NOTE:

At this moment, ACC power is supplied.

- Open the driver side door.
- Open the hood.
- Close the driver side door.
- Wait at least 3 minutes.

CAUTION:

While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

- Remove 12V battery terminal.

CAUTION:

After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precaution for Stop/Start System Service

INFOID:0000000010289579

CAUTION:

PRECAUTIONS

< PRECAUTION >

[K9K]

When performing an inspection and its related work with the engine at idle, always turn the stop/start OFF switch ON or open the hood to release the stop/start system.

On Board Diagnostic (OBD) System of Engine

INFOID:0000000010289581

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

CAUTION:

- Be sure to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to [PG-5, "Harness Connector"](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MI to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to the malfunction of the fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM before returning the vehicle to the customer.

A

ECK

C

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< SYSTEM DESCRIPTION >

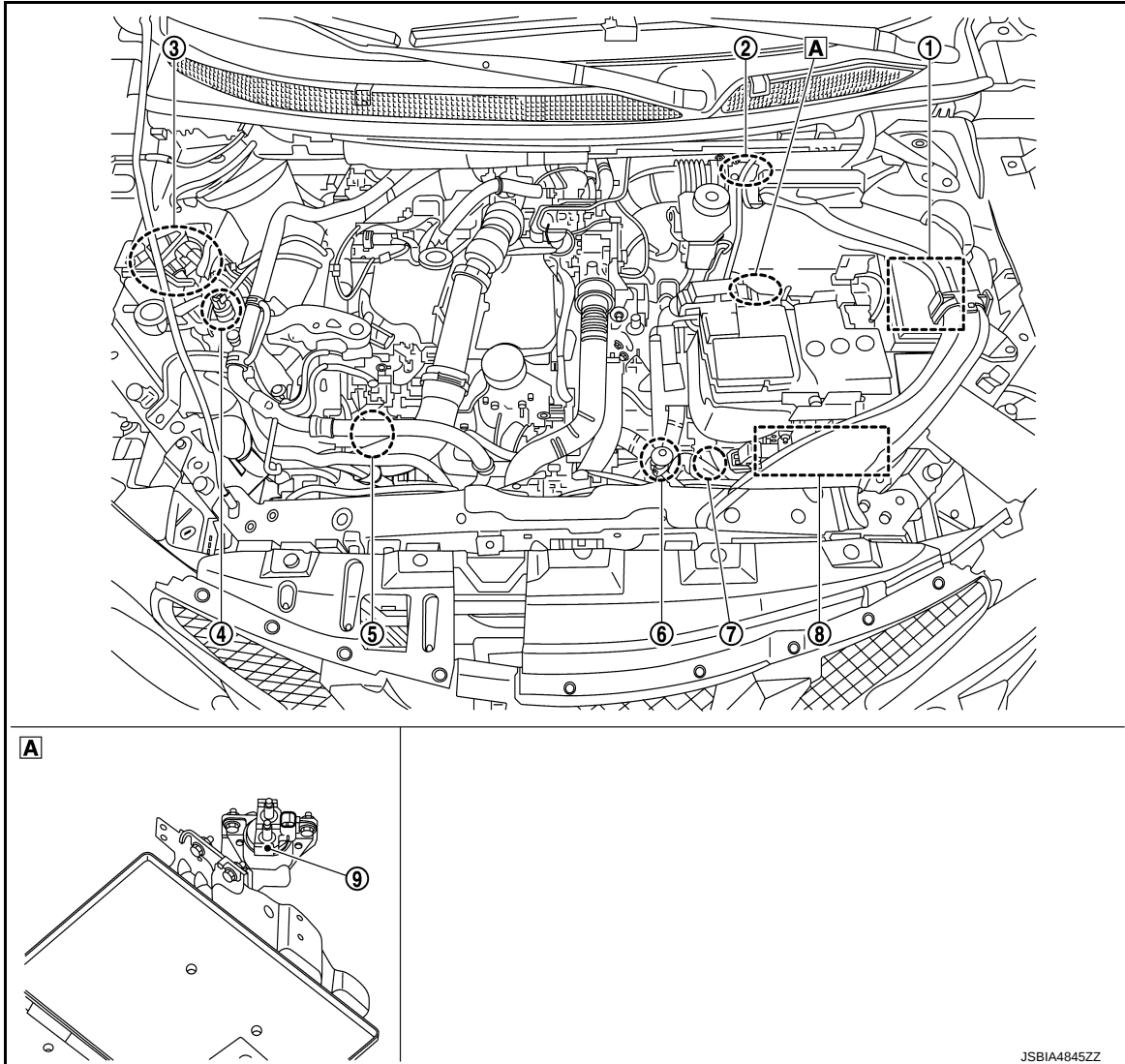
SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:000000010289582

ENGINE ROOM COMPARTMENT



A Battery mounting bracket assembly

No.	Component parts	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 PCS-5, "Component Parts Location" for detailed installation location.
2	Mass air flow (MAF) sensor (with intake air temperature sensor 1)	• ECK-16, "Mass Air Flow Sensor" • ECK-16, "Intake Air Temperature Sensor 1"
3	Fuel heater and water in fuel level sensor	ECK-23, "Fuel Heater With Water In Fuel Level Sensor"
4	Fuel pressure sensor	ECK-18, "Fuel Pressure Sensor"

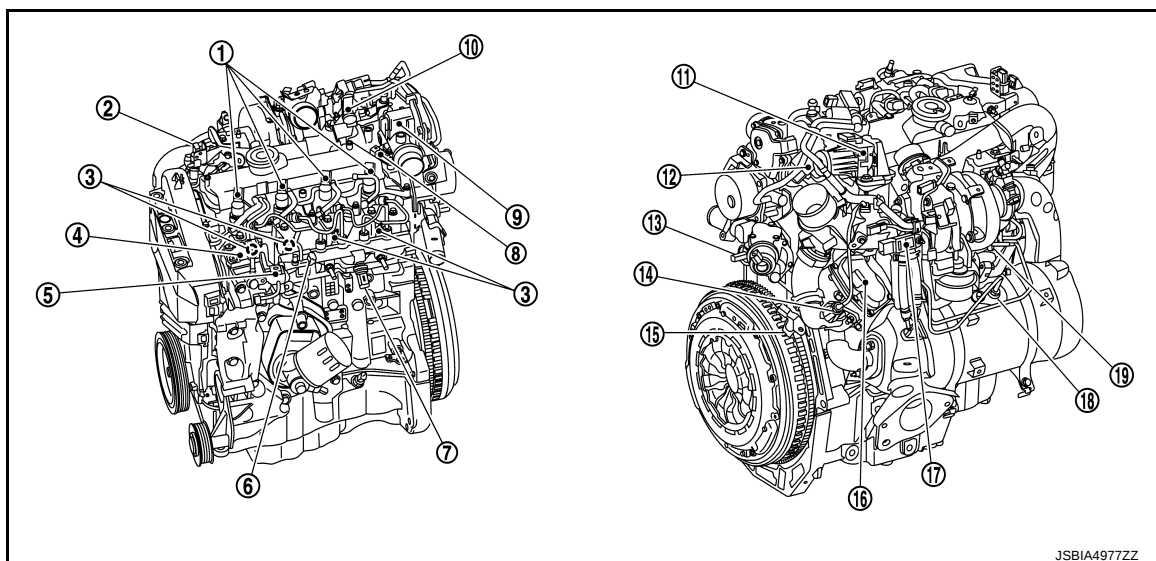
COMPONENT PARTS

< SYSTEM DESCRIPTION >

[K9K]

No.	Component parts	Function
5	Alternator	CHG-6, "Alternator"
6	Hood switch	ECK-23, "Hood Switch"
7	Reverse / neutral position switch	It detects that the transmission is in reverse and neutral.
8	ECM	ECK-16, "ECM"
9	Engine restart bypass relay	ECK-22, "Engine Restart Bypass Relay"

ENGINE COMPARTMENT



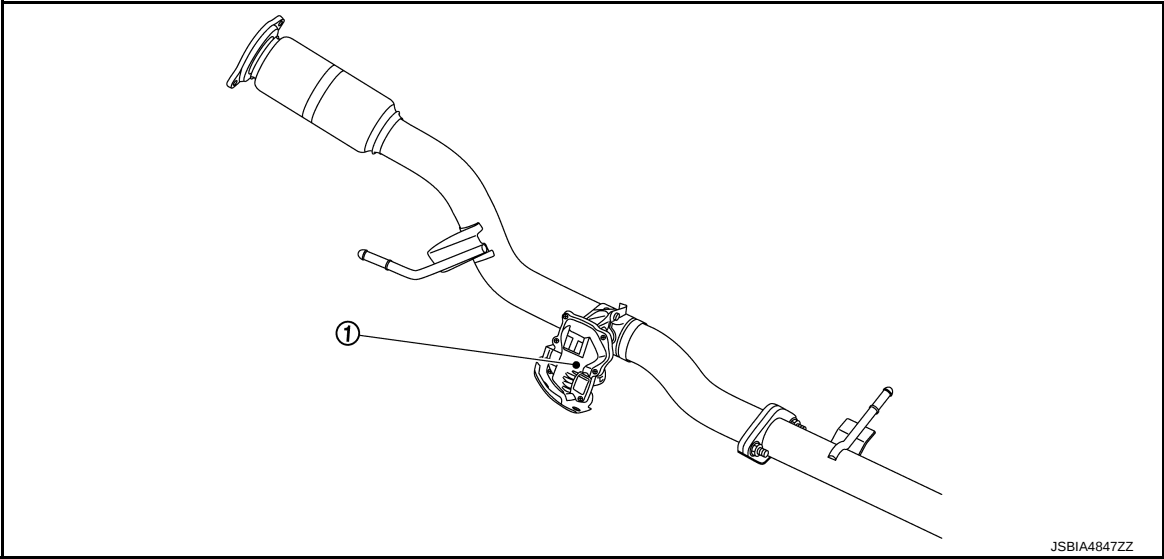
No.	Component parts	Function
1	Fuel injector	ECK-17, "Fuel Injector"
2	Exhaust gas pressure sensor	ECK-20, "Exhaust Gas Pressure Sensor"
3	Glow plug	ECK-20, "Glow Plug"
4	High pressure fuel pump	ECK-17, "High Pressure Fuel Pump"
5	Fuel flow actuator	ECK-17, "High Pressure Fuel Pump"
6	Fuel temperature sensor	ECK-18, "Fuel Temperature Sensor"
7	Fuel rail pressure (FRP) sensor	ECK-18, "Fuel Rail Pressure Sensor"
8	Camshaft position (CMP) sensor	ECK-16, "Camshaft Position Sensor"
9	Electric throttle control actuator	ECK-19, "Electric Throttle Control Actuator"
10	Turbocharger boost control solenoid valve	ECK-18, "Turbocharger Boost Control Solenoid Valve"
11	High pressure EGR volume control valve	ECK-18, "High Pressure EGR Volume Control Valve"
12	Turbocharger boost sensor [with intake air temperature (IAT) sensor 2]	ECK-17, "Turbocharger Boost Sensor" ECK-17, "Intake Air Temperature Sensor 2"
13	Engine coolant temperature sensor	ECK-17, "Engine Coolant Temperature Sensor"
14	Low pressure EGR temperature sensor	ECK-19, "Low Pressure EGR Temperature Sensor"
15	Crankshaft position sensor	ECK-16, "Crankshaft Position Sensor"
16	Low pressure EGR volume control valve	ECK-18, "Low Pressure EGR Volume Control Valve"
17	DPF (diesel particulate filter) differential pressure sensor	ECK-20, "DPF Differential Pressure Sensor"
18	Exhaust gas temperature (EGT) sensor 2	ECK-20, "Exhaust Gas Temperature Sensor 2"
19	Exhaust gas temperature (EGT) sensor 1	ECK-20, "Exhaust Gas Temperature Sensor 1"

COMPONENT PARTS

[K9K]

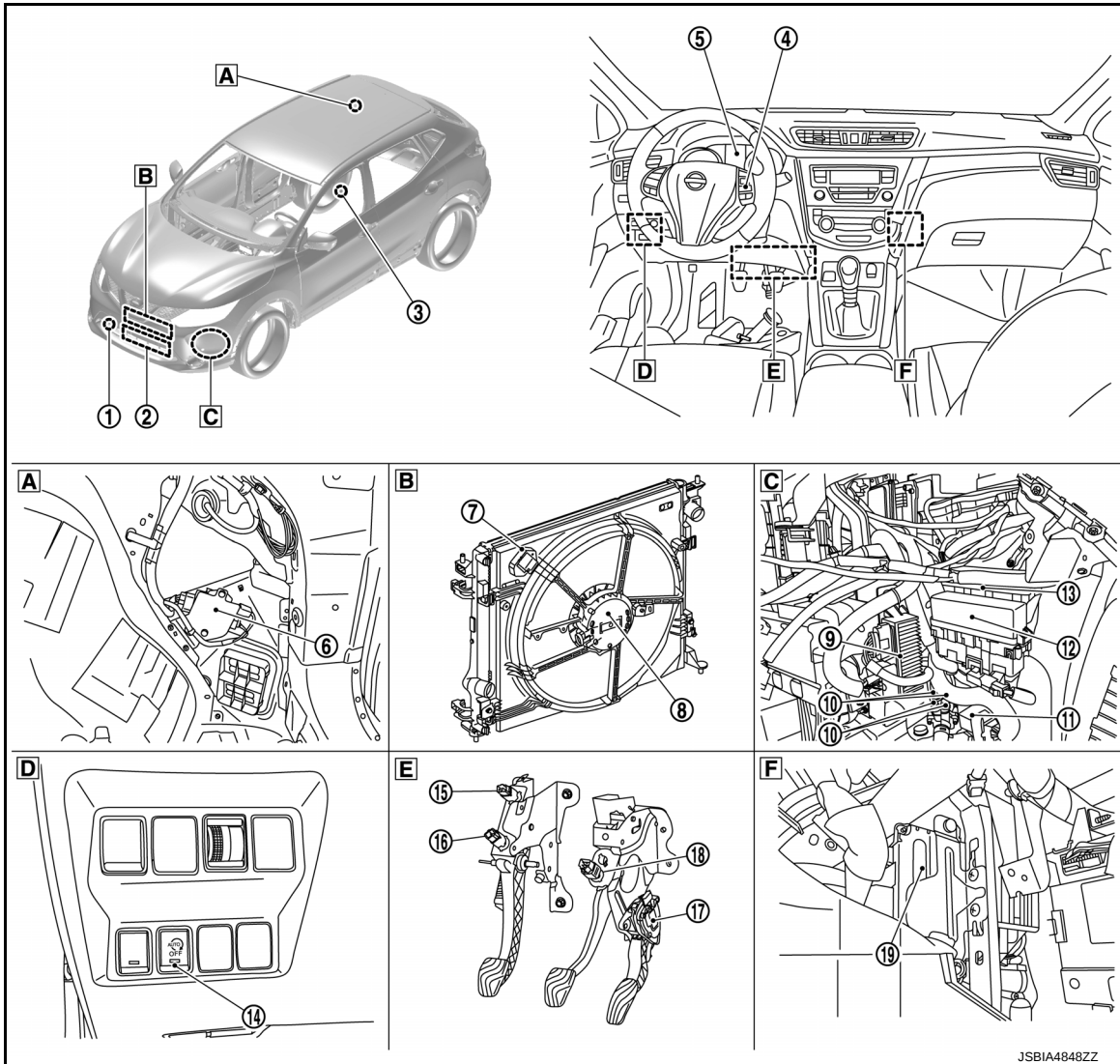
< SYSTEM DESCRIPTION >

EXHAUST COMPARTMENT



No.	Component parts	Function
1	Exhaust electric throttle control actuator	ECK-19, "Exhaust Electric Throttle Control Actuator"

BODY COMPARTMENT



- A** Behind luggage side finisher RH **B** Radiator assembly **C** Behind front fender protector LH
D Instrument lower panel **E** Periphery of pedals **F** Behind of glove upper box assembly

No.	Component parts	Function
1	Refrigerant pressure sensor	ECK-21, "Refrigerant Pressure Sensor"
2	Active grille shutter	
3	Fuel pump	ECK-18, "Fuel Pump"
4	ASCD steering switch	ECK-22, "ASCD Steering Switch"
5	Combination meter	MWI-7, "Component Description"
6	Fuel pump control module (FPCM)	ECK-17, "FPCM (Fuel Pump Control Module)"
7	Cooling fan resistor	ECK-21, "Cooling Fan Resistor"
8	Cooling fan	ECK-21, "Cooling Fan"
9	Thermoplunger control unit	ECK-21, "Thermoplunger Control Unit"
10	Thermoplunger	ECK-21, "Thermoplunger Unit"
11	Glow control unit	ECK-20, "Glow Control Unit"
12	Relay box	—
13	Fuse block (J/B)	—

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[K9K]

No.	Component parts	Function
14	Stop/start OFF switch	ECK-23, "Stop/Start OFF Switch"
15	Clutch interlock switch	ECK-21, "Clutch Interlock Switch & Clutch Pedal Position Switch"
16	Clutch pedal position switch	ECK-21, "Clutch Interlock Switch & Clutch Pedal Position Switch"
17	Accelerator pedal position sensor	ECK-21, "Accelerator Pedal Position Sensor"
18	Stop lamp switch	ECK-21, "Stop Lamp Switch"
19	DC/DC converter	ECK-22, "DC/DC Converter"

ECM

INFOID:0000000010289584

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.

Camshaft Position Sensor

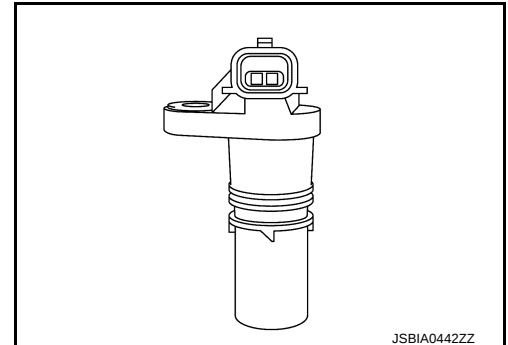
INFOID:0000000010289585

The camshaft position (CMP) sensor senses the retraction with camshaft to identify a particular cylinder. The camshaft position (CMP) sensor senses the piston position. When the crankshaft position (CKP) sensor system becomes inoperative, the camshaft position (CMP) sensor provides various controls of engine parts instead, utilizing timing of cylinder identification signals. The sensor consists of a permanent magnet and Hall IC.

Crankshaft Position Sensor

INFOID:0000000010289586

Crankshaft position (CKP) sensor detects engine speed and crankshaft position. The size difference of gear tooth placed on signal plate changes the gap between signal plate and sensor, and magnetic field change around the sensor induces sensor output voltage change. ECM detects engine speed and crankshaft position based on this voltage change.

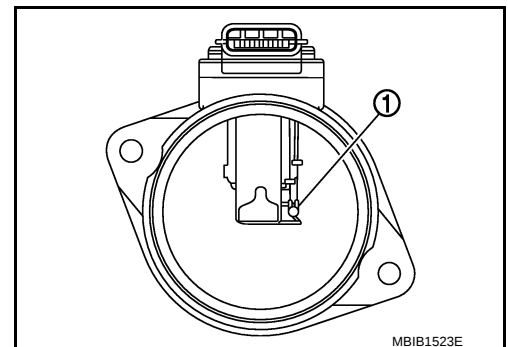


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Mass Air Flow Sensor

INFOID:0000000010289587

The mass air flow sensor (1) is installed in the passage of intake air and measures the intake flow rate. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The greater air flow, the greater the heat loss. Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



MBIB1523E

Intake Air Temperature Sensor 1

INFOID:0000000010289588

The intake air temperature (IAT) sensor 1 is built-into the mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM. The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the rise in temperature.

COMPONENT PARTS

[K9K]

< SYSTEM DESCRIPTION >

<Reference data>

Intake air temperature °C (°F)	Resistance (Approx.) kΩ
-10 (14)	8.716 – 9.689
10 (50)	3.553 – 3.875
20 (68)	2.353 – 2.543
30 (86)	1.613 – 1.729
50 (122)	0.794 – 0.839

Turbocharger Boost Sensor

INFOID:0000000010289589

The turbocharger boost sensor detects intake manifold pressure.

Intake Air Temperature Sensor 2

INFOID:0000000010289590

The Intake Air Temperature (IAT) Sensor 2 is built-into the Turbocharger Boost Pressure Sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

<Reference data>

Intake air temperature °C (°F)	Resistance (Approx.) kΩ
-10 (14)	9.395 – 9.775
10 (50)	3.791 – 3.927
20 (68)	2.416 – 2.583
30 (86)	1.706 – 1.760
50 (122)	0.833 – 0.857

Engine Coolant Temperature Sensor

INFOID:0000000010289592

The engine coolant temperature (ECT) sensor is used to detect the engine coolant temperature.

<Reference data>

Engine coolant temperature °C (°F)	Resistance (Approx.) kΩ
-10 (14)	11.33 – 13.59
25 (77)	2.140 – 2.364
50 (122)	0.771 – 0.849
80 (176)	0.275 – 0.291
110 (230)	0.112 – 0.117

Fuel Injector

INFOID:0000000010289593

This injector is a magnetic type injector. It has a code exhibiting unique characteristics, and fuel injection quantity can be controlled with more precision by writing the code into ECM.

FPCM (Fuel Pump Control Module)

INFOID:0000000010501740

FPCM (Fuel Pump Control Module) controls fuel pump discharge rate according to the actual fuel requirements of the engine and, as a result, the idling power of the electric fuel pump is significantly reduced.

This control unit consists of a control and power electronics unit.

The fuel pump is switched ON when a fuel pump ON signal is received by the FPCM.

High Pressure Fuel Pump

INFOID:0000000010289594

High Pressure Fuel Pump is operated by high pressure fuel pump drive pinion, installed at camshaft. The high pressure fuel pump inlets fuel transported through fuel filter and performs pressure feed to fuel rail. The pump includes fuel flow actuator which enables adjustment of fuel rail pressure.

Fuel Rail Pressure Sensor

INFOID:0000000010289597

The fuel rail pressure (FRP) sensor is placed to the fuel rail. It measures the fuel pressure in the fuel rail. The sensor sends voltage signal to the ECM. As the pressure increases, the voltage rises. ECM operates fuel flow actuator according to feedback signal from fuel rail pressure sensor, and controls fuel pressure inside fuel rail.

Fuel Temperature Sensor

INFOID:0000000010289598

Fuel temperature sensor measures fuel temperature inside fuel tube of engine room. 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>

Fuel temperature °C (°F)	Resistance (Approx.) kΩ
-10 (14)	8.623 – 10.454
25 (77)	1.928 – 2.174
50 (122)	0.764 – 0.858
80 (176)	0.292 – 0.326
110 (230)	0.127 – 0.143

Fuel Pressure Sensor

INFOID:0000000010501741

The fuel pressure sensor detects the fuel pressure (actual pressure) of low pressure fuel circuit.

Fuel Pump

INFOID:0000000010289600

The fuel pump is installed in the fuel tank to start the engine faster. Fuel pump is controlled by FPCM (Fuel Pump Control Module).

CAUTION:

Fuel pump is lubricated by the fuel in the tank. Never operate the pump for a long time without fuel in the tank to prevent serious damages.

Turbocharger Boost Control Solenoid Valve

INFOID:0000000010289601

Turbocharger boost control solenoid valve controls the turbocharger boost control actuator. By changing the variable nozzle vane opening through the rods, the intake air volume is adjusted. The turbocharger boost control solenoid valve is moved by ON/OFF pulse from the ECM. The longer the ON pulse, the charge air pressure rises.

High Pressure EGR Volume Control Valve

INFOID:0000000010289602

High pressure EGR Volume Control Valve controls the volume of EGR gas returning from the exhaust manifold to the intake manifold.

The High pressure EGR Volume Control Valve consists of high pressure EGR Volume Control Valve Position Sensor, EGR Valve, and DC motor. The EGR Volume Control Valve Position Sensor consists of a permanent magnet and Hall IC, and senses the valve position and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the valve from this signals, and controls the DC motor to make the valve opening angle in response to driving conditions.

Low Pressure EGR Volume Control Valve

INFOID:0000000010289603

Low Pressure EGR Volume Control Valve controls the volume of EGR gas returning from the exhaust tube (downstream of DPF) to the passage of intake air (upstream of turbocharger).

The Low pressure EGR Volume Control Valve consists of Low pressure EGR Volume Control Valve Position Sensor, EGR Valve, and DC motor. The EGR Volume Control Valve Position Sensor consists of a permanent magnet and Hall IC, and senses the valve position and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the valve from this signals, and controls the DC motor to make the valve opening angle in response to driving conditions.

Low Pressure EGR Temperature Sensor

INFOID:000000010289604

Low Pressure EGR Volume Control Valve Upstream Temperature Sensor is installed on the downstream of low pressure EGR volume control valve. The sensor detects the low pressure EGR gas temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the exhaust gas temperature input.

<Reference data>

Exhaust gas temperature °C (°F)	Resistance (Approx.) kΩ
0 (32)	148.9 – 175.5
20 (68)	57.1 – 65.8
100 (212)	3.167 – 3.433
130 (572)	0.062 – 0.068

Electric Throttle Control Actuator

INFOID:000000010289605

The Electric Throttle Control Actuator consists of position sensor, throttle valve, and DC motor. The position sensor consists of a permanent magnet and Hall IC, and senses the valve position and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the valve from this signals, and controls the DC motor to make the valve opening angle in response to driving conditions.

Throttle valve is fully open when in non-operating status. When EGR is Performed or the engine is stopped, this valve operates in direction that closes itself.

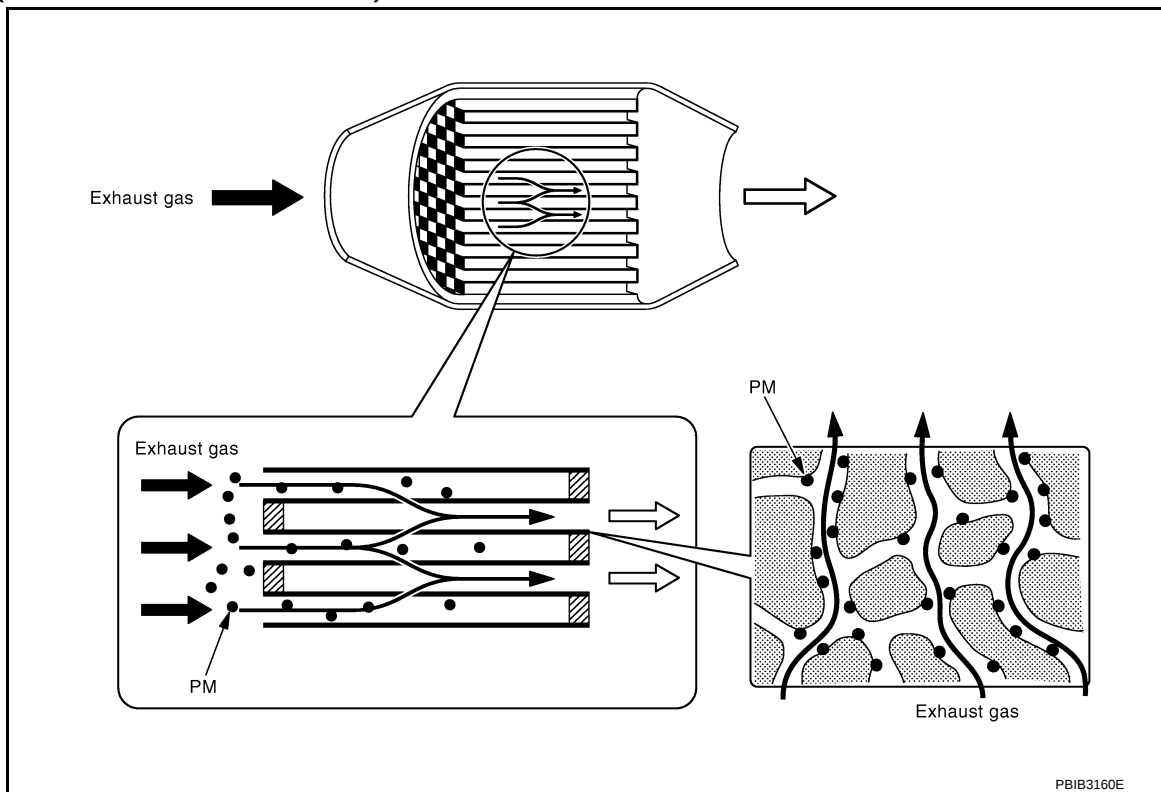
Exhaust Electric Throttle Control Actuator

INFOID:000000010289606

Exhaust Electric Throttle Control Actuator is installed to the exhaust tube and activated only during low pressure EGR.

DPF (Diesel Particulate Filter)

INFOID:000000010289607



DPF (Diesel Particulate Filter) traps PM (Particulate Matter) in exhaust gas. DPF is formed in a honeycomb form made of ceramic. This structure facilitates to trap particulate matter. When the amount of particulate matter in the DPF reaches the specified level, the particulate matter needs to be reduced through burning to maintain the DPF function. This reducing of particulate matter is called Regeneration and should be performed

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[K9K]

periodically. DPF can be effective for a long time through the cycle of trapping particulate matter and regeneration.

Exhaust Gas Pressure Sensor

INFOID:0000000010289608

Exhaust gas pressure sensor measures exhaust gas pressure around turbocharger outlet, converts it to voltage signal and transmits it to ECM. ECM controls turbocharger boost pressure according to this signal.

DPF Differential Pressure Sensor

INFOID:0000000010289609

DPF differential pressure sensor is connected to diesel particulate filter with exhaust pressure tube. DPF differential pressure sensor measures the exhaust back pressure before the filter. It converts into a voltage signal. ECM receives the signal and estimates the amount of particulate matter in diesel particulate filter.

Exhaust Gas Temperature Sensor 1

INFOID:0000000010289610

The exhaust gas temperature (EGT) sensor is built-into the Exhaust Pressure Sensor. The sensor detects the exhaust gas temperature before turbocharger. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the exhaust gas temperature input.

<Reference data>

Exhaust gas temperature °C (°F)	Resistance (Approx.) kΩ
0 (32)	5.671 – 6.118
25 (77)	1.99 – 2.123
100 (212)	0.097 – 0.103
130 (266)	0.087 – 0.091

Exhaust Gas Temperature Sensor 2

INFOID:0000000010289611

The exhaust gas temperature sensor 2 is used to detect the exhaust gas temperature after oxidation catalyst. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the exhaust gas 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>

Exhaust gas temperature °C (°F)	Resistance kΩ
20 (68)	89.309 - 159.795
100 (212)	22.96 - 51.16
300 (572)	2.261 - 2.975
500 (932)	0.640 - 0.709
600 (1112)	0.406 - 0.442
750 (1382)	0.230 - 0.254

Glow Control Unit

INFOID:0000000010289612

When ignition switch is turned ON while cooling temperature is lower than the specified value, ECM actuates glow plug through glow relay. Because of this, combustion chamber is warmed and stabilized combustion at starting can be obtained under low cooling temperature. The preheating time is determined according to cooling temperature, inlet air temperature and battery voltage.

Glow Plug

INFOID:0000000010289613

The glow plug is located in the cylinder head, in order to stabilize combustion and keep good cold start performance.

The glow plug glows in response to a signal sent from the ECM, allowing current to flow through the glow plug via the glow control unit.

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[K9K]

Glow Indicator Lamp

INFOID:0000000010289614

Glow indicator lamp illuminates when glow system is activated in order to inform it to the driver.

Cooling Fan

INFOID:0000000010289615

Cooling fan operates at each speed when the current flows in the cooling fan motor as follows. Refer to [ECK-34, "COOLING FAN CONTROL : System Description"](#) for cooling fan operation.

Cooling Fan Resistor

INFOID:0000000010503739

Cooling Fan Resistor is installed to the power circuit of Cooling Fan Motor and switches cooling fan speed between LOW and HIGH. When Cooling Fan Motor is rotated at LOW speeds, power is supplied to the cooling fan via Cooling Fan Resistor.

Thermoplunger Unit

INFOID:0000000010289616

Thermoplunger Unit is installed to the passage of engine coolant and has four thermoplungers. These thermoplungers increase engine coolant temperature by the passage of electric current through the Thermoplunger Control Unit.

Thermoplunger Control Unit

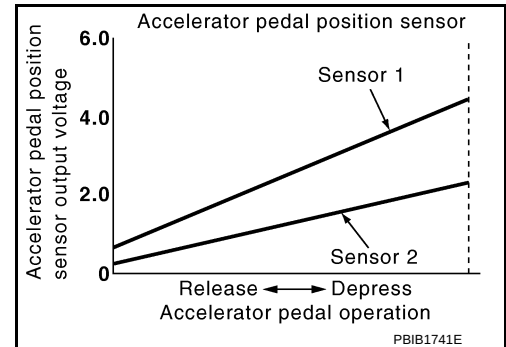
INFOID:0000000010289617

Thermoplunger Control Unit passes a current to Thermoplungers according to a signal transmitted from ECM.

Accelerator Pedal Position Sensor

INFOID:0000000010289620

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



Refrigerant Pressure Sensor

INFOID:0000000010289621

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor is used to sense a refrigerant pressure.

Stop Lamp Switch

INFOID:0000000010289622

Stop lamp switch is installed to brake pedal bracket. Stop lamp switch signal is sent to ECM via CAN communication from BCM when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is being driven.

Clutch Interlock Switch & Clutch Pedal Position Switch

INFOID:0000000010501742

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

Clutch pedal	Clutch interlock switch	Clutch pedal position switch
Released	OFF	ON
Depressed	ON	OFF

ASCD Steering Switch

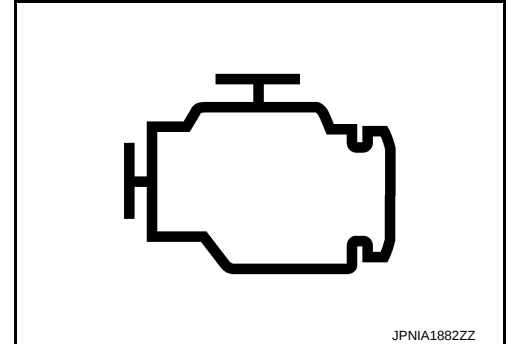
INFOID:0000000010289624

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

Malfunction Indicator Lamp

INFOID:0000000010289626

The malfunction indicator Lamp (MIL) is located on the combination meter. The MIL will illuminate when the ignition switch is turned ON without the engine running (bulb check). When the engine is started, the MIL should turn OFF. If the MIL remains illuminated, the on board diagnostic system has detected an engine system malfunction.



Information Display

INFOID:0000000010289627

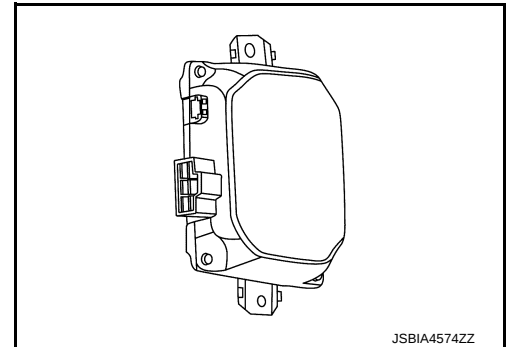
The operation mode of the ASCD and speed limiter are indicated on the information display in the combination meter.

ECM transmits the status signal to the combination meter via CAN communication according to ASCD and speed limiter operation.

DC/DC Converter

INFOID:0000000010289629

The DC/DC converter is installed at the behind of the glove box assembly and supplies power to the electrical equipment. This converter is connected to ECM via the engine communication line and includes an internal voltage converter. When restarting the vehicle from the stop/start system operating condition, the voltage converter boosts the voltage conveyed from the battery and provides stable power to the electrical equipment to prevent reset from occurring. For further details, refer to [ECK-39. "STOP/START SYSTEM : System Description"](#).



Engine Restart Relay

INFOID:0000000010289630

The engine restart relay is installed in the relay box and controlled by ECM when restarting the engine during the stop/start system operation.

Engine Restart Bypass Control Relay

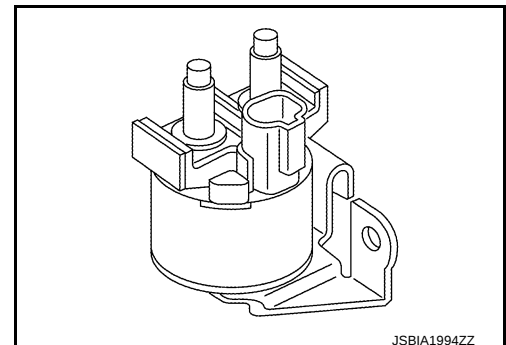
INFOID:0000000010289631

The engine restart bypass control relay is controlled by ECM and controls the engine restart bypass relay.

Engine Restart Bypass Relay

INFOID:0000000010289632

The engine restart bypass relay reduces battery voltage drop right after the starter motor activation at an engine restart by switching the electric circuit of the starter motor. For details, refer to [ECK-39. "STOP/START SYSTEM : System Description"](#).



Hood Switch

INFOID:0000000110289637

Hood switch is located around radiator core support. Hood switch detects open/close condition of hood and input the hood switch signal to IPDM E/R.

Stop/Start Indicator Lamp

INFOID:0000000110289638

The stop/start indicator lamp is located on the combination meter. The stop/start indicator lamp turns ON when the stop/start system is operating.

When a malfunction is detected in the stop/start system, the stop/start indicator lamp blinks at a slow speed to alert the driver to the malfunction. When a driver's operation is judged as dangerous one during stop/start system operation, the stop/start indicator lamp blinks at a high speed.

When ECM detects a malfunction in the stop/start system components, the lamp activation request signal is transmitted to ECM via CAN communication. ECM transmits the stop/start indicator lamp signal to the combination meter. Based on the signal from ECM, the combination meter turns stop/start indicator lamp to inform the driver that a malfunction has been detected.

NOTE:

- If the stop/start indicator lamp does not turn ON during stop/start system operation, check the stop/start indicator lamp circuit. Refer to [ECK-385, "Component Function Check"](#).
- If the stop/start indicator lamp turns blinks continuously, stop/start system-related DTC or malfunction is detected. Perform total self-diagnosis and inspect or repair the unit.

Stop/start indicator lamp status

System condition	Condition	Stop/start indicator lamp	Warning chime
Operate	Normal	Illuminate	—
	Door (driver side) open and seat belt released	High speed blinking	Sound
	Hood open	High speed blinking*	Sound*
Fail-Safe	Starter motor operation counter: too much	Slow speed blinking	—
	Malfunction of stop/start system	Slow speed blinking	—

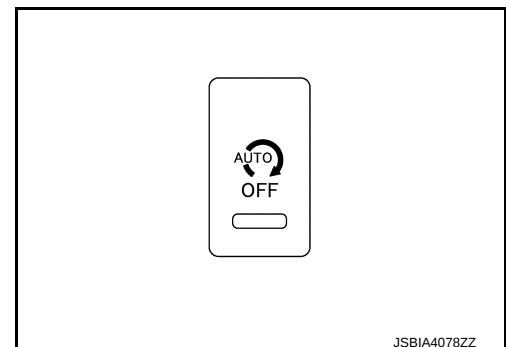
*: Engine is stalled after alert for 1.5 seconds.

Stop/Start OFF Switch

INFOID:0000000110289639

The stop/start OFF switch is mounted on the switch panel of the driver side lower instrument panel. When the stop/start OFF switch is pressed, the indicator lamp turns ON and the stop/start system can be deactivated.

For further details, refer to [ECK-49, "STOP/START SYSTEM : Switch Name and Function"](#).



Fuel Heater With Water In Fuel Level Sensor

INFOID:0000000110289641

- Water in fuel sensor detects the water volume increasing in the fuel filter.
- When water increases in the fuel filter, ECM turns ON the fuel filter warning lamp, according to the signal from water in fuel sensor.

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[K9K]

Reverse/Neutral Position Switch

INFOID:0000000010501851

Reverse/neutral position switch is ON when the selector lever is Neutral position. ECM detects the position because the continuity of the line (the ON) exists.

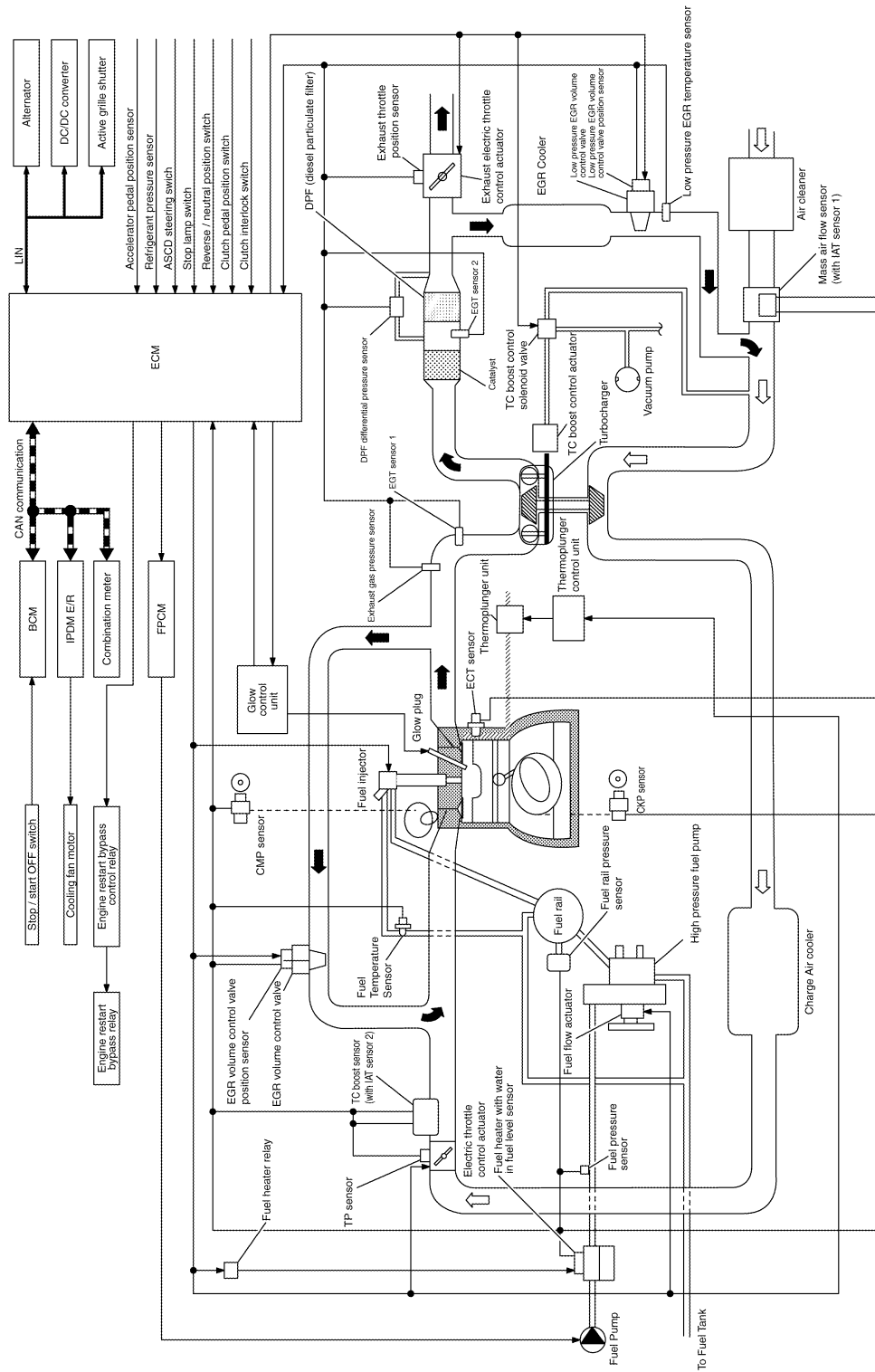
SYSTEM

ENGINE CONTROL SYSTEM

ENGINE CONTROL SYSTEM : System Diagram

INFOID:000000010289642

ECK



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ENGINE CONTROL SYSTEM : Vacuum Hose Drawing

INFOID:000000010289643

For vacuum hose drawing, refer to [ECK-398, "Vacuum Layout"](#).

ENGINE CONTROL SYSTEM : System Description

INFOID:000000010289644

ECM controls the engine by various functions.

Function	Reference
Engine speed control	ECK-26, "ENGINE SPEED CONTROL : System Description"
Powertrain coordination control	ECK-27, "POWERTRAIN COORDINATION CONTROL : System Description"
Turbocharger boost control	ECK-28, "TURBOCHARGER BOOST CONTROL : System Description"
EGR system	ECK-28, "EGR SYSTEM : System Description"
Throttle control	ECK-29, "THROTTLE CONTROL : System Description"
Swirl control system	ECK-29, "SWIRL CONTROL SYSTEM : System Description"
Engine torque control	ECK-30, "ENGINE TORQUE CONTROL : System Description"
Combustion control	ECK-32, "COMBUSTION CONTROL : System Description"
After treatment system	ECK-33, "AFTER TREATMENT SYSTEM : System Description"
Cooling fan control	ECK-34, "COOLING FAN CONTROL : System Description"
Thermostat control	ECK-35, "THERMOSTAT CONTROL : System Description"
Glow control	ECK-35, "GLOW CONTROL : System Description"
Oil control system	ECK-36, "OIL CONTROL SYSTEM : System Description"
ASCD (Automatic Speed Control Device)	ECK-36, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description"
Speed limiter	ECK-37, "SPEED LIMITER : System Description"
Gear shift indicator system	ECK-38, "GEAR SHIFT INDICATOR SYSTEM : System Description"
Stop/start system	ECK-39, "STOP/START SYSTEM : System Description"
Energy management system	ECK-46, "ENERGY MANAGEMENT SYSTEM : System Description"
CAN communication	ECK-46, "CAN COMMUNICATION : System Description"

ENGINE SPEED CONTROL

ENGINE SPEED CONTROL : System Description

INFOID:0000000010471219

SYSTEM DESCRIPTION

The engine speed control consists of the following functions:

- Curative anti-jerk
- Idle speed control
- Engine speed limitation
- Engine state

CURATIVE ANTI-JERK

This function aims to smooth the engine speed through torque corrections out of idle engine speed regulation. The torque correction is made by the anti-jerk function to damp the engine speed vibrations caused by the drive-line vibrations.

IDLE SPEED CONTROL

ECM calculates the engine idle speed set point and maintains the engine speed in order to follow the set point. The engine idle speed set-point is computed for the following load and signal:

- Post treatment
 - Diesel particulate filter
- Electric consumers
 - Cooling fan
 - Coolant heater
 - Power window

< SYSTEM DESCRIPTION >

- Air heater (air conditioning system)
- Alternator output current
- Automatic transmission
- Automatic transmission idle speed set point function (according to coolant temperature)
- Automatic transmission idle speed increase request
- Mechanical consumers
- Air conditioning
- Power steering
- Diagnosis and protection
- Diagnosis
- Engine protection by oil temperature
- CONSULT function
- Intake manifold pressure sensor signal

The final engine idle speed set point is computed from each consumer's engine idle speed set point:

- The final corrective torque of the Idle Speed Regulation is obtained taking into account proportional, integral, and derivative corrections.

ENGINE SPEED LIMITATION

ECM calculates the maximum engine speed set point and controls the maximum engine speed in order to follow the set point.

- Fail-safe mode
- Maximum available engine speed

ENGINE STATE

ECM calculates the engine state from detected engine speed:

- Engine running
- Driving state
- Idling state
- Engine stalled
- Initial state
- Stalled state

POWERTRAIN COORDINATION CONTROL

POWERTRAIN COORDINATION CONTROL : System Description

INFOID:000000010471220

SYSTEM DESCRIPTION

The powertrain coordination can be explained by following:

- Powertrain coordination inputs
- Preventive anti-jerk
- Gear shift indicator (for details, refer to [ECK-38, "GEAR SHIFT INDICATOR SYSTEM : System Description".](#))

POWERTRAIN COORDINATION INPUTS

ECM detects following signals necessary to decide the torque set point:

- Gear position
- Torque request from automatic transmission
- Torque request from ABS system
- Brake pedal operation
- Status of Cruise Control System or Speed Limiter

PREVENTIVE ANTI-JERK

The main objective of the preventive anti-jerk function is to decrease discomforts of driver during depress the accelerator pedal and during release the accelerator pedal.

The abrupt change of torque are delivered by engine excites a torsional natural frequencies of drive-line. It causes vehicle jerking and acceleration fluctuations. And they are causes of perception and assessment of performance and comfort for driver and the passengers.

The purpose of this function is to limit drive-line torque excitations. In fact, the engine torque set point is filtered according to requirements of driveability.

TURBOCHARGER BOOST CONTROL

TURBOCHARGER BOOST CONTROL : System Description

INFOID:000000010471221

DESCRIPTION

Turbocharger is used to increase the air pressure entering the engine. The turbocharger has two separate chambers. The turbocharger consists of the following components:

- A chamber linked to the engine exhaust gas system
- A chamber linked to the engine air inlet system
- A turbine and a compressor, joined together by shaft.

The turbine, driven by exhaust gases, drives the compressor which compresses the inlet air.

CAUTION:

To stop the engine immediately after high-load driving, park the vehicle with the engine at idle before turning OFF the ignition switch.

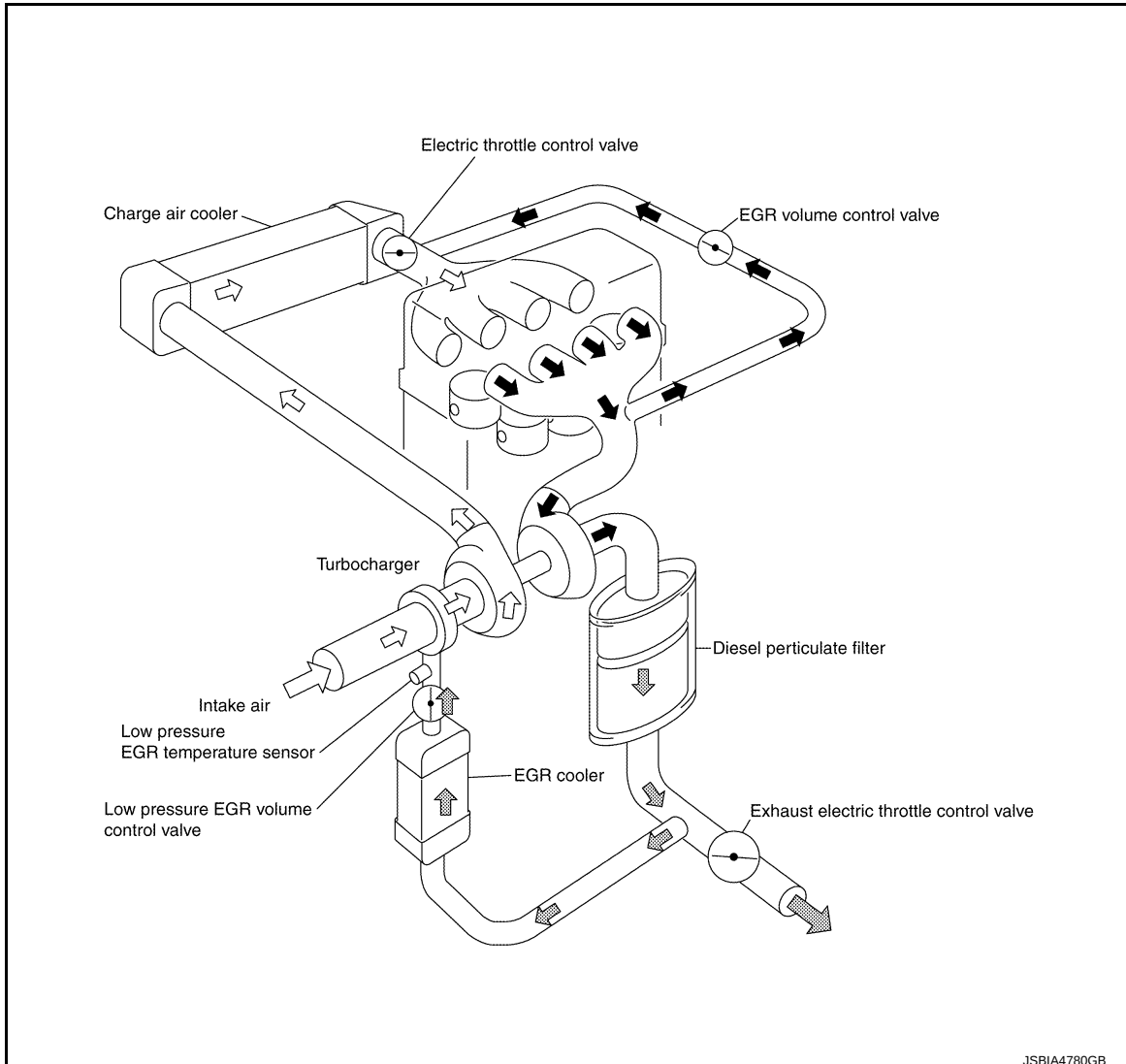
The boost pressure control is able to increase the manifold pressure with respect to the engine operating point. The system has an electric solenoid valve connected on the vacuum circuit to control the flow of exhaust gases through the turbine in order to generate high pressure in the boost circuit.

EGR SYSTEM

EGR SYSTEM : System Description

INFOID:000000010471222

DESCRIPTION



EGR (Exhaust Gas Recirculation) system reduces NOx emissions and improves fuel efficiency by recirculating exhaust gas into the intake manifold.

This engine has two EGR systems (low pressure and high pressure), and one of them is selected depending on condition.

< SYSTEM DESCRIPTION >

The purpose of the low pressure EGR is to decrease fuel consumption.

The low pressure EGR system and the high pressure EGR system are not activated simultaneously.

LOW PRESSURE EGR SYSTEM

The low pressure EGR system recirculates exhaust gasses in the downstream DPF (Diesel Particulate Filter) to the upstream turbocharger of intake air passage.

If EGR conditions are satisfied when engine coolant temperature is more than 70°C (158°F) and intake air temperature is 20°C (68°F), the opening angle of the exhaust throttle valve is reduced and the low pressure EGR volume control valve angle is adjusted to control EGR for achieving an appropriate EGR rate.

HIGH PRESSURE EGR SYSTEM

High pressure EGR system recirculates exhaust gasses in the exhaust manifold to the intake manifold.

If EGR conditions are satisfied when engine coolant temperature is less than 30°C (86°F), the opening angle of the throttle valve is reduced and the EGR volume control valve angle is adjusted to control EGR for achieving an appropriate EGR rate.

EGR COOLING SYSTEM

The EGR cooler bypass is controlled by ON/OFF solenoid valve, connected to the vacuum circuit. Control is determined according to the engine coolant temperature, intake air temperature, and the engine operating point. The gases flow through the cooler during the EGR activation, except when the engine is cold; otherwise, they go through the bypass. There is also a regular bypass activation function to prevent its clogging or jamming.

THROTTLE CONTROL

THROTTLE CONTROL : System Description

INFOID:0000000010471223

DESCRIPTION

This engine has two throttle valves. One of them is installed to the upstream of the intake manifold on the air intake line and used for the high pressure EGR control and smooth engine stop. The other throttle valve is installed to the downstream of DPF (Diesel Particulate Filter) on the exhaust line and used for the low pressure EGR control.

These valves are normally open.

ELECTRIC THROTTLE CONTROL ACTUATOR

- During high pressure EGR control, the electric throttle control actuator reduces the opening angle of the throttle valve and lowers pressure around the EGR feed port so that intake EGR gasses can be efficiently taken in.
- When ignition switch is turned OFF, throttle valve is closed to stop the engine smoothly.
- In DPF regeneration mode, fresh air flow control uses only electric throttle control actuator (EGR valve is fully closed).

EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

The exhaust electric throttle control actuator reduces the opening angle of the exhaust throttle valve and introduces exhaust gasses to the low pressure EGR system.

SWIRL CONTROL SYSTEM

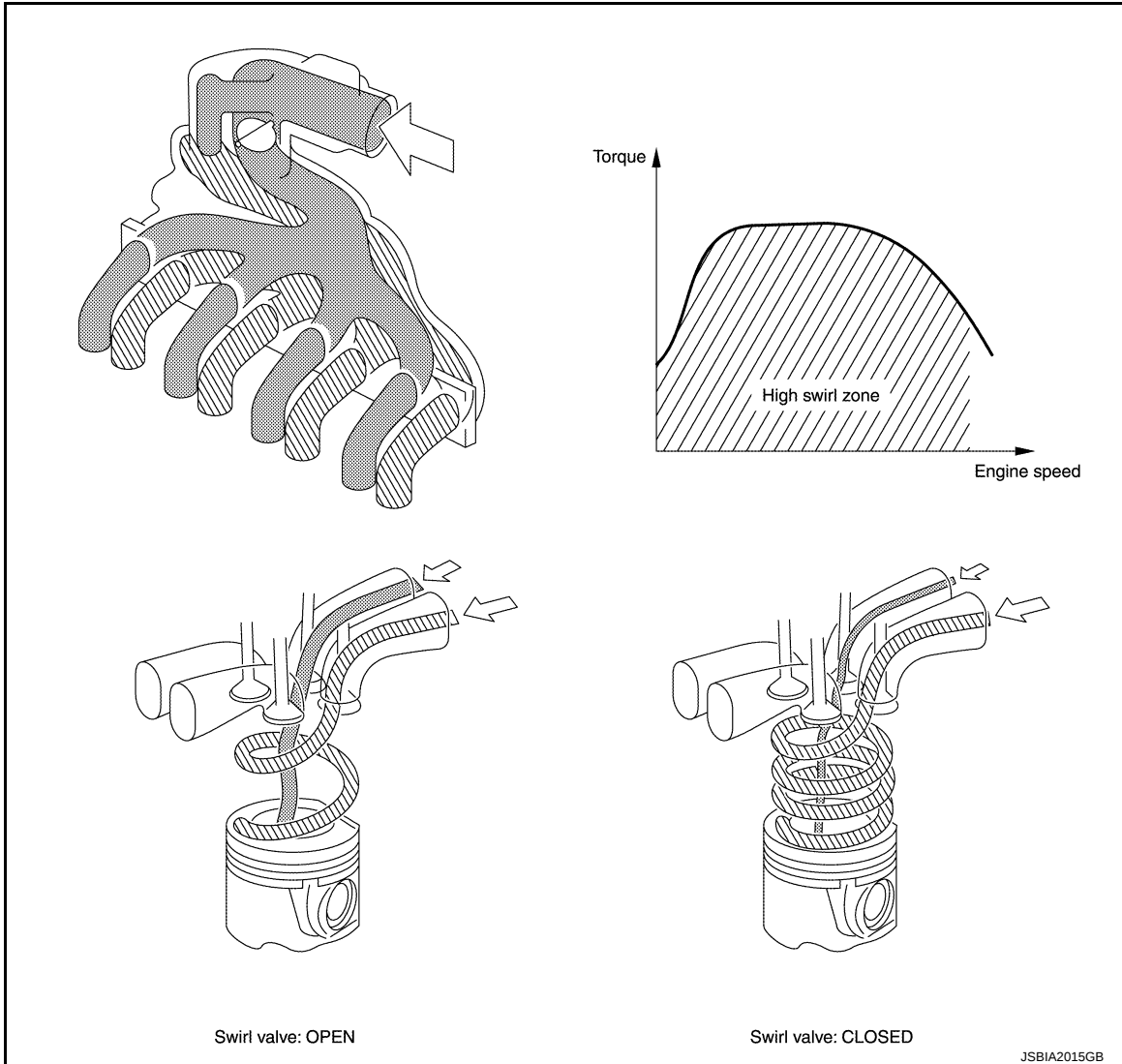
SWIRL CONTROL SYSTEM : System Description

INFOID:0000000010471224

DESCRIPTION

< SYSTEM DESCRIPTION >

The swirl control valve mounted on the intake manifold generates swirl flow in the combustion chamber. This swirl flow allows air mixture to become even, enabling the obtainment of the steady combustion.



ENGINE TORQUE CONTROL

ENGINE TORQUE CONTROL : System Description

INFOID:0000000010471225

SYSTEM DESCRIPTION

The torque function can be explained by the following:

- Accessories torque management
- Engine torque losses
- Minimum available torque
- Maximum available torque
- Fast set-points to complete torque request
- Final torque requests setting

ACCESSORIES TORQUE MANAGEMENT

Air Conditioning Power

The amount of power absorbed by the air conditioning is useful for the engine control to compute the torque requirement for air conditioning. Therefore, ECM can adapt dynamically the engine speed regulation depending on the load variations.

The power absorbed by the air conditioning depends on the refrigerant pressure and the compressor speed. The air conditioning system power correction for idle speed regulation avoids engine speed undershoots and overshoots at the compressor compressed volume variation.

Coolant Heaters or Air Heaters

< SYSTEM DESCRIPTION >

The air heater is activated on a driver request.

The thermoplunger are exclusively used to increase engine load during DPF (Diesel Particulate Filter) regeneration. When the vehicle is in a regenerating phase and the load is low, the coolant heaters are activated to increase the overall load.

ENGINE TORQUE LOSSES

The torque losses are the sum of three components: the rubbing, the pumping, and the torque losses caused by accessories consumption.

- The basic friction torque loss uses the coolant liquid temperature sensor and the engine speed for the torque correction.
- Accessories' consumption is caused by additional electrical (alternator power) and mechanical (power steering and air conditioning) components.

MINIMUM AVAILABLE TORQUE

The minimum available torque is used for the minimum driver setpoint calculation and the intersystem information.

The minimum torque is designed with a hyperbolic shape depending on the difference between the engine speed and the idle speed set-point:

- When the engine speed is under the idle speed set-point, the minimum torque is equal to the hyperbolic torque which increases to avoid an engine stalling.
- When the engine speed is over an engine speed threshold, the minimum torque reaches the engine torque losses with a ramp.

When the engine starts, a specific torque set-point is calculated to ensure the engine start. This torque is dependent of the engine speed and the coolant temperature.

At first, a calculation of the starting torque value is performed. In case of a difficult start (too long), this torque may be increased thanks to ramp.

The start torque offset is progressively set to zero to ensure a transition with the current torque set-point.

MAXIMUM AVAILABLE TORQUE

The maximum available torque results of a minimum selection including all powertrain constraints:

- Transmission torque limitation
- Maximum engine torque
- Torque reduction for the heating protection
- Torque for smoke limitation
- Fail-safe

Transmission torque limitation

This limitation is the maximum torque to protect the transmission from a mechanical overload:

- For a manual transmission, the limitation value of the torque is function of the engine speed and the transmission ratio.
- For an automatic transmission, the limitation value is directly supplied by the automatic transmission.

Maximum engine torque

The maximum torque depends on the engine speed and the manifold air pressure. It is corrected by:

- The soot mass value in order to take into account the limitations due to the particulate filter
- The atmospheric pressure
- The upstream inlet throttle temperature.

The maximum engine also depends on the combustion mode (the normal or the regeneration combustion mode). In some conditions (DPF clogging, etc.), this maximum available torque is reduced in order to keep the engine within its safety working limits.

Torque for the heating protection

This torque limitation is dedicated to the protection of the engine from an overheating. This limitation calculation depends on the engine speed, the engine coolant temperature, the intake air temperature and the vehicle speed.

Torque for the smoke limitation

This torque limitation is used to reduce the smoke emissions during a high torque driver request. The maximum fuel mass that can be injected is limited according to the maximum richness depending on the gear ratio, the engine speed, and the intake air mass flow. This value is corrected depending on the vehicle speed and the coolant temperature.

Fail-safe

The ECM limits a engine torque in case of malfunction of engine component or ECM.

A

ECK

C

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P

Depending on the engine components, ECM activates the fail-safe mode of the torque limitation level 1 (low limitation), the level 2 (mean limitation), or the level 3 (strong limitation function of vehicle speed).

FAST SET-POINTS TO COMPLETE TORQUE REQUEST

For each combustion mode (the normal combustion mode, the regeneration combustion mode, and the protection combustion mode), a torque model is designed to calculate the total fuel mass quantity, the estimated mean effective torque, the combustion efficiency and the current fuel consumption for the final torque set-point and the engine current speed.

The total fuel mass quantity is corrected to take into account the main injection advance deviation and the mass air flow deviation.

For each combustion mode, the after and the post injection relative efficiencies are calculated to determine the fuel mass quantity needed to perform the engine inner torque.

The after injection relative efficiency is equal to one in normal combustion mode and to zero in a regeneration combustion mode or in a protection combustion mode.

The post injection relative efficiency is function of the post injection timing and the difference between the current and the basic post injection timing.

FINAL TORQUE REQUESTS SETTING

The final torque requests are computed by the arbitration with the driver request, the intersystem torque request (VDC/ESP), the torque limitations and the curative anti-jerk correction.

The set-point torque is used for fuel mass calculation. It is filtered by the preventive anti-jerk and corrected by the curative anti-jerk.

COMBUSTION CONTROL

COMBUSTION CONTROL : System Description

INFOID:000000010471226

SYSTEM DESCRIPTION

The torque set-point is converted into a total fuel quantity injected. This quantity is split in various injections according to a mapped injection pattern. Thus, a fuel quantity and an initial phasing of injection are allocated for each injection. The choice of the number of injection (limited to five maximum) is given with different constraints such as acoustic, performance and emissions.

In the DPF (Diesel Particulate Filter) regeneration phase, post injections do not contribute to the torque elaboration but to the increase of the DPF temperature. Therefore, the fuel consumption increases in the DPF regeneration phase.

FUEL SUPPLY AND PRESSURE CONTROL SYSTEM

Fuel Supply System

The fuel supply system consists of two circuits: the fuel low and high-pressure circuit.

The fuel low-pressure circuit brings fuel from the tank to the high-pressure fuel pump through the fuel filter (with fuel heater).

The high-pressure circuit function is to put the fuel under pressure and distribute it to the injectors:

- High-pressure fuel pump
- Fuel flow actuator
- Common rail
- Fuel injectors

The low-pressure fuel (coming from low-pressure circuit) is transferred to the high-pressure pump part via the fuel flow actuator, which regulates the fuel flow quantity. The high-pressure fuel pump consists of a three-piston pump.

The fuel under pressure goes to the common rail, which distributes the fuel equally to each injector.

Finally, the commanded injectors deliver the fuel flow entering the cylinder.

Fuel Pressure Control

The combustion quality is influenced by the size of the droplets sprayed into the cylinder. In the combustion chamber, smaller fuel droplets will have enough time to burn completely and will produce less smoke and less unburnt particulate matter. To meet pollution requirements, the size of the droplets needs to be reduced and hence so too do the injection orifices.

Since these orifices are smaller, less fuel can be injected for a given pressure, which in turn limits the power. To counter this drawback, it is necessary to increase the quantity of injected fuel, which involves raising the pressure (and the number of orifices on the injector nozzles). The pressure is continuously regulated to 160 MPa (1600 bar, 1632 kg-cm², 23200 psi) in the rail. The measurement circuit consists of a pressure sensor on the rail and transmits the pressure signal to ECM.

The high-pressure pump is self-supplied by an integrated gear pump. This supplies the rail, whose pressure is controlled for loading by the fuel flow actuator. The flow regulation actuator allows the high-pressure fuel pump to supply only the necessary quantity of diesel for maintaining pressure in the rail.

A

INJECTION CONTROL

The injection control parameters are the quantities to inject and their respective advances. The system performs one to six injections.

ECK

An electrical current (impulse or pulse) is sent to each injector holder based on the previously computed data. The piezoelectric injectors ensure injected fuel quantity with an excellent repeatability of the injection process. Piezoelectric actuators work like capacitors. To control the injector, ECM punctually drives energy resulting in the actuator deformation and injector opening.

C

During the injection time, piezoelectric actuator stores this energy, the length of electrical pulse is computed with the fuel flow demand and injectors characteristics. At the end of the injection time, ECM recovers energy to send at the start of control. Piezoelectric actuator then discharges and returns to its initial shape. The injector nozzle closes.

D

Injector Adjustment Value Registration

E

At the factory, each injector is calibrated for specific pressure needs on a test bench, and the values are indicated on a label attached to the injector holder body. The individual injector correction values are then written to ECM, enabling the ECM to control the injectors by taking into account the variance from the factory production dispersion.

F

A specific strategy controls fuel injection deviations and dispersion during engine life (called Minimum Fuel Mass Adaptation strategy).

G

This function defines individual injector correction to compensate the injector drift to enhance the delivery fuel accuracy.

TEMPERATURE BEFORE TURBINE CONTROL

H

Upstream turbine temperature control sequentially uses injection parameters:

- Main injection phasing
- Post injection fuel mass
- Total fuel mass quantity
- Maximum torque

I

In normal combustion mode (without regeneration), the regulation aims to protect the turbine. when the temperature exceeds the recommended limits, the regulation is able to limit total fuel mass quantity and torque demand.

J

In regeneration mode, to increase the temperature in exhaust line, the regulation controls main injection phasing and post injection.

K

The purpose is to obtain the highest temperature while respecting the recommended limits. In addition, the regulation protects the turbine when the temperature is too hot.

WATER IN FUEL FUNCTION

L

The water in fuel detection sensor is an optional sensor integrated in the fuel filter. This function prevents serious damages on the common-rail system caused by water presence.

AFTER TREATMENT SYSTEM

M

AFTER TREATMENT SYSTEM : System Description

INFOID:0000000010471227

DESCRIPTION

N

This system has two main functions:

- Use the present oxygen in exhaust gases to transform the CO in CO₂, and the HC in CO₂ and H₂O.
- Increase the temperature of exhaust gases (with the exothermal energy of the oxidation reaction) to allow the regeneration in the DPF (Diesel Particulate Filter).

O

To be effective, the catalytic converter must reach the working temperature of 350 to 400°C (662 to 752°F).

DPF (DIESEL PARTICULATE FILTER)

P

The DPF filters up to 99% of the soot particulates that have not been filtered out up to this point. These particulates consist essentially of micro-spherules of carbon on which hydrocarbons from the fuel and lubricant have condensed.

The quantity of particulates and their composition depend on:

- The combustion process (an homogeneous air/fuel mixture minimizes particulate formation)
- The quantity of diesel (increasing the cetane index limits the number of particulates formed)
- The post-processing efficiency (only filtration allows the particulates to be removed efficiently)

The DPF is a porous structure with channels set out in such a way as to force the exhaust gases through the chamber walls.

In normal operation, DPF captures all the particulates emitted by the engine and so fills up progressively. It therefore becomes necessary to eliminate all the accumulated particulates, which is done by combustion (regeneration).

REGENERATION

The purpose of regeneration is to burn the particulates accumulated in the filter. In presence of oxygen, the particulates combustion regeneration occurs naturally when the temperature of exhaust gases exceeds 570°C (1058°F). In urban driving conditions, the engine barely reaches high temperature, and the exhaust gas temperature consequently varies between 150°C (302°F) and 200°C (392°F). Therefore, it is necessary the DPF (Diesel Particulate Filter) regeneration system, which does not adversely affect the driving comfort in any driving condition.

A differential pressure sensor detects filter load status (particulate mass) and triggers the regeneration operation. This takes place by means of a controlled combustion that raises the exhaust gas temperature up between 550°C (1022°F) and 650°C (1202°F) at the filter intake.

Regeneration is continuously executed according to the following:

Regarding driving conditions:

- Vehicle speed
- Ambient pressure
- Temperature upstream DPF
- Engine coolant temperature

DPF charging level criteria:

- Soot mass [(computed using DPF charging curves (exhaust gas flow according to differential pressure))]
- Simulated soot mass [computed using mapped soot mass emission speed (g/s)]
- Driven distance since last successful regeneration
- Regeneration failures counter

ECM activates many engine management function to ensure good regeneration efficiency:

- Fuel system: A specific injection pattern using post injections is activated.
- Air system: EGR volume control valve is closed and throttle valve (intake) is used to control engine air flow. In regeneration mode, other boost pressure set points are defined.
- Auxiliary functions: These functions (e.g. thermoplunger, etc.) are used to increase engine load.

At the same time, two specific exhaust gas temperature controllers are sequentially activated:

- Upstream turbine temperature control: As soon as a DPF regeneration is requested, the regulation is activated in order to obtain the highest safe upstream turbine temperature for any engine operating point and without turbine damage risk (over temperature).
- Upstream DPF temperature control: This regulation is activated to heat DPF and to control its regeneration.

REGULATION OF TEMPERATURE BEFORE DPF

Regulation of the exhaust gas temperature before DPF is needed to complete a secure regeneration. This strategy uses both exhaust line injectors and late post injections.

ECM computes the fuel mass flow injected by injectors (post injection) according to several parameters:

- Exhaust line temperature before DPF
- Atmospheric pressure
- Intake air temperature
- Differential pressure of the DPF
- Minimum level of fuel
- Engine speed
- Engine torque

COOLING FAN CONTROL

COOLING FAN CONTROL : System Description

INFOID:0000000010471228

SYSTEM DESCRIPTION

The cooling of the engine is done by a double speed motor driven fan unit (FAN1: small speed; FAN2: high speed). The ECM controls cooling fan relays through CAN communication line.

When the engine is running

SYSTEM

< SYSTEM DESCRIPTION >

[K9K]

To cool the engine, a request for FAN1 activation is sent when the engine coolant temperature exceeds 99°C (210°F) and a deactivated request is sent when the engine coolant temperature becomes lower than 96°C (204°F).

When the engine coolant temperature continues to increase, a request for FAN2 activation is sent when the engine coolant temperature exceeds 102°C (215°F) and a deactivated request is sent when the engine coolant temperature becomes lower than 99°C (210°F).

When the engine coolant temperature continues to increase and exceeds the alert threshold calibrated at 115°C (239°F), ECM judges the engine is over temperature status until the temperature becomes lower than 110°C (230°F).

In case of an abnormally high engine coolant temperature, the maximum engine torque is reduced; the driver will then feel a lack of engine power.

When the engine is not running

Only a FAN1 activation request can be sent for anti-percolation purpose (engine stopped with high engine coolant temperature). The anti-percolation function is active after ignition switch OFF for a defined maximum time. At ignition switch OFF, a FAN1 activation request is sent if the engine coolant temperature exceeds 100°C (212°F) and a cutting request is sent when the engine coolant temperature becomes lower than 95°C (203°F).

When there is a default on the engine coolant temperature signal, the FAN1 activation is permanently requested (engine running).

In addition to this, depending on the equipment mounted on the vehicle, the ECM can also send an activation request for air conditioning needs or automatic transmission needs or DPF (Diesel Particulate Filter) regeneration needs.

THERMOSTAT CONTROL

THERMOSTAT CONTROL : System Description

INFOID:0000000010471229

SYSTEM DRAWING

For system drawing of the thermostat control, Refer to [CO-62. "Cooling Circuit"](#).

DESCRIPTION

This engine has an engine coolant bypass valve and a thermoplunger and uses them for improving a warm-up time.

Thermoplunger

The thermoplunger is installed to the engine coolant line and directly warms up engine coolant.

In addition, this system increases the engine load by adding extra consumers to the alternator, in case of DPF (Diesel Particulate Filter) regeneration (to help the engine load rise).

ECM transmits a thermoplunger operating signal to the thermoplunger control unit when engine coolant temperature is low.

The thermoplunger control unit applies power to the thermoplunger according to the received signal and warms up engine coolant.

And ECM activates the thermoplunger during DPF (Diesel Particulate Filter) regeneration and increases electric load for get more engine load to perform normal DPF regeneration.

ECM controls thermoplunger based on the following information.

- Engine coolant temperature
- Battery voltage
- Engine speed
- Alternator load

GLOW CONTROL

GLOW CONTROL : System Description

INFOID:0000000010471230

SYSTEM DESCRIPTION

Glow control system operates at engine starting and after engine starting. The system energizes glow plug according to engine coolant temperature to improve engine starting function.

When the ignition switch is turned ON, the glow control system starts Pre-glow and the glow indicator lamp turns ON. When the engine starts, the glow indicator lamp turns OFF and the glow control state changes to After-glow.

Glow time varies according to engine coolant temperature, barometric pressure and battery voltage.

OIL CONTROL SYSTEM

OIL CONTROL SYSTEM : System Description

INFOID:000000010471231

DESCRIPTION

ECM calculates oil degradation based on engine speed and vehicle speed, and displays engine oil change timing on combination meter.

When the mileage before engine oil change comes to approximately 1500 km or less, pre-alert message is displayed to inform the driver that the maintenance timing is close as shown in the following table.

At oil change, the mileage must be reset using combination meter function. For how to reset, refer to [ECK-147, "Description"](#).

NOTE:

- Alerted mileage might be different from actual mileage.
- The level of oil deterioration may be increased depending on the status of vehicle use (e.g. frequent short-distance driving and engine start).

ECM calculates two types of oil deterioration

- Oxidation
- Dilution

Calculating oxidation of engine oil

Based on engine speed, ECM calculates the degree of oxidation of oxidation by adding correction value calculated from engine oil temperature and so on.

Calculating dilution of engine oil

ECM calculates the degree of dilution, based on air temperature, injection quantity at post-injection, the number of regeneration and so on.

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description

INFOID:000000010289655

BASIC ASCD SYSTEM

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 180 km/h (119 MPH).

ECM controls fuel injector to regulate engine speed.

Operation status of ASCD is indicated on the information display in the combination meter. If any malfunction occurs in 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 ASCD MAIN switch. (CRUISE indicated on the information display)

When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 180 km/h (119 MPH), press SET/COAST switch. (SET indicated on the information display)

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 keep 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
- Clutch pedal is depressed or gear position is changed to neutral position.
- Vehicle speed decreased under 15% of the set speed from 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.

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

SYSTEM

< SYSTEM DESCRIPTION >

[K9K]

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 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 during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

COAST OPERATION

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

RESUME OPERATION

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

- Brake pedal is released
- Clutch pedal is released
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 180 km/h (119 MPH)

SPEED LIMITER

SPEED LIMITER : System Description

INFOID:000000010289656

BASIC SPEED LIMITER SYSTEM

The speed limiter is a system that enables to restrict the vehicle speed within the set speed that is selected by the driver. Driver can set vehicle speed between 30 km/h and 180 km/h (in the metric system mode) or 20 MPH and 119 MPH (in the yard/pound system mode). ECM controls fuel injector to regulate vehicle speed. Operation status of speed limiter is indicated on the information display in the combination meter. If any malfunction occurs in speed limiter system, it automatically deactivates control.

NOTE:

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

SET OPERATION

Press speed limiter MAIN switch. (LIMIT indicated on the information display)

By pressing the SET/COAST switch, the vehicle speed can be set within the range between 30 km/h (20 MPH) and 180 km/h (119 MPH). (SET and set speed is indicated on the information display)

When pressing the RESUME/ACCELERATE switch, the set speed can be increased.

When pressing the SET/COAST switch, the set speed can be decreased.

CANCEL OPERATION

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

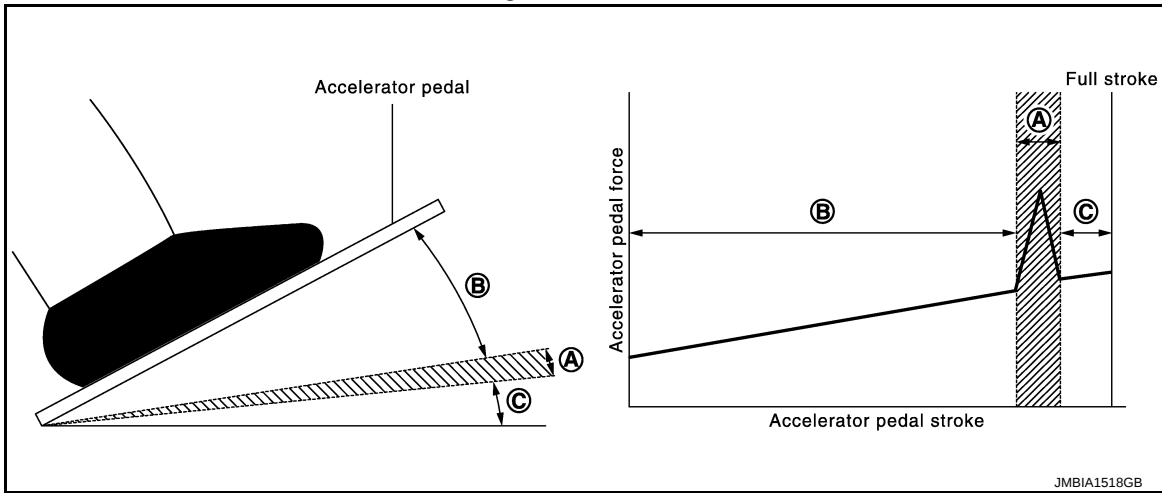
- Speed limiter MAIN switch pressed (Set speed will be cleared)
- ASCD MAIN switch pressed (Set speed will be cleared)
- CANCEL switch is pressed
- Accelerator pedal is fully depressed (kickdown)

SYSTEM

< SYSTEM DESCRIPTION >

[K9K]

When the accelerator pedal is depressed within the range shown in the figure (A) below, the accelerator pedal reaction force strengthens. Further depressing the accelerator pedal within the (C) range cancels the speed limiter. This allows acceleration in emergencies.



RESUME OPERATION

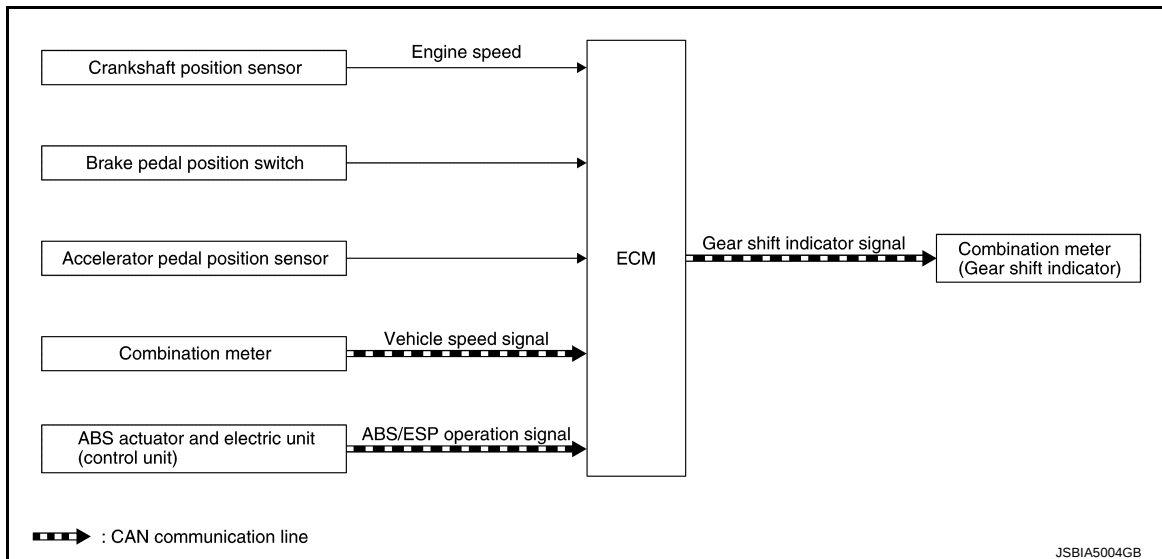
After the speed limiter is released by other method than the MAIN switch, the RESUME/ACCELERATE switch allows to set the vehicle speed again to the one that is previously set before releasing the speed limiter.

GEAR SHIFT INDICATOR SYSTEM

GEAR SHIFT INDICATOR SYSTEM : System Description

INFOID:0000000010505834

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

The gear shift indicator is controlled by ECM and indicates recommended gear shift timing on the combination meter.

- Upward arrow indication (↑): Upshift recommendation
- Downward arrow indication (↓): Downshift recommendation

ECM calculates optimal gear shift timing for better fuel consumption, according to the input signal and a gear ratio. In addition, the recommended gear shift timing is corrected, according to driver's operation and road conditions. ECM transmits a gear shift indicator signal to the combination meter via CAN communication line.

The gear shift indicator is deactivated when any of the following conditions is satisfied;

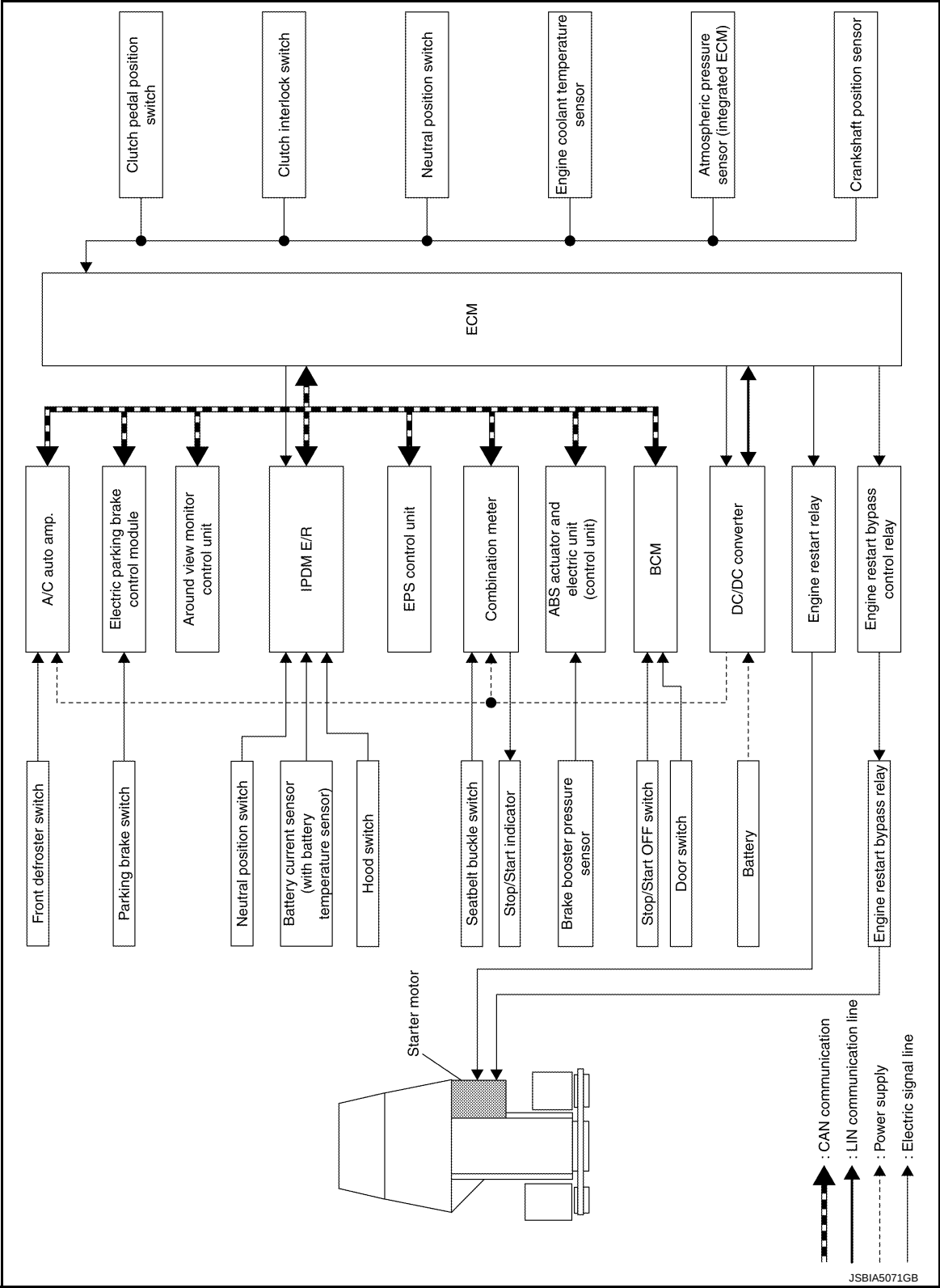
- Shift lever is in neutral position.
- Vehicle is under cruise control (ASCD function) or speed limit (speed limiter function).
- MIL (Malfunction Indicator Lamp) is indicated.
- ABS system or ESP system is operating.

STOP/START SYSTEM

STOP/START SYSTEM : System Description

INFOID:0000000110499029

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL CHART

SYSTEM

< SYSTEM DESCRIPTION >

[K9K]

Input/ Output	Transmits/Receives component	Signal name		Description
Input	Crankshaft position sensor	Crankshaft position sensor signal		Detects an engine speed.
	Engine coolant temperature sensor	Engine coolant temperature sensor signal		Detects an engine coolant temperature.
	Clutch pedal position switch	Clutch pedal position switch signal		Detects the clutch pedal is depressed (not released).
	Clutch pedal interlock switch	Clutch pedal interlock switch signal		Detects the clutch pedal is depressed (fully depressed).
	Neutral position switch	Neutral position switch signal		Detects the neutral position.
	Atmospheric pressure sensor (integrated in ECM)	Atmospheric pressure sensor signal		Detects an atmospheric pressure.
	IPDM E/R	CAN communication	Stop/Start permit signal	Detects IPDM E/R is ready to operate the stop/start system. For details, refer to CHG-8, "ENERGY MANAGEMENT SYSTEM : System Description" .
			Battery current signal	Detects battery current.
			Neutral position switch signal	Detects the neutral position.
			Hood switch signal	Detects engine hood status.
			Battery current sensor malfunction signal	Detects the battery current sensor is normal.
	BCM	CAN communication	Ignition switch status signal	Detects ignition switch status.
			Door switch signal	Detects the status of driver side door.
			Stop/Start OFF switch signal	Detects stop/start OFF switch status.
	ABS actuator and electric unit (control unit)	CAN communication	Vehicle speed signal	Detects vehicle speed.
			Brake booster pressure sensor signal	Detects a pressure in brake booster.
			ABS operation signal	Detects ABS operation.
			ESP operation signal	Detects ESP operation.
	EPS control unit	CAN communication	EPS torque signal	Detects an operational state of EPS system.
			Stop/Start inhibit signal	Receives the intelligent parking assist status signal sent from the around view monitor control unit through the EPS control unit.
	A/C auto amp.	CAN communication	Stop/Start permit signal	Detects the air conditioning system is ready to operate the stop/start system. For details, refer to HAC-32, "STOP/START SYSTEM : System Description" .
	Combination meter	CAN communication	Seat belt buckle switch signal	Detects driver is sitting on the driver seat.
	DC/DC converter	LIN communication	Operation status signal	Detects an operational state of DC/DC converter.
			Diagnosis signal	Detects DC/DC converter malfunction.

SYSTEM

< SYSTEM DESCRIPTION >

[K9K]

Input/ Output	Transmits/Receives component	Signal name		Description
Output	Around view monitor control unit	CAN communica- tion	Stop/Start status signal	Transmits a stop/start status sig- nal
	BCM	CAN communica- tion	Stop/Start status signal	Transmits a stop/start status sig- nal
	ABS actuator and electric unit (control unit)	CAN communica- tion	Stop/Start status signal	Transmits a stop/start status sig- nal
	EPS control unit	CAN communica- tion	Stop/Start status signal	Transmits a stop/start status sig- nal
			EPS assist request signal	Transmits EPS assist permit/in- hibit signal.
	A/C auto amp.	CAN communica- tion	Stop/Start status signal	Transmits a stop/start status sig- nal
	Combination meter	CAN communica- tion	Stop/Start status signal	Transmits a stop/start status sig- nal
			Stop/Start indicator lamp request signal	Transmits request signal which turn ON the stop/start indicator lamp.
	DC/DC converter	DC/DC converter operation check signal		Check DC/DC converter opera- tion status.

SYSTEM DESCRIPTION

The stop/start system enables the engine to automatically stop/restart with a simple operation and reduces unnecessary idling during stoplight or traffic congestion to improve fuel economy, reduce exhaust gas, and minimize noise.

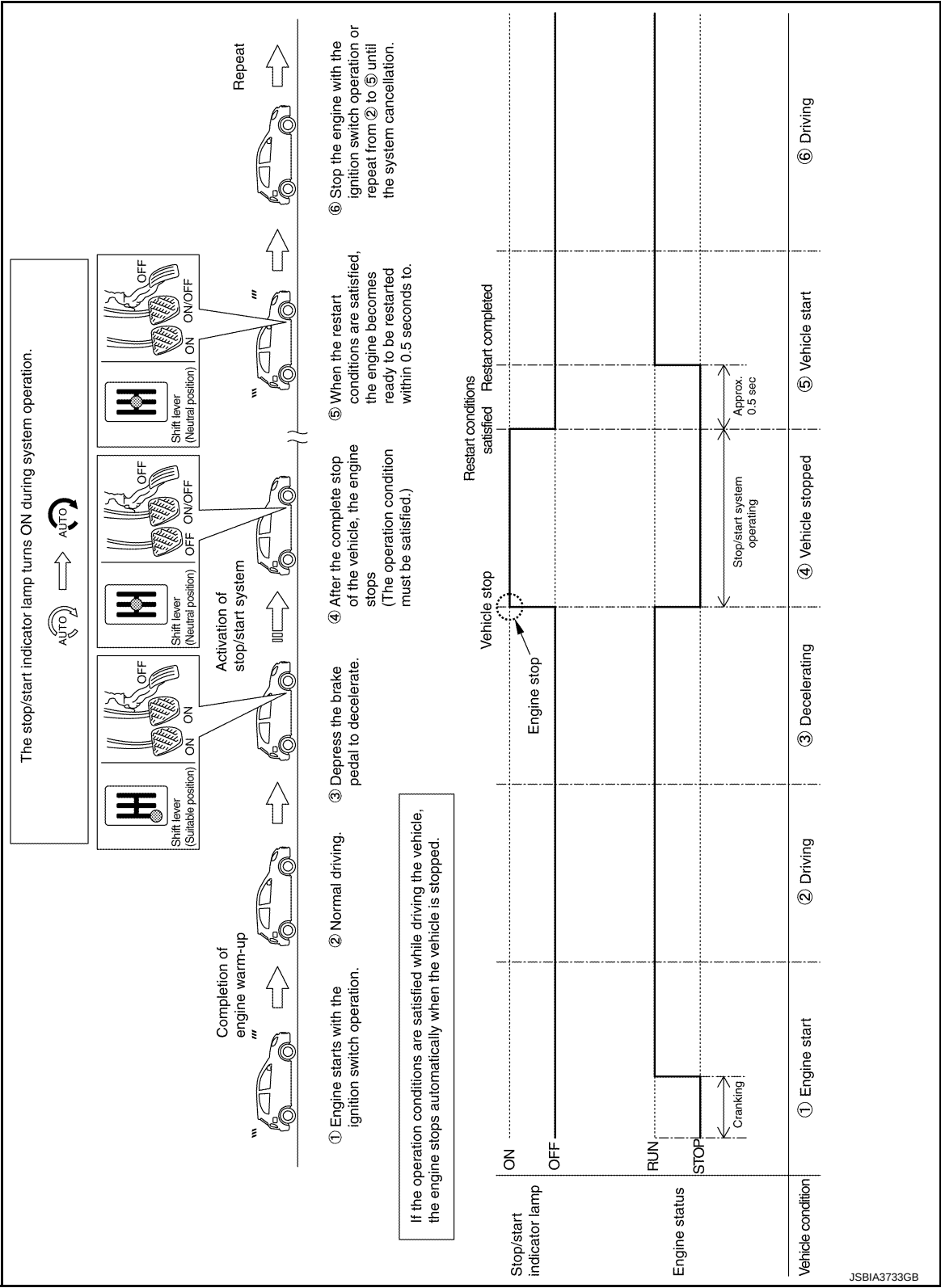
ECM detects a vehicle condition, engine condition and driver's operation condition based on signals sent from each unit and the sensors to comprehensively control the stop/start system.

The operation condition of the stop/start system is indicated by the stop/start indicator lamp on the combination meter and showing on the information display (dot matrix information display). (Refer to [ECK-23, "Stop/Start Indicator Lamp"](#).) If a malfunction is detected in the stop/start system, the system control is automatically deactivated and the malfunction is alerted to the driver by blinking the stop/start indicator lamp and showing the status on the information display (dot matrix information display). When a driver's operation is judged as dangerous one during the stop/start system operation, the stop/start indicator lamp blinks at a high speed and the status is shown on the information display (with dot matrix information display). The buzzer mounted on the combination meter sounds simultaneously to warn the driver of the dangerous operation.

NOTE:

Starting the engine from stop/start system operation is regarded as "Restart".

BASIC OPERATION



FUNCTION DESCRIPTION

When the stop/start system readiness conditions are satisfied while the vehicle is moving, the system is ready. When the stop/start system operation conditions are satisfied while the vehicle is in a stop condition, the engine is stopped.

During stop/start system operation, stopping time, the amount of fuel saved by the stop/start system and CO₂ saved information are indicated on the combination meter. (With dot matrix information display. Refer to [MWI-17. "INFORMATION DISPLAY : System Description".](#))

SYSTEM

< SYSTEM DESCRIPTION >

[K9K]

When the engine restart conditions are satisfied, ECM activates the engine restart relay, the engine restart bypass control relay, and the engine restart bypass relay to restart the engine. And the DC/DC converter boosts the voltage during cranking to protect the electrical equipment from low voltage.

After restarting the engine, the stop/start indicator lamp and the indication on the information display turn OFF.

NOTE:

- When engine restart conditions are satisfied during the electric parking brake operation, ECM performs the engine restart after the completion of the electric parking brake operation. This may cause delay in engine restart, compared with a usual engine restart.
- When the electric parking brake operation and engine restart occur simultaneously, the electric parking brake activates after the completion of engine restart.

Stop/Start Readiness Condition

ECM judges stop/start system is ready when the following conditions are satisfied.

Item		Condition
Vehicle	Stop/start OFF switch	OFF (Switch indicator: OFF)
	Stop/start indicator Lamp	Not blink (No malfunction)
	Door (driver side)	Close
	Seat belt (driver side)	Fastened
	Driving history	Drive the vehicle at 20 km/h (12 MPH) or more after start the engine with ignition switch
		Passes 2 minutes or more after start the engine with ignition switch ^{*1}
		Gear position other than neutral is selected after restart
		Drive the vehicle at 4 km/h (2.5 MPH) or more after restart
		Passes 5 seconds or more after restart
	Hood	Close
	Air conditioning	Automatic air conditioning
		Not in DEF mode Receives Stop/start permit signal (for details, refer to HAC-32, "STOP/START SYSTEM : System Description" .)
		Manual air conditioning
		Not in DEF mode
	ABS	System is normal
		ABS not activated ^{*2}
		ESP not activated
	EPS	System is normal
	Battery status	Receives Stop/start permit signal from IPDM E/R. (for details, refer to CHG-8, "ENERGY MANAGEMENT SYSTEM : System Description" .)
	Elevation	2,000 m (6,562 ft) or less
	Intelligent parking assist	OFF
Engine	MIL (Malfunction indicator lamp)	Not illuminate (No malfunction)
	DPF	Not regeneration
	Engine coolant temperature	19 - 105 °C (67 -221 °F)
	Fuel temperature	90 °C (194 °F) or less
	Turbocharger temperature	670 °C (1238 °F) or less
	Starter motor	The number of starter motor operations exceeds the specified times
	High pressure fuel pump	The number of high pressure fuel pump operations exceeds the specified times

*1: Depends on the vehicle conditions.

SYSTEM

< SYSTEM DESCRIPTION >

[K9K]

*2: If ABS system is activated, drive the vehicle at 12 km/h (7.5 MPH) or more after stop the vehicle.

CAUTION:

- The stop/start system may be cancelled when the battery is weak or if a battery other than the stop/start system specific battery is used.
- Even though the vehicle is in above conditions, the stop/start system may be cancelled automatically.

Refer to [ECK-10, "Precaution for Stop/Start System Service"](#).

Stop/Start Operation Condition

When the following conditions are satisfied, ECM stops the engine. And the combination meter turns ON a stop/start indicator lamp.

Item		Condition
Vehicle	Stop/start readiness condition	Ready
	Vehicle speed	Vehicle stopped [0 km/h (0 MPH)]
	Steering wheel	Not steer (steering force does not occur)
	Brake booster pressure	Presence of sufficient negative pressure to a brake-force. (Refer to BRC-36, "BRAKE FORCE DISTRIBUTION FUNCTION : System Description" .)
	Clutch pedal position	Released
Engine	Engine speed	Around idle speed (Approx. 850 rpm or less)
Transmission	Shift lever position	Neutral position

NOTE:

During the operation of the stop/start system, the stop/start system continues operating even if the vehicle is stopped by using the parking brake.

Restart Condition

When any of the following conditions is satisfied during stop/start system operating condition (gear position is neutral), ECM restarts the engine. And the combination meter turns OFF the stop/start indicator lamp.

Item		Condition
Stop/start OFF switch		ON (Switch indicator: ON)
Clutch pedal position		Fully depressed*
Air conditioning	Automatic air conditioning	DEF switch is pressed. Air conditioning system cannot keep the performance.
	Manual air conditioning	Mode dial is in DEF position.
Brake booster pressure		Insufficient negative pressure for braking force
Vehicle speed		2 km/h (1.3 MPH) or more
Intelligent parking assist		Intelligent parking assist is activated.
Battery		Poor battery performance (for details, refer to CHG-8, "ENERGY MANAGEMENT SYSTEM : System Description" .)

*: Restart timing varies according to vehicle condition. For details, refer to RELATIONSHIP BETWEEN VEHICLE CONDITION AND RESTART TIMING.

NOTE:

In models with M/T, the stop/start system operates continuously even if the steering wheel is operated during the system operating condition.

Restart Inhibit Mode

When the any of the following condition is satisfied during stop/start system operating condition, ECM inhibits restart of the engine (go into a state in ENGINE STALL). In this case, the engine needs to be started with ignition switch.

Item	Condition
Engine hood	Opened
Driver presence*	Absent: Both of the following conditions are satisfied. • Seat belt (driver side): Released • Door (driver side): Open

*: When the condition is satisfied either door open or seat belt released, ECM transitions to the recovery waiting mode (not ENGINE STALL) for approximately 5 minutes. In this case, the engine is able to start by clutch operation.

RELATIONSHIP BETWEEN VEHICLE CONDITION AND RESTART TIMING

ECM detects clutch pedal position based on the clutch pedal position switch signal and clutch interlock switch signal. The engine restart timing varies with gear position, vehicle speed, and clutch position.

Engine restart condition

x: Restart —: Not restart

Vehicle condition		Clutch pedal position					
Vehicle speed	Gear position	Fully depressed		Half depressed		Released	
		Clutch pedal position SW	Clutch interlock SW	Clutch pedal position SW	Clutch interlock SW	Clutch pedal position SW	Clutch interlock SW
		OFF	ON	OFF	OFF	ON	OFF
Vehicle stopped	Neutral	x		x		—	
	Except neutral	x		—		—	
Vehicle speed occurs	Neutral	x		x		x	
	Except neutral	x		—		—	

NOTE:

If the above mentioned “Not restart” condition occurs during restart, ECM stops cranking and returns to the stop/start system operating condition (engine stop).

ENGINE STALL ASSIST FUNCTION

The engine stall assist function allows the engine to start only with a clutch operation without operating the ignition switch when a clutch operation is unsuccessful during vehicle start.

When an engine stall caused by a clutch operation error is detected, the stop/start system enters the recovery waiting mode and ECM indicates the activation of engine stall assist function by illuminating the stop/start indicator lamp. When the clutch pedal is depressed under this condition, the engine starts.

NOTE:

This function also operates at an engine start other than the one performed during stop/start system operation. This function operates when the following conditions are satisfied:

- After engine warm-up.
- Vehicle stopped. (No vehicle speed input.)
- The battery is charged enough.
- No malfunctions in the engine control system and the stop/start system. (No DTC detected.)

VOLTAGE STABILIZER FUNCTION

ECM transmits a voltage stabilizer signal to the DC/DC converter during cranking at an engine restart. The DC/DC converter temporarily increases the voltage to prevent the electric equipment from reset due to low voltage. The adoption of the DC/DC converter enables a stable power supply to the electric equipment connected to the DC/DC converter and permits a substantial lowering of the voltage. For the electrical equipment connected to the DC/DC converter, see “SYSTEM DIAGRAM.

NOTE:

The brightness of the head lamps may be changed due to the voltage reduction at an engine restart because they are not connected to the DC/DC converter.

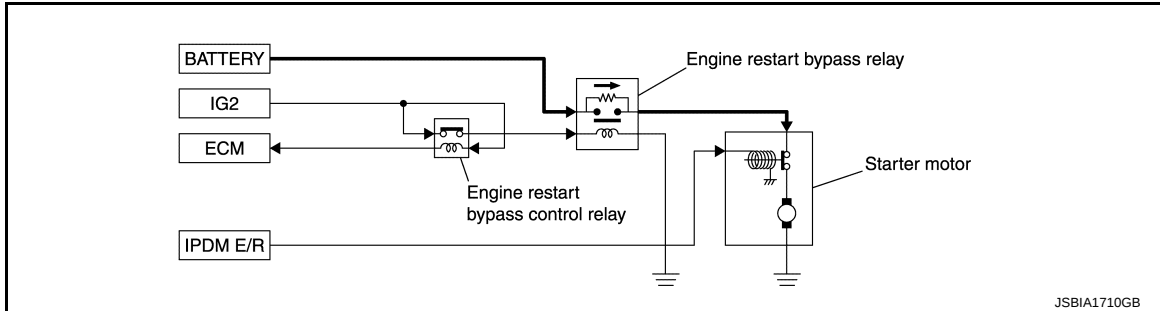
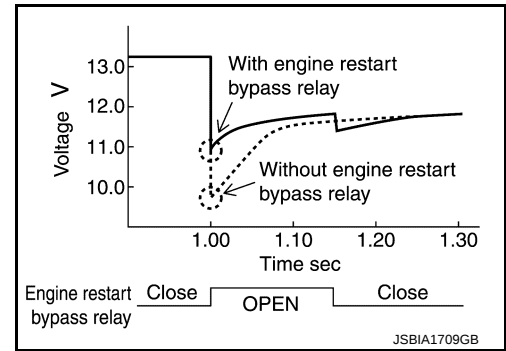
ENGINE RESTART BYPASS RELAY CONTROL

SYSTEM

< SYSTEM DESCRIPTION >

[K9K]

ECM controls the engine restart bypass control relay and activates the engine restart bypass relay. When the restart conditions are satisfied, ECM turns ON the engine restart bypass control relay instantaneously right after the restart and opens the engine restart bypass relay. This allows a current to pass the inner resistance circuit right after the starter motor is activated. When the starter motor is rotating, the voltage is directly supplied to the starter motor without being passed through the inner resistance circuit in the engine restart bypass relay because the engine restart bypass relay is closed. In this way, ECM enables the battery voltage stabilization and reduces the battery deterioration rate by decreasing the battery voltage drop resulted from cranking at an engine restart.



ENERGY MANAGEMENT SYSTEM

ENERGY MANAGEMENT SYSTEM : System Description

INFOID:0000000010500313

DESCRIPTION

ECM transmits a target power generation voltage signal received from IPDM E/R to the generator via LIN communication.

The generator includes a self-diagnosis function and transmits a diagnosis signal to ECM via LIN communication when detecting a malfunction. When ECM receives a diagnosis signal, ECM detects DTC and transmits a charge warning lamp request signal to the combination meter to turn ON the charge warning lamp.

For details of ENERGY MANAGEMENT SYSTEM, refer to [CHG-8. "ENERGY MANAGEMENT SYSTEM : System Description"](#).

CAN COMMUNICATION

CAN COMMUNICATION : System Description

INFOID:0000000010289659

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

Refer to [LAN-51. "CAN COMMUNICATION SYSTEM : CAN Communication Signal Chart"](#), about CAN communication for detail.

OPERATION

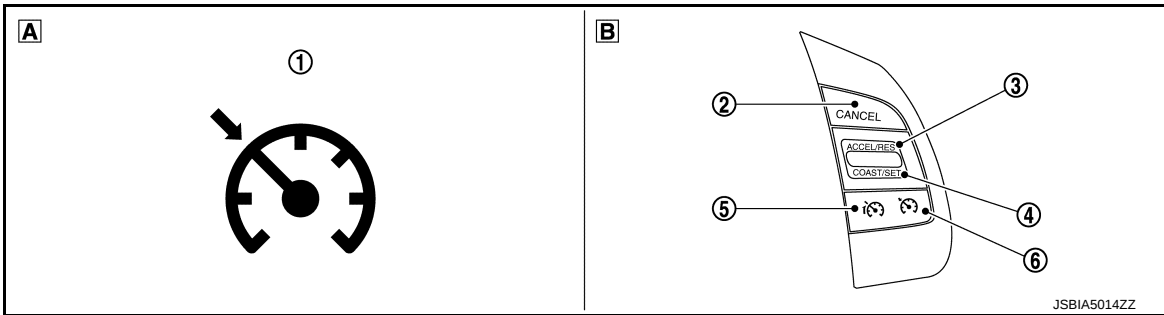
AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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

INFOID:0000000010289660

ECK

SWITCHES AND INDICATORS



- | | | |
|-----------------------------|------------------------------|---------------------|
| 1. CRUISE indicator | 2. CANCEL switch | 3. ACCL/RES switch |
| 4. COAST/SET switch | 5. Speed limiter MAIN Switch | 6. ASCD MAIN switch |
| A. On the combination meter | B. On the steering wheel | |

SET SPEED RANGE

ASCD system can be set the following vehicle speed.

Minimum speed (Approx.)	Maximum speed (Approx.)
40 km/h (25 MPH)	180 km/h (119 MPH)

SWITCH OPERATION

Item	Function
CANCEL switch	Cancels the cruise control driving.
ACCL/RES switch	- Resumes the set speed. - Increases speed incrementally during cruise control driving.
COAST/SET switch	- Sets desired cruise speed. - Decreases speed incrementally during cruise control driving.
ASCD MAIN switch	Master switch to activate the ASCD system.

SPEED LIMITER

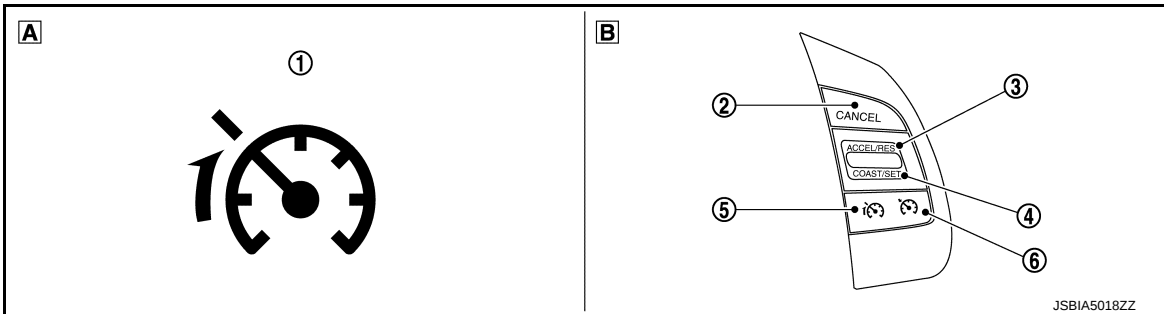
SPEED LIMITER : Switch Name and Function

INFOID:0000000010289661

SWITCHES AND INDICATORS

NOTE:

Shared with ASCD switch.



OPERATION

[K9K]

< SYSTEM DESCRIPTION >

- | | | |
|-----------------------------|------------------------------|---------------------|
| 1. Speed limiter indicator | 2. CANCEL switch | 3. ACCL/RES switch |
| 4. COAST/SET switch | 5. Speed limiter MAIN Switch | 6. ASCD MAIN switch |
| A. On the combination meter | B. On the steering wheel | |

SET SPEED RANGE

Speed limiter system can be set the following vehicle speed.

Minimum speed (Approx.)	Maximum speed (Approx.)
30 km/h (20 MPH)	180 km/h (119 MPH)

SWITCH OPERATION

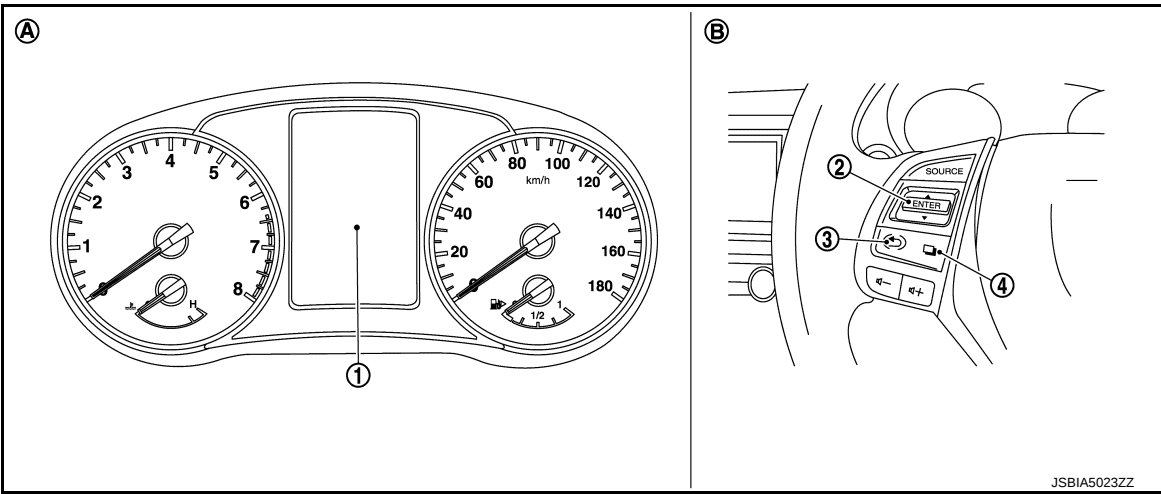
Item	Function
CANCEL switch	Cancels the speed limiter control.
ACCL/RES switch	- Resumes the set speed. - Increases the set speed incrementally.
COAST/SET switch	- Sets desired speed. - Decreases the set speed incrementally.
Speed limiter MAIN switch	Master switch to activate the speed limiter system.

OIL CONTROL SYSTEM

OIL CONTROL SYSTEM : Switch Name and Function

INFOID:0000000010289662

SWITCHES AND INDICATORS



- | | | |
|------------------------|-------------------------|----------------|
| A. Combination meter | B. Steering | |
| 1. Information display | 2. Enter/Up/Down switch | 3. Back switch |
| 4. Display switch | | |

SWITCH OPERATION

Item	Function
Steering switch	Refer to MWI-26, "Switch Name and Function" .

RESET OPERATION

CAUTION:

When an alert was displayed, change the engine oil, and reset the engine oil data.

- Turn ignition switch ON.
- On information display, select "Settings" >> "Maintenance" >> "Service".
- Press "ENTER" switch until "YES/NO" is appeared.

- 4. Select "YES".
- 5. Check that "—" is displayed.

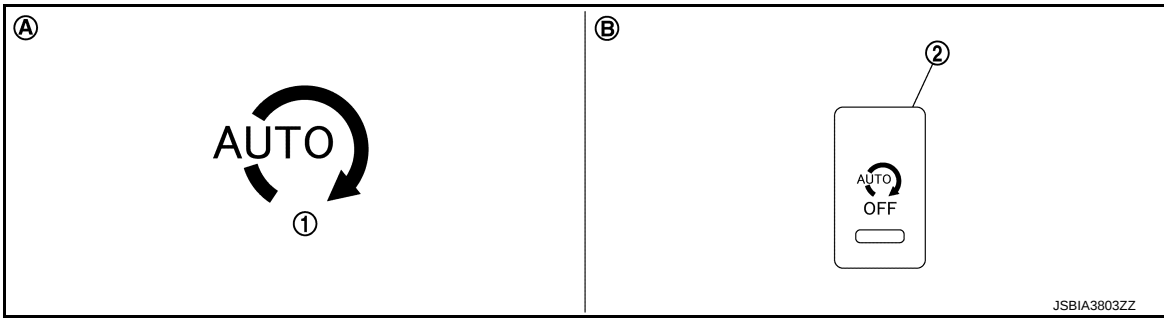
STOP/START SYSTEM

STOP/START SYSTEM : Switch Name and Function

INFOID:0000000010289663

ECK

SWITCHES AND INDICATORS



- 1. Stop/start indicator lamp
- 2. Stop/start OFF switch
- A. On the combination meter
- B. Lower instrument panel (driver side)

SWITCH OPERATION

Item	Function
Stop/start OFF switch	When the switch is pressed, switch indicator (LED) turns ON and the stop/start system can be deactivated.

NOTE:

If stop/start OFF switch turn ON when stop/start system is operating, stop/start system is canceled and engine restart.

HANDLING PRECAUTION

Precaution for Stop/Start System

INFOID:000000010499112

PRECAUTIONS FOR STOP/START SYSTEM OPERATION

The operation of the stop/start system needs to satisfy various conditions. For details of the conditions, refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

The stop/start system may not operate under the conditions listed below:

- After restarting the engine, the vehicle is repeatedly stopped and started at a low speed due to traffic congestion.
- When driving the vehicle repeatedly back and forth at a low speed due to parallel parking.
- When the intelligent key is not authenticated. (In this case, the KEY warning lamp built in the combination meter blinks.)
- The battery is deteriorated. (High discharge rate.)
- A battery other than the stop/start system-specific battery is used.
- Ambient temperature is extremely low.

HANDLING PRECAUTIONS

- When engine restart conditions are satisfied during the electric parking brake operation, ECM performs the engine restart after the completion of the electric parking brake operation. This may cause delay in engine restart, compared with a usual engine restart.
For a smooth engine restart under the stop/start system operating condition, restart the engine before releasing the parking brake.
- To use the stop/start system, the vehicle needs to recognize the status of battery. For this reason, the stop/start system may not be activated immediately after battery change.
- When restarting the vehicle under stop/start system operating condition, continue depressing the clutch pedal until the restart completes.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000010289665

DESCRIPTION

This system uses two malfunction indicator lamps. When detecting a system error, ECM turns ON the malfunction indicator lamp to alert the driver of the presence of malfunction.

MALFUNCTION INDICATOR LAMP (MIL) (YELLOW)

ECM turns ON MIL (yellow) when an emission-related malfunction occurs or when a component part specified by European laws and regulations becomes inoperable three trips in a row.

MALFUNCTION INDICATOR LAMP (MIL) (RED)

ECM may turn ON MIL (red) when a malfunction occurs in the engine.

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DIAGNOSIS SYSTEM (ECM)

CONSULT Function

INFOID:000000010289666

FUNCTION

Diagnostic test mode	Function
Self-diagnostic results	Self-diagnostic results such as DTC 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 indications 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 and homologation number can be read.
Configuration	This function is used to store vehicle specifications to ECM after ECM replacement.

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

- Diagnostic trouble codes

SELF-DIAGNOSTIC MODE

Self Diagnostic Item

Regarding items detected in “SELF-DIAG RESULTS” mode, refer to — [ECK-97, "DTC Index"](#).

How to erase DTC

- If power is continuously in the ON position after a DTC is detected, turn power switch OFF before turning power switch to the ON position again, and then erase DTC.
- Check the all self-diagnostic screen to confirm there are no DTCs in other ECUs.

Freeze Frame Data and 1st Trip Freeze Frame Data

The Freeze Frame Data shows the state of the vehicle at the time a DTC is detected and is useful in re-creating the circumstances that caused the malfunction.

NOTE:

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

Item*		Unit	Remarks
CONSULT screen terms	Full spell		
WATER TEMP	Water temperature	°C or °F	
ENGINE SPEED	Engine speed	rpm	
VEHICLE SPEED	Vehicle speed	km/h or mph	
COMPUTER SUPPLY VOLTAGE	Computer supply voltage	V	
RAIL PRES SET	Rail pressure setting	bar	
RAIL PRESSURE	Rail pressure	bar	
RAIL PRESS SEN VOLT	Rail pressure sensor voltage	V	
FUEL FLOW	Fuel flow	mg/cp	
BOOST PRESSURE	Boost pressure	mbar	
BOOST PRESS REF VAL-UE	Boost pressure reference value	hpa	
MEASURE AIR FLOW	Measured air flow	kg/h	
TURBOCHARGING SOLE-NOID VALVE OCR	Turbocharging solenoid valve OCR	%	
DAMPER VALVE UP-STREAM TEMPERATURE	Estimated inlet flap upstream temperature	°C or °F	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[K9K]

Item*		Unit	Remarks
CONSULT screen terms	Full spell		
MANIFOLD PRESSURE	Manifold pressure	mbar	
INLET AIR TEMPERATURE	Inlet air temperature	°C or °F	
EST. AIR FLOW	Estimated air flow	mg/cp	
INLET AIR FLOW	Inlet air flow	mg/cp	
ATMOSPHERIC PRES-SURE	Atmospheric pressure	mbar	
TBN UPSTR PRS SEN VOLT	Turbine upstream pressure sensor voltage	V	
AIR INLET/F REL POS	Air inlet flap relative position	%	
FUEL TEMPERATURE	Fuel temperature	°C or °F	
IN FLAP ABSO POSI	Air inlet flap absolute position	%	
INLET/F SEN SUPPLY VOLT	Inlet flap sensor supply voltage	mV	
DAMPER VALVE SEN VOLT	Damper valve sensor voltage	mV	
DMPR VLV SET POS	Damper valve setpoint position	%	
IN/FLAP CTRL	Inlet flap control	%	
SEN 1 FEED V	Sensors No. 1 feed voltage	mV	
ADDITIONAL INFO FD9C	Additional information FD9C	—	
ALTERNATOR LOAD	Alternator load	%	
ADDITIONAL INFO 2069	Additional information 2069	Nm	
SEN 2 FEED V	Sensors No. 2 feed voltage	mV	
PL PTNMR T2 V	Pedal potentiometer track 2 voltage	mV	
PL PTNMR T1 V	Pedal potentiometer track 1 voltage	mV	
HEATER PLUG CONTROL	Heater plug control	%	
EGR VALVE OPENING REFERENCE	EGR valve opening reference	%	
EGR VALVE CONTROL	EGR valve control	%	
LAST EGR VALVE OFFSET	Last EGR valve offset	%	
EGR VALVE FIRST OFF-SET	EGR valve first offset	%	
POTN VAL EGR VALVE CLSD	Potentiometer value EGR valve closed	%	
EGR SENSOR SUPPLY VOLTAGE	EGR sensor supply voltage	mV	
EGR POTENTIOMETER VOLTAGE	EGR potentiometer voltage	mV	
EXHAUST SYSTEM FLOW	Exhaust system flow	g/s	
ADDITIONAL INFORMA-TION 24F3	Additional information 24F3	°C or °F	
TEMP. UPSTREAM OF PF	Temperature upstream of particle filter	°C or °F	
PRS UPSTR OF TBN	Pressure upstream of turbine	mbar	
RFRG TEMP PRESS SEN VOLT	Refrigerant pressure sensor voltage	V	
REFRIGERANT PRES-SURE	Refrigerant pressure	bar	

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DIAGNOSIS SYSTEM (ECM)

[K9K]

< SYSTEM DESCRIPTION >

Item*		Unit	Remarks
CONSULT screen terms	Full spell		
TBN UPSTR TEMP SETP	Turbine upstream temperature set-point	°C or °F	
TEMP UPSTREAM TURBINE	Temperature upstream of turbine	°C or °F	
RV/LV BUTTON VOLTAGE	RV/LV button voltage	mV	
LAST OFF/V CLOSE	Last offset damper valve closed	%	
LAST OFF/V OPEN	Last offset damper valve open	%	
SEN SUPPLY N-3 VOL	Sensor supply No. 3 voltage	mV	
SUPPLY VOLTAGE EX-HAUST AIR FLAP SENSOR	Supply voltage exhaust air flap sensor	mV	
FIRST OFFSET OF THE CLOSED EXHAUST FLAP	First offset of the closed exhaust flap	%	
EGR LOW PRESSURE POSITION	EGR low pressure position	%	
LAST OFFSET OF CLOSED LOW PRESSURE EGR	Last offset of closed low pressure EGR	%	
EGR LOW PRESSURE OCR	EGR low pressure OCR	%	
LOW PRESSURE EGR POSITION REFERENCE VALUE	Low pressure EGR position reference value	%	
L/PRES EGR VALVE POSITION	Low pressure EGR valve position	%	
LOW PRESSURE EGR VALVE SUPPLY VOLTAGE	Low pressure EGR valve supply voltage	mV	
LOW PRESSURE EGR VALVE FIRST OFFSET	Low pressure EGR valve first offset	%	
PART.FILTER UPSTREAM TEMP SENSOR VOLTAGE	Part.filter upstream temperature sensor voltage	V	
ADDITIONAL INFO 2813	Additional information 2813	°Crk	
POST INJECTION FLOW	Post injection flow	mg/cp	
POST INJECTION FLOW 1	Post injection flow 1	mg/cp	
FLOW GAS IN DPF	Flow of gas inside the particle filter	m3/h	
P/FLT DIFF. PRS	Particle filter pressure diff	hPa	
REGEN MALFNC	Number of regeneration failure	—	
FIRST OFF/V CLOSE	First offset damper valve closed	%	
FIRST OFF/V OPEN	First offset damper valve open	%	
ATMOS PRESS SEN VOLT	Atmospheric pressure sensor voltage	mV	
OIL DILUTION INFORMATION	Oil dilution information	%	
RAIL FLOW REGULATION VALVE OCR	Rail flow regulation valve OCR	%	
CRNKS SYNC LOSS COUN	Crankshaft synchronisation loss counter	—	
AVERAGE PERIOD OF FLOWMETER SIGNAL	Average period of flowmeter signal	μS	
F/FLOW CORR CYL NO.1	Fuel flow correction for cylinder No.1	—	
F/FLOW CORR CYL NO.2	Fuel flow correction for cylinder No.2	—	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

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Item*		Unit	Remarks
CONSULT screen terms	Full spell		
F/FLOW CORR CYL NO.3	Fuel flow correction for cylinder No.3	—	
F/FLOW CORR CYL NO.4	Fuel flow correction for cylinder No.4	—	
ADDITIONAL INFORMATION FD1A	Additional information FD1A	μF	
ADDITIONAL INFORMATION FD19	Additional information FD19	μF	
ADDITIONAL INFORMATION FD1B	Additional information FD1B	μF	
ADDITIONAL INFORMATION FD1C	Additional information FD1C	μF	
CYLINDER 1 ADAPTATION STATUS	Cylinder 1 adaptation status	—	
CYLINDER 2 ADAPTATION STATUS	Cylinder 2 adaptation status	—	
CYLINDER 3 ADAPTATION STATUS	Cylinder 3 adaptation status	—	
CYLINDER 4 ADAPTATION STATUS	Cylinder 4 adaptation status	—	
MEDIAN OF TEMPERATURES WHOSE SENSORS ARE LIABLE TO RATIONALITY DIAGNOSIS	Median of temperatures whose sensors are liable to rationality diagnosis	°C or °F	
ADDITIONAL INFO 24D0	Additional information 24D0	—	
BRAKE CNT 1 DURATION	Brake contact 1 duration	S	
BRAKE CNT 2 DURATION	Brake contact 2 duration	S	
OIL TEMPERATURE - ENGINE	Oil temperature - engine	°C or °F	
ENGINE RPM	Engine rpm	rpm	
VEHICLE SPEED DISPLAYED	Vehicle speed displayed	km/h or mph	
ADDITIONAL INFO 287A	Additional information 287A	—	
ADDITIONAL INFORMATION FD42	Additional information FD42	—	
ADDITIONAL INFORMATION FD43	Additional information FD43	—	
ADDITIONAL INFORMATION FD4D	Additional information FD4D	—	
ADDITIONAL INFORMATION FD4E	Additional information FD4E	—	
MAIN INJECTION FLOW	Main injection flow	mg/cp	
LOADED NOx mass	Loaded nox mass	G	
CUMULATIVE MILEAGE IN HIGHWAY CONDITIONS	Cumulative mileage in highway conditions	km or mile	
ADDITIONAL INFO FD2D	Additional information FD2D	%	
ADDITIONAL INFO FD2F	Additional information FD2F	mg/cp	
ADDITIONAL INFO FD96	Additional information FD96	μF	
ADDITIONAL INFO FD2E	Additional information FD2E	rpm	
SOOT IN P/FLT	Soot in the particle filter	G	
EXH THROTTLE POSITION	Exhaust throttle position	%	

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DIAGNOSIS SYSTEM (ECM)

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Item*		Unit	Remarks
CONSULT screen terms	Full spell		
EXHAUST FLAP POSITION SETPOINT	Exhaust flap position setpoint	%	
EXHAUST AIR FLAP OCR	Exhaust air flap OCR	%	
EXHAUST AIR FLAP OFF-SET	Exhaust air flap offset	%	
FIRST OFFSET OF THE EXHAUST AIR FLAP OPEN	First offset of the exhaust air flap open	%	
EXHAUST FLAP ABSOLUTE POSITION	Exhaust flap absolute position	%	
PREHEATING MODE	Preheating mode	%	
ADDITIONAL INFO FD2D	Additional informaiton FD2D	%	
TURBO REGULATION	Turbo regulation	• MAX • PROTECT-ED • DIAG MODE • INACTIVE • REG • INTRME	
MOTOR-DRIVEN FAN UNIT REQUEST	Motor-driven fan unit request	• ACTIVE • INACTIVE	
MOTOR	Motor	• Off • RUNNING • STALLED • CRANKING • INACTIVE	
LOW FUEL LEVEL INFORMATION	Low fuel level information	• OK • LOW • INACTIVE	
GEARBOX RATIO	Gearbox ratio	• REVERSE • DCLTCH • INACTIVE	
COMBUSTION MODE SET	Combustion mode setting	• NORMAL • STATUS1 • STAT2 • STAT3 • STAT4 • INACTIVE	
ACC. PDL DETECT BLOCK	ACC. pedal detection blocked	• NO • YES	
PREHEATING REL CNT	Preheating relay control	• ACTIVE • DEACTIVAT • INACTIVE	
CRUISECONTROL/SPEED LIMITER OPERATION	Cruise control/speed limiter operation	• Off • SL ON • SL SUS • SL INHI • CC ON • CC SUS • CC INHI • CC/SL A • INACTIVE	
CC OPERATING RELIABLY	Cruise control operating reliably	• STAT0 • STAT3 • STAT2 • STATUS1 • INACTIVE	

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Item*		Unit	Remarks
CONSULT screen terms	Full spell		
CC/SL LMTR BUTTONS	Cruise control/speed limiter buttons	• INACTIVE • INVALID • CO.1 • SUSPD • MINUS • PLUS • RESTART	
BRAKING DETECTED MULTIPLEX SIGNAL	Braking detected multiplex signal	• MISSING • INTRME • PRESENT • INACTIVE	
COMP + AFTER IGNITION	Computer + After ignition	• DEACTIVAT • ACTIVE • INACTIVE	
EXHAUST FLAP HIGH SETTING	Exhaust flap high setting	• YET • DONE • INACTIVE	
CC/SL SPEED SIGNAL MONITORING	Cruise control/speed limiter speed signal monitoring	• STAT0 • STAT6 • STAT5 • STAT4 • STAT3 • STAT2 • STATUS1 • INACTIVE	
COMBUSTION MODE	Combustion mode setting	• NORMAL • STATUS1 • STAT2 • STAT3 • STAT4 • INACTIVE	
DPF REGENERATION PERMIT	Diesel particulate filter regeneration permit	• PRBT • AUTH • INACTIVE	
THERMOPLUNGER1 RELAY	Thermoplunger No. 1 relay control	• DEACTIVAT • ACTIVE • INACTIVE	
THERMOPLUNGER2 RELAY	Thermoplunger No. 2 relay control	• DEACTIVAT • ACTIVE • INACTIVE	
THERMOPLUNGER3 RELAY	Thermoplunger No. 3 relay control	• DEACTIVAT • ACTIVE • INACTIVE	
WATER IN DIESEL DETECTOR	Water in diesel detector	• NOT DETECTED • DETECTED • INACTIVE	
CRANKSHAFT SYNCHRONISATION	Crankshaft synchronisation	• INCORRECT • CORRECT • INACTIVE	
CRANK SIGNAL	Crank signal	• NOT DETECTED • DETECTED • INACTIVE	

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DIAGNOSIS SYSTEM (ECM)

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Item*		Unit	Remarks
CONSULT screen terms	Full spell		
VEHICLE SPEED UNIT	Vehicle speed unit	• NOT DETECTED • DETECTED • INACTIVE	
CAM TDC SYNC	Camshaft TDC synchronisation	• NOT DONE • DONE • INACTIVE	
PREHEATER LIGHT	Preheating warning light	• EXTING • ILLUM • INACTIVE	

*: 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.

Monitor item	Unit	Description	Remarks
INLET AIR TEMPERATURE	°C or °F	Intake air temperature is displayed.	
BOOST PRESSURE	mbar	Turbocharger boost pressure is displayed.	
TEMP UPSTREAM TURBINE	°C or °F	Exhaust gas temperature computed from exhaust gas temperature sensor 1 is displayed.	
ATOMOS PRESS	mbar	Atmospheric pressure is displayed.	
WATER TEMP	°C or °F	Engine coolant temperature is displayed.	
COMP SUP VOLT	V	The power supply voltage of ECM is displayed.	
ENGINE SPEED	rpm	Engine speed computed from crankshaft position sensors displayed.	
VEHICLE SPEED	km/h or mph	The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
MEASURE AIR FLOW	kg/h	Intake air flow rate computed from the mass air flow sensor signal is displayed.	
RAIL PRESSURE	bar	Fuel rail pressure is displayed.	
RAIL PRES SET	bar	Target fuel rail pressure is displayed.	
UPS PRTCL FLTR TMP	°C or °F	Exhaust gas temperature before DPF computed from the upstream DPF temperature sensor.	
FUEL FLOW S/V CURRENT	mA	Current value of fuel flow actuator is displayed.	
LAST OFF/V CLOSE	%	Inlet throttle valve offset - last closed learning	
IN FLAP ABSO POSI	%	Raw value of the position in percent of the sensor supply voltage	
FIRST OFF/V OPEN	%	Inlet throttle valve offset - first opened learning	
FIRST OFF/V CLOSE	%	Inlet throttle valve offset - first closed learning	
LAST OFF/V OPEN	%	Inlet throttle valve offset - last opened learning	
REGENERATION FAIL	—	Indicates the number of DPF regeneration failures since the last success.	
FLOW GAS IN DPF	m3/h	Flow of gas inside the DPF is displayed.	
POST INJEC FLOW 1	mg/cp	Post injection quantity is displayed.	
SOOT IN P/FLT	g	Soot mass in the DPF is displayed.	
EX SYSTEM FLW	g/s	Exhaust gas air mass flow for estimation of downstream pressure and temperature models	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

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Monitor item	Unit	Description	Remarks
DIFF EXH PRES.	hPa	Differential exhaust gas pressure before/after DPF is displayed.	A
PART.FILTER UPSTREAM TEMP SENSOR VOLTAGE	mV	Upstream DPF Temperature Sensor signal voltage is displayed.	ECK
EGR VALVE FIRST OFFSET	%	High pressure EGR valve offset - first learning	
LAST EGR VALVE OFFSET	%	High pressure EGR valve offset - last learning	
PTNMR EGR VLV CL	%	Absolute position in percent of the sensor supply voltage	C
EXH GAS PRESS SEN 1	mbar	Exhaust gas pressure before turbine computed from the exhaust gas pressure sensor 1 is displayed.	D
FUEL TEMP	°C or °F	Fuel temperature computed from the fuel temperature sensor is displayed.	
RAIL PRESSURE	mV	Fuel rail pressure computed from the fuel rail pressure sensor is displayed.	E
PL PTNMR T1 V	mV	Accelerator pedal position sensor 1 signal voltage is displayed.	
PL PTNMR T2 V	mV	Accelerator pedal position sensor 2 signal voltage is displayed.	F
ACCEL/PDL POS	—	Accelerator pedal position is displayed.	G
EGR VALVE POSITION SEN	mV	High pressure EGR volume control valve position sensor signal voltage is displayed.	
RV/LV BUTTON VOLTAGE	mV	ASCD/Speed limiter steering switch voltage	H
RFRGRNT PRSS	bar	Refrigerant pressure is displayed.	
FUEL FLOW	mg/cp	Total fuel flow is displayed.	
TOTAL DRIVE DISTANCE	km or mile	Total drive distance is displayed.	I
SEN 1 FEED V	mV	Sensors power supply voltage 1 is displayed.	
SEN 2 FEED V	mV	Sensors power supply voltage 2 is displayed.	J
SEN SUPPLY N-3 VOL	mV	Sensors power supply voltage 3 is displayed.	
VEHICLE SPEED DISPLAYED	km/h or mph	The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	K
BOOST PRESSUR	hPa	The boost pressure (determined by the signal voltage of the turbocharger boost sensor) is displayed.	
TURBOCHARGING SOLENOID VALVE OCR	%	Turbocharger boost control solenoid valve open is displayed.	L
AIR INL TMP SEN VO	mV	Intake air temperature sensor 1 signal voltage is displayed.	
ATMOSPHERIC P	mV	Atmospheric pressure sensor voltage	M
HEATER PLUG CONTROL	%	Glow plug control PWM command is displayed.	
AIR INL FLAP REL PO	%	Throttle opening angle is displayed.	N
EGR/V OPN REF	%	High pressure EGR volume control valve opening reference is displayed.	
EGR VLV CONT	%	High pressure EGR volume control valve PWM command is displayed.	O
DMP V SET POS	%	Throttle opening angle is displayed.	
EST. AIR FLOW	mg/cp	Estimated air flow is displayed	P
TURB PRE SEN VOL	mV	Exhaust gas pressure sensor 1 signal voltage is displayed.	
ALTERNATOR LO	%	Alternator load is displayed.	
INLET AIR/FLW	mg/cp	The inlet air flow (determined by the signal voltage of the mass air flow sensor) is displayed.	
REFRGRT PRESS SEN	V	Refrigerant signal voltage is displayed.	
IN/FLAP CTRL	%	Inlet throttle PWM command is displayed.	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

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Monitor item	Unit	Description	Remarks
DMPR VLV SEN VO	mV	Inlet throttle position sensor voltage	
EST INL FLP TMP	°C or °F	Inlet throttle upstream temperature	
INL FLP SEN SUP VO	mV	Inlet throttle position sensor signal voltage is displayed.	
EGR POSITION	%	High pressure EGR position is displayed.	
TURB TMP SET	°C or °F	Exhaust gas temperature set point is displayed.	
MANIFOLD PRESSURE	mbar	Intake manifold pressure computed from the TC boost sensor is displayed.	
EXH GAS TEMP (UPSTM CAT)	°C or °F	This item is indicated, but not used.	
EXH THRRTL VALVE OFFSET	%	Exhaust Air Flap - Current value of the "last closed thrust position" learnt.	
OIL DILUTION INFORMATION	%	Oil dilution rate	
L/ PRES EGR/V FIRST OFFSET	%	Low Pressure EGR valve - Current value of the first closed thrust position learnt	
L/PRES EGR VALVE POSITION	%	Low pressure EGR volume control valve position is displayed.	
EXH THROTTLE POSITION	%	Exhaust throttle opening rate is displayed.	
ALTERNATOR POWER	W	Alternator power	
L/PRES EGR VALVE POS SEN	mV	Low pressure EGR volume control valve position sensor signal voltage is displayed.	
ENGINE REV COUNT	—	Number of engine revolutions since the last oil drain	
ENG OIL DILU RATIO	%	Current oil dilution rate for oil wear estimation	
ENG TORQUE	Nm	Engine output torque calculated by ECM is displayed.	
EXH THROTTLE POS SEN	mV	Exhaust throttle position sensor signal voltage is displayed.	
DPF PRESSURE	hPa	Memorized difference pressure to apply on the CSF differential pressure for adaptation	
Cruise control setting	km or mile	The preset ASCD vehicle speed is displayed.	
DURATION OF RESUME BUTTON PRESS	s	Duration of resume button press is displayed.	
DURATION OF + BUTTON PRESS	s	Duration of SET/+ button press is displayed.	
DURATION OF - BUTTON PRESS	s	Duration of SET/- button press is displayed.	
DURATION OF SUSPEND BUTTON PRESS	s	Duration of suspend button press is displayed.	
NUMBER OF ABNORMAL CC/SL TRANSITIONS	—	Maximum value of blocked button detection counter	
MOTOR	RUNNING/ OFF/ STALLED/ CRANKING	Engine status is displayed.	
1ST IN VAL OPEN PR	YES/NO	Inlet throttle valve offset - first opened learning running	
1ST IN VAL CLOS PR	YES/NO	Inlet throttle valve offset - first closed learning running	
THERMOPLUNGER	DETCT/ACTIVE	Thermoplunger No.1 status is displayed.	
THERMOPLNGR 2	DETCT/ACTIVE	Thermoplunger No.2 status is displayed.	
THERMOPLNGR 3	DETCT/ACTIVE	Thermoplunger No.3 status is displayed.	
EGR FUN PROG	YES/NO	High pressure EGR volume control valve offset - first learning running	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

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Monitor item	Unit	Description	Remarks
CAM TDC SYNC	NOT DONE/ DONE	Camshaft/crankshaft synchronization status is displayed.	
C/U+AFTR IGN	MISSING/ PRESENT	Ignition switch status is displayed.	
CLUTCH PEDAL SWITCH	INACTIVE/AC- TIVE/ BLOCKED	Clutch pedal position switch status is displayed.	
CCS LMT BTN	INACTIVE/IN- VALID/CO.1/ SUSPD/MI- NUS/PLUS/ RSTRT	ASCD steering switch status is displayed. • INACTIVE: unpressed • INVALID: invalid voltage • CO.1: open circuit • SUSPD: suspend switch pressed • MINUS: SET/- switch pressed • PLUS: SET/+ switch pressed • RSTRT: RES switch pressed	
CRS CN/SPD LMT OP	OFF/SL ON/SL SUS/SL INHI/ CC ON/CC SUS/CC INHI/ NONE	ASCD and speed limiter status is displayed. • OFF: ASCD and speed limiter is no activated. • SL ON: speed limiter is activated. (active or over speed) • SL SUS: speed limiter is activated. (awaiting or sus- pended) • SL INHI: speed limiter requested and in failure • CC ON: ASCD is activated. (active) • CC SUS: ASCD is activated. (awaiting or suspended) • /CC INH: ASCD requested and in failure • NONE: ASCD and speed limiter not present	
CC/SL CONNECTION AFTER CC BUTTON PRESSED	Not detected/ DETCT	When ASCD MAIN switch is pressed, it displays actual ASCD operating condition detected by ECM.	
CC/SL CONNECTION AFTER SL BUTTON PRESSED	Not detected/ DETCT	When speed limiter MAIN switch is pressed, it displays ac- tual speed limiter operating condition detected by ECM.	
CRS C/SPD LIM	Inactive/REG- UL/LIMIT/Inco- herence	Speed limiter MAIN switch status is displayed.	
CC/SL ACT DR	STAT1/STAT2/ STAT3/STAT4/ STAT5	Cancellation condition of ASCD/speed limiter is displayed. • STAT1: ASCD/speed limiter main switch changed. • STAT2: Suspend button is pressed. • STAT3: ASCD brake switch is ON. • STAT4: Clutch pedal position switch is ON. • STAT5: Shift the selector lever to "N" position. • NONE: Deactivation	
TRC/ANTI-YAW CNT	No/Yes	Anti skid regulation or anti yaw control in regulation.	
CRUISE CONTROL	COR/Incoher- ence	Speed/set point ratio too small.	
PARKING BRAKE	RELES/AP- PLIED	Parking brake status is displayed.	
CC CONT INHI INJ	No/Yes	ASCD system engine control inhibition	
SL INHI INJECTION	No/Yes	Speed limiter system engine control inhibition	
CLUTCH INFO UNAV	Not detected/ DETCT	Clutch information unavailable is detected.	
BRAKE INFO UNAVAI	Not detected/ DETCT	Brake information unavailable is detected.	
BRAKE INFO ABSENT	Not detected/ DETCT	Brake information absent is detected.	
DECELE W/O BRAKE	Not detected/ DETCT	Sudden braking detected without brake information	
SHA DEC W/O BRAK	Not detected/ DETCT	Braking detected without brake information	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

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Monitor item	Unit	Description	Remarks
CC INHI INJECTION	Not detected/ DETCT	ASCD inhibition is detected.	
DISP VEHI SP UNAV	Not detected/ DETCT	Displayed vehicle speed unavailable is detected.	
ACT SP INFO ABSE	Not detected/ DETCT	Real vehicle speed unavailable is detected.	
DISP SP INFO ABSE	Not detected/ DETCT	Display vehicle speed absence is detected.	
CHANGE SP UNIT	Not detected/ DETCT	Change of the displayed speed unit is detected.	
SL INHI INJECTION	Not detected/ DETCT	Speed limiter inhibition is detected.	
VEHICLE SPEED UNIT	km/h/mph	Vehicle speed is displayed.	
WIRED BRAK CONTA	OFF/ PRESSED/ INTM	ASCD brake switch state is displayed.	
CC OPERATING RELIABLY	STAT1/STAT2/ STAT3	State of the failures which cause irreversible ASCD safety failure is displayed. • STAT1: Presence of ASCD force request despite the ASCD deactivation • STAT2: Activation of the open brake switch without ASCD deactivation • STAT3: Activation of the minimum travel clutch switch without ASCD deactivation	
TURBO REGULATION	Inactive/REG- UL/INTM/DIAG MODE/ PRTCT/MAX	Boost regulation state is displayed.	
CC/SL CONN AUTH	Inactive/AC- TIVE	Authorization to connect ASCD and speed limiter options status is displayed.	
LOW FUEL LEVEL INFORMATION	OK/Low	LOW FUEL LEVEL INFORMATION is displayed.	
WTR DIESEL DETECTR	Not detected/ DETCT	This item is not used.	
COOLING FAN ACTIV REQ	INACTIVE/AC- TIVE	Cooling fan request status is displayed.	
CC/SL SPEED SIGNAL MONITORING	STAT1/STAT2/ STAT3/STAT4/ STAT5/STAT6	State of the reversible failures not due to ASCD/speed limiter which cause ASCD/speed limiter failure • STAT1: Real vehicle speed unavailable is detected. • STAT2: Displayed vehicle speed unavailable is detected. • STAT3: Real vehicle speed absence is detected. • STAT4: Display vehicle speed absence is detected. • STAT5: Change of the displayed speed unit is detected. • STAT6: Speed limiter inhibition is detected.	
COMBU MODE SET	NORMAL/ 1.DEF/2.DEF/ 3.DEF/STAT4/ RESERV/ STAT5/STAT6/ 4.DEF	REQUIREMENT VALUE OF COMBUSTION MODE is displayed.	
COMBUSTION MODE	NORMAL/ 2.DEF/3.DEF/ STAT4/RE- SERVED/ 1.DEF/STAT5/ STAT6/4.DEF	REQUIREMENT VALUE OF COMBUSTION MODE is displayed.	

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Monitor item	Unit	Description	Remarks
EXH THRTL/ V CLSD POS LRN	NOT DONE/ DONE	Indicates Exhaust Throttle Valve Closed Position Learning status.	A
ETAT PRIVE 5	1.DEF/2.DEF	Combustion mode - particulate filter regeneration authorization state	ECK
INJ ERROR FIND PROCEDRE	1.DEF/2.DEF	Error detected by the monitoring of supplier injections (value after reset)	
L/PRES EGR/V CLSD POS LRN	NOT DONE/ DONE	Indicates Low Pressure EGR Volume Control Valve Closed Position Learning status.	C
LOW PRESSURE EGR VALVE PROGRAMMING	UNAVAIL- ABLE/AVAILBL	Low Pressure EGR Volume Control Valve Offset - first learning running	D
STARTER BUTTON	PRESSED/ RELSD	Ignition switch status is displayed.	
ENGAGE REVERSE GEAR	No/Yes	Selector lever "R" position status is displayed.	E
AUTOMATIC GEARBOX IN DEFECT MODE	Not detected/ DETCT	Transaxle in limp home mode is detected.	
ACT SP INFO UNAV	Not detected/ DETCT	Real vehicle speed unavailable is detected.	F
VEHICLE SPEED DISPLAYED	UNAVAIL- ABLE/AVAILBL	Displayed vehicle speed received on the CAN network not available after a filtering time	G
VEHICLE SPEED MULTIPLEXED INFORMATION	UNAVAIL- ABLE/AVAILBL	Vehicle speed received on the CAN network not available after a filtering time	
GEARBOX RATIO	DECLTC/1/2/3/ 4/5/6/RVRS	Current gear engaged • DECLTC: Declutched at rest • 1: 1st gear • 2: 2nd gear • 3: 3rd gear • 4: 4th gear • 5: 5th gear • 6: 6th gear • RVRS: Reverse	H
FIRST START	NOT DONE/ DONE	First start status is displayed.	I
CLUTCH CONTACT MULTIPLEX SIGNAL	UNAVAIL- ABLE/AVAILBL	Filtered unavailable clutch pedal status information	J
CLUTCH CONTACT WIRING - START OF TRAVEL	UNAVAIL- ABLE/AVAILBL	Begin stroke clutch pedal switch for cruise control safety	K
COMP + AFTER IGNITION	PRESENT/IN- ACTIVE	Key state	L
A/C ATRSTION	NOT DONE/ DONE/INAC- TIVE	Air conditioning request	M
THERMOPLUNGER1 RELAY	DEACTIVAT/ ACTIVE/INAC- TIVE	Thermoplungers command state	N
THERMOPLUNGER2 RELAY	DEACTIVAT/ ACTIVE/INAC- TIVE	Thermoplungers command state	O
THERMOPLUNGER3 RELAY	DEACTIVAT/ ACTIVE/INAC- TIVE	Thermoplungers command state	P
BRAKE PEDAL	NO PRS/RE- SERVED/ PRESSED/IN- ACTIVE	Brake pedal - close active switch state	

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< SYSTEM DESCRIPTION >

Monitor item	Unit	Description	Remarks
CC/SL LMTR	DEACTIVAT/ ACTIVE//INAC- TIVE	Cruise control On/Off button state	
COMBUSTION MODE - PARTICULATE FILTER REGENERATION AUTHORIZATION STATE	1.DEF/2.DEF/ INACTIVE	Combustion mode - particulate filter regeneration authorization state	
PREHEATING REL CNT	ACTIVE/DE- ACTIVAT//IN- ACTIVE	State of glow plug control actuator relay	
CRUISE CONTROL/SPEED LIMITER OPERATION	OFF/SL ON/SL SUS/SL INHI/ CC ON/CC SUS/CC INHI/ CC/SL A//IN- ACTIVE	CCSL - Status	
CC/SL DEACT BY DR ACTIN	STATUS1/ STAT2/STAT3/ STAT4/STAT5/ NONE//INAC- TIVE	CCSL - State of the causes for normal CCSL deactivation	
WATER PUMP RELAY COMMAND	DEACTIVAT/ ACTIVE//INAC- TIVE	Flow water valve command of water system	
BRAKE SWITCH	WITHOUT/ WITH//INAC- TIVE	Configuration - Brake pedal - open active switch	
FUEL PUMP RELAY	DEACTIVAT/ ACTIVE//INAC- TIVE	State of the fuel pump relay control	
WATER IN DIESEL DETECTOR	NOT DETECT- ED//DETECT- ED//INACTIVE	Flag that indicates the activation of the fuel water sensor	
STATIC REGEN (IWRKSHOP)	STATUS1/ STAT2/STAT3/ STAT4/STAT5/ STAT6//INAC- TIVE	CSF statemachine status for aftersale diagnosis regeneration	
CC/SL LMTR BUTTONS	INACTIVE//IN- VALID//CO.1/ SUSPD//MI- NUS//PLUS/ RESTART//IN- ACTIVE	CCSL - Steering wheel push buttons state	
ENG OIL DILUTION	NO//YES//INAC- TIVE	OWE - Boolean set if the first oil dilution threshold is passed	
GEARBOX RATIO TARGET	NOT DONE/ DONE//INAC- TIVE	Targeted gear engaged	
VEHICLE SPEED DISPLAYED	UNAVAIL- ABLE//AVAIL/ INACTIVE	Displayed vehicle speed received on the CAN network not available after a filtering time	
CL CONTACT WIRE SIGNAL	RELS//D/ PRESSED//IN- ACTIVE	Clutch pedal - minimum travel switch state - wire	
MANUAL OR ASSISTED PARKING BRAKE	RELS//D//AP- PLIED//INAC- TIVE	Automatic or manual parking brake detected	

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< SYSTEM DESCRIPTION >

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Monitor item	Unit	Description	Remarks
CRUISE CONTROL INFO MONITORING	STAT0/STAT8/ STAT7/STAT6/ STAT5/STAT4/ STAT3/STAT2/ STATUS1/IN- ACTIVE	CCSL - State of the reversible failures not due to CC which cause CC failure	
MANUAL GEARBOX LEVER IN NEUTRAL	NOT DETECT- ED/DETECT- ED/INACTIVE	Neutral engaged switch for manual gearbox	
BRAKING DETECTED MULTIPLEX SIGNAL	MISSING/IN- TRME/ PRESENT/IN- ACTIVE	Brake pedal - switches consolidation state	
CLUTCH INFO UNAVAILABLE	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CC which cause CC failure	
CLUTCH INFO ABSENT	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CC which cause CC failure	
BRAKE INFO UNAVAILABLE	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CC which cause CC failure	
DECEL W/O BRK DEPR	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CC which cause CC failure	
S/DECEL W/O BRK DEPR	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CC which cause CC failure	
CC INHIBITED BY INJECTION	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CC which cause CC failure	
SL INHIBITED BY INJECTION	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CCSL which cause CCSL failure	
ACTL VHCL SPD INFO UNAVL	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CCSL which cause CCSL failure	
DISP VHCL SPD UNAVL	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CCSL which cause CCSL failure	
ACTL VHCL SPD INFO ABSNT	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CCSL which cause CCSL failure	
DISP VHCL SPD INFO ABSNT	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CCSL which cause CCSL failure	
CHANGE OF VHCL SPD UNIT	NOT DETECT- ED/DETECT- ED/INACTIVE	CCSL - State of the reversible failures not due to CCSL which cause CCSL failure	
WIRED BRAKE CONTACT	NO PRS/IN- TRME/ PRESSED/IN- ACTIVE	Brake pedal - open active switch state	
FAST IDLE SPD FUNCTION	INACTIVE/AC- TIVE	Configuration - Accessories idle engine speed strategy	

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DIAGNOSIS SYSTEM (ECM)

[K9K]

< SYSTEM DESCRIPTION >

Monitor item	Unit	Description	Remarks
CLUTCH START OF TRAVEL SWITCH	CONNECTED/ N CON/INACTIVE	Configuration - Clutch pedal - minimum travel switch	
MOTOR-DRIVEN FAN UNIT REQUEST	ACTIVE//INACTIVE	Motor-fans requests	
REGENERATION COMMAND	STATUS1/ STAT2/STAT3/ STAT4/STAT5/ STAT6/STAT7/ STAT8/STAT9/ STAT10/INACTIVE	CSF - After-sales regeneration status	
REGENERATION AUTHORIZATION	INACTIVE/ACTIVE	External controls safety authorization flag	
SL INHI SYS INJ	NO/YES/INACTIVE	CCSL - State of the system causes for normal CCSL deactivation	
COMBUSTION MODE SET	NORMAL/STATUS/INACTIVE	Requirement value of combustion mode	
EXHAUST FLAP HIGH SETTING	YET/DONE/INACTIVE	Exhaust Air Flap - Boolean of first learning stored in EEPROM	
EXHAUST AIR FLAP PROGRAMMING	NOT DONE/ DONE/INACTIVE	Exhaust Air Flap - Boolean of first learning stored in EEPROM	
SPEED LIMITER	LIMIT/INACTIVE	Speed limiter On/Off button state	
STOP WARNING LIGHT	YES/NO/INACTIVE	CCSL - State of the system causes for normal CCSL deactivation (2nd byte)	
CL START OF TRAVEL SW	RELS/DETTED/INACTIVE	State of the begin high of the clutch pedal (0 = pedal released, 1 = pedal pressed)	
SPEED LIMITER FUNCTION	NOT DETECTED/DETTED/NOT DEFINED	Configuration - Speed limiter	
CRUISE CONTROL FUNCTION	WITHOUT/ WITH/INACTIVE	Configuration - Cruise control	
CC/SL LMTR BUTTONS	WITHOUT/ WITH/INACTIVE	CCSL - Steering wheel push buttons state	
ACC. PDL DETECT BLOCK	NO/YES	Counter of inconsistencies between accelerator pedal and brake	
CLUTCH START OF TRAVEL SWITCH	NO PRS/ PRESSES/INVALID/INACTIVE	Configuration - Clutch pedal - minimum travel switch	
CLUTCH END OF TRAVEL SWITCH	NO PRS/ PRESSES/RESERVED/INVALID/ INACTIVE	Clutch pedal - maximum travel switch state	
SWIRL/F CLOSED POS LEARN	NOT DONE/ DONE/INACTIVE	Swirl Flap - Flag of the first closed thrust learnt and stored in EEPROM	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[K9K]

Monitor item	Unit	Description	Remarks
INJECTION PROTECTION	NOT PRO- TECTED/ STAT2/STAT3/ Inactive/ STATUS1/In- active/STAT4/ INDETERMI- NATE/	Immobilizer	
A/C COMMAND	NOT DETECT- ED/DETECT- ED/INACTIVE	Air conditioning request detection	
ACCELERATED IDLE RE- QUEST	INACTIVE/AC- TIVE	Idle speed for LCV accessories activation requested by BCM	
PREHEATER LIGHT	EXTING/IL- LUM/INAC- TIVE	Preheating lamp state	
RECYC EXGAS COOLING	INACTIVE/AC- TIVE	EGR cooling bypass state	
TURB ELEC WTR PMP CMND	ACTIVE/INAC- TIVE	Turbo water cooling pump command	
EXHAUST INJ S/V COMMAND	INACTIVE/AC- TIVE	5th injector solenoid valve command	
SWIRL/F OPEN POS LEARN	NOT DONE/ DONE/INAC- TIVE	Swirl Flap - Flag of the first opened thrust learnt and stored in EEPROM	
CRANKSHAFT SYNCHRONI- SATION	INCORRECT/ CORRECT/IN- ACTIVE	Crankshaft synchronization state	
CRANK SIGNAL	NOT DETECT- ED/DETECT- ED/INACTIVE	Crankshaft signal	
ATMOSPHERIC PRESSURE	MBAR	Atmospheric pressure	
COMPUTER SUPPLY VOLTAGE	V	Battery voltage	
NUMBER OF ROT ENG		OWE - Number of engine revolutions since the last oil drain	
ENGINE OIL DILUTION RATIO	%	Current raw oil dilution rate	
TEMP. UPSTREAM OF PF	°C or °F	CSF upstream temperature	
REGEN MALFNC		CSF - Indicates the number of regeneration failures since the last success	
TEMP. UPSTRM OF CAT CNV	°C or °F	Catalyst exhaust gas 1 upstream temperature (from sen- sor)	
AIR FLOW REFERENCE	mg/cp	Mass air flow setpoint	
ROUGH TC PRESS	kPa	\$01 - Intake Manifold Absolute Pressure	
EGR LOW PRESSURE POSI- TION	%	Low Pressure EMTV - position relative to the closed thrust	
ENGINE TORQUE	Nm	Estimated effective engine torque	
POST INJECTION FLOW 1	mg/cp	Late post injection quantity	
EXHAUST SYSTEM FLOW	g/s	Exhaust gas air mass flow for estimation of downstream pressure and temperature models	
P/FLT DIFF. PRS	hPa	CSF - Particulate differential pressure	
EXHAUST AIR FLAP OFFSET	%	Exhaust Air Flap - Current value of the "last closed thrust position" learnt.	
POTN VAL EGR VALVE CLSD	%	Absolute position in percent of the sensor supply voltage	

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DIAGNOSIS SYSTEM (ECM)

[K9K]

< SYSTEM DESCRIPTION >

Monitor item	Unit	Description	Remarks
POSITION SETPOINT SENT BY THE MONITORING SYSTEM	%	Position setpoint sent by the monitoring system	
FUEL TEMPERATURE	°C or °F	Fuel temperature	
PARTICLE FILTER DIFF. PRESSURE CORRECTION	hPa	CSF - Memorized difference pressure to apply on the CSF differential pressure for adaptation	
RAIL PRESS SEN VOLT	V	Rail pressure sensor voltage	
LOW PRESSURE EGR AIR TEMPERATURE	°C or °F	Temperature sensor after EGR cooler	
LOW PRESSURE EGR VALVE FIRST OFFSET	%	Low Pressure EMTV - Current value of the first closed thrust position learnt	
ACCELERATOR PEDAL POSITION	NO	Accelerator pedal position	
RAIL PRESS LOOP VAR	bar	Rail pressure	
EGR POTENTIOMETER VOLTAGE	mV	EGR valve position sensor voltage	
PF PRS SEN VOLT	mV	CSF upstream pressure	
DAMPER VALVE SEN VOLT	mV	Analogic StateLine Value of the Smart Inlet Throttle	
SUPPLY VOLTAGE EXHAUST AIR FLAP SENSOR	mV	Exhaust Air Flap - Voltage supplied to the sensor	
REFRIGERANT PRESSURE	bar	Relative air conditioning pressure	
DAMPER VALVE UPSTREAM TEMPERATURE	°C or °F	Inlet throttle upstream temperature	
MILEAGE	km or mile	Total vehicle distance	
ADDITIONAL INFO FD23	V	Sensors power supply voltage raw acquisition (3)	
LOW PRESSURE EMTV - EGR BP VALVE CONTROL SETPOINT USED BY THE MONITORING SYSTEM	%	Low Pressure EMTV - EGR BP valve control setpoint used by the monitoring system	
BOOST PRESS REF VALUE	hPa	Boost pressure setpoint	
AIR INLET TEMP SEN VOLT	V	Intake air temperature voltage	
FAULT APPEARANCE COUNTER	wu	Total occurrence counter of default	
AIR INLET/F REL POS	%	Inlet throttle relative position	
EGR VALVE OPENING REFERENCE	%	EGR valve position setpoint	
EGR VALVE CONTROL	%	EGR valve PWM command	
RFRG TEMP PRESS SEN VOLT	V	Freon pressure sensor voltage	
DMPR VLV SET POS	%	Inlet throttle position setpoint	
ADDITIONAL INFO 2069	Nm	Final indicated torque setpoint	
TBN UPSTR PRS SEN VOLT	V	Pressure before turbine sensor voltage	
MAX PERMISSIBLE SPEED	km/h or mph	Requested speed setpoint for FSL function	
INLET AIR FLOW	mg/cp	Mass air flow	
ADDITIONAL INFO FD2E	rpm	Engine Speed	
INLET/F SEN SUPPLY VOLT	mV	Voltage supplied to the sensor	
EGR LOW PRESSURE OCR	%	Low Pressure EMTV - PWM command asked to the H - bridge	
EGR SENSOR SUPPLY VOLTAGE	mV	Voltage, supplied to the sensor EGR	
ADDITIONAL INFO FD24	V	Air conditioning pressure voltage	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[K9K]

Monitor item	Unit	Description	Remarks
ADDITIONAL INFORMATION 24F3	°C or °F	Catalyst exhaust gas 1 upstream temperature	
ADDITIONAL INFO 2813	°Crk	Post injection angle	
TBN UPSTR TEMP SETP	°C or °F	Temperature before turbine setpoint	
POST INJECTION FLOW	mg/cp	Post injection quantity	
NUMBER OF STARTING 2		Cumulative number of engine starts, nonresettable	
ADDITIONAL INFO FD96	μF	Main injection capacitance cylinder 3	
NUMBER OF STARTING 1	—	Number of engine first starts (or number of trips done by the vehicle), nonresettable	
NUMBER OF STARTING 3	—	Number of engine first starts (or number of trips done by the vehicle)	
NUMBER OF STARTING 4	—	Cumulative number of engine starts	
GROSS INLET MANIFOLD PRESSURE	hPa	Manifold pressure from sensor	
ADDITIONAL INFO FD2D	%	Output to DCDCconverter	
ADDITIONAL INFO FD2F	mg/cp	Calculated mass air flow	
EXHAUST FLAP POSITION SETPOINT	%	Exhaust Air Flap - ET throttle position setpoint used by the monitoring system	
EXHAUST AIR FLAP OCR	%	Exhaust Air Flap - PWM command asked to the H - bridge	
FIRST OFFSET OF THE EX-HAUST AIR FLAP OPEN	%	Exhaust Air Flap - Value of the opened thrust position learnt. Value stored in EEPROM	
EXHAUST FLAP ABSOLUTE POSITION	%	Exhaust Air Flap - Absolute position in percent of the sensor supply voltage	
LOW PRESSURE EGR VALVE SUPPLY VOLTAGE	mV	Low Pressure EMTV - Voltage supplied to the sensor	
LOW PRESSURE EGR POSITION REFERENCE VALUE	%	Low Pressure EMTV - Low pressure EGR valve position setpoint after closing position	
NUMBER OF ABNORMAL CC/SL TRANSITIONS	—	Maximum value of blocked	
SOOT AFTER REGEN	G	CSF - Memorized soot mass left in CSF after a regeneration	
FAST IDLE SPEED	rpm	Requested idle speed setpoint for LCV's accessories	
MAXIMUM VEHICLE SPEED	km/h or mph	Maximum vehicle speed to authorize commercial vehicle accessories accelerated idle speed	
ADDITIONAL INFO FD22	V	Sensors power supply voltage raw acquisition (2)	
FIRST OFFSET OF THE CLOSED EXHAUST FLAP	%	Exhaust Air Flap - Current value of the first closed thrust position learnt	
LAST OFFSET OF CLOSED LOW PRESSURE EGR	%	Low Pressure EMTV - Current value of the "last closed thrust position" learnt	
ADDITIONAL INFO FD25	V	Cruise control analog input	
PRESSURE UPSTREAM OF PARTICLE FILTER	hPa	Raw upstream DPF relative pressure	
BRAKE CNT 1 DURATION	S	Brake pedal - duration of the close active switch blocked	
BRAKE CNT 2 DURATION	S	Brake pedal - duration of the open active switch blocked	
VEHICLE SPEED SENSOR	km/h or mph	\$01 - Vehicle speed sensor	
PARTICLE FILTER PRESSURE SENSOR OFFSET	mbar	Memorized difference pressure for adaptation	
ADDITIONAL INFO FD9C	—	Main injection charge Cylinder 3	
ADDITIONAL INFO FD9D	—	Main injection charge Cylinder 4	

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DIAGNOSIS SYSTEM (ECM)

[K9K]

< SYSTEM DESCRIPTION >

Monitor item	Unit	Description	Remarks
ALTERNATOR LOAD	%	Alternator load	
PRS UPSTR OF TBN	mbar	Pressure before turbine	
INT/M RUN VLV OPEN ANGLE	%	Swirl Flap - Swirl position relative to the closed thrust	
INT/M RUNNER VLV SETPOINT	%	Swirl Flap - Swirl throttle position setpoint used by the monitoring system	
INT/MANI RUNNER VALVE REQ	%	Swirl Flap - PWM command asked to the H- bridge	
IN/M RUN/V LEARN VAL (LAST)	%	Swirl Flap - Current value of the "last closed thrust position" learnt	
IN/M RUN/V LEARN VAL(CRNT)	%	Swirl Flap - Current value of the first closed thrust position learnt	
IN/M RUN/V LEARN VAL (1ST)	%	Swirl Flap - Current value of the "first opened thrust position" learnt	
INT/MANI RUNNER VALVE POS	%	Swirl Flap - Absolute position in percent of the sensor supply voltage	
SWIRL FLAP VOLTAGE	mV	Swirl Flap - Voltage supplied to the sensor	
ATMOS PRESS SEN VOLT	mV	Atmospheric pressure sensor voltage	
AFTER REPLAC DPF	km or mile	CSF - Value of the driven	
TIME SINCE LAST REGEN	S	CSF - Elapsed time since the last regeneration	
DURATION LAST REGEN	S	CSF - Current regeneration duration	
PF UPSTR TEMP. REF VAL	°C or °F	CSF upstream temperature setpoint	
KM SINCE SUCCESS REGEN	km or mile	CSF - Indicates the vehicle mileage just after a successful regeneration	
EGR S/V CONTROL	%	EGR cooling bypass PWM command	
FUEL TEMP SEN V	V	Fuel temperature sensor voltage	
GROSS ENGINE TORQUE	Nm	Final indicated torque raw	
COOLANT TEMP SEN VOLT	V	Engine coolant temperature sensor voltage	
MAIN INJECTION FLOW	mg/cp	Main injection quantity	
ADDITIONAL INFO 287A	—	Error detected by the monitoring of supplier injections (value after reset)	
ADDITIONAL INFO 24D0	—	—	
CARBON MATERIAL RATE	%	OWE - Oil soot rate	
DAMPER VALVE SEN VOLT	mV	Analogic StateLine Value of the Smart Inlet Throttle	
PREHEATING MODE	%	PWM diagnosis signal of the heating glow plugs	
RAIL FLOW REGULATION VALVE OCR	%	Volume flow actuator PWM command	
CRNKS SYNC LOSS COUN	—	Counter of loose of crankshaft synchronization	
AVERAGE PERIOD OF FLOW-METER SIGNAL	μS	Basic arithmetic average of the period time	
F/FLOW CORR CYL NO. 1	—	Fuel balancing control - cylinder 1	
F/FLOW CORR CYL NO. 2	—	Fuel balancing control - cylinder 2	
F/FLOW CORR CYL NO. 3	—	Fuel balancing control - cylinder 3	
F/FLOW CORR CYL NO. 4	—	Fuel balancing control - cylinder 4	
ADDITIONAL INFORMATION FD1A	μF	Piezo capacity deviation to a nominal system - cylinder 2	
ADDITIONAL INFORMATION FD19	μF	Piezo capacity deviation to a nominal system - cylinder 1	
ADDITIONAL INFORMATION FD1B	μF	Piezo capacity deviation to a nominal system - cylinder 3	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[K9K]

Monitor item	Unit	Description	Remarks
ADDITIONAL INFORMATION FD1C	μF	Piezo capacity deviation to a nominal system - cylinder 4	
CYLINDER 1 ADAPTATION STATUS	—	Status flag of the adaptation - cylinder 1	
CYLINDER 2 ADAPTATION STATUS	—	Status flag of the adaptation - cylinder 2	
CYLINDER 3 ADAPTATION STATUS	—	Status flag of the adaptation - cylinder 3	
CYLINDER 4 ADAPTATION STATUS	—	Status flag of the adaptation - cylinder 4	
MEDIAN OF TEMPERATURES WHOSE SENSORS ARE LIABLE TO RATIONALITY DIAGNOSIS	°C or °F	Median of temperatures whose sensors are liable to rationality diagnosis	
OIL TEMPERATURE - ENGINE	°C or °F	Oil temperature - engine	
ENGINE RPM	rpm	\$01 - Engine RPM	
ADDITIONAL INFORMATION FD42	—	Context not safety datas microcontroller memorized carrier 1	
ADDITIONAL INFORMATION FD43	—	Context safety datas memorized in main microcontroller	
ADDITIONAL INFORMATION FD4D	—	Context not safety datas microcontroller memorized carrier 2	
ADDITIONAL INFORMATION FD4E	—	Context safety datas memorized in safety microcontroller	
LOADED NOX MASS	G	Loaded NOx mass	
CUMULATIVE MILEAGE IN HIGHWAY CONDITIONS	km or mile	Cumulated mileage in highway conditions	
ADDITIONAL INFORMATION FD9B	—	Main injection charge - Cylinder 2	
ADDITIONAL INFORMATION FD77	—	Main injection charge - Cylinder 1	
STRT OPRTN CNTR	count	Starter motor operation counter is displayed.	Indicated multiplication value of the starter motor operation of key switch operation and the restart.

NOTE:

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

WORK SUPPORT MODE

Work Item

NOTE:

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

Work item	Description	Usage
WRITE SAVED DATA	In this mode, write data stored by "SAVE COMPUTER DATA" in work support mode to ECM.	When ECM is replaced.*
ENTER INJECTOR CODES	In this mode, fuel injector adjustment value is registered.	- When ECM is replaced.* - When fuel injector(s) is replaced.
SAVE COMPUTER DATA	In this mode, save data that is in ECM.	When ECM is replaced.*

DIAGNOSIS SYSTEM (ECM)

[K9K]

< SYSTEM DESCRIPTION >

Work item	Description	Usage
PARTICLE FILTER REGENERATION	In this mode, service regeneration is performed.	- When ECM is replaced.* - ECM enter fail-safe mode because the amount of particulate matter in DPF reaches the specified level. - Component inspection for DPF is performed.
CYLINDER FUNCTION FAULT FINDING	—	—
High pressure fuel circuit fault finding	This function can perform high pressure fuel pressure check.	When performing high pressure fuel system check.
AFTER DPF REPLACEMENT	In this mode, estimated PM amount in DPF is cleared.	When DPF is replaced.
AFTER DPF REGENERATION	In this mode, estimated PM amount in DPF is cleared.	When DPF is regenerated.
ENGINE OIL OXIDATION DATA RESET	In this mode, engine oil oxidation data is cleared.	- When engine oil is changed. - When engine assembly is replaced.
ENGINE OIL DILUTION DATA RESET	In this mode, engine oil dilution data is cleared.	- When engine oil is changed. - When engine assembly is replaced.
VIN REGISTRATION	In this mode, VIN is registered in ECM.	When registering VIN in ECM.
EGR VALVE PROGRAMMING	In this mode, EGR valve learnings are cleared.	When EGR valve is replaced.
EXHAUST THROTTLE VALVE PROGRAMMING	In this mode, exhaust throttle valve learnings are cleared.	When exhaust throttle valve is replaced.
TURBOCHARGER PROGRAMMING	In this mode, turbocharger learnings are cleared.	When turbocharger is replaced.
ADAPTIVES ON ETC ACTUATOR MALFUNCTION	In this mode, electric throttle control actuator learnings are cleared.	When electric throttle control actuator is replaced.
AIR FLOW METER PROGRAMMING	In this mode, air flow meter learnings are cleared.	When Air Flow Meter is replaced.
MANIFOLD PRESSURE SENSOR PROGRAMMING	In this mode, manifold pressure sensor learnings are cleared.	When manifold pressure sensor is replaced.
DIFF EXH PRES. SEN	In this mode, DPF differential pressure sensor learnings are cleared.	When DPF differential pressure sensor is replaced.
LOW PRESSURE EGR VALVE PROGRAMMING	In this mode, low pressure EGR volume control valve learnings are cleared.	When low pressure EGR volume control valve is replaced.
RAIL PRS SEN ADAPTIVES	In this mode, long engine start is permitted.	When fuel rail pressure sensor is replaced.
INJECTION PUMP ADAPTIVES	In this mode, high pressure fuel pump learnings are cleared.	When high pressure fuel pump is replaced.
H/P FUEL PUMP INITIAL STARTS COUNTER RESET	In this mode, high pressure fuel pump initial starts counter is cleared.	When high pressure fuel pump is replaced.
H/P FUEL PUMP TOTAL STARTS COUNTER RESET	In this mode, high pressure fuel pump total starts counter is cleared.	When high pressure fuel pump is replaced.
WRITE V.I.N.	—	—
FUEL PUMP PROGRAMMING	In this mode, first priming is requested.	When fuel pump is replaced.
ADAPTIVES ON AIR INTAKE FLAP MALFUNCTION	In this mode, intake throttle valve learnings are cleared.	When Intake throttle valve is replaced.
AIR DAMPER VALVE PROGRAMMING(R088)	In this mode, intake throttle valve learnings are cleared.	When intake throttle valve is replaced.

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[K9K]

Work item	Description	Usage
EXHAUST FLAP LOW SETTING	In this mode, exhaust throttle valve learnings are cleared.	When exhaust throttle valve is replaced.
EGR BYPASS PROGRAMMING	In this mode, EGR valve learnings are cleared.	When EGR valve is replaced.
INJECTION PUMP ADAPTIVES	In this mode, high pressure fuel pump learnings are cleared.	When high pressure fuel pump is replaced.
RAIL PRESSURE SENSOR ADAPTIVES	In this mode, long engine start is permitted.	When Rail pressure sensor is replaced.
P/FLT DIFF PRS SEN	In this mode, DPF differential pressure sensor learnings are cleared.	When DPF differential pressure sensor is replaced.
AIR DAMPER VALVE PROGRAMMING(R044)	In this mode, intake throttle valve learnings are cleared.	When intake throttle valve is replaced.
CABIN FILTER REGENERATION	CSF After Sales Regeneration requirement.	When CSF is collapsed.
SPEED LIMITER	—	—
ADAPTIVES AFTER REPLACING CABIN FILTER	In this mode, CSF learnings are cleared.	When CSF is replaced.
ADAPTIVES AFTER REGENERATING PF	In this mode, CSF learnings are cleared.	When CSF is replaced.
INTERVAL OF OIL CHANGE (OCS) OXIDATION	—	—
OIL CHANGE INTERVAL (OCS): DILUTION	—	—
FUEL RAIL PRESSURE TEST	Confirmation of fuel rail pressure.	When high pressure fuel pump or fuel rail pressure sensor are replaced.
STATIC TEST	—	—
FUEL PUMP	Electrical fuel pump of low pressure fuel circuit is activated.	When fuel pump or FPCM is replaced.
STARTER OPERATION COUNTER CLEAR	Cumulative number of engine starts, for starter reliability is cleared.	When Starter Motor is replaced.
H/P FUEL PUMP TOTAL STARTS COUNTER CLEAR	Cumulative number of engine starts for high pressure fuel pump reliability is cleared.	When high pressure fuel pump is replaced.
WRITE STARTER OPERATION COUNT	Cumulative number of engine starts, for starter reliability is written.	When ECM is replaced.
WRITE H/P FUEL PUMP TOTAL STARTS COUNT	Cumulative number of engine starts for high pressure fuel pump reliability is written.	When ECM is replaced.

*: The necessary operation is different depending on the operation result of ECM data save or write. Always perform the operation according to procedures. Refer to [ECK-131. "Description"](#).

ACTIVE TEST MODE

NOTE:

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

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[K9K]

Test item	Condition	Judgment	Check item (Remedy)
TURBOCHARGING SOLENOID VALVE	- Ignition switch: ON - Turn turbocharger boost control solenoid valve ON and OFF with the CONSULT and listen to operation sound.	Turbocharger boost control solenoid valve makes an operating sound.	- Harness and connector - Turbocharger boost control solenoid valve
AIR INLET FLAP	- Ignition switch: ON - Turn throttle control motor ON and OFF with the CONSULT and confirm the operation.	Throttle valve is operated.	- Harness and connector - Electric throttle control actuator
THERMOPLNGR RLY N1	—	—	—
THERMOPLNGR RLY N2	—	—	—
THERMOPLNGR 3 RLY	—	—	—
PREHEATER RLY	—	—	—
EGR VALVE	- Ignition switch: ON - Turn high pressure EGR volume control valve ON and OFF with the CONSULT and confirm the operation.	High pressure EGR volume control valve is operated.	- Harness and connector - High pressure EGR volume control valve
PUMP PRESSURE REGULATOR	—	—	—
CONTROLLED CL THERMOS	—	—	—
FUEL PUMP	- Ignition switch: ON - Turn fuel flow actuator ON and OFF with the CONSULT and listen to operation sound.	Fuel flow actuator makes an operating sound.	- Harness and connector - Fuel pump
EXHAUST E/ THROTTLE CONTROL ACTUATOR	- Ignition switch: ON - Turn exhaust throttle control motor ON and OFF with the CONSULT and confirm the operation.	Exhaust throttle valve is operated.	- Harness and connector - Exhaust electric throttle control actuator
LOW PRESSURE EGR VALVE	- Ignition switch: ON - Turn low pressure EGR volume control valve ON and OFF with the CONSULT and confirm the operation.	Low pressure EGR volume control valve is operated.	- Harness and connector - Low pressure EGR volume control valve
A/F SENSOR HEATER	—	—	—
FUEL FLOW ACTUATOR	—	—	—
COOLING FAN 2	—	—	—
COOLING FAN 1	—	—	—
EXHAUST FUEL INJECTOR	—	—	—
FUEL RAIL PRESSURE	—	—	—
INTAKE MANIFOLD RUNNER VALVE	—	—	—
EGR COOLER BY-PASS VALVE	—	—	—
EXHAUST THROTTLE	—	—	—

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[K9K]

Test item	Condition	Judgment	Check item (Remedy)
TC COOLING WATER PUMP	—	—	—
EGR COOLER BY-PASS PWM	—	—	—
EGR VOLUME CONTROL VALVE	—	—	—
THROTTLE VALVE	—	—	—
TURBOCHARGER BOOST PRESSURE	—	—	—
COOLANT FLOW VALVE	—	—	—
PTC 3	—	—	—
PTC 2	—	—	—
PTC 1	—	—	—
GLOW PLUG	—	—	—
IDLE SPEED	—	—	—
A/C COMPRESSOR	—	—	—
THERMO PLUNGER	—	—	—
FUEL INJECTOR	—	—	—
AUTO STOP START	- Engine: After warming up, run engine at idle. - Gear position: Neutral - Stop/Start OFF switch: ON (indicator lamp is ON) CAUTION: Be careful so that a hood operations in the opened state when carry out the work. NOTE: Before performing this test, be sure to check that OK is displayed on BATTERY STATUS in DATA MONITOR of IPDM E/R because this function may not be operate when the battery condition is not satisfied.	Stop/Start system operates normally. (Engine stop/Restart)	Stop/Start system component parts

CONFIGURATION

Function	Description
SPEED LIMITER FUNCTION	This function stores the information to ECM that the vehicle is equipped with Speed Limiter.
CRUISE CONTROL FUNCTION	This function stores the information to ECM that the vehicle is equipped with Cruise Control System.
CC/SL LMTR BUTTONS	This function stores the information to ECM that the vehicle is equipped with ASCD/speed limiter main switch.

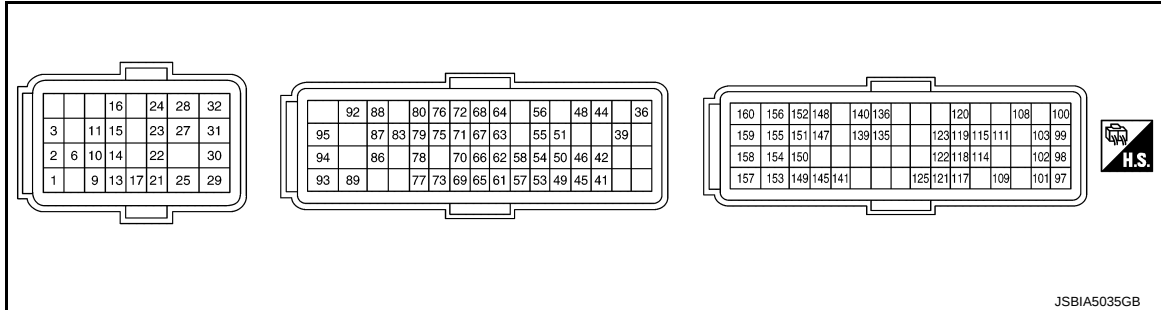
ECU DIAGNOSIS INFORMATION

ECM

Reference Value

INFOID:0000000010289668

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

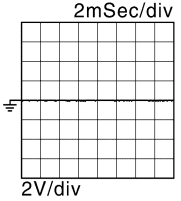
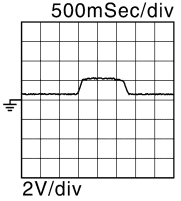
- ECM is located in the engine room left side near battery.
- Pulse signal is measured by CONSULT.

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/ Output		
1 (L)	—	CAN communication line (CAN-H)	Input/ Output	—	—
2 (P)	—	CAN communication line (CAN-L)	Input/ Output	—	—
3 (SB)	29 (B)	ASCD MAIN switch	Input	[Ignition switch: ON] ASCD MAIN switch: OFF	0 V
				[Ignition switch: ON] ASCD MAIN switch: ON	Battery voltage (11 - 14 V)
6 (V)	29 (B)	Clutch interlock switch	Input	[Ignition switch: ON] • Engine stopped • Clutch pedal: Fully released	0 V
				[Ignition switch: ON] • Engine stopped • Clutch pedal: Fully depressed	BATTERY VOLTAGE (11 - 14 V)
9 (R)	29 (B)	Clutch pedal position switch	Input	[Ignition switch: ON] • Clutch pedal: Fully released	0 V
				[Ignition switch: ON] • Clutch pedal: Fully depressed	11.25 V
10 (V)	29 (B)	Speed limiter MAIN switch	Input	[Ignition switch: ON] Speed limiter MAIN switch: OFF	0 V
				[Ignition switch: ON] Speed limiter MAIN switch: ON	Battery voltage (11 - 14 V)
11 (G)	29 (B)	Fuel pump control module (Diagnosis)	Input	[Ignition switch: ON]	11.0 V

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< ECU DIAGNOSIS INFORMATION >

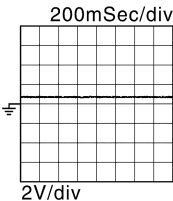
[K9K]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)	
+	—	Signal name	Input/ Output			
13 (BR)	29 (B)	Fuel pump control module (Command)	Output	[Ignition switch: ON] Fuel pump not activates	0.05 V (PWM duty: less than 14%)	ECK
				[Ignition switch: ON] Fuel pump activated	0 – 6.74 V (PWM duty: Approx. 40%)	
				Engine running at idle	PWM duty: 50 – 60%	
14 (BR)	—	Sensor ground (ASCD steering switch)	—	—	—	D
15 (G)	14 (BR)	ASCD steering switch	Input	[Ignition switch: ON] • ASCD steering switch: OFF	4 V	E
				[Ignition switch: ON] • CANCEL switch: Pressed	1 V	F
				[Ignition switch: ON] • RES/+ switch: Pressed	3 V	G
				[Ignition switch: ON] • SET/– switch: Pressed	2 V	H
16 (LG)	29 (B)	Ignition switch	Input	[Ignition switch: ON]	12.20 V	I
17 (BG)	29 (B)	Stop lamp switch	Input	[Ignition switch: OFF] • Brake pedal: Fully released	0 V	J
				[Ignition switch: OFF] • Brake pedal: Slightly depressed	12.18 V	
21 (Y)	—	Sensor ground (Accelerator pedal position sensor 2)	—	—	—	K
22 (W)	21 (Y)	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	 2V/div JSBIA4811ZZ	L
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	 2V/div JSBIA4812ZZ	M
23 (BG)	21 (Y)	Sensor power supply (Accelerator pedal position sensor 2)	—	[Ignition switch: ON]	5 V	N
24 (L)	29 (B)	Fuel heater and water in fuel sensor	Input	[Engine is running] • Warm-up condition • Idle speed	14.0 V	O
25 (B)	—	ECM ground	—	—	—	P
26 (B)	—	ECM ground	—	—	—	

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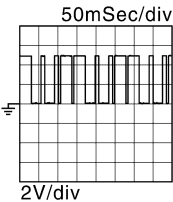
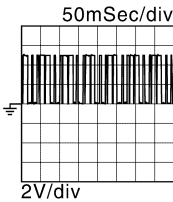
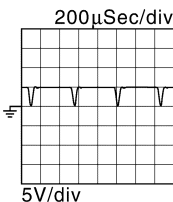
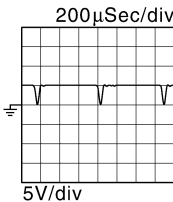
[K9K]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/ Output		
27 (V)	30 (GR)	Sensor power supply (Accelerator pedal position sensor 1)	—	[Ignition switch: ON]	5 V
29 (B)	—	ECM ground	—	—	—
30 (GR)	—	Sensor ground (Accelerator pedal position sensor 1)	—	—	—
31 (R)	30 (GR)	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	
32 (B)	—	ECM ground	—	—	—
36 (G)	29 (B)	ECM relay (Self shut-off)	Output	[Engine is running] [Ignition switch: OFF] • A few seconds after turning ignition switch OFF	0.78 V
				[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	12.42 V
39 (BR)	29 (B)	Water heater 2	Output	Diesel particulate filter regeneration mode	0 V
				Diesel particulate filter No regeneration mode	13.67 V
41 (P)	50 (V)	Sensor power supply (Camshaft position sensor)	—	[Ignition switch: ON]	5 V

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< ECU DIAGNOSIS INFORMATION >

[K9K]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/ Output		
42 (Y)	50 (V)	Camshaft position sensor	Input	[Engine is running] - Warm-up condition - Idle speed NOTE: The pulse cycle changes depending on rpm at idle	
				[Engine is running] Engine speed is 2,000 rpm	
44 (BG)	29 (B)	Water heater 1	Output	Diesel particulate filter regeneration mode	0 V
				Diesel particulate filter No regeneration mode	14.23 V
45 (L)	68 (B)	Sensor power supply (Fuel rail pressure sensor)	—	[Ignition switch: ON]	5.0 V
46 (GR)	86 (G)	Mass air flow sensor	Input	[Engine is running] - Warm-up condition - Idle speed	
				[Engine is running] - Warm-up condition - Engine speed: 2,500 rpm	
48 (Y)	29 (B)	Engine restart relay control signal	Output	[Stop/start system operates] While cranking of restart	11.76 V (While operating the starter motor)
				[Engine is running] - Warm-up condition - Idle speed	14.46 V
49 (L)	54 (SB)	Sensor power supply (Low fuel rail pressure sensor)	—	[Ignition switch: ON]	5.0 V
50 (V)	—	Sensor ground (Camshaft position sensor)	—	—	—

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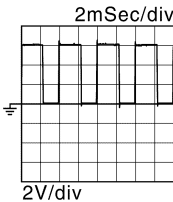
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Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/ Output		
51 (LG)	29 (B)	Voltage stabilizer signal	Output	[Stop/start system operates] • While cranking of restart	(While operating the starter motor) 100mSec/div  5V/div JSBIA5055GB
53 (SB)	58 (B)	Sensor power supply (DPF differential pressure sensor)	—	[Ignition switch: ON]	5.0 V
54 (SB)	—	Sensor ground (Low fuel rail pressure sensor)	—	—	—
55 (G)	29 (B)	Engine restart bypass control relay	Output	[Engine is running] • Warm-up condition • Idle speed	1.73 V
				[Stop/start system operates] While cranking of restart	14.0 V
56 (R)	29 (B)	Glow plug control (COM-MAND)	Input	[Ignition sw OFF goes to ON] • Glow ON	0 – 4.01 V
				• Glow OFF	0 V
57 (BG)	62 (BR)	Sensor power supply (Exhaust throttle position sensor)	—	[Ignition switch: ON]	5.0 V
58 (B)	—	Sensor ground (DPF differential pressure sensor)	—	—	—
61 (W)	67 (BR)	Sensor power supply (Throttle position sensor)	—	[Ignition switch: ON]	5 V
62 (BR)	—	Sensor ground (Exhaust throttle position sensor)	—	—	—
63 (SB)	29 (B)	Water heater 3	Output	Diesel particulate filter regeneration mode	0 V
				Diesel particulate filter No regeneration mode	14.23 V

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< ECU DIAGNOSIS INFORMATION >

[K9K]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
64 (R)	29 (B)	Turbocharger boost control solenoid valve	Output	[Ignition switch: ON] • Warm-up condition • Idle speed	
				[Ignition switch: ON] • Warm-up condition • Engine speed: 2,000 rpm	
65 (R)	66 (B)	Sensor power supply (Low pressure EGR volume control valve position sensor)	—	[Ignition switch: ON]	5 V
66 (B)	—	Sensor ground (Low pressure EGR volume control valve position sensor)	—	—	—
67 (BR)	—	Sensor ground (Throttle position sensor)	—	—	—
68 (B)	—	Sensor ground (Fuel rail pressure sensor)	—	—	—
69 (V)	70 (BG)	Sensor power supply (High pressure EGR volume control valve position sensor)	—	[Ignition switch: ON]	5 V
70 (BG)	—	Sensor ground (High pressure EGR volume control valve position sensor)	—	—	—
71 (G)	67 (BR)	Throttle position sensor	Input	[Engine is running] • Warm-up condition • Engine speed: Idle	4.49 V
				[Ignition switch: OFF] • For approx. 20 seconds after turning ignition switch OFF.	0.5 - 4.5 V Output voltage fluctuates between 0.5 V and 5 V.
				[Ignition switch: OFF] • More than approx. 20 seconds after turning ignition switch OFF.	0 V
72 (R)	68 (B)	Fuel rail pressure sensor	Input	[Engine is running] • Warm-up condition • Idle speed	0.96 - 1.95 V
				[Engine is running] • Warm-up condition • Revving engine from idle to 2,000 rpm quickly	1.13 - 1.28 V

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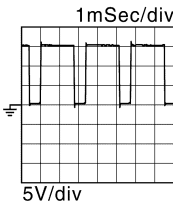
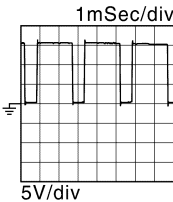
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Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/ Output		
73 (L)	86 (G)	Sensor power supply (Mass air flow sensor)	—	[Ignition switch: ON]	5.0 V
75 (P)	70 (BG)	High pressure EGR volume control valve (High pressure EGR volume control valve control position sensor)	Input	[Engine is running] • Warm-up condition • Idle speed	0.78 V
76 (GR)	62 (BR)	Exhaust throttle position sensor	Input	[Engine is running] • Warm-up condition	3.97 V
77 (LG)	86 (G)	Sensor power supply (Exhaust gas pressure sensor 1)	—	[Ignition switch: ON]	5.0 V
78 (GR)	—	Sensor ground (Exhaust gas pressure sensor 1)	—	—	—
79 (L)	66 (B)	Low pressure EGR volume control valve (Low pressure EGR volume control valve control position sensor)	Input	[Engine is running] • Warm-up condition • Idle speed (Less than 60 seconds idle time)	3.47 V
				[Engine is running] • Warm-up condition • Idle speed (More than 60 seconds idle time)	1.23 V
80 (LG)	58 (B)	DPF differential pressure sensor	Input	[Engine is running] • Warm-up condition • Idle speed	0.54 V
				[Engine is running] • Warm-up condition • Engine speed: 2000rpm	0.63 V
83 (Y)	78 (GR)	Exhaust gas pressure sensor 1	Input	[Engine is running] • Warm-up condition • Idle speed	1.0 V
86 (G)	—	Sensor ground (Mass air flow sensor, Intake air temperature sensor 1)	—	—	—
87 (V)	86 (G)	Intake air temperature sensor 1	Input	[Engine is running] • Warm-up condition	0.27 – 1.92 V Output voltage varies with intake air temperature.
88 (W)	54 (SB)	Low fuel pressure sensor	Input	[Engine is running] • Warm-up condition	0.02 - 0.04 V
89 (GR)	29 (B)	Fuel pump relay control	Output	[Ignition switch: ON] • Fuel Pump relay always is on	0 – 5.17 V

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< ECU DIAGNOSIS INFORMATION >

[K9K]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/ Output		
92 (Y)	29 (B)	Fuel flow volume control valve	Output	[Engine is running] • Idle speed	
				[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	
93 (R) 94 (GR)	29 (B)	Power supply for ECM	Input	[Ignition switch: OFF]	0 V
				[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
95 (B)	29 (B)	Fuel heater relay	Output	[Ignition switch: ON] • Fuel temperature: less than 45°C (113°F)	0 - 1 V
				[Engine is running] • Warm-up condition • Fuel temperature: 65°C (149°F) or more	11 - 14 V
97 (W)	125 (BR)	Sensor power supply (Refrigerant pressure sensor)	—	[Ignition switch: ON]	5.0 V
98 (BR)	—	Sensor ground (Fuel temperature sensor)	—	—	—
99 (P)	125 (BR)	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.20 V
100 (G)	102 (B)	Turbocharger boost sensor	Input	[Engine is running] • Warm-up condition • Idle speed	1.19 V
				[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	1.30 V
101 (R)	102 (B)	Sensor power supply (Turbocharger boost sensor)	—	[Ignition switch: ON]	5.0 V
102 (B)	—	Sensor ground (Turbocharger boost sensor, Intake air temperature sensor 2)	—	—	—
103 (P)	98 (BR)	Fuel temperature sensor	Input	[Engine is running] • Warm-up condition	0.28 - 1.83 V Output voltage varies with fuel pump temperature.

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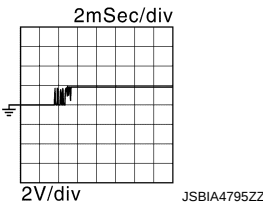
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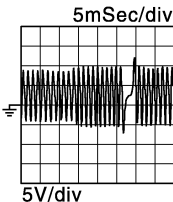
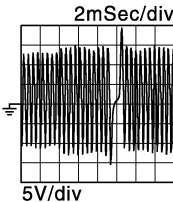
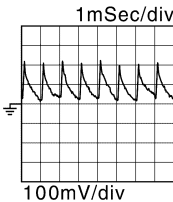
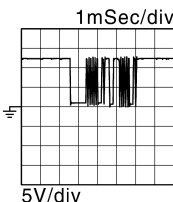
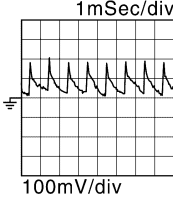
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Terminal No. (Wire color)		Description	Input/ Output	Condition	Value (Approx.)
+	—				
108 (Y)	123 (GR)	Exhaust gas temperature sensor 2	Input	[Engine is running] • Warm-up condition • Idle speed	
109 (G)	29 (B)	Glow plug control (DIAGNOSIS)	Input	[Ignition sw OFF goes to ON] • Glow ON	0 – 3.4 V
				• Glow OFF	11.25 - 13.16 V
111 (Y)	29 (B)	Water heater (diagnosis 2)	Output	Diesel particulate filter regeneration mode	0 V
				Diesel particulate filter No regeneration mode	13.16 V
114 (Y)	—	Sensor ground (Exhaust gas temperature sensor 1)	—	—	—
115 (G)	114 (Y)	Exhaust gas temperature sensor 1	Input	[Engine is running] • Warm-up condition • Idle speed	0.47 – 4.95 V Output voltage varies with exhaust gas temperature.
117 (W)	29 (B)	PNP signal	Input	[Ignition switch: ON] • Selector lever: Neutral	13.44 V
				[Ignition switch: ON] • Selector lever: Except above	0 V
118 (GR)	—	Sensor ground (EGR temperature sensor)	—	—	—
119 (R)	118 (GR)	EGR temperature sensor	Input	—	—
120 (P)	122 (B)	Engine coolant temperature sensor	Input	[Engine is running] • Warm-up condition	0.124 – 0.83 V Output voltage varies with engine coolant temperature.
121 (LG)	29 (B)	Water heater (diagnosis 1)	Output	Diesel particulate filter regeneration mode	0 V
				Diesel particulate filter No regeneration mode	13.84 V
122 (B)	—	Sensor ground (Engine coolant temperature sensor)	—	—	—
123 (GR)	—	Sensor ground (Exhaust gas temperature sensor 2)	—	—	—
125 (BR)	—	Sensor ground (Refrigerant pressure sensor)	—	—	—
135 (B)	—	Sensor ground (Crankshaft position sensor)	—	—	—

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< ECU DIAGNOSIS INFORMATION >

[K9K]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
136 (R)	135 (B)	Crankshaft position sensor (POS)	Input	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	
				[Engine is running] • Engine speed: 2,000 rpm	
139 (SB)	29 (B)	Throttle control motor (+)	Output	[Engine is running] • Warm-up condition • Idle speed	
				[Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 V
140 (V)	29 (B)	Throttle control motor (–)	—	[Engine is running] • Warm-up condition • Idle speed	0 V
141 (G)	29 (B)	Engine communication line	Input/ Output	[Ignition switch: ON]	
145 (W)	102 (B)	Intake air temperature sensor 2	Input	[Engine is running] • Warm-up condition	0.25 – 4.75 V Output voltage varies with engine rpm.
147 (BR)	29 (B)	High pressure EGR volume control valve (DC motor +)	Output	[Engine is running] • Warm-up condition • Idle speed	

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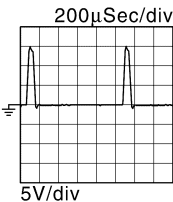
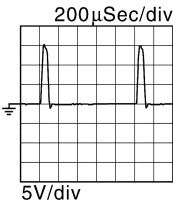
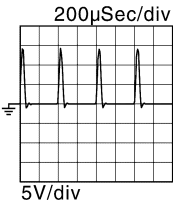
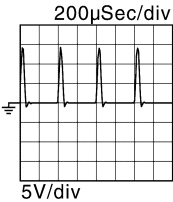
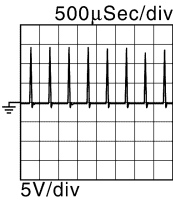
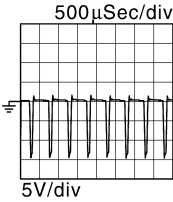
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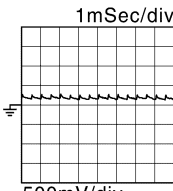
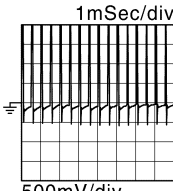
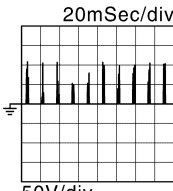
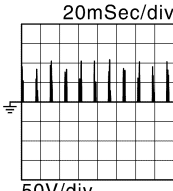
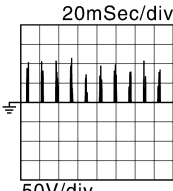
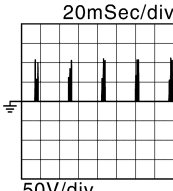
< ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
148 (BG)	29 (B)	High pressure EGR volume control valve (DC motor –)	Output	[Engine is running] • Warm-up condition • Engine speed: Idle	
				[Engine is running] • Warm-up condition • Depress the accelerator for a second and then release it.	
149 (V)	29 (B)	Exhaust throttle control motor (–)	Output	[Engine is running] • Warm-up condition	
150 (Y)	29 (B)	Exhaust throttle control motor (+)	Output	[Engine is running] • Warm-up condition • Press & release acceleration pedal.	
151 (W)	152 (B)	Low pressure EGR volume control valve (DC motor –)	Output	[Engine is running] • Warm-up condition • Engine speed: Idle	
				[Engine is running] • Warm-up condition • Depress the accelerator for a second and then release it.	

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< ECU DIAGNOSIS INFORMATION >

[K9K]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
152 (B)	151 (W)	Low pressure EGR volume control valve (DC motor +)	Output	[Engine is running] • Warm-up condition • Idle speed	 JSBIA4803ZZ
				[Engine is running] • Warm-up condition • Depress the accelerator for a second and then release it.	 JSBIA4804ZZ
153 (BR)	29 (B)	Fuel injector No. 2 (HI)	Output	[Engine is running] • Engine speed is 2,000 rpm	 JSBIA4805ZZ
154 (V)		Fuel injector No. 4 (HI)		[Engine is running] • Engine speed is 2,000 rpm	 JSBIA4806ZZ
155 (R)		Fuel injector No. 3 (HI)		[Engine is running] • Engine speed is 2,000 rpm	 JSBIA4807ZZ
156 (Y)		Fuel injector No. 1 (HI)		[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	 JSBIA4808ZZ

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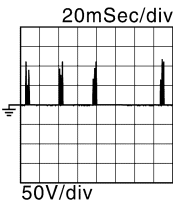
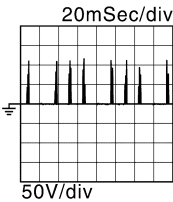
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Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
157 (P)	29 (B)	Fuel injector No. 2 (LO)	Output	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	
158 (L)		Fuel injector No. 4 (LO)			
159 (G)		Fuel injector No. 3 (LO)		[Engine is running] • Engine speed is 2,000 rpm	
160 (L)		Fuel injector No. 1 (LO)			

Fail-safe

INFOID:0000000010289669

ENGINE CONTROL SYSTEM

DTC No.	Detected items	Engine operating condition in fail-safe mode
P0001	High pressure fuel pump circuit	• Not of limitation of calibration performance • Prohibit stop/start system • Regeneration forbidden • ASCD/Speed limiter deactivation • Freeshift inhibited • Not of limitation of calibrated performance
P0002 P0087	Fuel rail pressure	• Prohibit stop/start system • Rail pressure limitation • Freeshift inhibited • ASCD/Speed limiter deactivation • Regeneration forbidden • EGR valve closed, throttle opened • Not limitation of calibrated performance • ZFC correction inhibited • Strong vehicle speed limitation (30km/h) • Torque limitation • Overpressure on rail on 5 time • Inhibition of regulation mode of fuel pressure regulator
P0016	Camshaft position- Crankshaft position correlation	• Prohibit stop/start system • Prohibit intake valve timing control system
P0045	Turbo solenoid valve control circuit	• Torque limitation • EGR valve is closed position • Throttle control motor is opened • Boost regulation cut off • Regeneration forbidden • Freeshift inhibited • ASCD/Speed limiter deactivation

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< ECU DIAGNOSIS INFORMATION >

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DTC No.	Detected items	Engine operating condition in fail-safe mode
P0089	Fuel pressure regulator performance	• EGR valve is closed position • Throttle control motor is opened • Regeneration forbidden • ASCD/Speed limiter deactivation • Freeshift inhibited • Rail pressure limitation • Prohibit stop/start system • Request of technical restart in case of ineffective relaunch • Inhibition of fuel system diagnosis
P0095	Intake air temperature sensor 2	• EGR volume control valve is closed position • Throttle control motor is opened • Inhibition of the correction of ZFC • Over torque inhibited • Engine speed attachment detection inhibited
P0100 P0101	Mass air flow sensor	• EGR valve is closed position • Throttle control motor is opened • Prohibit the operation of the ASCD system
P0105 P0106	TC boost sensor	• EGR valve is closed position • Throttle control motor is opened • Prohibit DPF regeneration • Limited boost pressure regulation • Torque limitation • Increase idle speed
P0110	Intake air temperature sensor 1	• Boost pressure limitation • EGR valve is closed position • Throttle control motor is opened
P0115	Engine coolant temperature sensor circuit	• Engine cooling fan activation • Engine speed limitation • EGR valve is closed position • Prohibit DPF regeneration • EGR cooling valve activated • Over torque inhibited • Increase idle speed
P0120	Throttle position sensor	• EGR valve is closed position • Throttle control motor is opened • Regeneration forbidden • Airflow regulation cut off • Compression test routine forbidden • ASCD/Speed limiter deactivated with dashboard message • Freeshift inhibited
P0135	A/F sensor circuit	Stop closed-loop control
P2244		Cut-off of the richness closed-loop regulation
P0190	Fuel rail pressure sensor	• EGR valve is closed position • Throttle control motor is opened • Regeneration forbidden • Freeshift inhibited • ASCD/Speed limiter deactivation (considered as abnormal with dashboard message) • Rail pressure limitation • Aftersales and factory routines inhibited
P0200	Fuel injector circuit	• Regeneration forbidden • Freeshift inhibited • ASCD/Speed limiter deactivation (considered as abnormal with dashboard message) • EGR valve is closed position • Throttle control motor is opened • Increased idle speed

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DTC No.	Detected items	Engine operating condition in fail-safe mode
P0201 P0202 P0203 P0204	Fuel injector circuit	• Regenerations forbidden • Increased idle speed • EGR valve closed, throttle opened • Freeshift inhibited • ASCD/Speed limiter deactivation (considered as abnormal with dash-board)
P0217	Engine over temperature	• Cooling fan Activated • Active grille shutter opening • Warning overheating lamp activated • Prohibit stop/start system • EGR control cut off • A/C compressor cut off
P0225	Accelerator pedal position sensor 1circuit	• Torque limitation • Freeshift inhibited • ASCD/Speed limiter deactivation (considered as abnormal with dashboard message)
P0226	Brake/accelerator pedal positions	• Torque limitation • Pedal limp home activated • Freeshift Inhibited • ASCD/Speed limiter deactivation (considered as abnormal with dashboard message)
P0263 P0266 P0269 P0272	Fuel injector	• ASCD/Speed limiter deactivation • Freeshift inhibited • Regeneration forbidden • EGR valve is closed position • Throttle control motor is opened • Increased idle speed
P0335	Crankshaft position sensor	• EGR valve is closed position • Throttle control motor is opened • Prohibit DPF regeneration • Prohibit stop/start system • Torque limitation • Engine speed limitation • Prohibit the operation of the ASCD system • Prohibit valve timing control
P0340	Camshaft position sensor circuit	• Prohibit stop/start system • Synchronization on the exhaust CAM
P0402 P0403	EGR system	• EGR valve is closed position • Throttle control motor is opened • Regenerations forbidden • ASCD/Speed limiter deactivation with dashboard message • Freeshift inhibited
P0409	EGR volume control valve control position sensor circuit	• EGR valve is closed position • Regeneration forbidden • ASCD/Speed limiter deactivation with dashboard message • Freeshift inhibited • Airflow closed loop regulation cut off
P0470	Exhaust gas pressure sensor	• Boost pressure limitation • EGR valve is closed position • Throttle control motor is opened • ASCD/Speed limiter deactivation (considered as abnormal with dashboard message) • Freeshift inhibited • Regeneration forbidden

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< ECU DIAGNOSIS INFORMATION >

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DTC No.	Detected items	Engine operating condition in fail-safe mode
P0471	Exhaust gas pressure sensor	• Boost pressure limitation • EGR valve is closed position • Throttle control motor is opened • ASCD/Speed limiter deactivation (considered as abnormal with dashboard message) • Freeshift inhibited • Regeneration forbidden • Torque limitation
P0487	EGR volume command circuit	• EGR valve is closed position • Throttle control motor is opened • Freeshift inhibited • Regeneration forbidden • ASCD/Speed limiter deactivation • Airflow closed loop regulation cut off
P0488	EGR valve position control	• EGR valve is closed position • Throttle control motor is opened • Freeshift inhibited • ASCD/Speed limiter deactivation • Regeneration forbidden
P0504		• No coherency between wiring and CAN information for brake pedal • ASCD/Speed limiter Deactivation
P0544	Exhaust gas temperature sensor 1 circuit	• EGR valve is closed position • Throttle control motor is opened • Prohibit DPF regeneration
P0560	Battery voltage	• Mechanically activated throttle limp-home • Glow plug circuit deactivated • Overtorque cut off • Inhibition of the idle speed regulation • Freeshift Inhibited • ASCD/Speed limiter deactivation
P0571	Vehicle speed	Prohibit the operation of the ASCD system
P0606	ECM	• Freeshift inhibited • ASCD/Speed limiter deactivation
P060A		• Reset ECU • Reset ECU and vehicle stopped • Reset ECU and vehicle stopped after 5th failure occurrence
P062B		• EGR valve is closed position • Throttle control motor is opened • Increased idle speed • ASCD/Speed limiter deactivation • Freeshift inhibited
P1620		Stop closed-loop control
P060B	Vehicle speed	Engine speed limitation
P0638 P2100 P2119	Electric throttle control actuator	• EGR valve is closed position • Throttle control motor is opened • Compression test routine inhibited • Airflow regulation cut off • Regeneration forbidden • ASCD/Speed limiter deactivation • Freeshift inhibited

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DTC No.	Detected items	Engine operating condition in fail-safe mode
P0641	Sensor power supply	• EGR valve is closed position • Throttle control motor is opened • Prohibit DPF regeneration • Limited boost pressure regulation • Torque limitation • Prohibit the operation of the ASCD system • Boost pressure limitation
P0651		• Air conditioner deactivation • Small Torque limitation • Fan 2 activation • Freeshift inhibited • ASCD/Speed limiter deactivation
P0697		• EGR valve is closed position • Throttle control motor is opened • Rail pressure limitation • Freeshift inhibited • ASCD/Speed limiter deactivation (considered as abnormal with dashboard message) • Regeneration forbidden
P0833	Clutch pedal switch	ASCD/Speed limiter not available
P1453	DPF pressure sensor	• EGR valve is closed position • Throttle control motor is opened • Prohibit DPF regeneration • Prohibit the operation of the ASCD system
P1480 P1481 P1482 P1483	Exhaust electric throttle control actuator	• EGR valve is closed position • Throttle control motor is opened • Airflow regulation cut off • Compression test routine forbidden • Regeneration forbidden • ASCD/Speed limiter deactivation with dashboard message • Freeshift inhibited
P1484 P1485 P1486 P1487 P1488 P1489	Low pressure EGR volume control valve	• EGR valve is closed position • Throttle control motor is opened • Regenerations forbidden • ASCD/Speed limiter deactivation with dashboard message • Freeshift inhibited
P1544	Exhaust gas temperature sensor 2 circuit	• EGR valve is closed position • Throttle control motor is opened • Prohibit DPF regeneration • Prohibit the operation of the ASCD system
P1641 P1642 P1643	Thermoplunger circuit	Thermoplunger cut-off
P2002	Diesel particulate filter	• EGR valve is closed position • Throttle control motor is opened • Prohibit DPF regeneration • Prohibit the operation of the ASCD system • Prohibit stop/start system
P2120	Accelerator pedal position sensor 2 circuit	• Torque limitation • Aftersales and factory routines inhibited • Freeshift inhibited • ASCD/Speed limiter deactivation (considered as abnormal with dashboard message)
P2226	Barometric pressure sensor	• EGR valve is closed position • Throttle control motor is opened • Prohibit DPF regeneration • Prohibit the operation of the ASCD system

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< ECU DIAGNOSIS INFORMATION >

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DTC No.	Detected items	Engine operating condition in fail-safe mode
P2263	Turbocharger boost pressure sensor circuit	• EGR valve is closed position • Throttle control motor is opened • Torque limitation • ASCD/Speed limiter deactivation • Freeshift is inhibited • Regeneration forbidden
P2452	Diesel particulate filter pressure sensor circuit	• EGR valve is closed position • Throttle control motor is opened • Prohibit DPF regeneration • Prohibit the operation of the ASCD system
P253F		• Torque limitation • EGR valve is closed position • Throttle control motor is opened • Regeneration is forbidden

STOP/START SYSTEM

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DTC No.	Detected items	Stop/start system operating condition in fail safe mode		
		Idling or driving the vehicle	Stop/start system operating	
			Stop	During cranking (Restart)
U0298	Communication with DC/DC converter control unit	—	—	Prohibit the stop/start system operation from the next time
B1900 B1901 B1902 B1903	DC/DC converter	Prohibit the stop/start system operation	Restart the engine	
B1904		—	—	
P0001	Fuel pump	Prohibit the stop/start system operation	Restart the engine	
P0002	Fuel pressure			
P0016	CKP - CMP correlation			
P0089	Fuel pressure			
P0115	ECT sensor			
P0120	Throttle position sensor			
P0180	Fuel temperature sensor			
P0190	FRP sensor			
P0200 P0201 P0202 P0203 P0204	Fuel injector			
P0335				
P0340	CMP sensor			
P0402 P0403	EGR volume control valve			
P0409	EGR volume control valve position sensor			
P0487	EGR volume control valve			
P0488	EGR system			
P0544	EGT sensor 1			
P061A P062B	ECM			
P0638	Electric throttle control actuator function			
P0641 P0697	Sensor power supply			
P0833	CPP switch			—

DTC No.	Detected items	Stop/start system operating condition in fail safe mode		
		Idling or driving the vehicle	Stop/start system operating	
			Stop	During cranking (Restart)
P1480 P1481 P1482 P1483	Exhaust electric throttle control actuator	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1484 P1485 P1487 P1488	Low pressure EGR volume control valve			
P1486	Low pressure EGR volume control valve position sensor			
P1512	Starter motor		—	
P1516	High pressure fuel pump system		Restart the engine	
P1650	Starter motor relay2		Restart the engine or stall the engine	
P1655 P1656	Engine restart bypass relay	—	—	
P2002	Diesel particulate filter	Prohibit the stop/start system operation	Restart the engine	
P2100	Throttle control motor relay		—	
P2119	Electric throttle control function		Restart the engine	

DTC Inspection Priority Chart

INFOID:000000010289670

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

Priority	DTC	Detected items
1	U0019, U0111, U0121, U0298, U0299, U0315, U0415	CAN communication line
	B1900, B1901, B1902, B1903, B1904	DC/DC converter
	P0016	Crankshaft position - camshaft position correlation
	P0087	Fuel rail pressure sensor
	P0095	Intake air temperature sensor 2
	P0100, P0101	Mass air flow sensor
	P0105	Turbocharger boost sensor
	P0110	Intake air temperature sensor 1
	P0115	Engine coolant temperature sensor
	P0120	Throttle position sensor
	P0180	Fuel temperature sensor
	P0190, P018C	Fuel rail pressure sensor
	P0225, P0226, P2120	Accelerator pedal sensor
	P025A, P025B	Fuel pump control module
	P0335	Crankshaft position sensor
	P0340	Camshaft position sensor
	P0409	EGR volume control valve control position sensor
	P0470, P0471	Exhaust gas pressure sensor 1
	P0530	Refrigerant pressure sensor
	P0544, P2080	Exhaust gas temperature sensor 1
	P0574	Vehicle speed sensor
	P0606, P060A, P060B, P061A, P062B, P160C	ECM
	P0641, P0651, P0697	Sensor power supply
	P0806, P158A	Clutch switch
	P1453, P2452	DPF pressure sensor
	P1482, P1483	Exhaust throttle valve position sensor
	P1486, P1489	Low pressure EGR volume control valve control position sensor
	P1544	Exhaust gas temperature sensor 2
	P1589	Neutral switch
	P1650	Thermoplunger control unit
	P2226	Barometric pressure sensor

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< ECU DIAGNOSIS INFORMATION >

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Priority	DTC	Detected items
2	P0001, P0002	High pressure fuel pump (volumetric control valve)
	P0045	Turbocharger boost control solenoid valve
	P0200, P0201, P0202, P0203, P0204, P0263, P0266, P0269, P0272	Fuel injector
	P0403	EGR volume control valve
	P0504	Stop lamp switch
	P0560	Battery voltage
	P0627	Fuel pump relay
	P0638, P2100, P2119	Electric throttle control actuator
	P0657	ECM relay
	P0833	Clutch pedal position switch
	P1480, P1481	Exhaust electric throttle control actuator
	P1484, P1485, P1487, P1488	Low pressure EGR volume control valve
	P1503	Active grille shutter
	P1512	Starter motor
	P1516	High pressure fuel pump
	P1641, P1642, P1643	Thermoplunger
	P1655, P1656	Engine restart bypass relay
	P2504	Alternator
	P2688	Fuel heater
3	P0089	Fuel pressure
	P0217, P1675	Engine over temperature (Overheat)
	P0380	Glow control system
	P0402, P0487, P0488	EGR system
	P0525, P1525	ASCD system
	P0564, P0575	ASCD steering switch
	P1546, P2002	Diesel particulate filter
	P2263	Turbocharger system
	P2264	Water diesel detector
	P253F	Engine oil dilution

DTC Index

INFOID:000000010289671

DTC*	Items (CONSULT screen terms)	Trip	MI lighting up		Reference
			Yellow	Red	
U0019	—	10	—	—	ECK-159
U0111	COMMUNICATION ERROR	1 or 3	—	—	ECK-160
U0121	MLTIPLXD TRACTION CNTRL CONN	10	—	—	ECK-161
U0298	COMMUNICATION ERROR (LOST)	1	—	—	ECK-162
U0299	COMMUNICATION ERROR (LOST)	1	—	—	ECK-164
U0315	VEHICLE SPEED	1	—	—	ECK-166
U0415	MLTIPLXD TRACTION CNTRL CONN	10	—	—	ECK-167
B1900	DC/DC CONVERTER	1	—	—	ECK-168
B1901	DC/DC CONVERTER	1	—	—	ECK-170
B1902	DC/DC CONVERTER	1	—	—	ECK-172

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< ECU DIAGNOSIS INFORMATION >

[K9K]

DTC*	Items (CONSULT screen terms)	Trip	MI lighting up		Reference
			Yellow	Red	
B1903	DC/DC CONVERTER	1	—	—	ECK-174
B1904	DC/DC CONVERTER	1	—	—	ECK-176
P0001	FUEL FLOW REGULATOR CIRCUIT	3 or 10	× or —	×	ECK-177
P0002	FLOW CONTROL ADAPTIVE	3	×	× or —	ECK-179
P0016	COHER BTWN CSFT SEN/ENG SPD	1	×	—	ECK-181
P0045	TC SOLENOID VALVE CNTRL CIRC	1	×	—	ECK-183
P0087	RAIL PRESSURE	1	×	—	ECK-185
P0089	RAIL PRESS REGULTIN	10	—	—	ECK-187
P0095	AIR TEMP SEN/CIRC	1	×	—	ECK-190
P0100	AIR FLOW SENSOR CIRCUIT	1	×	—	ECK-193
P0101	AIR FLOW SENSOR INFORMATION	1	×	—	ECK-195
P0105	INLET MANIFPRS SEN CIRC	1	×	—	ECK-197
P0110	AIR TEMP SEN CIRC	1	×	—	ECK-199
P0115	WATER TEMPERATURE SENSOR CIRC	1	×	—	ECK-201
P0120	Inlet air flap position SEN	1	×	—	ECK-203
P0180	FUEL TEMPERATURE SENSOR CIRCUIT	3 or 10	—	—	ECK-205
P018C	FUEL PRESSURE SENSOR B	10	—	—	ECK-207
P0190	RAIL PRESSURE SENSOR CIRCUIT	3	×	×	ECK-209
P0200	INJECTOR CONTROL CIRCUIT	3	×	—	ECK-211
P0201	CYLINDER 1 INJECTOR CIRC	1 or 3	× or —	× or —	ECK-213
P0202	CYLINDER 2 INJECTOR CIRC	1 or 3	× or —	× or —	ECK-213
P0203	CYLINDER 3 INJECTOR CIRC	1 or 3	× or —	× or —	ECK-213
P0204	CYLINDER 4 INJECTOR CIRC	1 or 3	× or —	× or —	ECK-213
P0217	ENGINE OVERHEATING	1	—	×	ECK-216
P0225	PEDAL POTENTIOMETER CIRCUIT TRACK 1	1	×	—	ECK-219
P0226	BRAKE/ACCELERATOR PEDAL POSITIONS	1 or 3 or 10	× or —	× or —	ECK-221
P025A	FUEL PUMP MODULE A	1	× or —	—	ECK-223
P025B	Fuel Pump Module Control Circuit	1	×	—	ECK-225
P0263	FUEL INJECTION CALIBRATION FOR CYLINDER No.1	10	—	—	ECK-226
P0266	FUEL INJECTION CALIBRATION FOR CYLINDER No.2	10	—	—	ECK-226
P0269	FUEL INJECTION CALIBRATION FOR CYLINDER No.3	10	—	—	ECK-226
P0272	FUEL INJECTION CALIBRATION FOR CYLINDER No.4	10	—	—	ECK-226
P0335	ENGINE SPEED SENSOR SIGNAL	1	× or —	—	ECK-229
P0340	CAMSHAFT SENSOR CIRCUIT	1	×	—	ECK-231
P0380	Preheating unit DIAG CONN	3	—	—	ECK-233
P0402	EGR VALVE JAMMED OPEN	1	×	—	ECK-235
P0403	EGR VLV CMD CIRC	3	×	—	ECK-238
P0409	EGR VALVE POSITION SEN CIRC	1	×	—	ECK-240
P0470	TBN UPSTR PRS SEN CIRC	1	×	—	ECK-243
P0471	PRS UPSTR OF TBN	1 or 3	×	× or —	ECK-245
P0487	EGR VLV CMD CIRC	1	×	—	ECK-247
P0488	EGR VALVE POSITION CNTRL	1	×	—	ECK-250
P0504	BRAKE SWITCH SIGNAL CONSISTENCY	1 or 10	—	× or —	ECK-253

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< ECU DIAGNOSIS INFORMATION >

[K9K]

DTC*	Items (CONSULT screen terms)	Trip	MI lighting up		Reference
			Yellow	Red	
P0525	CRUISE CONTROL DATA MONITORING	1	—	—	ECK-256
P0530	REFG TEMP PRESS SEN VOLT	1	—	—	ECK-257
P0544	TBN UPS TEMP SEN CIRC	1	×	—	ECK-259
P0560	COMPUTER SUPPLY VOLTAGE	3	×	—	ECK-261
P0564	SL LMTR ICC FNC	1	—	—	ECK-263
P0574	VEHICLE SPEED CONSISTENCY	1	—	—	ECK-265
P0575	CC/SL LMTR BUTTONS	1	—	—	ECK-266
P0606	COMPUTER	1	×	—	ECK-268
P060A	COMPUTER	3 or 10	×	×	ECK-269
P060B	COMPUTER	1	×	—	ECK-270
P061A	COMP	1 or 10	×	—	ECK-271
P0627	LOW PRES PMP REL CIRC	1	×	—	ECK-272
P062B	COMPUTER	3 or 10	×	×	ECK-274
P0638	Inlet air flap position CTRL	1	×	—	ECK-275
P0641	SEN SUPPLY N1 VOL	3	×	×	ECK-277
P0651	SEN SUPPLY N2 VOL	1	×	—	ECK-280
P0657	MAIN RELAY CONTROL CIRCUIT	10	—	—	ECK-282
P0697	SEN SUPPLY N-3 VOL	3	×	×	ECK-284
P0806	—	1	—	—	ECK-286
P0833	CLUTCH SWITCH SIGNAL CONSISTENCY	1 or 10	—	—	ECK-291
P1453	DIFF. PRESSURE SENSOR CIRCUIT, PARTICLE FILTER	1	×	—	ECK-294
P1480	EXHAUST AIR FLAP	1	×	—	ECK-296
P1481	EXHAUST AIR FLAP CIRCUIT	3	×	—	ECK-299
P1482	EXHAUST AIR FLAP POSITION SENSOR	1	×	—	ECK-302
P1483	EXHAUST AIR FLAP POSITION SENSOR CIRCUIT	1	×	—	ECK-304
P1484	HIGH PRESSURE EGR VALVE	1	×	—	ECK-306
P1485	LOW PRESSURE EGR VALVE COMMAND CIRCUIT	3	×	—	ECK-308
P1486	LOW PRES EGR VALVE POSITION SENSOR	1	×	—	ECK-310
P1487	LOW PRESSURE EGR VALVE POSITION OFFSET	1	×	—	ECK-312
P1488	LOW PRESSURE EGR VALVE BLOCKED	1	×	—	ECK-314
P1489	LOW PRESSURE EGR VALVE TEMPERATURE SENSOR	1 or 3	×	—	ECK-316
P1503	AIR VENT CONTROL	2	—	—	ECK-318
P1512	STARTER	1	—	—	ECK-321
P1516	HIGH PRESSURE FUEL PUMP	1	—	—	ECK-322
P1525	CONSISTENT MULTIPLEX SIGNALS FOR CC/SL	1	—	—	ECK-323
P1544	TEMP SEN UPSTREAM OF PF	1 or 3	×	×	ECK-324
P1546	TEMP. UPSTREAM OF PF	10	—	×	ECK-327
P1589	NEUTRAL POSITION SW/SENSOR	1	—	—	ECK-328
P158A	CLUTCH PEDAL SWITCH/SENSOR	1	—	—	ECK-331
P160C	COMPUTER	1	—	—	ECK-334
P1641	THMPR 1 RLY C/CIR	10	—	—	ECK-336
P1642	THMPR 2 RLY C/CIR	10	—	—	ECK-339
P1643	THMPR 3 RLY C/CIR	10	—	—	ECK-342

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< ECU DIAGNOSIS INFORMATION >

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DTC*	Items (CONSULT screen terms)	Trip	MI lighting up		Reference
			Yellow	Red	
P1650	CNT UNIT -> HEAT ELEM CONN	1	—	—	ECK-345
P1655	ENGINE RESTART BYPASS RELAY	1	—	—	ECK-348
P1656	—	1	—	—	ECK-352
P1675	—	1	—	×	ECK-356
P2002	PARTICLE FILTER	1 or 3 or 10	× or —	—	ECK-359
P2080	TBN DOWNS TEMP REG	1	×	—	ECK-361
P2100	INLET AIR FLAP CIRCUIT	1	×	—	ECK-362
P2119	AIR INLET FLAP	1	×	—	ECK-364
P2120	PEDAL POTENTIOMETER CIRCUIT TRACK 2	1	×	—	ECK-365
P2226	ATMOS PRESS SEN	1	×	—	ECK-367
P2263	Boost pressure circuit	1 or 3	×	× or —	ECK-368
P2264	WTR DIESEL DETECTR	10	—	—	ECK-370
P2452	P/FLT DIFF PRS SEN	1	×	—	ECK-372
P2504	CHARGING SYSTEM VOLTAGE	3	—	—	ECK-374
P253F	ENG OIL DILUTION	1	×	—	ECK-375
P2688	—	1	—	—	ECK-376

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

DC/DC CONVERTER

< ECU DIAGNOSIS INFORMATION >

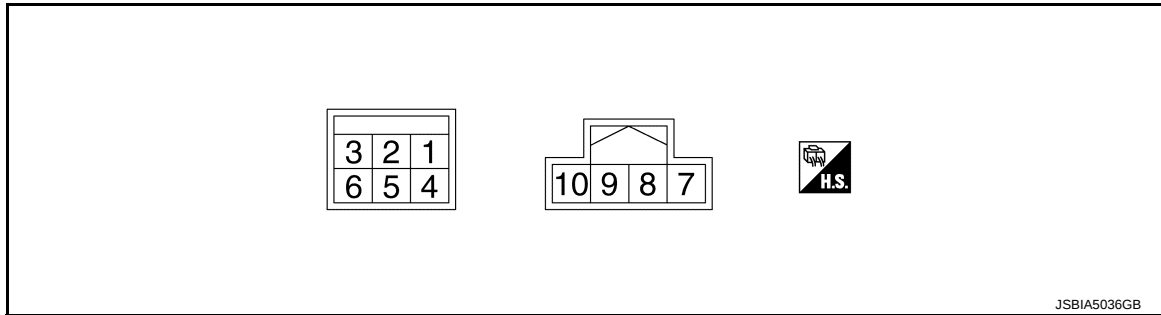
[K9K]

DC/DC CONVERTER

Reference Value

INFOID:0000000110289676

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- DC/DC converter is located behind the glove upper box assembly. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT.

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/ Output		
1 (LG)	2 (B)	Power supply input 1	Input	[Ignition switch: OFF]	9 - 13 V
2 (B)	—	Ground	—	—	—
3 (L)	2 (B)	Power supply input 2	Input	[Ignition switch: OFF]	9 - 13 V
4 (G)	2 (B)	Power supply output 1	Output	[Stop/start system operates] • While cranking of restart	12 V
				Except above	9 - 13 V
6 (W)	2 (B)	Power supply output 2	Output	[Stop/start system operates] • While cranking of restart	12 V
				Except above	9 - 13 V
7 (SB)	2 (B)	Engine communication line	Input/ Output	[Ignition switch: ON]	
9 (LG)	2 (B)	Voltage stabilizer signal	Input	[Stop/start system operates] • While cranking of restart	★ Less than 2 V
				Except above	Battery voltage

DC/DC CONVERTER

< ECU DIAGNOSIS INFORMATION >

[K9K]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
10 (R)	2 (B)	Ignition signal	Input	[Ignition switch: ON]	9 - 13 V
				[Ignition switch: OFF]	0 V

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

< WIRING DIAGRAM >

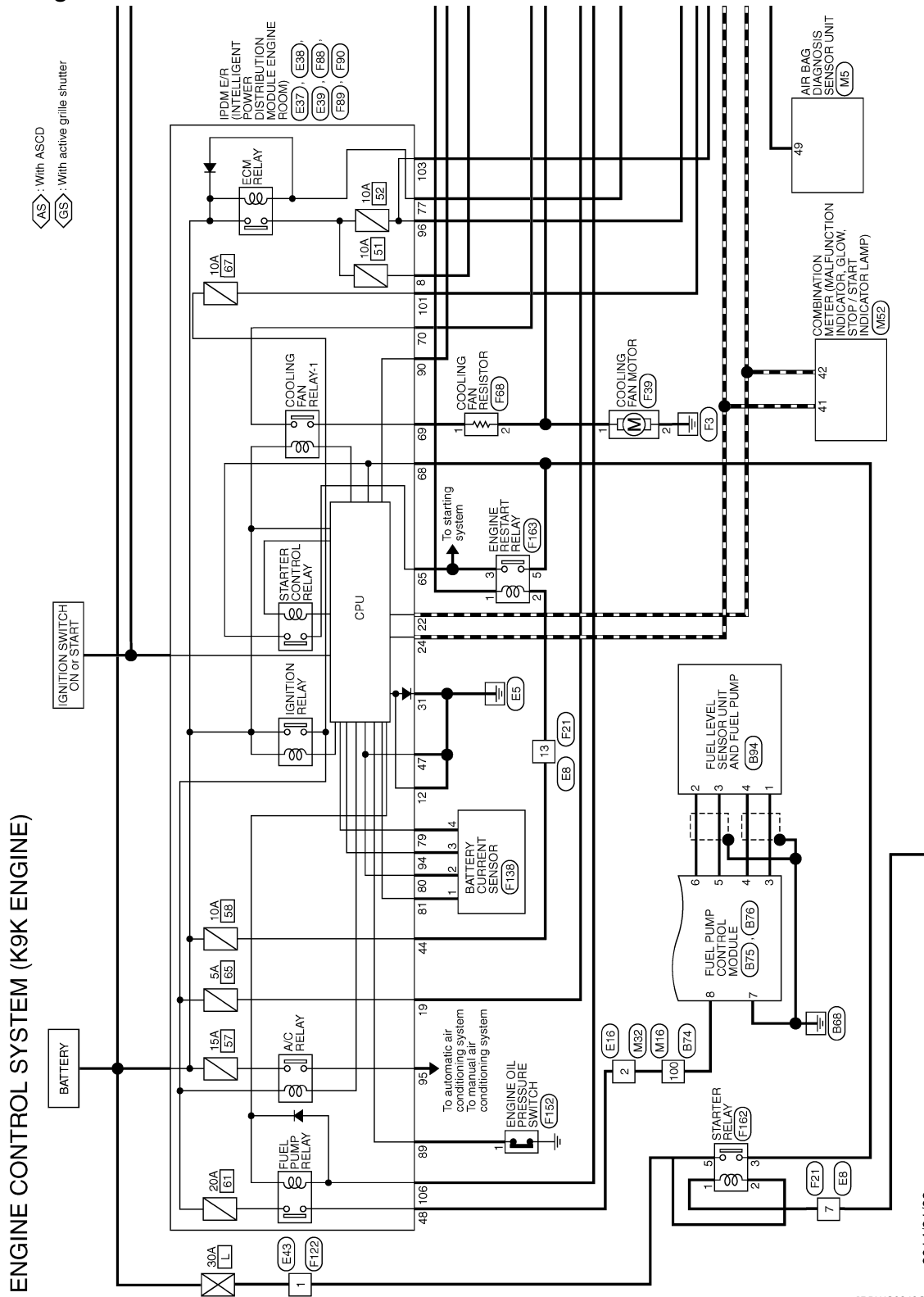
WIRING DIAGRAM

ENGINE CONTROL SYSTEM

Wiring Diagram

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ECK



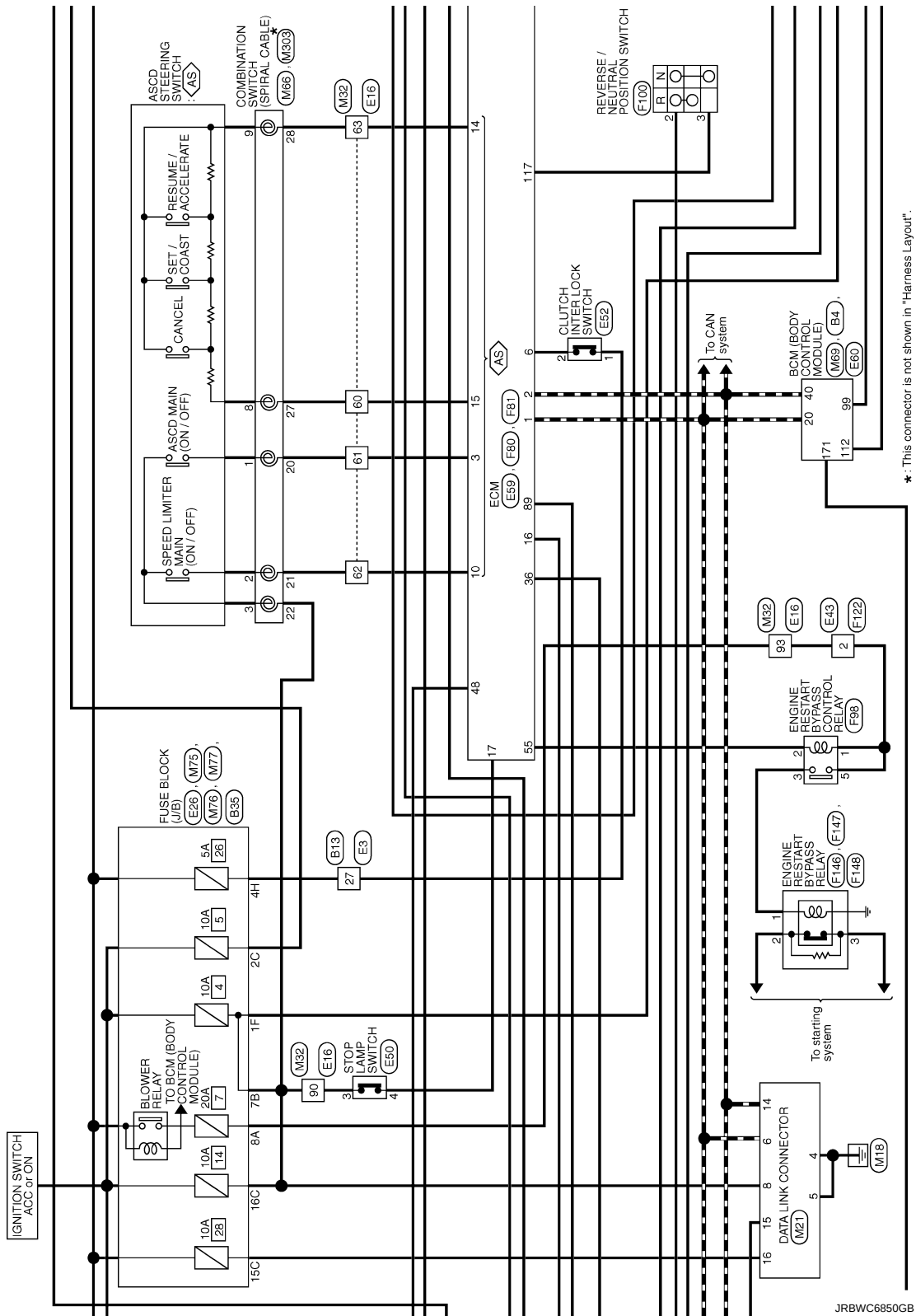
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ENGINE CONTROL SYSTEM

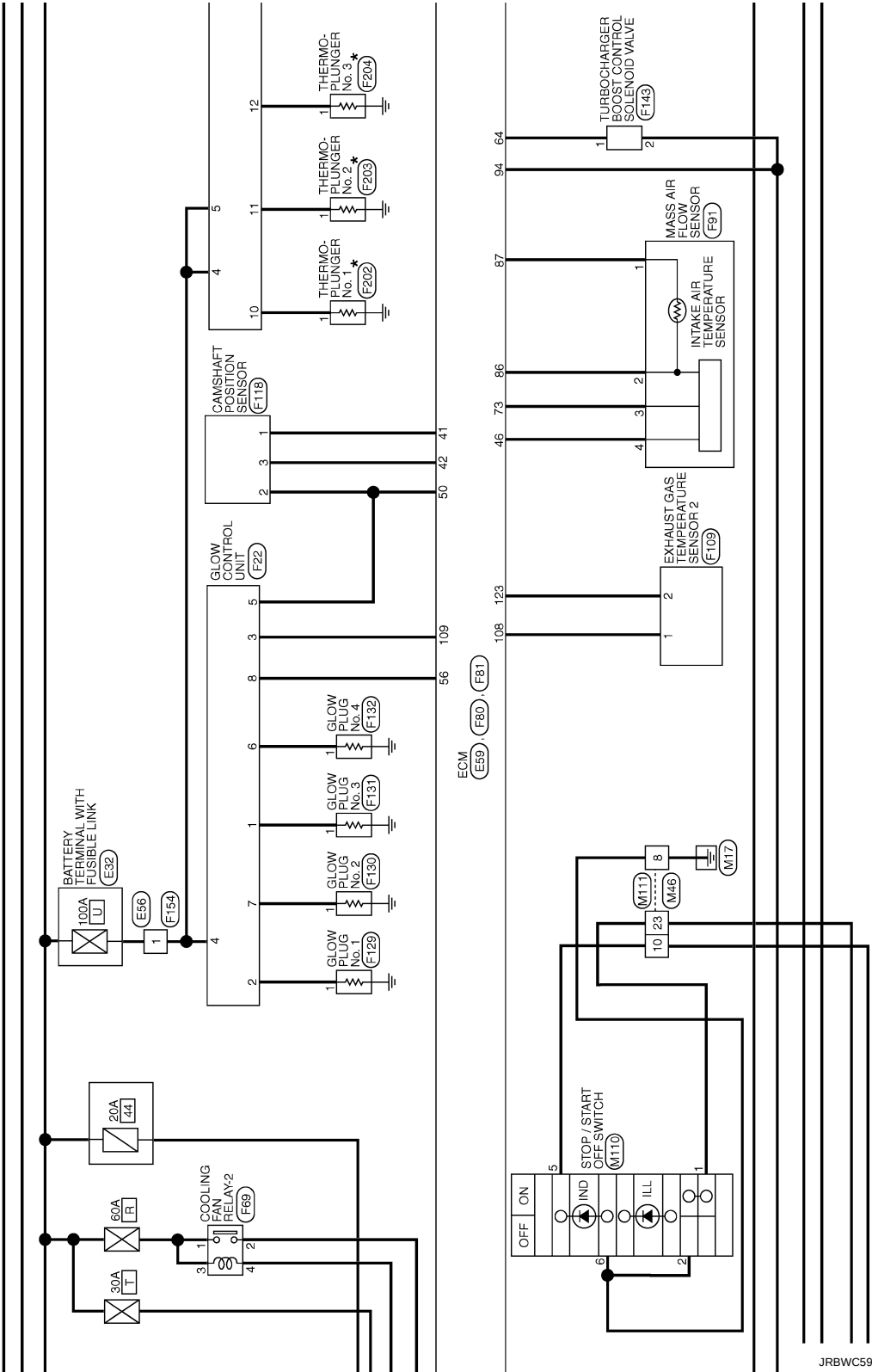
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[K9K]



* This connector is not shown in "Harness Layout".

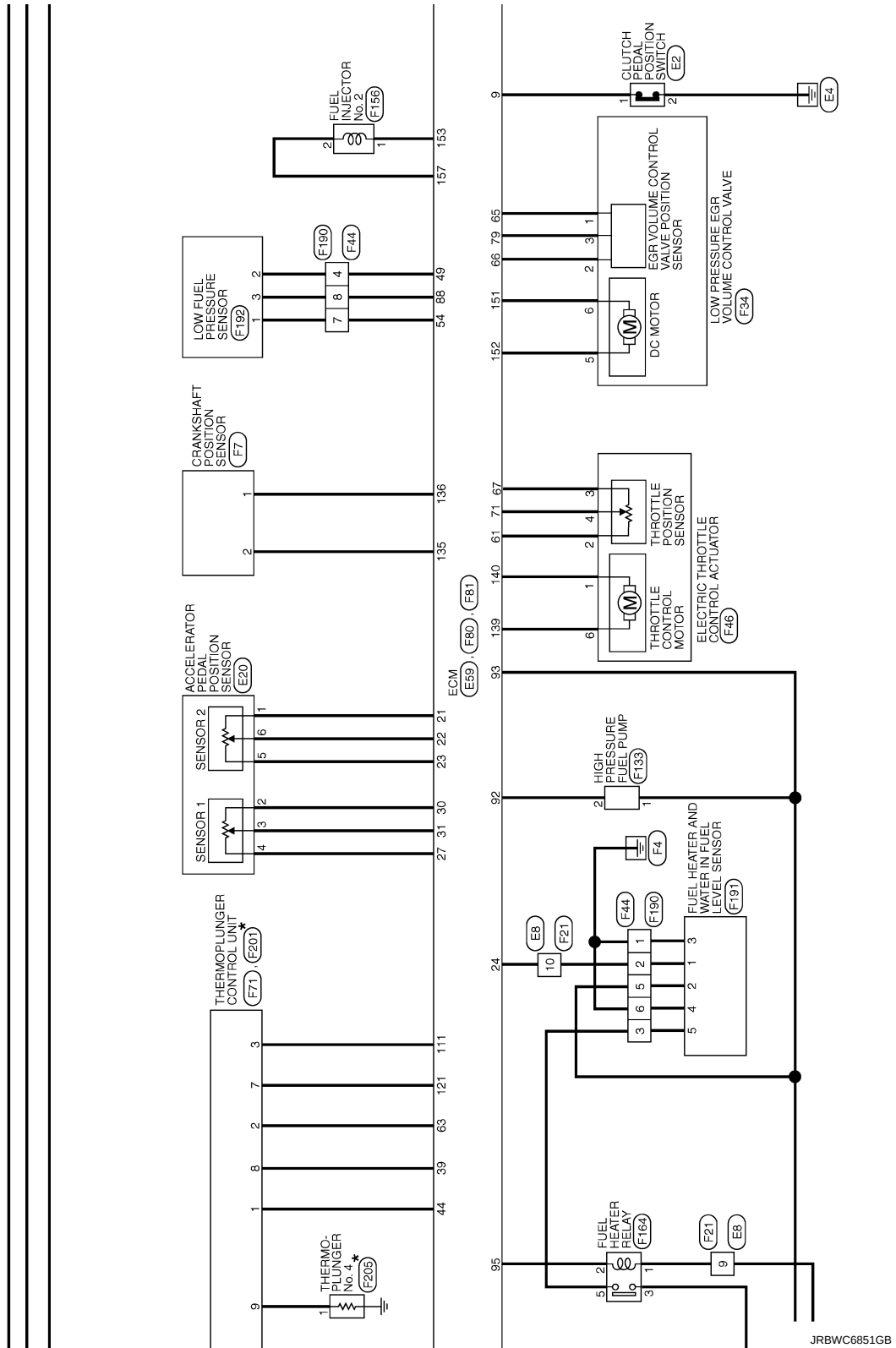
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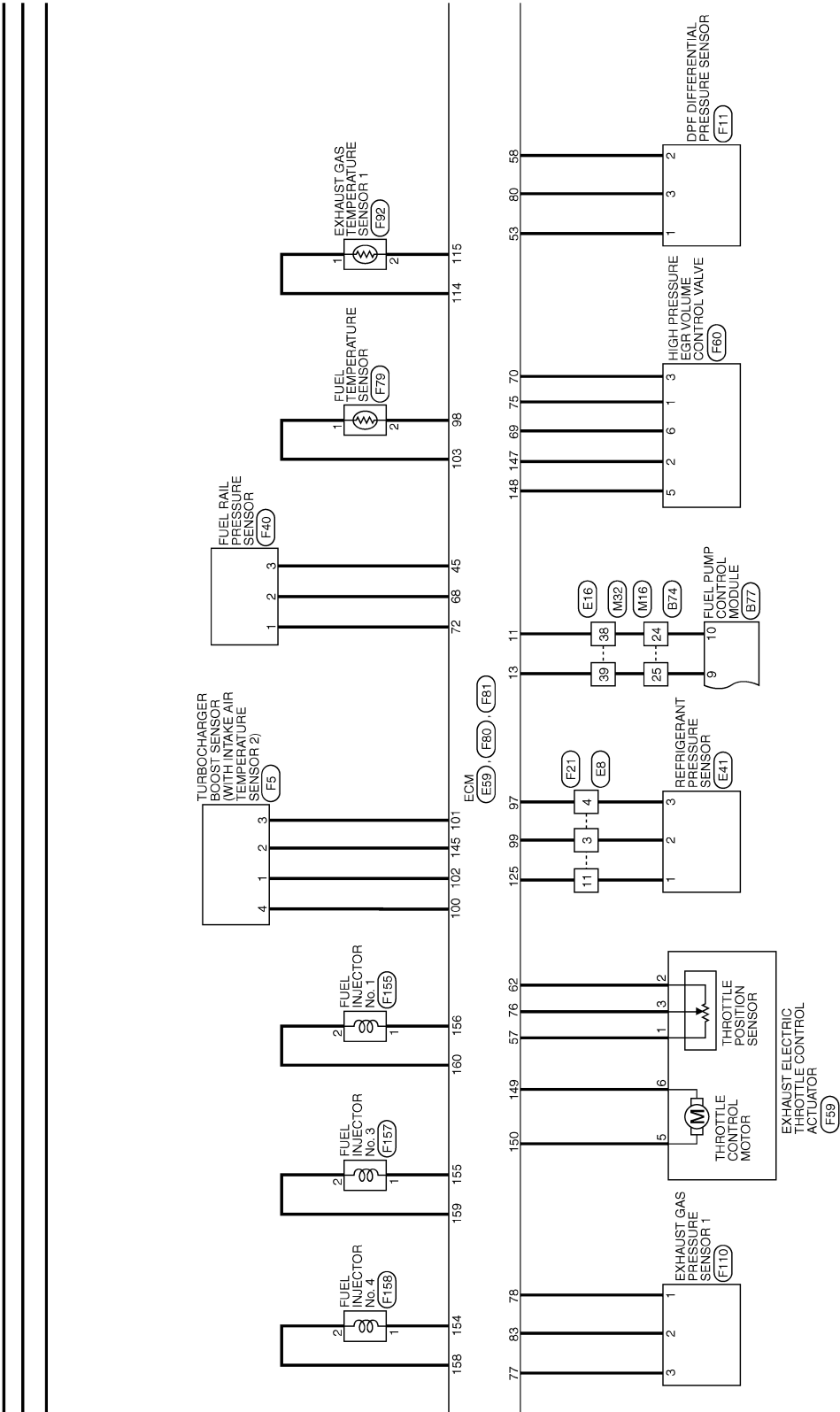


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[K9K]

ECK-106



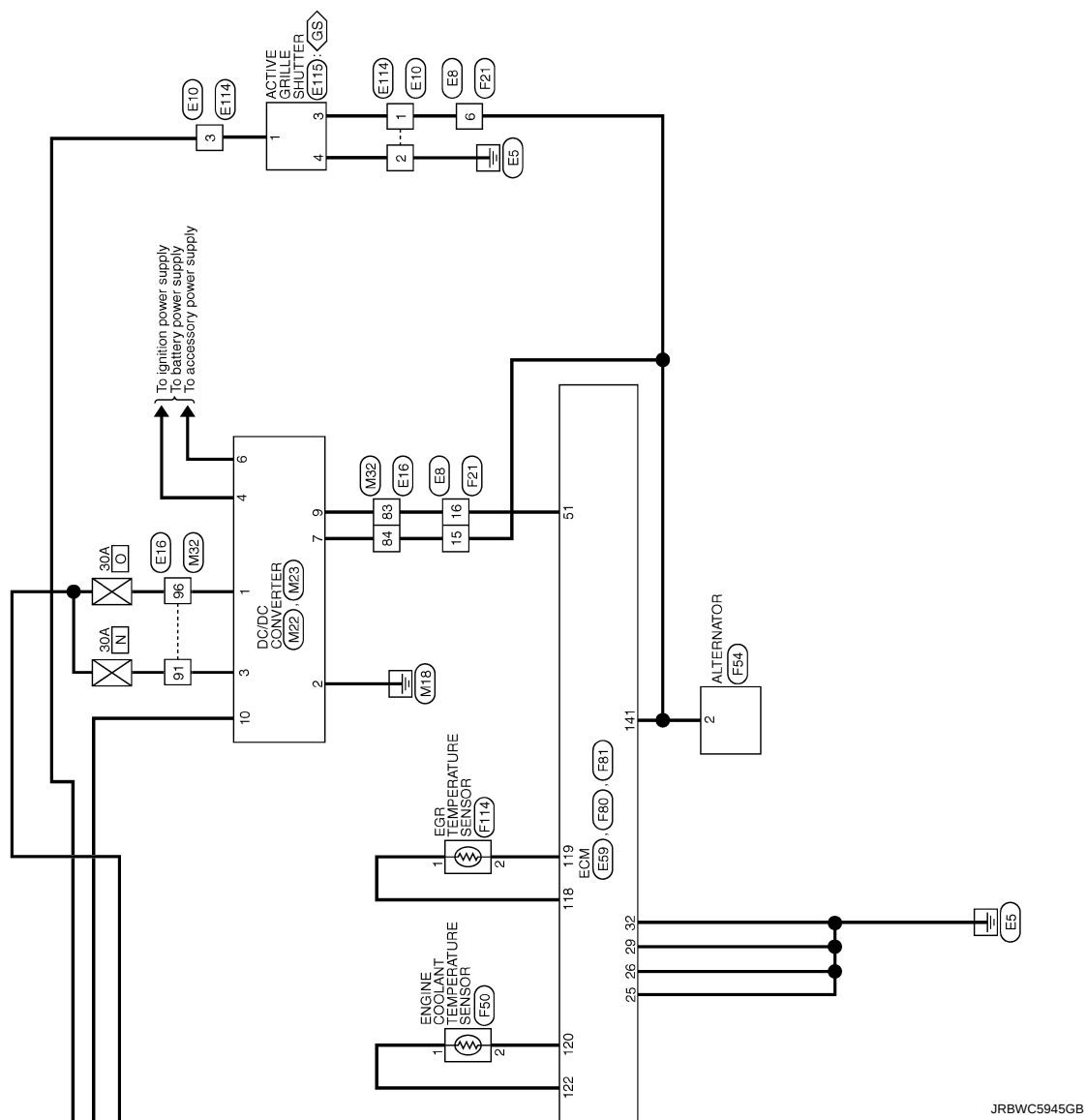
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ENGINE CONTROL SYSTEM

< WIRING DIAGRAM >

[K9K]



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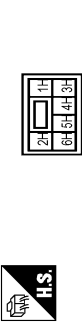
ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	B14
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH80MW-CS16-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	G	-
5	O	-
20	G	-
21	BR	-
22	SB	-
23	BQ	-
24	SB	-
25	G	-
26	B	-
27	P	-

Connector No.	B55
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS96FW-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
24	GR	-
24H	P	-
34	G	-
44	P	-
54	G	-
64	Y	-



Connector No.	B13
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4

Connector No.	B14
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	-
2	L	-
3	LG	-
4	P	-
9	SB	-
20	G	- [With gasoline engine]
20	L	- [With diesel engine]
21	B	-
24	G	-
25	BR	-
55	LG	-
66	GR	-
74	R	-
79	V	-
84	W	-
88	BQ	-
93	GR	-
94	Y	-
94	P	-
95	L	-
99	LG	-
100	GR	- [With diesel engine]
100	R	- [With gasoline engine]

Connector No.	B75
Connector Name	FUEL PUMP CONTROL MODULE
Connector Type	ED6FGY-RS



Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	-
2	W	-
3	O	-
4	O	-
5	G/Y	-
6	G/R	-

Connector No.	B70
Connector Name	FUEL PUMP CONTROL MODULE
Connector Type	FEA02FBR-RZ



Terminal No.	Color Of Wire	Signal Name [Specification]
7	B	-
8	GR	-

ENGINE CONTROL SYSTEM

< WIRING DIAGRAM >

[K9K]

ENGINE CONTROL SYSTEM (K9K ENGINE)

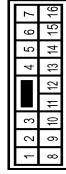
Connector No.	E17
Connector Name	FUEL PUMP CONTROL MODULE
Connector Type	ES04EB



Connector No.	E2
Connector Name	CLUTCH PEDAL POSITION SWITCH
Connector Type	M02EB-LC



Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	NS18MW-CS

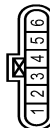


Connector No.	E10
Connector Name	WIRE TO WIRE
Connector Type	ES04EB-FR



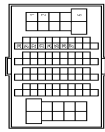
Terminal No.	Color Of Wire	Signal Name [Specification]
10	GR	-
11	L	-
12	B	-

Connector No.	EB84
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	ED0FGY-RS



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	-
2	B	-

Connector No.	E3
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS18-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	- [With gasoline engine]
2	B	- [With gasoline engine]
3	Y	- [With diesel engine]
4	L	-
5	GR	-
6	W	-
7	G	-
8	LG	-
9	B	- [With gasoline engine]
10	B	- [With diesel engine]
11	Y	- [With gasoline engine]
12	G	-
13	GR	-
14	V	-
15	L	-
16	SB	-

Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	W	-
5	BG	-
20	G	-
21	BR	-
22	SB	-
23	EG	-
24	SB	-
25	G	-
26	B	-
27	P	-

Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	G/R	-
3	G/Y	-
4	O	-
5	W	-
6	B	-

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	L	-

Connector No.	E16
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS18-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
2	W	-
5	V	-
7	BG	-
8	L	-
9	LG	-
10	W	-
14	BG	-
20	L	-
21	P	-
22	SHIELD	-
23	V	-
31	V	-
32	W	-
33	SB	-
34	LG	-
35	BG	-
36	LG	-

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ENGINE CONTROL SYSTEM (K9K ENGINE)

37	V	-	-	-	-
38	G	-	-	-	-
39	BR	-	-	-	-
40	L	-	-	-	-
41	P	-	-	-	-
42	B	-	-	-	-
43	G	-	-	-	-
44	Y	-	-	-	-
45	BR	-	-	-	-
46	L	-	-	-	-
47	GR	-	-	-	-
48	Y	-	-	-	-
49	P	-	-	-	-
51	P	-	-	-	-
52	W	-	-	-	-
53	R	-	-	-	-
55	BR	-	-	-	-
56	P	-	-	-	-
57	B	-	-	-	-
58	L	-	-	-	-
59	Y	-	-	-	-
60	G	-	-	-	-
61	SB	-	-	-	-
62	V	-	-	-	-
63	BR	-	-	-	-
64	SB	-	-	-	-
65	LG	-	-	-	-
66	Y	-	-	-	-
67	BG	-	-	-	-
68	R	-	-	-	-
69	W	-	-	-	-
70	G	-	-	-	-
71	Y	-	-	-	-
72	L	-	-	-	-
73	R	-	-	-	-
76	L	-	-	-	-
77	V	-	-	-	-
78	LG	-	-	-	-
79	SHIELD	-	-	-	-
80	GR	-	-	-	-
82	Y	-	-	-	-
83	SB	-	-	-	-
84	L	-	-	-	-
85	G	-	-	-	-
86	Y	-	-	-	-
87	B	-	-	-	-
88	B	-	-	-	-
90	Y	-	-	-	-
91	R	-	-	-	-
93	Y	-	-	-	-

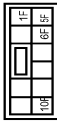
96	GR	-	-	-	-
97	W	-	-	-	-
98	V	-	-	-	-
99	GR	-	-	-	-

Connector No.	E20
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RH06FB



Terminal No.	Color	Wire	Signal Name [Specification]
1	P	-	- [For RRM engine]
2	Y	-	- [Except for RRM engine]
3	GR	-	- [Except for RRM engine]
4	Y	-	- [For RRM engine]
5	R	-	- [Except for RRM engine]
6	W	-	- [For RRM engine]
7	G	-	- [For RRM engine]
8	V	-	- [Except for RRM engine]
9	BG	-	- [For RRM engine]
10	L	-	- [For RRM engine]
11	W	-	- [For RRM engine]

Connector No.	E26
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS10FW-CS



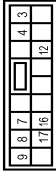
Terminal No.	Color	Wire	Signal Name [Specification]
10F	BG	-	- [With stop/start system]
10E	L	-	- [Without stop/start system]
15F	V	-	-
16F	GR	-	-

Connector No.	E32
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	L07FBR-MC



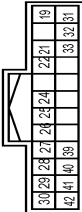
Terminal No.	Color	Wire	Signal Name [Specification]
3	R	-	- [With gasoline engine]
3	W	-	- [With diesel engine]
4	W	-	-

Connector No.	E37
Connector Name	INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	NS18FY-CS



17	G	-	-	-	-
17	W	-	-	-	-

Connector No.	E38
Connector Name	INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	TH24FY-MH



Terminal No.	Color	Wire	Signal Name [Specification]
19	LG	-	-
21	SB	-	-
22	P	-	-
24	L	-	-
25	G	-	-
26	B	-	-
27	BG	-	-
28	LG	-	-
29	V	-	-
30	Y	-	-
31	GR	-	-
32	SB	-	-
33	BR	-	-
39	L	-	-
40	P	-	-
41	W	-	-
42	R	-	-

ENGINE CONTROL SYSTEM

< WIRING DIAGRAM >

[K9K]

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	E39
Connector Name	INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	Female 24345408R



Connector No.	E43
Connector Name	WIRE TO WIRE
Connector Type	M02MW-LG



Connector No.	E52
Connector Name	CLUTCH INTERLOCK SWITCH
Connector Type	M02EBR-LG



Terminal No.	Color Of Wire	Signal Name [Specification]
43	Y	-
44	R	-
45	P	-
46	Y	-
47	GR	-
48	W	-

Connector No.	E41
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	PK03FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	V	-
2	GR	-
3	L	-

Terminal No.	Color Of Wire	Signal Name [Specification]
2	Y	-

Connector No.	E50
Connector Name	STOP LAMP SWITCH
Connector Type	M04EW-LG



Terminal No.	Color Of Wire	Signal Name [Specification]
1	V	-
2	LG	-
3	W	- [With CVT]
4	R	- [With M/T]
4	SB	- [With M/T]



Terminal No.	1	W
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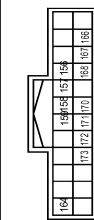
Connector No.	E59
Connector Name	ECM
Connector Type	RH24FB-R28-L, LH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	V	CAN-H
2	P	CAN-L
3	SB	ASCO MAIN SWITCH
6	V	CLUTCH INTERLOCK SWITCH
9	R	CLUTCH PEDAL POSITION SWITCH
10	V	SPEED LIMITER MAIN SWITCH
11	G	FUEL PUMP CONTROL MODULE (DIAGNOSIS)
13	BR	FUEL PUMP CONTROL MODULE (COMMAND)
14	BR	ASCO STEERING SWITCH GROUND
15	G	ASCO STEERING SWITCH
16	LG	ECM POWER SUPPLY (IGNITION)
17	EG	STOP LAMP SWITCH
18	EG	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
21	W	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 2)
22	W	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
23	EG	FUEL HEATER AND WATER IN FUEL SENSOR
24	L	ECM GROUND
25	B	ECM GROUND
26	B	ECM GROUND
27	V	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
29	B	ECM GROUND
30	GR	ECM GROUND
31	R	ACCELERATOR PEDAL POSITION SENSOR 1
32	B	ECM GROUND



Connector No.	E60
Connector Name	ECM (BODY CONTROL MODULE)
Connector Type	TH24EP-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
158	V	CLUTCH INTERLOCK SW
159	LG	STOP LAMP SWITCH 2
159	V	STOP LAMP SW
159	R	CLUTCH PEDAL POSITION SWITCH
184	Y	INTELLIGENT KEY WARNING BUZZER
166	P	STEERING LOCK UNIT POWER SUPPLY
167	BR	TURN SIG LH (FRONT)
188	GR	TURN SIG RH (FRONT)
170	L	PTC RELY-3 CONT

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ENGINE CONTROL SYSTEM (K9K ENGINE)

171	G	STARTER RELAY CONT
172	W	PTC RELAY-1 CONT
173	BG	PTC RELAY-2 CONT

Connector No.	E114
Connector Name	WIRE TO WIRE
Connector Type	FSD4MB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	L	-

Connector No.	E115
Connector Name	ACTIVE GRILLE SHUTTER
Connector Type	FHD4FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
3	W	-
4	B	-

Connector No.	F5
Connector Name	UPPER/LOWER BOOSE SENSOR WITH INANE AIR
Connector Type	FR04FB

Connector No.	FR04FB
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Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	-
2	W	-
3	R	-
4	G	-

Connector No.	F7
Connector Name	CRANKSHAFT POSITION SENSOR (POS)
Connector Type	FR02FY



Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-
2	B	-

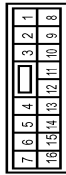
Connector No.	F11
Connector Name	DPF DIFFERENTIAL PRESSURE SENSOR
Connector Type	RENALU-770329794

Connector No.	RENALU-770329794
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Terminal No.	Color Of Wire	Signal Name [Specification]
1	SB	-
2	B	-
3	LG	-

Connector No.	F21
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	- [With diesel engine]
2	GR	- [With gasoline engine]
3	Y	- [With diesel engine]
4	BR	- [With RSM engine]
5	B	- [With RSM engine]
6	EG	- [With RSM engine with CVT]
7	G	- [With diesel engine]
8	SB	-
9	B	- [With gasoline engine]

9	W	- [With diesel engine]
10	B	- [With MR20 engine]
10	L	- [With K9K engine]
10	V	- [With RSM engine]
11	BR	- [With K9K engine]
11	Y	- [With MR20 engine]
11	Y	- [With diesel engine]
12	P	- [With HP engine]
12	P	- [With gasoline engine]
13	R	- [With diesel engine with stop/start system]
13	W	- [With gasoline engine with stop/start system]
13	Y	- [Without stop/start system]
14	GR	- [With M/T]
14	V	- [With CVT]
15	L	-
16	LG	-

Connector No.	F22
Connector Name	GLOW CONTROL UNIT
Connector Type	FHX06FB-ANZ2



Terminal No.	Color Of Wire	Signal Name [Specification]
3	W	GLOW PLUG No.3
3	B	GLOW PLUG No.3
4	G	GLOW PLUG CONTROL (DIAGNOSIS)
4	W	BATTERY POWER SUPPLY
5	B	GROUND
6	Y	GLOW PLUG No.4
7	L	GLOW PLUG No.2
8	R	GLOW PLUG CONTROL (COMMAND)

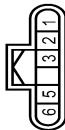
ENGINE CONTROL SYSTEM

< WIRING DIAGRAM >

[K9K]

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	F34
Connector Name	LOW PRESSURE EGR VOLUME CONTROL VALVE
Connector Type	RH08FB



Connector No.	F40
Connector Name	FUEL RAIL PRESSURE SENSOR
Connector Type	EC211PC0252549



Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-
2	B	-
3	L	-
4	B	-
5	B	-
6	W	-

Connector No.	F39
Connector Name	COOLING FAN MOTOR
Connector Type	renault 243407053R



Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	-
2	B	-

Connector No.	F46
Connector Name	ELECTRIC THROTTLE CONTROL ACTUATOR
Connector Type	RH08FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	- [With gasoline engine]
2	L	- [With gasoline engine]
3	B	- [With gasoline engine]
4	G	- [With gasoline engine]
5	R	- [With gasoline engine]
6	G	- [With gasoline engine]
7	SB	- [With gasoline engine]

Connector No.	F44
Connector Name	WIRE TO WIRE
Connector Type	RS08MB



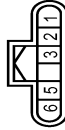
Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	-
2	L	-
3	W	-
4	L	-
5	R	-
6	B	-
7	SB	-
8	W	-

Connector No.	F54
Connector Name	ALTERNATOR
Connector Type	RH02FB



Terminal No.	Color Of Wire	Signal Name [Specification]
2	G	-

Connector No.	F59
Connector Name	EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR
Connector Type	RH08FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	BG	SENSOR +5V [With K9K engine]
2	BR	SENSOR GND [With K9K engine]
3	Y	SENS SIG OUTPUT [With K9K engine]
4	R	SENS SIG OUTPUT [With K9K engine]
5	BR	DC MOTOR+ [With K9K engine]
6	Y	DC MOTOR- [With K9K engine]
7	GR	DC MOTOR- [With K9K engine]
8	V	DC MOTOR- [With K9K engine]

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[K9K]

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Terminal No.	Color Of Wire	Signal Name [Specification]
97	W	SENSOR POWER SUPPLY (REFRIGERANT PRESSURE SENSOR)
98	BR	SENSOR GROUND (FUEL TEMPERATURE SENSOR)
99	P	REFRIGERANT PRESSURE SENSOR
100	G	TURBOCHARGER BOOST SENSOR
101	R	SENSOR POWER SUPPLY (TURBOCHARGER BOOST SENSOR)
102	B	SENSOR GROUND (TURBOCHARGER BOOST SENSOR)
103	D	ELCT. TEMPERATURE SENSOR

ENGINE CONTROL SYSTEM (K9K ENGINE)

108	Y	EXHAUST GAS TEMPERATURE SENSOR 2
109	G	CRUISE CONTROL (CC) DIAGNOSIS 2
110	Y	WATER PUMP MOTOR (WATER PUMP)
111	Y	WATER HEATER (DIAGNOSIS 2)
114	Y	SENSOR GROUND EXHAUST GAS TEMPERATURE SENSOR 1
115	G	EXHAUST GAS TEMPERATURE SENSOR 1
117	W	NEUTRAL SW
118	GR	SENSOR GROUND EGR TEMPERATURE SENSOR
119	P	EGR TEMPERATURE SENSOR
120	P	ENGINE COOLANT TEMPERATURE SENSOR
121	LG	WATER HEATER (DIAGNOSIS 1)
122	B	SENSOR GROUND ENGINE COOLANT TEMPERATURE SENSOR 2
123	GR	SENSOR GROUND DEFROSTANT PRESSURE SENSOR
125	B	SENSOR GROUND DEFROSTANT PRESSURE SENSOR 2
135	B	SENSOR GROUND CRANKSHAFT POSITION SENSOR
136	R	CRANKSHAFT POSITION SENSOR
138	SB	ELECTRIC THROTTLE CONTROL ACTUATOR MOTOR (A)
140	V	ELECTRIC THROTTLE CONTROL ACTUATOR MOTOR (B)
141	G	LIN
145	W	INTAKE AIR TEMPERATURE SENSOR 2
147	BR	HIGH PRESSURE EGR VOLUME CONTROL VALVE MOTOR (A)
148	BG	HIGH PRESSURE EGR VOLUME CONTROL VALVE MOTOR (B)
149	V	EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR MOTOR (A)
150	Y	EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR MOTOR (B)
151	W	LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR (A)
152	B	LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR (B)
153	BR	FUEL INJECTOR No. 2 (HI)
154	V	FUEL INJECTOR No. 4 (HI)
155	R	FUEL INJECTOR No. 3 (HI)
156	Y	FUEL INJECTOR No. 1 (HI)
157	P	FUEL INJECTOR No. 2 (LO)
158	L	FUEL INJECTOR No. 4 (LO)
159	G	FUEL INJECTOR No. 3 (LO)
160	L	FUEL INJECTOR No. 1 (LO)

Connector No.	F88
Connector Name	FROM E/R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE (P00M)
Connector Type	YLAD0FY



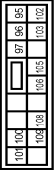
Terminal No.	Color Of Wire	Signal Name [Specification]
65	G	—
67	W	— (Takes with gasoline engine without stop/start system)
68	GR	— (With gasoline engine without stop/start system)
69	P	—
70	LG	—

Connector No.	F89
Connector Name	FROM E/R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE (P00M)
Connector Type	1T24FB-H1



Terminal No.	Color Of Wire	Signal Name [Specification]
71	L	—
72	P	—
73	W	—
74	R	—
75	GR	—
77	G	— (With diesel engine)
78	SB	— (With gasoline engine)
79	LG	—
80	W	—
81	P	—
82	Y	—
83	LG	—
84	W	—
85	P	—
86	Y	—
88	SB	— (With diesel engine)
89	W	— (With gasoline engine)
90	L	—
94	SB	—

Connector No.	F90
Connector Name	FROM E/R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE (P00M)
Connector Type	NS18FW-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
98	GR	— (With K9K engine)
99	L	— (With K9K engine)
98	R	— (With R0M engine)
97	V	— (With gasoline engine)
100	BG	— (With diesel engine with CVT)
100	BR	— (With gasoline engine with CVT)
101	GR	— (With M.T.)
101	W	—
102	GR	—
103	R	— (With diesel engine)
103	Y	— (With gasoline engine)
105	BR	— (With M20 engine)
105	L	— (With diesel engine)
106	R	— (With K9K engine)
108	GR	— (With diesel engine)
108	L	— (With gasoline engine)
108	R	— (With diesel engine)
109	G	—

Connector No.	F92
Connector Name	EXHAUST GAS TEMPERATURE SENSOR 1
Connector Type	RH0ZFR



Connector No.	F91
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH04EB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	— (With R0M engine)
2	Y	— (With K9K engine)
2	G	—
3	L	—
4	GR	— (With K9K engine)
4	P	— (With R0M engine)

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	F108
Connector Name	ENGINE RESTART BYPASS CONTROL RELAY
Connector Type	MS02EL-MP-LC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
2	G	-
3	B	-
5	W	-

Connector No.	F100
Connector Name	REVERSE / NEUTRAL POSITION SWITCH
Connector Type	FEAD3FG



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	W	-
3	SB	-

Connector No.	F109
Connector Name	EXHAUST GAS TEMPERATURE SENSOR 2
Connector Type	FRH02ELGY



Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	-
2	GR	-

Connector No.	F110
Connector Name	EXHAUST GAS PRESSURE SENSOR 1
Connector Type	AAZ03FEI-S



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	-
2	Y	-
3	LG	-

Connector No.	F114
Connector Name	EGR TEMPERATURE SENSOR
Connector Type	RH02FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	-
2	R	-

Connector No.	F118
Connector Name	CAMSHAFT POSITION SENSOR
Connector Type	RH03FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	- [With K9K engine]
1	R	- [With R0M engine]
2	V	- [With K9K engine]
2	Y	- [With R0M engine]
3	L	- [With R0M engine]
3	Y	- [With K9K engine]

Connector No.	F122
Connector Name	WIRE TO WIRE
Connector Type	M02FW-LC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
2	W	-

Connector No.	F129
Connector Name	GLOW PLUG No. 1
Connector Type	TYGO 0-095318-1

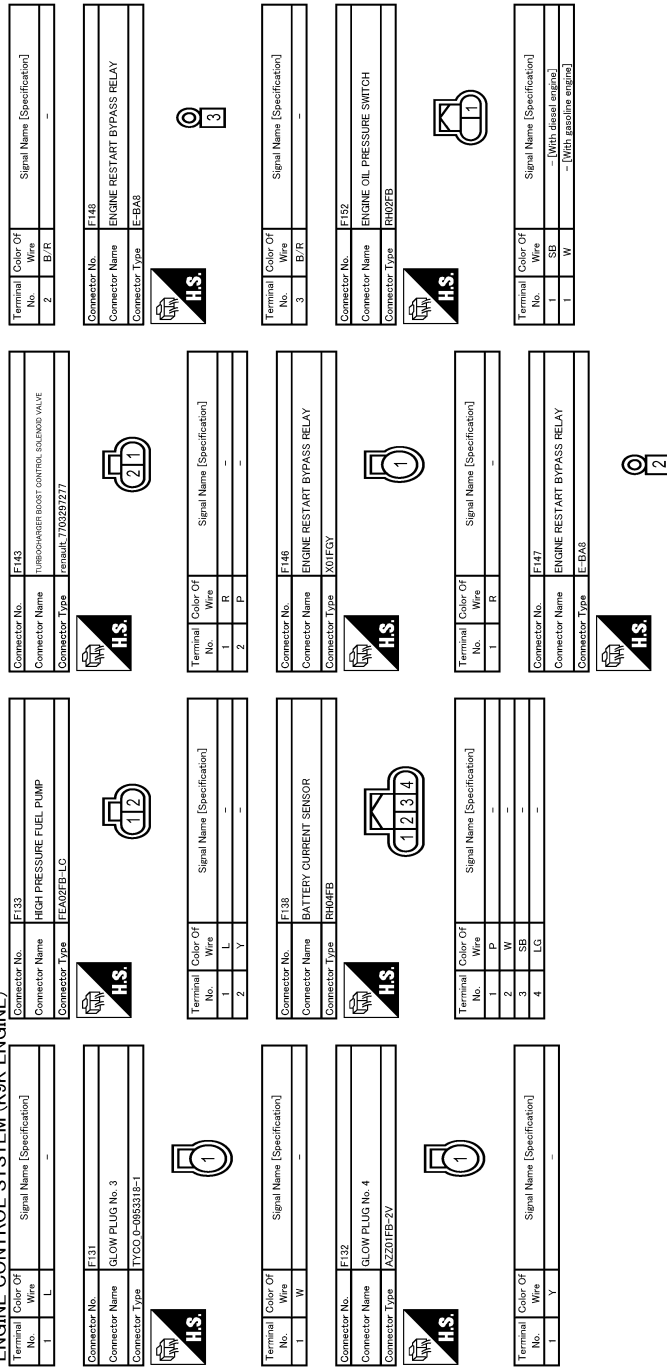


Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-

Connector No.	F130
Connector Name	GLOW PLUG No. 2
Connector Type	TYGO 0-095318-1



ENGINE CONTROL SYSTEM (K9K ENGINE)



ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	F154
Connector Name	WIRE TO WIRE
Connector Type	X01FGY



Terminal No.	1
Color Of Wire	W
Signal Name [Specification]	-

Connector No.	F155
Connector Name	FUEL INJECTOR No. 1
Connector Type	K0STAL 09441241



Terminal No.	1
Color Of Wire	Y
Signal Name [Specification]	-

Connector No.	F156
Connector Name	FUEL INJECTOR No. 2
Connector Type	K0STAL 09441241



Terminal No.	1
Color Of Wire	BR
Signal Name [Specification]	-



Connector No.	F157
Connector Name	FUEL INJECTOR No. 3
Connector Type	K0STAL 09441241

Terminal No.	1
Color Of Wire	R
Signal Name [Specification]	-



Connector No.	F158
Connector Name	FUEL INJECTOR No. 4
Connector Type	K0STAL 09441241

Terminal No.	1
Color Of Wire	V
Signal Name [Specification]	-

Connector No.	F162
Connector Name	STARTER RELAY
Connector Type	24381 4BA1A



Terminal No.	1
Color Of Wire	G
Signal Name [Specification]	-

Terminal No.	2
Color Of Wire	B
Signal Name [Specification]	-

Terminal No.	3
Color Of Wire	BR
Signal Name [Specification]	-

Terminal No.	5
Color Of Wire	L
Signal Name [Specification]	-

Connector No.	F163
Connector Name	ENGINE RESTART RELAY
Connector Type	24381 4BA1A



Terminal No.	1
Color Of Wire	Y
Signal Name [Specification]	-

Terminal No.	2
Color Of Wire	R
Signal Name [Specification]	- (With diesel engine)

Terminal No.	3
Color Of Wire	W
Signal Name [Specification]	- (With gasoline engine)

Terminal No.	4
Color Of Wire	BR
Signal Name [Specification]	- (With gasoline engine)

Terminal No.	5
Color Of Wire	L
Signal Name [Specification]	- (With diesel engine)

Connector No.	F164
Connector Name	FUEL HEATER RELAY
Connector Type	24381 4BA1A



Terminal No.	1
Color Of Wire	W
Signal Name [Specification]	-

Terminal No.	2
Color Of Wire	B
Signal Name [Specification]	-

Terminal No.	3
Color Of Wire	B
Signal Name [Specification]	-

Terminal No.	5
Color Of Wire	W
Signal Name [Specification]	-

Connector No.	F190
Connector Name	WIRE TO WIRE
Connector Type	RS08FB-PR



Terminal No.	1
Color Of Wire	B
Signal Name [Specification]	-

Terminal No.	2
Color Of Wire	L
Signal Name [Specification]	-

Terminal No.	3
Color Of Wire	W
Signal Name [Specification]	-

Terminal No.	4
Color Of Wire	G
Signal Name [Specification]	-

Terminal No.	5
Color Of Wire	R
Signal Name [Specification]	-

Terminal No.	6
Color Of Wire	B
Signal Name [Specification]	-

Terminal No.	7
Color Of Wire	SB
Signal Name [Specification]	-

Terminal No.	8
Color Of Wire	V
Signal Name [Specification]	-

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	F191
Connector Name	FUEL HEATER AND WATER IN FUEL LEVEL SENSOR
Connector Type	HS08FCV-TV



Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	—
2	B	—
3	B	—
4	B	—
5	W	—

Connector No.	F192
Connector Name	LOW FUEL PRESSURE SENSOR
Connector Type	PH09FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	SB	—
2	V	—
3	G	—

Connector No.	F201
Connector Name	THERMOPLUNGER CONTROL UNIT
Connector Type	Terminal: ED00538707



Terminal No.	Color Of Wire	Signal Name [Specification]
9	—	BOUGE 1 (B1)
10	—	BOUGE 1 (B1)
11	—	BOUGE 2 (B2)
12	—	BOUGE 3 (B3)

Connector No.	F202
Connector Name	THERMOPLUNGER No. 1
Connector Type	SIAG 5721-M



Terminal No.	1
Color Of Wire	—
Signal Name [Specification]	THERMOPLUNGER No. 1

Connector No.	F203
Connector Name	THERMOPLUNGER No. 2
Connector Type	SIAG 5721-M



Terminal No.	1
Color Of Wire	—
Signal Name [Specification]	THERMOPLUNGER No. 2

Connector No.	F204
Connector Name	THERMOPLUNGER No. 3
Connector Type	SIAG 5721-M



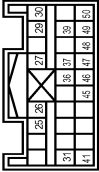
Terminal No.	1
Color Of Wire	—
Signal Name [Specification]	THERMOPLUNGER No. 3

Connector No.	F205
Connector Name	THERMOPLUNGER No. 4
Connector Type	SIAG 5721-M



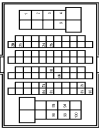
Terminal No.	1
Color Of Wire	—
Signal Name [Specification]	THERMOPLUNGER No. 4

Connector No.	M5
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	NI02FY-EX



Terminal No.	Color Of Wire	Signal Name [Specification]
25	SP	INFLATOR AS-
26	SP	INFLATOR AS+
27	B	GND
28	B	—
29	G	INFLATOR DR-
30	Y	INFLATOR DR+
31	P	ECZS-
36	B	—
37	R	OUT OFF SW(EOACT)
39	SHIELD	GND
41	L	ECZS+
45	P	—
46	L	—
47	GR	—
48	W	TELLTALE OFF
49	BR	—
50	BR	ACL [For airbag air bag module]
50	R	ACL [Except for airbag air bag module]
50	R	—

Connector No.	M16
Connector Name	WIRE TO WIRE
Connector Type	TH08FW-CS16-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	—
2	P	—
3	SB	—

ENGINE CONTROL SYSTEM (K9K ENGINE)

4	P	-
5	SB	-
6	LG	-
20	G	-
21	B	-
24	G	-
25	BR	-
55	LG	-
66	GR	-
74	R	-
79	V	-
84	L	-
85	W	-
89	GR	-
90	BR	-
93	Y	-
95	P	-
98	L	-
99	LG	-
100	R	-



Connector No.	M22
Connector Name	DC/DC CONVERTER
Connector Type	TH04FW-441

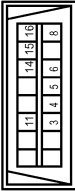
Terminal No.	Color Of Wire	Signal Name [Specification]
1	SB	IGN
6	G	VOLTAGE STABILIZER SIGNAL
10	R	POWER SUPPLY (IGNITION)

Connector No.	M23
Connector Name	DC/DC CONVERTER
Connector Type	MO9FW-LC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	POWER SUPPLY (BATTERY)
2	B	GROUND
3	L	POWER SUPPLY (BATTERY)
4	G	VOLTAGE OUTPUT
6	W	VOLTAGE OUTPUT

Connector No.	M21
Connector Name	DATA LINK CONNECTOR
Connector Type	BD18FW



Terminal No.	Color Of Wire	Signal Name [Specification]
3	LG	-
4	B	-
5	B	-
6	L	-
8	Y	-
11	SB	-
14	P	-
15	BR	-
16	W	-

Connector No.	M52
Connector Name	WIRE TO WIRE
Connector Type	TH50MW-CST6-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
2	R	-
7	GR	-
8	P	-
9	SB	-
10	R	-
14	W	-
20	L	-
21	P	-
22	SHIELD	-
24	BR	-
31	V	-
32	GR	-
33	G	-
34	LG	-
36	LG	-
37	V	-
38	G	-
39	BR	-
40	L	-
41	P	-
42	W	-
43	R	-
44	Y	-
45	LG	-
46	L	-
47	BL	-
48	Y	-
51	G	-
52	SB	-
53	LG	-
55	W	-
56	BR	-
59	P	-

57	B	-
58	L	-
59	GR	-
60	G	-
61	SB	-
62	V	-
63	BR	-
64	Y	-
65	GR	-
66	P	-
67	L	-
68	R	-
69	W	-
70	Y	-
71	Y	-
72	BR	-
73	R	-
76	L	-
77	V	-
78	LG	-
79	SHIELD	-
80	GR	-
82	Y	-
83	LG	-
84	SB	-
85	G	-
86	G	-
87	B	-
88	Y	-
89	Y	-
90	Y	-
93	W	-
96	LG	-
97	BR	-
98	V	-
99	R	-

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	M46
Connector Name	WIRE TO WIRE
Connector Type	TH24FW-NH



	11	10	9	8	7	6	5	4	3		
		23	22	21	20	19	18	17	16	15	

43	R	ILL CONT OUT(HI-SIDE)
44	B	FUEL SENSOR GND
45	W	BAT
46	BG	IGN
47	SB	M-CAN H
48	LG	M-CAN L
49	V	OIL LEVEL
50	P	OIL LEVEL GND
51	G	FUEL SENSOR
52	B	GND2



10	99			95	94			90	88	87	86	85	84		82	81
80	79	78	77	76	75	74	73	72	71	70	69	68	64		60	59

Connector No.	M69
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH



3A		1A
8A	7A 6A	5A 4A

Connector No.	MT5
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS08FW-M2

Terminal No.	Color Of Wire	Signal Name (Specification)
1	B	-
2	B	-
3	B	-
4	SB	-
5	L	-
6	P	-
7	P	-
8	B	-
9	B	-
10	GP	-
11	SB	-
12	SB	-
13	B	-
14	G	-
15	G	-
16	Y	-
17	V	-
18	B	-
19	G	-
20	BR	-
21	GP	-
22	V	-
23	B	-
24	B	-



31	30	29	28	27	26
	24	23	22	21	20

Connector No.	M66
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TH12EW-JH

Terminal	Color Of Wire	Signal Name [Specification]
No.	20	SB
	21	V
	22	W
	23	L
	24	GR
	26	P
	27	G
	28	BR
	29	LG
	30	B
	34	P



7B	6B	5B	4B	3B	2B	1B
165		148	138	108		86

Connector No.	M76
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS

Connector No.	M52
Connector Name	COMBINATION METER
Connector Type	TH12FW-NH



41	42	43	44	45	46
47	48	49	50	51	52

Terminal No.	Color Of Wire	Signal Name [Specification]
41	L	V-CAN H
42	B	V-CAN L

Terminal No.	Cable Or Wire	Signal Name [Specification]
81	L	KEY SWITCH
82	L	KEY SW (ST. WITHOUT Intelligent key)
82	W	PASS DOOR RELE SW (With Intelligent key)
84	BR	COMBI SW OUTPUT 2
85	L	COMBI SW OUTPUT 1
85	R	COMBI SW OUTPUT 3
87	B/G	COMBI SW OUTPUT 4
88	L	PUSH-BTN IGN SW ILL CONT.
90	L	STEERING LOCK UNL. SENSOR LINE
91	W	DRIVER DOOR LOCK SW
92	W	EXTENDED STORAGE FUSE SW
95	R	STOP / START OFF SWITCH
96	R	DRIVER DOOR ANT *
100	V	PUSH SW
101	R	DR DOOR UNLK. SENS
104	G	KEY SW (PDM E/R)
105	GR	DR DOOR RELE SW (With Intelligent key)
106	W	ACC OUTPUT
107	Y	ALARM CANCEL SW
108	W	NATS ANTENNA AMP.
110	W	NATS ANTENNA AMP.
111	R	DOOR LOCK INTO OUTPUT
112	SB	STOP / START OFF SWITCHING IN OUTPUT
113	LG	NATS ANTENNA AMP.
114	Y	NATS ANTENNA AMP.
115	W	NATS ANTENNA AMP.
116	B/G	ROOM ANT 1 +
117	GR	ROOM ANT 1 -
118	LG	PASSENGER DOOR ANT +
118	P	PASSENGER DOOR ANT -

Terminal No.	Color Of Wire	Signal Name [Specification]
10B	V	-
13B	W	-
14B	GR	-
16B	L	-
1B	R	-
2B	G	-
3B	LG	-
4B	LG	-
5B	LG	-
6B	SB	-
7B	Y	-

ENGINE CONTROL SYSTEM (K9K ENGINE)

Connector No.	M77
Connector Name	FUSE BLOCK (J.B)
Connector Type	NSJFEBR-CS



7C	6C	5C	4C	3C	2C	1C
12A	12B	12C	12D	12E	12F	12G

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH12AMW-NH



3	4	5	6	7	8	9	10	11
15	16	17	18	19	20	21	22	23

Terminal No.	Color Of Wire	Signal Name [Specification]
10C	GR	-
11C	GR	-
12C	GR	-
13C	GR	-
14C	GR	-
15C	GR	-
16C	GR	-
17C	GR	-
18C	GR	-
19C	GR	-
20C	GR	-
21C	GR	-
22C	GR	-
23C	GR	-

Connector No.	M110
Connector Name	STOP / START OFF SWITCH
Connector Type	TH08EL-NH



4	6	3
2	1	5

Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-
2	B	-
3	G	-
4	GR	-
5	SB	-
6	B	-

Terminal No.	Color Of Wire	Signal Name [Specification]
3	B	-
4	SB	-
5	L	-
6	P	-
7	B	-
8	B	-
9	GR	-
10	SB	-
11	G	-
15	B	-
16	Y	-
17	V	-
18	B	-
19	G	-
20	BR	-
21	GR	-
22	V	-
23	R	-

Connector No.	M303
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TH12FW-NH



1	2	3	4	5
7	8	9	10	12

Terminal No.	Color Of Wire	Signal Name [Specification]
2	-	-
3	-	-
4	-	-
5	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-

BASIC INSPECTION

BASIC INSPECTION

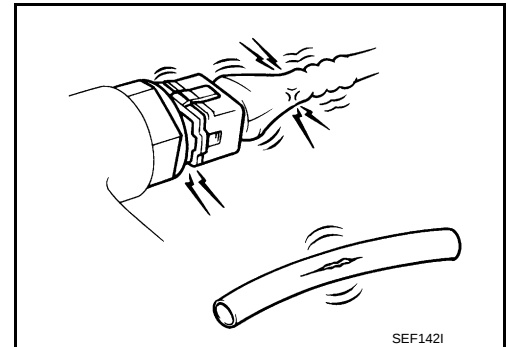
Work Procedure

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1.INSPECTION START

1. Check service records for any recent repairs that may indicate a related incident.
2. Check the current need for scheduled maintenance, especially for fuel filter and air cleaner filter. Refer to [MA-29, "K9K : Periodic Maintenance"](#).
3. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Vacuum hoses for splits, kinks, or improper connections
 - Wiring for improper connections, pinches, or cuts
4. Start engine and warm it up to the normal operating temperature.

>> GO TO 2.



2.CHECK IDLE SPEED

Check idle speed.

For procedure, refer to [ECK-397, "Inspection"](#).

For specification, refer to [ECK-405, "Idle Speed"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

3.CHECK FOR INTAKE AIR LEAK

1. Stop engine.
2. Listen for an intake air leak after the mass air flow sensor.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace. Refer to [EM-279, "Exploded View"](#).

4.BLEED AIR FROM FUEL SYSTEM

Use priming pump to bleed air from fuel system. Refer to [FL-34, "Air Bleeding"](#).

>> GO TO 5.

5.CHECK IDLE SPEED AGAIN

Check idle speed.

For procedure, refer to [ECK-397, "Inspection"](#).

For specification, refer to [ECK-405, "Idle Speed"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

6.DRAIN WATER FROM FUEL FILTER

1. Stop engine.
2. Drain water from fuel filter. Refer to [FL-34, "Water Draining"](#).

BASIC INSPECTION

< BASIC INSPECTION >

[K9K]

>> GO TO 7.

7.CHECK IDLE SPEED AGAIN

Check idle speed.

For procedure, refer to [ECK-397, "Inspection"](#).

For specification, refer to [ECK-405, "Idle Speed"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 8.

8.CHECK AIR CLEANER FILTER

1. Stop engine.

2. Check air cleaner filter for clogging or breaks.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace air cleaner filter. Refer to [EM-279, "Removal and Installation"](#).

9.CHECK BATTERY VOLTAGE

Check battery voltage.

Voltage: More than 12 V

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10.CHECK BATTERY

Refer to [PG-138, "FOR MAINTENANCE REQUIRED BATTERY MODELS : Work Procedure"](#) (for maintenance required battery models) or [PG-143, "FOR MAINTENANCE FREE BATTERY MODELS : Work Flow"](#) (for maintenance free battery models).

Is the inspection result normal?

YES >> Check charging system. Refer to [CHG-15, "Work Flow"](#).

NO >> Repair or replace. Refer to [PG-155, "Removal and Installation"](#).

11.CHECK COMPRESSION PRESSURE

Check compression pressure.

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace error-detected parts.

12.CHECK IDLE SPEED AGAIN

Check idle speed.

For procedure, refer to [ECK-397, "Inspection"](#).

For specification, refer to [ECK-405, "Idle Speed"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> 1. Replace fuel injector. Refer to [EM-293, "Removal and Installation"](#).
2. Perform [ECK-154, "Work Procedure \(Fuel Injectors Leak Check\)"](#), [ECK-155, "Work Procedure \(Fuel Injection Quantity Check\)"](#).
3. GO TO 2.

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

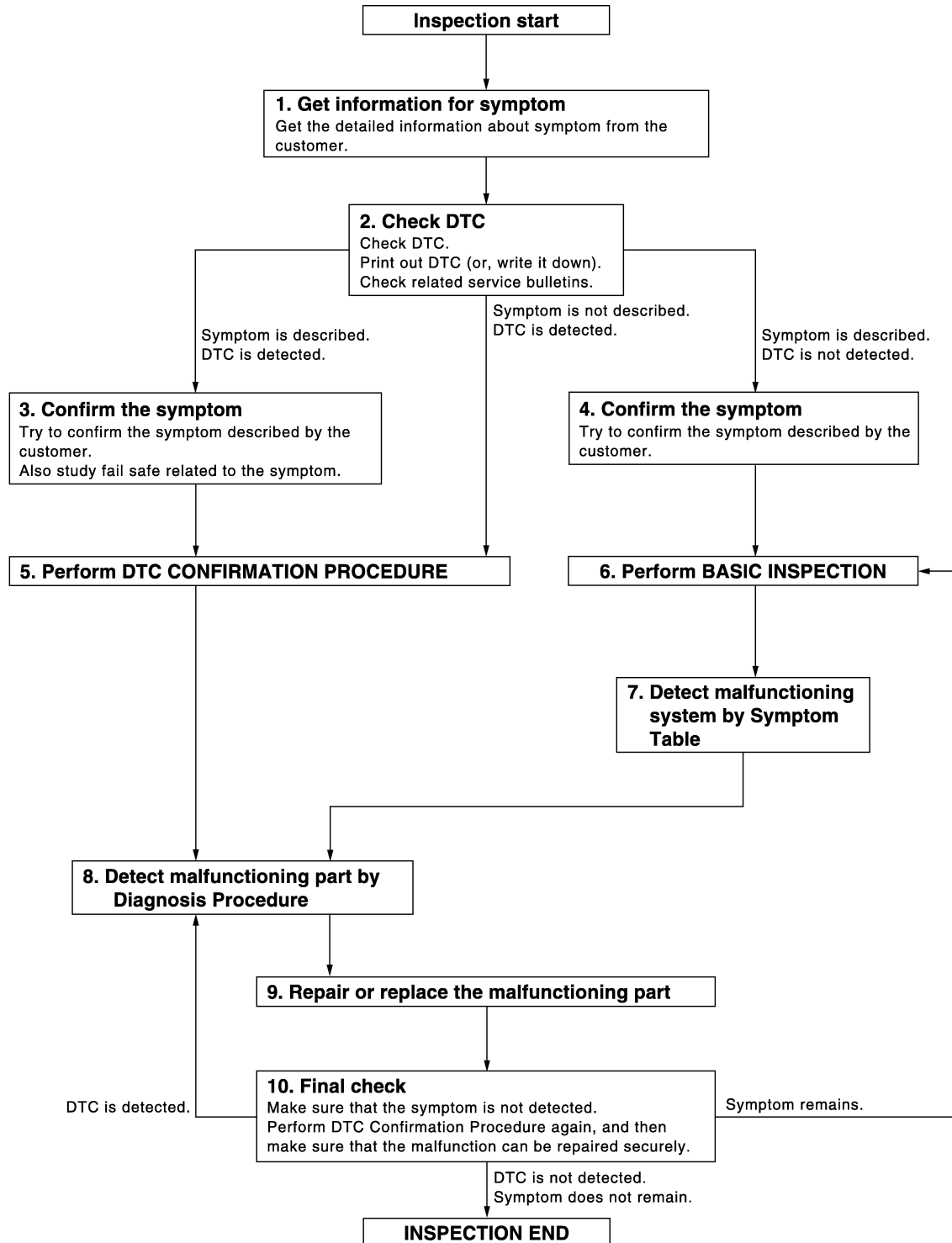
[K9K]

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000010289680

OVERALL SEQUENCE



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DETAILED FLOW

1.GET INFORMATION FOR SYMPTOM

DIAGNOSIS AND REPAIR WORKFLOW

[K9K]

< BASIC INSPECTION >

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 [ECK-128, "Diagnostic Work Sheet"](#).)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
 - Record DTC. (Print them out with CONSULT or GST.)
 - Erase DTC.
 - Study the relationship between the cause detected by DTC and the symptom described by the customer. [Symptom Table or diagnosis procedure is useful. Refer to [ECK-388, "Symptom Table"](#) (for engine control system) or [ECK-394, "Diagnosis Procedure"](#) (for stop/start system).]
3. Check related service bulletins for information.

Is any symptom described and is any DTC 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 MI ON).

Also study the fail safe related to the symptom. Refer to [ECK-88, "Fail-safe"](#) (for engine control system) or [ECK-394, "Diagnosis Procedure"](#) (for stop/start system).

Diagnosis Work Sheet is useful to verify the incident.

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

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.

Diagnosis Work Sheet is useful to verify the incident.

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

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC.

If two or more DTCs are detected, refer to [ECK-95, "DTC Inspection Priority Chart"](#) and determine trouble diagnosis order.

NOTE:

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

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

Is DTC detected?

YES >> GO TO 8.

NO >> Check according to [GI-41, "Intermittent Incident"](#).

6.PERFORM BASIC INSPECTION

Perform [ECK-124, "Work Procedure"](#).

>> GO TO 7.

7.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[K9K]

Detect malfunctioning system according to [ECK-388, "Symptom Table"](#) (for engine control system) or [ECK-394, "Diagnosis Procedure"](#) (for stop/start system) based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

>> GO TO 8.

8. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

NOTE:

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to [GI-43, "Circuit Inspection"](#).

Is malfunctioning part detected?

YES >> GO TO 9.

NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CONSULT. Refer to [ECK-76, "Reference Value"](#).

9. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to [ECK-51, "Diagnosis Description"](#).

>> GO TO 10.

10. FINAL CHECK

When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then make sure that the malfunction have been repaired securely.

When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 8.

YES-2 >> Symptom remains: GO TO 6.

NO >> Before returning the vehicle to the customer, make sure to erase unnecessary DTC in ECM.

Diagnostic Work Sheet

INFOID:000000010289681

DESCRIPTION

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

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

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

Some conditions may cause the MI to come on steady and DTC to be detected. Examples:

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

KEY POINTS

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

SEF907L

[K9K]

WORKSHEET SAMPLE

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

MTBL0017

SERVICE AFTER REPLACING OR REMOVING ENGINE PARTS

< BASIC INSPECTION >

[K9K]

SERVICE AFTER REPLACING OR REMOVING ENGINE PARTS

Special Repair Requirement List

INFOID:000000010477821

×:Applicable

Part name	Service performed		Required service	Reference
	Replacement	Removal*		
ECM	×		Additional service when replacing ECM	ECK-131
Fuel injector	×		Injector adjustment value registration	ECK-134
Mass air flow sensor	×		Mass air flow sensor learning value clear	ECK-141
TC boost sensor	×		TC boost sensor learning value clear	ECK-143
Turbocharger	×		Turbocharger learning value clear	ECK-142
Electric throttle control actuator	×		Throttle valve position learning value clear	ECK-136
	×	×	Throttle valve position learning	
Exhaust electric throttle control actuator	×		Exhaust throttle valve position learning value clear	ECK-137
	×	×	Exhaust throttle valve position learning	
EGR volume control valve	×		EGR volume control valve position learning value clear	ECK-138
	×	×	EGR volume control valve position learning	
Low pressure EGR volume control valve	×		Low pressure EGR volume control valve position learning value clear	ECK-139
	×	×	Low pressure EGR volume control valve position learning	
DPF (Diesel Particulate Filter) differential pressure sensor	×		DPF differential pressure sensor learning value clear	ECK-144
DPF (Diesel Particulate Filter)	×		DPF (Diesel Particulate Filter) data clear	ECK-140
High pressure fuel pump	×		Fuel pump operation counter clear	ECK-145
Starter	×		Starter operation counter clear	ECK-146
Engine oil	×		Oil change remaining distance reset	ECK-147

*:Harness connector disconnection included.

ADDITIONAL SERVICE WHEN REPLACING ECM

< BASIC INSPECTION >

[K9K]

ADDITIONAL SERVICE WHEN REPLACING ECM

Description

INFOID:0000000010289682

When replacing ECM, this procedure must be performed.

NOTE:

The necessary operation is different depending on the operation result of ECM data save or write. Always perform the operation according to procedures. Refer to [ECK-131, "Work Procedure"](#).

Work Procedure

INFOID:0000000010289683

1.SAVE ECM DATA

1. Turn ignition switch OFF and wait at least 1 minute.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. Select "SAVE COMPUTER DATA" 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.

Is operation completed successfully?

- YES >> GO TO 2.
NO >> GO TO 6.

2.REPLACE ECM

1. Turn ignition switch OFF and wait at least 1 minute.
2. Replace ECM. Refer to [ECK-399, "Removal and Installation"](#).

>> GO TO 3.

3.PERFORM PROGRAMMING

Refer to "CONSULT Operation Manual".

>> GO TO 4.

4.PERFORM ECM KEY ID REGISTRATION

Refer to "CONSULT Operation Manual NATS-IVIS/NVIS".

>> GO TO 5.

5.WRITE ECM DATA

1. Select "WRITE SAVED DATA" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
2. Follow the instruction of CONSULT display.

NOTE:

The data saved by "WRITE SAVED DATA" is written to ECM.

Is operation completed successfully?

- YES >> GO TO 11.
NO >> GO TO 9.

6.REPLACE ECM

1. Turn ignition switch OFF and wait at least 1 minute.
2. Replace ECM. Refer to [ECK-399, "Removal and Installation"](#).

>> GO TO 7.

7.PERFORM PROGRAMMING

Refer to "CONSULT Operation Manual".

ADDITIONAL SERVICE WHEN REPLACING ECM

[K9K]

< BASIC INSPECTION >

>> GO TO 8.

8.PERFORM ECM KEY ID REGISTRATION

Refer to "CONSULT Operation Manual NATS-IVIS/NVIS".

>> GO TO 9.

9.PERFORM VIN REGISTRATION

Perform [ECK-148, "Work Procedure"](#).

>> GO TO 10.

10.PERFORM INJECTOR ADJUSTMENT VALUE REGISTRATION

Perform [ECK-134, "Work Procedure"](#).

>> GO TO 11.

11.PERFORM FUEL PUMP CONTROL MODULE (FPCM) ACTIVATION

With CONSULT

1. Turn ignition switch ON.
2. Perform "FUEL PUMP PROGRAMMING" of "WORK SUPPORT" in "ENGINE".

>> GO TO 12.

12.PERFORM THROTTLE VALVE POSITION LEARNING

Perform [ECK-136, "Work Procedure"](#).

>> GO TO 13.

13.PERFORM EXHAUST THROTTLE VALVE POSITION LEARNING

Perform [ECK-137, "Work Procedure"](#).

>> GO TO 14.

14.PERFORM HIGH PRESSURE EGR VOLUME CONTROL VALVE POSITION LEARNING

Perform [ECK-138, "Work Procedure"](#).

>> GO TO 15.

15.PERFORM LOW PRESSURE EGR VOLUME CONTROL VALVE POSITION LEARNING

Perform [ECK-139, "Work Procedure"](#).

>> GO TO 16.

16.PERFORM SERVICE REGENERATION

Perform [ECK-149, "Work Procedure"](#).

>> GO TO 17.

17.CHANGE ENGINE OIL

Refer to [LU-36, "Draining"](#) or [LU-36, "Refilling"](#).

>> GO TO 18.

18.PERFORM ENGINE OIL DATA RESET

Perform [ECK-147, "Work Procedure"](#).

ADDITIONAL SERVICE WHEN REPLACING ECM

< BASIC INSPECTION >

[K9K]

>> GO TO 19.

19.CHECK DTC

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Check DTC. If DTC is displayed, erase it.

>> END

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INJECTOR ADJUSTMENT VALUE REGISTRATION

< BASIC INSPECTION >

[K9K]

INJECTOR ADJUSTMENT VALUE REGISTRATION

Description

INFOID:000000010477831

Injector adjustment value ① indicates manufacturing tolerance and the value is printed on the top of fuel injector.

The injector adjustment value which is correctly stored in ECM is needed for precise fuel injection control.

A performance of emission control and a driveability may effect when there is a mismatch between the following two values.

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

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

- Injector(s) are replaced.
 - Injector Adjustment Value Registration for the replaced fuel injector must be performed.
- ECM is replaced.
 - Injector Adjustment Value Registration for all the fuel injectors must be performed.

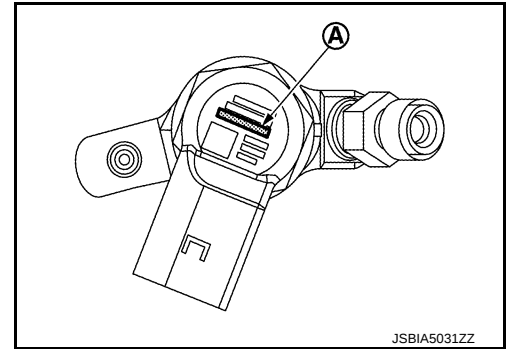
NOTE:

The necessary operation is different depending on the operation result of ECM data save or write. Always perform the operation according to procedures. Refer to [ECK-131, "Work Procedure"](#).

For injector adjustment value, refer to the following table.

NOTE:

"I", "O", "Q" and "V" are not applied.



Input character	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Stamping on injector	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Input character	1	2	3	4	5	6	7	8	9	0																
Stamping on injector	1	2	3	4	5	6	7	8	9	0																

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Work Procedure

INFOID:000000010477832

1.START

NOTE:

- Before performing this procedure, record injector adjustment value printed on a fuel injector.

1. Turn ignition switch ON (engine stopped).
2. Select "ENTER INJECTOR CODES" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
3. Touch "START".

NOTE:

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

4. Select the number of the cylinder which needs Injector Adjustment Value Registration.
5. Input injector adjustment value.

NOTE:

- For injector adjustment value, refer to the following table.

INJECTOR ADJUSTMENT VALUE REGISTRATION

< BASIC INSPECTION >

[K9K]

- “I”, “O”, “Q” and “V” are not applied.

Input character	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Stamping on injector	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Input character	1	2	3	4	5	6	7	8	9	0																
Stamping on injector	1	2	3	4	5	6	7	8	9	0																

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

NOTE:

When touching “START”, injector adjustment values stored in CONSULT are written onto ECM memory.

- Check that the following values are same for each cylinder.
 - Injector adjustment value which is printed on a fuel injector.
 - Injector adjustment value which is displayed on CONSULT screen.

NOTE:

- In this step, CONSULT reads injector adjustment values stored in ECM and displays the values on the CONSULT screen. This is for checking if injector adjustment values are written onto ECM memory correctly.
 - If DTC is detected, perform DTC Confirmation Procedure for the DTC, and check if the same DTC is detected again.
- Turn ignition switch OFF and wait at least 1 minute.

>> END

THROTTLE VALVE POSITION LEARNING

< BASIC INSPECTION >

[K9K]

THROTTLE VALVE POSITION LEARNING

Description

INFOID:000000010289688

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

Throttle Valve Position Learning Value Clear is an operation to clear the fully closed position of the throttle valve learnt in ECM. It must be performed when replacing electric controlled throttle actuator.

Work Procedure

INFOID:000000010289689

1.START

Is the work performing after replacing throttle actuator?

YES >> GO TO 2.

NO >> GO TO 4.

2.PERFORM THROTTLE VALVE POSITION LEARNING VALUE CLEAR-1

With CONSULT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Perform "ADAPTIVES ON AIR INTAKE FLAP MALFUNCTION" of "WORK SUPPORT" in "ENGINE" using CONSULT.

>> GO TO 3.

3.PERFORM THROTTLE VALVE POSITION LEARNING VALUE CLEAR-2

With CONSULT

Perform "AIR DAMPER VALVE PROGRAMMING (R088)" of "WORK SUPPORT" in "ENGINE" using CONSULT.

>> GO TO 4.

4.PERFORM THROTTLE VALVE POSITION LEARNING

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

NOTE:

Check that throttle valve moves by confirming the operating sound.

>> END

EXHAUST THROTTLE VALVE POSITION LEARNING

< BASIC INSPECTION >

[K9K]

EXHAUST THROTTLE VALVE POSITION LEARNING

Description

INFOID:000000010289690

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

Exhaust Throttle Valve Position Learning Value Clear is an operation to clear the fully closed position of the exhaust throttle valve learnt in ECM. It must be performed when replacing exhaust electric controlled throttle actuator.

Work Procedure

INFOID:000000010289691

1.START

Is the work performing after replacing throttle actuator?

YES >> GO TO 2.

NO >> GO TO 3.

2.PERFORM EXHAUST THROTTLE VALVE POSITION LEARNING VALUE CLEAR

With CONSULT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Perform "EXHAUST FLAP LOW SETTING" of "WORK SUPPORT" in "ENGINE" using CONSULT.

>> GO TO 3.

3.PERFORM EXHAUST THROTTLE VALVE POSITION LEARNING

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON and wait at least 1 minute.
3. Turn ignition switch OFF and wait at least 1 minute.

NOTE:

Check that throttle valve moves by confirming the operating sound.

>> END

EGR VOLUME CONTROL VALVE POSITION LEARNING

Description

INFOID:0000000010289692

High Pressure EGR Volume Control Valve Position Learning is an operation to learn the fully closed position of the high pressure EGR volume control valve by monitoring the high pressure EGR volume control valve position sensor output signal. It must be performed under any of the following conditions:

- High pressure EGR volume control valve is removed.
- High pressure EGR volume control valve is replaced.
- ECM is replaced.

High Pressure EGR Volume Control Valve Position Learning Value Clear is an operation to clear the fully closed position of the high pressure EGR volume control valve learnt in ECM. It must be performed when replacing high pressure EGR volume control valve.

Work Procedure

INFOID:0000000010289693

1.START

Is the work performing after replacing high pressure EGR volume control valve?

YES >> GO TO 2.

NO >> GO TO 3.

2.PERFORM HIGH PRESSURE EGR VOLUME CONTROL VALVE POSITION LEARNING VALUE CLEAR

With CONSULT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Perform "EGR VALVE PROGRAMMING" of "WORK SUPPORT" in "ENGINE" using CONSULT.

>> GO TO 3.

3.PERFORM HIGH PRESSURE EGR VOLUME CONTROL VALVE POSITION LEARNING

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON and wait at least 1 minute.
3. Turn ignition switch OFF and wait at least 1 minute.

NOTE:

Check that high pressure EGR volume control valve moves by confirming the operating sound.

>> END

LOW PRESSURE EGR VOLUME CONTROL VALVE POSITION LEARNING

< BASIC INSPECTION >

[K9K]

LOW PRESSURE EGR VOLUME CONTROL VALVE POSITION LEARNING

Description

INFOID:000000010289694

Low Pressure EGR Volume Control Valve Position Learning is an operation to learn the fully closed position of the low pressure EGR volume control valve by monitoring the low pressure EGR volume control valve position sensor output signal. It must be performed under any of the following conditions:

- Low pressure EGR volume control valve is removed.
- Low pressure EGR volume control valve is replaced.
- ECM is replaced.

Low Pressure EGR Volume Control Valve Position Learning Value Clear is an operation to clear the fully closed position of the low pressure EGR volume control valve learnt in ECM. It must be performed when replacing low pressure EGR volume control valve.

Work Procedure

INFOID:000000010289695

1.START

Is the work performing after replacing low pressure EGR volume control valve?

YES >> GO TO 2.

NO >> GO TO 3.

2.PERFORM LOW PRESSURE EGR VOLUME CONTROL VALVE POSITION LEARNING VALUE CLEAR

With CONSULT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Perform "LOW PRESSURE EGR VALVE PROGRAMMING" of "WORK SUPPORT" in "ENGINE" using CONSULT.

>> GO TO 3.

3.PERFORM LOW PRESSURE EGR VOLUME CONTROL VALVE POSITION LEARNING

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON and wait at least 1 minute.
3. Turn ignition switch OFF and wait at least 1 minute.

NOTE:

Check that low pressure EGR volume control valve moves by confirming the operating sound.

>> END

DIESEL PARTICULATE FILTER DATA CLEAR

< BASIC INSPECTION >

[K9K]

DIESEL PARTICULATE FILTER DATA CLEAR

Description

INFOID:0000000010289698

Perform "DPF DATA CLEAR" in "WORK SUPPORT" mode with CONSULT when oxidation catalyst with diesel particulate filter is replaced with a new one. Based on the signal from sensors, ECM estimates the amount of particulate matter in diesel particulate filter and stores the value in EEPROM as diesel particulate filter data. When oxidation catalyst with diesel particulate filter is replaced with a new one, there is a difference between diesel particulate filter data stored in ECM and the actual amount of particulate matter in diesel particulate filter, because no particulate matter is trapped in new diesel particulate filter. In this case, ECM cannot perform regeneration control correctly. So perform "AFTER DPF REPLACEMENT" in "WORK SUPPORT" mode of "ENGINE" using CONSULT to clear diesel particulate filter data stored in ECM.

CAUTION:

Never perform "AFTER DPF REPLACEMENT" in "WORK SUPPORT" mode of "ENGINE" using CONSULT when oxidation catalyst with diesel particulate filter is not replaced with a new one. Diesel particulate filter may be damaged because regeneration is not performed at appropriate timing.

Work Procedure

INFOID:0000000010289699

1.START

1. Turn ignition switch ON.
2. Select "AFTER DPF REPLACEMENT" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
3. Touch "CLEAR" and wait a few seconds.
4. Make sure that "CMPLT" is displayed on CONSULT screen.

>> END

MASS AIR FLOW SENSOR LEARNING VALUE CLEAR

< BASIC INSPECTION >

[K9K]

MASS AIR FLOW SENSOR LEARNING VALUE CLEAR

Description

INFOID:0000000010623656

ECM learns the output characteristic of mass air flow sensor. Mass Air Flow Sensor Learning Value should be cleared when mass air flow sensor is replaced.

ECK

Work Procedure

INFOID:0000000010623657

1.PERFORM MASS AIR FLOW SENSOR LEARNING VALUE CLEAR

With CONSULT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Perform "AIR FLOW METER PROGRAMMING" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.

>> END

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TURBOCHARGER LEARNING VALUE CLEAR

< BASIC INSPECTION >

[K9K]

TURBOCHARGER LEARNING VALUE CLEAR

Description

INFOID:0000000010623658

ECM learns the output characteristic of turbocharger. turbocharger learning value should be cleared when turbocharger is replaced.

Work Procedure

INFOID:0000000010623659

1.PERFORM TURBOCHARGER LEARNING VALUE CLEAR

With CONSULT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Perform "TURBOCHARGER PROGRAMMING" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.

>> END

TURBOCHARGER BOOST SENSOR

< BASIC INSPECTION >

[K9K]

TURBOCHARGER BOOST SENSOR

Description

INFOID:0000000010623660

ECM learns the output characteristic of turbocharger boost sensor. Turbocharger boost sensor learning value should be cleared when turbocharger boost sensor is replaced.

ECK

Work Procedure

INFOID:0000000010623661

1.PERFORM TC BOOST SENSOR LEARNING VALUE CLEAR

With CONSULT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Perform "MANIFOLD PRESSURE SENSOR PROGRAMMING" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.

>> END

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DPF DIFFERENTIAL PRESSURE SENSOR LEARNING VALUE CLEAR

< BASIC INSPECTION >

[K9K]

DPF DIFFERENTIAL PRESSURE SENSOR LEARNING VALUE CLEAR

Description

INFOID:0000000010501963

ECM learns the output characteristic of DPF (Diesel Particulate Filter) differential pressure sensor to perform the control of the DPF regeneration control precisely. DPF differential pressure sensor learning value should be cleared when DPF differential pressure sensor is replaced.

Work Procedure

INFOID:0000000010501964

1.PERFORM DPF (DIESEL PARTICULATE FILTER) DIFFERENTIAL PRESSURE SENSOR LEARNING VALUE CLEAR

With CONSULT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Perform "P/FLT DIFF PRS SENSOR" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.

>> END

HIGH PRESSURE FUEL PUMP TOTAL STARTS COUNTER RESET

< BASIC INSPECTION >

[K9K]

HIGH PRESSURE FUEL PUMP TOTAL STARTS COUNTER RESET

Description

INFOID:0000000010289700

High Pressure Fuel Pump Total Starts Counter Reset is a function to erase the accumulated number of high pressure fuel pump operation with engine start. It must be performed when high pressure fuel pump is replaced.

CAUTION:

Never perform High Pressure Fuel Pump Total Starts Counter Reset when the high pressure fuel pump is not replaced as new one.

Special Repair Requirement

INFOID:0000000010289701

1.START

With CONSULT

1. Turn ignition switch ON.
2. On the CONSULT screen, select "ENGINE" >> "WORK SUPPORT" >> "H/P FUEL PUMP TOTAL STARTS COUNTER CLEAR".
3. Touch "CLEAR" and wait a few seconds.
4. Make sure that "CMPLT" is displayed on CONSULT screen.

>> END

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STARTER OPERATION COUNTER CLEAR

< BASIC INSPECTION >

[K9K]

STARTER OPERATION COUNTER CLEAR

Description

INFOID:0000000010289707

Starter Operation Counter Clear is a function of ECM to erase the starter motor operation counter. It must be performed when starter motor is replaced.

CAUTION:

Performed this function when starter motor is replaced.

Work Procedure

INFOID:0000000010289708

1.ERASE STARTER OPERATION COUNTER

Ⓔ With CONSULT

1. Turn ignition switch ON.
2. Select "STRT OPRTN CNTR CLEAR" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
3. Touch "CLEAR" and erase starter operation counter.

>> INSPECTION END

ENGINE OIL DATA RESET

< BASIC INSPECTION >

[K9K]

ENGINE OIL DATA RESET

Description

INFOID:0000000110289702

The oil change alert function allows calculating the remaining distance to drive before oil change request. The engine oil data reset must be performed after engine oil is changed.

ECK

Work Procedure

INFOID:0000000110289703

1. ENGINE OIL OXIDATION DATA RESET

1. Select "ENGINE OIL OXIDATION DATA RESET" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
2. Follow the instruction of CONSULT display.

>> GO TO 2.

2. ENGINE OIL DILUTION DATA RESET

1. Select "ENGINE OIL DILUTION DATA RESET" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
2. Follow the instruction of CONSULT display.

>> END

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VIN REGISTRATION

Description

INFOID:0000000010477823

VIN Registration is an operation to registering VIN in ECM. It must be performed each time ECM is replaced.

Work Procedure

INFOID:0000000010477824

1. CHECK VIN

Check the VIN of the vehicle and note it. Refer to [GI-24, "Information About Identification or Model Code"](#).

>> GO TO 2.

2. PERFORM VIN REGISTRATION **With CONSULT**

1. Turn ignition switch ON and engine stopped.
2. Select "VIN REGISTRATION" in "WORK SUPPORT" mode of "ENGINE".
3. Follow the instruction of CONSULT display.

>> END

SERVICE REGENERATION

Description

INFOID:000000010289696

Certain types of driving conditions (e.g. urban driving) may load to heavy loads in DPF (Diesel Particulate Filter). This soot mass may adversely affect the driving. This function can perform DPF regeneration under vehicle stop condition.

Service regeneration is performed with CONSULT to reduce particulate matter in DPF (Diesel Particulate Filter). Service regeneration should be performed in the following cases.

- ECM enters fail-safe mode because the amount of particulate matter in DPF reaches the specified level.

NOTE:

When ECM enters fail-safe mode because the amount of particulate matter in DPF reaches the specified level, check whether or not DTC P2002 is stored in ECM. In the case of DTC stored, perform the Diagnostic Procedure for the DTC.

- ECM is replaced.

NOTE:

- Based on the signal from sensors ECM measures the amount of particulate matter in DPF and stores the value in EEPROM (Electrically Erasable Programmable Read Only Memory). When ECM is replaced as new one, there is a difference between the actual amount of particulate matter and the value stored in new ECM, because the value stored in new ECM is initialized one. In the case above, ECM can not perform regeneration control correctly. So, perform service regeneration to make the amount of particulate matter in DPF zero.
- The necessary operation is different depending on the operation result of ECM data save or write. Always perform the operation according to procedures. Refer to [ECK-131, "Work Procedure"](#).
- Component inspection for DPF is performed.

CAUTION:

Oil change is required, depending on service regeneration procedure. Because fuel mixes with engine oil during service regeneration. The mixture does not occur during the regeneration which is automatically performed under normal operation.

Work Procedure

INFOID:000000010289697

1.CHECK DTC

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Check DTC.

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [ECK-97, "DTC Index"](#).
 NO >> GO TO 2.

2.CHECK QUANTITY OF SOOT MASS

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "SOOT IN P/FLT".
2. Check that the value is 46.2g or less.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Replace DPF. Refer to [EX-17, "Removal and Installation"](#).

3.CHECK ENGINE OIL LEVEL

Refer to [LU-35, "Inspection"](#).

CAUTION:

When the oil level reaches maximum, drain engine oil as to be in MIN and HALF.

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> Drain or refill engine oil. And then GO TO 4.

4.PERFORM OK OR NG JUDGEMENT FOR SERVICE REGENERATION

1. Close the engine hood.
2. Start engine and warm it up to normal operating temperature.

NOTE:

SERVICE REGENERATION

[K9K]

< BASIC INSPECTION >

For best results, warm up the engine until "WATER TEMP" on "DATA MONITOR" mode of "ENGINE" using CONSULT reaches at least 80°C (176°F).

3. Select "PARTICLE FILTER REGENERATION" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
4. Touch "START".

Which is displayed on CONSULT screen?

Judged OK>>GO TO 5.

Judged NG>>GO TO 9.

5.PERFORM SERVICE REGENERATION

Touch "START" and wait for approximately 40 minutes.

CAUTION:

Never perform any vehicle operation during service regeneration.

NOTE:

It takes approximately 40 minutes until "COMPLETE" is displayed.

Which is displayed on CONSULT screen?

COMPLETE>>GO TO 8.

INCOMPLETE>>GO TO 6.

6.CHECK DPF TEMPERATURE

Check "EXH GAS TEMP (UPSTM CAT)" in "DATA MONITOR" mode of "ENGINE" using CONSULT.

Is the indication value more than 400°C (752°F)?

YES >> GO TO 7.

NO >> Check exhaust system.

7.PERFORM SERVICE REGENERATION AGAIN

1. Turn ignition switch OFF.
2. Open the engine hood.
3. Cool the engine at least 2 hours.
4. Check engine oil level. Refer to [LU-35, "Inspection"](#).
5. Close the engine hood.
6. Turn ignition switch ON.
7. Perform "PARTICLE FILTER REGENERATION" again.

Which is displayed on CONSULT screen?

COMPLETE>>GO TO 8.

INCOMPLETE>>GO TO 9.

8.PERFORM RESET AFTER SERVICE REGENERATION

1. Select "AFTER DPF REGENERATION" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
2. Touch "START".
3. Check that "COMPLETE" is displayed on CONSULT screen.
4. Touch "END".

>> GO TO 9.

9.REPLACE DPF

1. Turn ignition switch OFF.
2. Replace DPF. Refer to [EX-17, "Removal and Installation"](#).
3. Turn ignition switch ON.
4. Perform "AFTER DPF REPLACEMENT" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.

>> GO TO 10.

10.CHECK DTC

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Check DTC.

Is DTC "P253F" detected?

SERVICE REGENERATION

< BASIC INSPECTION >

[K9K]

YES >> GO TO 11.

NO >> END

A

11.CHANGE ENGINE OIL

1. Change engine oil. Refer to [LU-36, "Draining"](#) or [LU-36, "Refilling"](#).
2. Perform "ENGINE OIL DATA RESET". Refer to [ECK-147, "Work Procedure"](#).
3. Erase DTC.

ECK

>> END

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ACCELERATOR PEDAL

< BASIC INSPECTION >

[K9K]

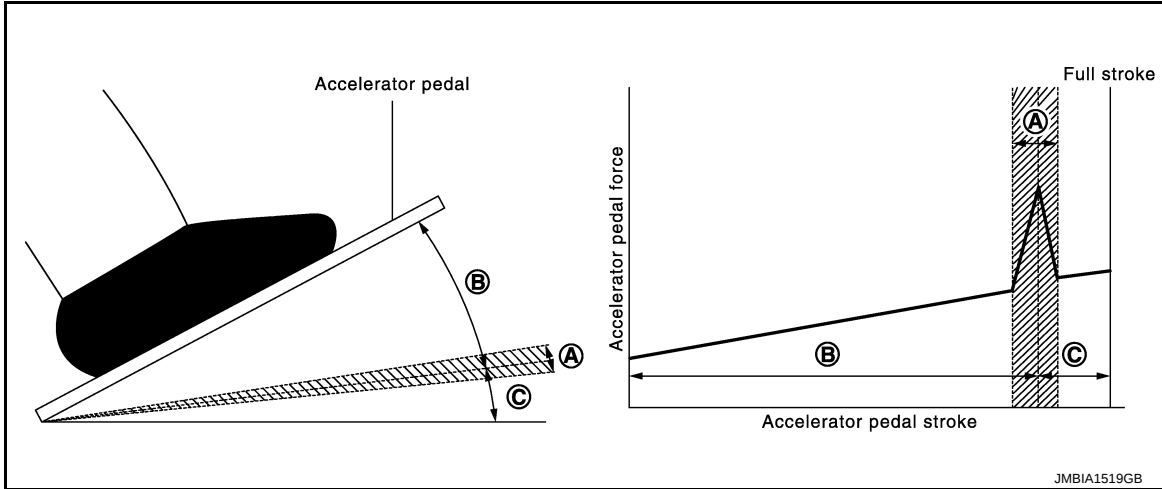
ACCELERATOR PEDAL

Work Procedure

INFOID:000000010289704

1.PERFORM ACCELERATOR PEDAL FORCE-I

1. Turn ignition switch OFF.
2. Depress the accelerator pedal and check if there is a specific point (A) in the pedal stroke where the pedal force increase as shown in the figure.



Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

2.PERFORM ACCELERATOR PEDAL FORCE-II

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

ECM			Condition	Voltage
Connector	+	-		
	Terminal	Terminal		
E59	31 (APP sensor 1)	30	Depressing range of the accelerator pedal: Within (C) as indicated in the figure	More than 4.35 V
	22 (APP sensor 2)	21		More than 2.17 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

FUEL PRESSURE CHECK

< BASIC INSPECTION >

[K9K]

FUEL PRESSURE CHECK

Work Procedure

INFOID:000000010289706

1.START

1. Start engine and warm it up until engine coolant temperature is suitable temperature.
2. On CONSULT screen, select "ENGINE" >> "WORK SUPPORT" >> "High pressure fuel circuit fault finding".
3. Touch "START" and wait a few seconds.
4. Make sure that CMPLT is displayed on CONSULT screen.

>> END

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INJECTOR CHECK

Work Procedure (Fuel Injectors Leak Check)

INFOID:000000010289686

NOTE:**• CONDITIONS PRIOR TO TEST**

- The entire low pressure system must be in good condition.
- Check the sealing of the high pressure pipes and unions.
- Test 3 High pressure fuel pump (pressure control valve) check is OK
- Test 4 High pressure fuel pump (volumetric control valve) check is OK
- Test 5 Rail high pressure regulation circuit check is OK.

• CAUSE

- Not enough or no rail pressure during starting.
- The engine does not start.

1. CHECK FUEL INJECTOR-I

Refer to [ECK-212, "Component Inspection \(Fuel Injector\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning fuel injector. Refer to [EM-293, "Removal and Installation"](#).

2. CHECK INTERNAL FUEL TRANSFER PUMP

1. Turn ignition switch OFF.
2. Disconnect the return system connections at the fuel injectors and close off the return pipes so they are leak-tight.
3. To authorise a 15 second cranking engine and carry out this test it is essential to carry out the following procedure:
 - Disconnect high pressure fuel pump (volumetric control valve) harness connector
 - Turn ignition switch ON.
 - Perform "SAVE COMPUTER DATA" in WORK SUPPORT mode with CONSULT.
 - Cranking engine for at least 15 seconds (starting speed 250 rpm)
 - Perform "WRITING SAVED DATA" in WORK SUPPORT mode with CONSULT.

Is the return volume at the fuel injectors more than 20 ml per fuel injector for the starting phase?

NOTE:

- Do not repeat this procedure more than 3 times and wait 30 seconds between each 15 second cranking engine.
- Then wait 30 minutes before cranking the engine for 315 second cycles.
- Follow this instruction so that the starter does not get damaged.

Does the flow measure more than 20 ml?

Yes >> Replace malfunctioning fuel injector. Refer to [EM-293, "Removal and Installation"](#).

No >> GO TO 3.

3. CHECK FUEL INJECTOR-II

1. Turn ignition switch OFF.
2. Reconnect return pipes.
3. Start Engine.
4. Select "DATA MONITOR" mode with CONSULT.
5. Check "RAIL PRESSURE" and "RAIL PRES SET" indication.
6. Does "RAIL PRESSURE" follow "RAIL PRES SET" during the 3 second cranking engine?

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK GLOW PLUG

1. Turn ignition switch OFF.
2. Remove the glow plugs and check for moisture.
3. If the glow plugs are wet with fuel, it is possible that the fuel injector is leaking.

Are the glow plugs wet with fuel?

Yes >> Replace malfunction fuel injector. Refer to [EM-293, "Removal and Installation"](#).

INJECTOR CHECK

[K9K]

< BASIC INSPECTION >

No >> Replace high pressure fuel pump. Refer to [EM-300, "Removal and Installation"](#).

5.INSPECTION END

Fuel injector system OK.

>> INSPECTION END

Work Procedure (Fuel Injection Quantity Check)

INFOID:000000010289687

NOTE:

• CONDITIONS PRIOR TO TEST

- The entire low pressure system must be in good condition.
- Check the sealing of the high pressure pipes and unions.
- Test 3 High pressure fuel pump (pressure control valve) check is OK
- Test 4 High pressure fuel pump (volumetric control valve) check is OK
- Test 5 Rail high pressure regulation circuit check is OK.
- All the electrical loads are switched off.
- Air conditioning is switched off.

• CAUSE

- The engine runs poorly at idle speed, possibly emits white smoke.

1.CHECK FUEL INJECTOR 1

Refer to [ECK-212, "Component Inspection \(Fuel Injector\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning fuel injector. Refer to [EM-293, "Removal and Installation"](#).

2.CHECK FUEL INJECTOR 2

1. Start engine let it idle speed.
2. Check the signal of the fuel injector. Refer to [ECK-76, "Reference Value"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

3.CHECK INTERNAL FUEL TRANSFER PUMP

1. Turn ignition switch OFF.
2. Disconnect the return system connections at the fuel injectors and close off the return pipes so they are leak-tight. While the engine is idling, check the return flow rate at the fuel injector. After 5 minutes the return volume must be between 16 - 24 ml per fuel injector.

Is there more than 24 ml or less than 16 ml of return for each fuel injector?

Yes >> Replace malfunctioning fuel injector. Refer to [EM-293, "Removal and Installation"](#).

No >> INSPECTION END

4.CHECK COMPRESSION PRESSURE

Check compression pressure.

>> INSPECTION END

DTC/CIRCUIT DIAGNOSIS**POWER SUPPLY AND GROUND CIRCUIT****ECM****ECM : Diagnosis Procedure**

INFOID:0000000010289711

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check that the following fuse is not fusing.

Fuse No.	Capacity
#52	10 A
#65	5 A

Is the fuse fusing?

- YES >> Replace the fuse after repairing the applicable circuit.
 NO >> GO TO 2.

2.CHECK GROUND CONNECTION

Check ground connection E5. Refer to Ground Inspection in [GI-43, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace ground connection.

3.CHECK ECM GROUND CIRCUIT FOR OPEN

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

+		-	Continuity
ECM			
Connector	Terminal		
E59	25	Ground	Existed
	26		
	29		
	32		

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> Repair or replace error-detected parts.

4.CHECK ECM RELAY CONTROL SIGNAL

1. Reconnect ECM harness connector.
2. Check the voltage between ECM harness connector and ground as per the following condition.

+		−	Condition	Voltage
ECM				
Connector	Terminal			
F80	36	Ground	Ignition switch: OFF	0 V
			Ignition switch: ON	Battery voltage

Is the inspection result normal?

- YES >> GO TO 6.
 NO >> GO TO 5.

POWER SUPPLY AND GROUND CIRCUIT

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

5.CHECK ECM RELAY CONTROL SIGNAL CIRCUIT

1. Turn ignition OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector.
4. Check the continuity between ECM harness connector and ECM relay harness connector.

+		-		Continuity
ECM		IPDM E/R		
Connector	Terminal	Connector	Terminal	
F80	36	F89	77	Existed

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

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair or replace error-detected parts.

6.CHECK ECM BATTERY POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

+		-	Voltage
ECM			
Connector	Terminal		
F80	93	Ground	Battery voltage
	94		

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7.CHECK ECM BATTERY POWER SUPPLY CIRCUIT

1. Turn ignition 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.

+		-		Continuity
ECM		IPDM E/R		
Connector	Terminal	Connector	Terminal	
F80	93	F90	103	Existed
	94		96	

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

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair or replace error-detected parts.

8.CHECK ECM IGNITION POWER SUPPLY

1. Turn ignition ON.
2. Check the voltage between ECM harness connector and ground.

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-	Voltage
ECM			
Connector	Terminal		
E59	16	Ground	Battery voltage

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Perform trouble diagnosis for ignition power supply circuit.

U0019 LIN BUS OFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

U0019 LIN BUS OFF ERROR

DTC Logic

INFOID:0000000010434146

DTC DETECTION LOGIC

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ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
U0019	— (Low speed can communication bus)	ECM detects LIN communication error.	• Harness or connectors (LIN communication circuit is open or shorted.) • Generator • ECM

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DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

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

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Is DTC detected?

G

- YES >> Proceed to [ECK-159, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010434147

1.CHECK LIN COMMUNICATION CIRCUIT

H

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and alternator harness connector.
3. Check the continuity between ECM harness connector and alternator harness connector.

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+		-		Continuity
ECM		Alternator		
Connector	Terminal	Connector	Terminal	
F81	141	F54	2	Existed

J

K

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

Is the inspection result normal?

L

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.REPLACE ALTERNATOR

M

1. Replace alternator.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to [ECK-159, "DTC Logic"](#).

N

Is DTC detected again?

- YES >> Replace ECM.
NO >> INSPECTION END

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U0111 LIN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

U0111 LIN COMMUNICATION

DTC Logic

INFOID:0000000010434238

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0111	Lost communication with battery energy control module "A" 1.DEF: COMPONENT PROTECTION TIME-OUT	ECM detects LIN communication error.	- Harness and connectors (LIN communication circuit is open or shorted.) - Alternator - ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-160, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010434239

1.CHECK LIN COMMUNICATION CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector and alternator harness connector.
- Check the continuity between ECM harness connector and alternator harness connector.

+		-		Continuity
ECM		Alternator		
Connector	Terminal	Connector	Terminal	
F81	141	F54	2	Existed

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.REPLACE ALTERNATOR

- Replace alternator.
- Erase DTC.
- Perform DTC confirmation procedure again. Refer to [ECK-160, "DTC Logic"](#).

Is DTC detected again?

YES >> Replace ECM.
NO >> INSPECTION END

U0121 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

U0121 CAN COMMUNICATION

DTC Logic

INFOID:0000000010434240

DTC DETECTION LOGIC

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ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
U0121	MLTIPLXD TRACTION CNTRL CONN [Lost communication with anti-lock brake system (ABS) control module] • 1.DEF: INVALID SOURCE COMPUTER MULTIPLEX SIGNALS • 2.DEF: INVALID SOURCE COMPUTER MULTIPLEX SIGNALS • 3.DEF: CIRCUIT QUANTITY NOT PLAUSIBLE	When ECM is not receiving CAN communication signal between ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit)

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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?

F

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H

- YES >> Proceed to [ECK-161, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010434241

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

Check DTC with ABS actuator and electric unit (control unit). Refer to [BRC-42, "CONSULT Function"](#).

Is DTC detected?

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- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Perform trouble shooting relevant to DTC indicated.

U0298 COMMUNICATION WITH DC/DC CONVERTER CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

U0298 COMMUNICATION WITH DC/DC CONVERTER CONTROL UNIT

DTC Logic

INFOID:000000010434242

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
U0298	COMMUNICATION ERROR (LOST) (Lost communication with DC to DC converter control module "A")	During the restart, the DC/DC converter status of the engine communication line does not show an decrease in voltage after an ECM transmitted voltage stabi- lizer signal is changed from battery volt- age to 2.0 V or less.	• Harness and connectors (Voltage stabilizer signal line is open or cir- cuit shorted.) • DC/DC converter

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 1 minute or more to start this procedure.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (Stop the engine.)
5. Touch "CANCEL" and restart the engine.
6. Check DTC.

Without CONSULT

1. Activate stop/start system. Refer to [ECK-39. "STOP/START SYSTEM : System Description"](#).

CAUTION:

Always drive vehicle at a safe speed.

2. Restart the engine.
3. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-162. "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010434243

1. CHECK VOLTAGE STABILIZER SIGNAL

With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (engine stop.)
5. Touch "CANCEL" and restart the engine, and then check the voltage between DC/DC converter harness connector and ground as per the following conditions.

+		-	Condition	Voltage (Approx.)
DC/DC converter				
Connector	Terminal			
M22	9	Ground	While cranking with restart	2.0 V or less
			Except above	Battery voltage

U0298 COMMUNICATION WITH DC/DC CONVERTER CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK VOLTAGE STABILIZER SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect DC/DC converter harness connector and alternator harness connector .
3. Disconnect ECM harness connector.
4. Check the continuity between DC/DC converter harness connector and ECM harness connector.

+		-		Continuity
DC/DC converter		ECM		
Connector	Terminal	Connector	Terminal	
M22	9	F80	51	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.

3.CHECK INTERMITTENT INCIDENT

Perform intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace DC/DC converter. Refer to [ECK-402, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

4.CHECK INTERMITTENT INCIDENT

Perform intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace ECM. Refer to [ECK-399, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

U0299 LOST COMMUNICATION (DC/DC CONVERTER)

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

U0299 LOST COMMUNICATION (DC/DC CONVERTER)

DTC Logic

INFOID:0000000010434244

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
U0299	COMMUNICATION ERROR (LOST) (Lost communication with DC to DC converter control module "B")	- ECM receives an abnormality signal sent from DC/DC converter. - ECM is not receiving LIN communication signal sent from DC/DC converter.	- DC/DC converter - Harness and connectors (LIN communication line)

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 1 minute or more to start this procedure.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-1

- Turn ignition switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-164, "Diagnosis Procedure"](#).
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-2

- Start the engine and let it idle for at least 5 minutes.
- Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-164, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010434245

1. CHECK ENGINE COMMUNICATION LINE

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Disconnect DC/DC converter harness connector, alternator harness connector, and active grille shutter harness connector.
- Check the continuity between ECM harness connector and DC/DC converter harness connector.

+		-		Continuity
ECM		DC/DC converter		
Connector	Terminal	Connector	Terminal	
F81	141	M22	7	Existed

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2. CHECK INTERMITTENT INCIDENT

Perform intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

U0299 LOST COMMUNICATION (DC/DC CONVERTER)

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

YES >> Replace DC/DC converter. Refer to [ECK-402. "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

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U0315 CAN COMMUNICATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

U0315 CAN COMMUNICATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

DTC Logic

INFOID:0000000010434246

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
U0315	VEHICLE SPEED (Software incompatibility with anti-lock brake system control module) • 1.DEF: INVALID SERIAL DATA RECEIVED • 2.DEF: INVALID SOURCE COMPUTER MULTIPLEX SIGNALS • 3.DEF: CIRCUIT QUANTITY NOT PLAUSIBLE • 4.DEF: INVALID SOURCE COMPUTER MULTIPLEX SIGNALS	ECM receives invalid signal of vehicle speed sent from ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit)

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 [ECK-166, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010434247

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

Check DTC with ABS actuator and electric unit (control unit). Refer to [BRC-42, "CONSULT Function"](#).

Is DTC detected?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Perform trouble shooting relevant to DTC indicated.

U0415 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

U0415 CAN COMMUNICATION

DTC Logic

INFOID:0000000010289717

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
U0415	MLTIPLXD TRACTION CNTRL CONN [Invalid data received from anti-lock brake system (ABS) control module] • 1.DEF: IMPLAUSIBLE SIGNAL • 2.DEF: INVALID SOURCE COMPUT- ER MULTIPLEX SIGNALS	ECM receives invalid data sent from ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit)

C

D

DTC CONFIRMATION PROCEDURE

E

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC U0415 can not duplicate.

F

>> Proceed to [ECK-167, "Diagnosis Procedure"](#).

G

Diagnosis Procedure

INFOID:0000000010289718

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

H

Check DTC with ABS actuator and electric unit (control unit). Refer to [BRC-42, "CONSULT Function"](#).

Is DTC detected?

I

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Perform trouble shooting relevant to DTC indicated.

J

K

L

M

N

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P

B1900 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

B1900 DC/DC CONVERTER

DTC Logic

INFOID:000000010289730

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
B1900	DC/DC CONVERTER (DC/DC converter)	DC/DC converter detects power supply input 1 is 5.0 V or less and difference between power supply input 1 and power supply input 2 is 4.0 V or more for 3 seconds.	• Harness and connectors (DC/DC converter power supply input 1 circuit is open or shorted.) • DC/DC converter

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 10 seconds or more to start this procedure.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-1

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

Is DTC detected?

YES >> Proceed to [ECK-168, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-2

 With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (engine stop.)
5. Touch "CANCEL" and restart the engine.
6. Check DTC.

 Without CONSULT

1. Activate stop/start system. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

CAUTION:

Always drive vehicle at a safe speed.

2. Restart the engine.
3. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-168, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289731

1. CHECK FUSIBLE LINK

1. Turn ignition switch OFF.
2. Check that the following fusible link is not fusing.

Location	Fusible link	Capacity
Fusible link holder	O	30 A

Is the fusible link fusing?

YES >> Replace the fusible link after repairing the applicable circuit.

ECK-168

B1900 DC/DC CONVERTER

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2.

2.CHECK DC/DC CONVERTER POWER SUPPLY INPUT 1

1. Disconnect DC/DC converter harness connector.
2. Check the voltage between DC/DC converter harness connector and ground.

+		–	Voltage
DC/DC converter			
Connector	Terminal		
M23	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK DC/DC CONVERTER POWER SUPPLY INPUT 1 CIRCUIT

1. Disconnect battery negative terminal.
2. Check the continuity between DC/DC converter harness connector and fusible link.

+		-	Continuity
DC/DC converter		Fusible link	
Connector	Terminal		
M23	1	O	Existed

Is the inspection result normal?

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

NO >> Repair or replace error-detected parts.

4.CHECK INTERMITTENT INCIDENT

Perform intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace DC/DC converter. Refer to [ECK-402, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

B1901 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

B1901 DC/DC CONVERTER

DTC Logic

INFOID:000000010289732

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
B1901	DC/DC CONVERTER (DC/DC converter)	DC/DC converter detects power supply input 2 is 5.0 V or less and difference between power supply input 2 and power supply input 1 is 4.0 V or more for 3 seconds.	• Harness and connectors (DC/DC converter power supply input 2 circuit is open or shorted.) • DC/DC converter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 10 seconds or more to start this procedure.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

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

Is DTC detected?

YES >> Proceed to [ECK-170, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

 With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (engine stop.)
5. Touch "CANCEL" and restart the engine.
6. Check DTC.

 Without CONSULT

1. Activate stop/start system. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

CAUTION:

Always drive vehicle at a safe speed.

2. Restart the engine.
3. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-170, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289733

1.CHECK FUSIBLE LINK

1. Turn ignition switch OFF.
2. Check that the following fusible link is not fusing.

Location	Fusible link	Capacity
Fusible link holder	N	30 A

Is the fusible link fusing?

YES >> Replace the fusible link after repairing the applicable circuit.

ECK-170

B1901 DC/DC CONVERTER

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2.

2.CHECK DC/DC CONVERTER POWER SUPPLY INPUT 2

1. Disconnect DC/DC converter harness connector.
2. Check the voltage between DC/DC converter harness connector and ground.

+		-	Voltage
DC/DC converter			
Connector	Terminal		
M23	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK DC/DC CONVERTER POWER SUPPLY INPUT 2 CIRCUIT

1. Disconnect battery negative terminal.
2. Check the continuity between DC/DC converter harness connector and fusible link.

+		—	Continuity
DC/DC converter		Fusible link	
Connector	Terminal		
M23	3	N	Existed

Is the inspection result normal?

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

NO >> Repair or replace error-detected parts.

4.CHECK INTERMITTENT INCIDENT

Perform intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace DC/DC converter. Refer to [ECK-402, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

B1902 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

B1902 DC/DC CONVERTER

DTC Logic

INFOID:000000010289734

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
B1902	DC/DC CONVERTER (DC/DC converter)	DC/DC converter detects power supply output 1 is 5.0 V or less when restart the engine.	• Harness and connectors (DC/DC converter power supply output 1 circuit is open or shorted.) • DC/DC converter • Components power-supplied from DC/DC output 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 10 seconds or more to start this procedure.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

Ⓐ With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (Stop the engine.)
5. Touch "CANCEL" and restart the engine.
6. Check DTC.

Ⓑ Without CONSULT

1. Activate stop/start system. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

CAUTION:

Always drive vehicle at a safe speed.

2. Restart the engine.
3. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-172, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289735

1.CHECK DC/DC CONVERTER POWER SUPPLY OUTPUT 1

1. Turn ignition switch ON.
2. Check the voltage between fuse and ground.

+	-	Voltage
Fuse No.		
71	Ground	Battery voltage
72		
73		
74		

Refer to [PG-56, "Wiring Diagram - IGNITION POWER SUPPLY -"](#).

Is the inspection result normal?

YES >> GO TO 2.

B1902 DC/DC CONVERTER

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 3.

2.CHECK IGNITION POWER SUPPLY CIRCUIT

Check the following units power supply circuit.

- Combination meter
- Steering angle sensor
- Ignition power supply fuse No. 73 circuit
- Ignition power supply fuse No. 74 circuit

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

3.CHECK DC/DC CONVERTER POWER SUPPLY OUTPUT 1 CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect battery negative terminal.
3. Disconnect DC/DC converter harness connector.
4. Check the continuity between DC/DC converter and Ignition relay.

+		-	Continuity
DC/DC converter			
Connector	Terminal		
M23	4	Ignition relay	Existed

Refer to [PG-56, "Wiring Diagram - IGNITION POWER SUPPLY -"](#).

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 INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace DC/DC converter. Refer to [ECK-402, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

B1903 DC/DC CONVERTER

DTC Logic

INFOID:0000000010289736

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
B1903	DC/DC CONVERTER (DC/DC converter)	DC/DC converter detects power supply output 2 is 5.0 V or less when restart the engine.	• Harness and connectors (DC/DC converter power supply output 2 circuit is open or shorted.) • DC/DC converter • Components power-supplied from DC/DC output 2

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 10 seconds or more to start this procedure.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

Ⓐ With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (Stop the engine.)
5. Touch "CANCEL" and restart the engine.
6. Check DTC.

Ⓑ Without CONSULT

1. Activate stop/start system. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

CAUTION:

Always drive vehicle at a safe speed.

2. Restart the engine.
3. Check DTC.

Is DTC detected?

- YES >> Proceed to [ECK-174, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289737

1. CHECK FUSE-1

Check that the following fuse is not fusing.

Fuse No.	Capacity
#80	20 A

Refer to [PG-11, "Wiring Diagram - BATTERY POWER SUPPLY -"](#).

Is the fuse fusing?

- YES >> Replace the fuse after repairing the applicable circuit.
 NO >> GO TO 2.

2. CHECK DC/DC CONVERTER POWER SUPPLY OUTPUT 2 (BATTERY)

1. Turn ignition switch OFF.
2. Check the voltage between fuse and ground.

B1903 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+	-	Voltage
Fuse No.		
#80	Ground	Battery voltage

Refer to [PG-11, "Wiring Diagram - BATTERY POWER SUPPLY -"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for battery power supply circuit.

3.CHECK FUSE-2

Check that the following fuse is not fusing.

Fuse No.	Capacity
#76	10 A
#77	10 A

Refer to [PG-11, "Wiring Diagram - BATTERY POWER SUPPLY -"](#).

Is the fuse fusing?

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

NO >> GO TO 4.

4.CHECK DC/DC CONVERTER POWER SUPPLY OUTPUT 2 (ACCESSORY)

1. Turn ignition switch ON.
2. Check the voltage between fuse and ground.

+	-	Voltage
Fuse No.		
76	Ground	Battery voltage
77		

Refer to [PG-49, "Wiring Diagram - ACCESSORY POWER SUPPLY -"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for accessory power supply circuit.

5.CHECK ACCESSORY RELAY ROUTING CIRCUIT

Check ignition relay routing circuit.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Perform intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace DC/DC converter. Refer to [ECH-314, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

B1904 DC/DC CONVERTER

DTC Logic

INFOID:0000000010289738

DTC DETECTION LOGIC

NOTE:

If DTC B1904 is displayed with DTC B1900 or B1901, perform the trouble diagnosis for DTC B1900 or B1901. Refer to [ECK-168, "DTC Logic"](#) or [ECK-170, "DTC Logic"](#).

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
B1904	DC/DC CONVERTER (DC/DC converter)	DC/DC converter function is malfunctioning.	DC/DC converter

1. PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 10 seconds or more to start this procedure.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (Stop the engine.)
5. Touch "CANCEL" and restart the engine.
6. Check DTC.

 Without CONSULT

1. Activate stop/start system. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

CAUTION:

Always drive vehicle at a safe speed.

2. Restart the engine.
3. Check DTC.

Is DTC detected?

- YES >> Proceed to [ECK-176, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289739

1. INSPECTION START

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC Confirmation Procedure. Refer to [ECK-176, "DTC Logic"](#).
4. Check DTC.

Is the DTC B1904 displayed again?

- YES >> Replace DC/DC converter. Refer to [ECK-402, "Removal and Installation"](#).
 NO >> INSPECTION END

P0001 FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0001 FUEL PUMP

DTC Logic

INFOID:0000000010289742

DTC DETECTION LOGIC

NOTE:

If DTC P0001 is displayed with DTC P0560 or P0657, first perform trouble diagnosis for DTC P0560 or P0657. Refer to [ECK-261, "DTC Logic"](#) (DTC P0560) or [ECK-282, "DTC Logic"](#) (DTC P0657).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0001	FUEL FLOW REGULATOR CIRCUIT (Fuel volume regulator control circuit/ open) 1.DEF: INLET FLAP BLOCKED CLOSED 2.DEF: INLET FLAP BLOCKED OPEN 3.DEF: CIRCUIT CURRENT ABOVE THRESHOLD	- ECM detects a short circuit to ground. - ECM detects a short circuit to battery. - ECM detects a open circuit.	- Harness or connectors (High pressure fuel pump cir- cuit is open or shorted.) - High pressure fuel pump

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [ECK-177, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289743

1.CHECK HIGH PRESSURE FUEL PUMP POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect high pressure fuel pump harness connector.
- Turn ignition switch ON.
- Check the voltage between high pressure fuel pump harness connector and ground.

+		-	Voltage
High pressure fuel pump			
Connector	Terminal		
F133	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Perform the trouble diagnosis for power supply circuit.

2.CHECK HIGH PRESSURE FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between high pressure fuel pump harness connector and ECM harness connector.

P0001 FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
High pressure fuel pump		ECM		
Connector	Terminal	Connector	Terminal	
F133	2	F80	92	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 HIGH PRESSURE FUEL PUMP

Refer to [ECK-178, "Component Inspection \(High Pressure Fuel Pump\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (High Pressure Fuel Pump)

INFOID:0000000010289744

1.CHECK HIGH PRESSURE FUEL PUMP

1. Disconnect high pressure fuel pump harness connector.
2. Check the resistance between high pressure fuel pump terminals as follows.

High pressure fuel pump		Condition		Resistance
+	-			
Terminal				
1	2	Temperature °C (°F)	20 (68)	2.55 - 2.81 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace high pressure fuel pump.

P0002 FUEL PRESSURE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0002 FUEL PRESSURE

DTC Logic

INFOID:0000000010289745

DTC DETECTION LOGIC

NOTE:

If DTC P0002 is displayed with DTC P0001, P0087, P0089, P0201, P0115, P0180, P0200, P0202, P0203, P0204 or P0627, first perform trouble diagnosis for DTC P0001, P0087, P0089, P0201, P0115, P0180, P0200, P0202, P0203, P0204 or P0627. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0002	FLOW CONTROL ADAPTIVE (Fuel volume regulator control circuit range/performance) 1.DEF: PARAMETER AT MAXIMUM STOP 2.DEF: PARAMETER AT MINIMUM STOP 3.DEF: ABOVE THE MAX LEVEL 4.DEF: CLOGGED. 5.DEF: OFFSET IMPLAUSIBLE 6.DEF: IMPLAUSIBLE SIGNAL 7.DEF: SIGNAL STUCK LOW	- Fuel rail pressure is excessively high. - Fuel rail pressure is excessively low. - Fuel pressure of low pressure fuel circuit is excessively high.	- High pressure fuel pump - Fuel leakage - Fuel filter clogged - Injectors clogged - Fuel leakage on fuel rail pressure limiter - High pressure fuel pump blocked

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0002 can not duplicate.

>> Proceed to [ECK-179, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289746

1.CHECK FUEL LEVEL

Check that the fuel level is enough.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refuel.

2.PERFORM FUEL FILTER AIR BLEEDING

NOTE:

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

- Turn ignition switch ON.
- Perform fuel filter air bleeding. Refer to [FL-34, "Air Bleeding"](#).
- Erase DTC.
- Perform DTC confirmation procedure again. Refer to [ECK-179, "DTC Logic"](#).

Is the DTC P0002 detected again?

YES >> GO TO 3.

NO >> INSPECTION END

3.CHECK FUEL FILTER

Check the correctness of the fuel filter.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace error-detected parts.

P0002 FUEL PRESSURE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

4.CHECK FOR FUEL LEAK

Check for fuel leakage at fuel circuit.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace malfunctioning parts.

5.CHECK HIGH PRESSURE FUEL PUMP

Check high pressure fuel pump. Refer to [ECK-180, "Component Inspection \(High Pressure Fuel Pump\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace error-detected parts.

6.CHECK FUEL INJECTOR

Check fuel injector. Refer to [ECK-180, "Component Inspection \(Fuel Injector\)"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace error-detected parts.

7.CHECK FUEL RAIL PRESSURE LIMITER

Check fuel rail pressure limiter.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (High Pressure Fuel Pump)

INFOID:0000000010289747

1.CHECK HIGH PRESSURE FUEL PUMP

1. Disconnect high pressure fuel pump harness connector.
2. Check the resistance between high pressure fuel pump terminals as follows.

High pressure fuel pump		Condition		Resistance
+	-			
Terminal				
1	2	Temperature °C (°F)	20 (68)	2.55 - 2.81 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace high pressure fuel pump.

Component Inspection (Fuel Injector)

INFOID:0000000010289748

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between fuel injector terminals.

Fuel injector		Condition	Resistance
+	-		
Terminal			
1	2	Temperature: 20°C (68°F)	150 – 250k Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel injector.

P0016 CKP - CMP CORRELATION

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0016 CKP - CMP CORRELATION

DTC Logic

INFOID:000000010289749

DTC DETECTION LOGIC

NOTE:

- If DTC P0016 is displayed with DTC P0335, P0560, P0657, or P0641, perform the trouble diagnosis for DTC P0335, P0560, P0657, or P0641. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0016	COHER BTWN CSFT SEN/ ENG SPD (Crankshaft position - cam- shaft position correlation bank 1 sensor A) • 1.DEF: SIGNAL INCOHER- ENCE	The correlation between crankshaft position sensor signal and camshaft position sensor signal is out of the normal range.	• Harness or connectors (CKP sensor circuit is open or shorted.) (CMP sensor circuit is open or shorted.) • Crankshaft position sensor • Camshaft position sensor • Timing chain • Signal plate

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 1 second.
2. Check DTC.

Is DTC detected?

- YES >> [ECK-181, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289750

1.CHECK CKP SENSOR

Check CKP sensor. Refer to [ECK-182, "Component Inspection \(Crankshaft Position Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Replace error-detected parts.

2.CHECK CMP SENSOR

Check CMP sensor. Refer to [ECK-182, "Component Inspection \(Camshaft Position Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace error-detected parts.

3.CHECK SIGNAL PLATE OF CAMSHAFT REAR END

Visually check for chipping signal plate of camshaft rear end.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace camshaft RH.

4.CHECK SIGNAL PLATE WITH FLYWHEEL

Visually check for chipping signal plate with flywheel.

P0016 CKP - CMP CORRELATION

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace signal plate with flywheel.

5.CHECK TIMING BELT

Check timing belt.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Replace timing belt.

Component Inspection (Crankshaft Position Sensor)

INFOID:0000000010289751

1.CHECK CRANKSHAFT POSITION SENSOR

1. Turn ignition switch OFF.
2. Disconnect crankshaft position (CKP) sensor harness connector.
3. Check the resistance between CKP sensor terminals.

CKP sensor		Condition		Resistance
+	-			
Terminal				
1	2	Temperature °C (°F)	20 (68)	690 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace CKP sensor.

Component Inspection (Camshaft Position Sensor)

INFOID:0000000010289752

1.CHECK CAMSHAFT POSITION SENSOR

1. Turn ignition switch OFF.
2. Disconnect camshaft position (CMP) sensor harness connector.
3. Check the resistance between CMP sensor terminals.

CMP sensor		Resistance
+	-	
Terminal		
2	3	More than 100 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace CMP sensor.

P0045 TC BOOST CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0045 TC BOOST CONTROL SOLENOID VALVE

DTC Logic

INFOID:0000000010289753

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0045	TC SOLENOID VALVE CNTRL CIRC (Turbocharger/supercharger boost control "A" circuit/open) 1.DEF: VOLTAGE TOO LOW 2.DEF: VOLTAGE TOO HIGH	- ECM detects turbocharger boost control solenoid valve circuit is open. - ECM detects turbocharger boost control solenoid valve circuit is short to ground. - ECM detects turbocharger boost control solenoid valve circuit is short to power.	- Harness or connectors (Turbocharger boost control solenoid valve circuit is open or shorted.) - Turbocharger boost control solenoid valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-183, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289754

1.CHECK ECM HARNESS CONNECTOR CONNECTION

- Turn ignition switch OFF.
- Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ECM harness connector connection.

2.CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE HARNESS CONNECTOR CONNECTION

Check turbocharger boost control solenoid valve harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace turbocharger boost control solenoid valve harness connector connection. Refer to [ECK-12, "Component Parts Location"](#).

3.CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE POWER SUPPLY

- Turn ignition switch OFF.
- Disconnect turbocharger boost control solenoid valve harness connector.
- Turn ignition switch ON.
- Check the voltage between turbocharger boost control solenoid valve harness connector and ground.

P0045 TC BOOST CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-	Voltage
Turbocharger boost control solenoid valve			
Connector	Terminal		
F143	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for power supply circuit.

4. CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between turbocharger boost control solenoid valve harness connector and ECM harness connector.

+		-		Continuity
Turbocharger boost control solenoid valve		ECM		
Connector	Terminal	Connector	Terminal	
F143	1	F80	64	Existed

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

Is the inspection result normal?

YES >> Replace turbocharger boost control solenoid valve.

NO >> Repair or replace error-detected parts.

P0087 FUEL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0087 FUEL SYSTEM

DTC Logic

INFOID:0000000010289755

NOTE:

- If DTC P0087 is displayed with DTC P0001, P0089, P0115, P0180, P0190, P0201, P0202, P0203, P0204 or P0627, perform the trouble diagnosis for DTC P0001, P0089, P0115, P0180, P0190, P0201, P0202, P0203, P0204 or P0627. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0087	RAIL PRESSURE (Fuel rail/system pressure - too low) 1.DEF: VALUES OUTSIDE TOLERANCES	An excessively low voltage from the fuel rail pressure sensor is sent to ECM.	- High pressure fuel pump - Fuel pump - Fuel injector - Fuel rail pressure sensor - Fuel temperature sensor - Fuel filter - Air mixed with fuel - Lack of fuel - Fuel line

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Start engine and let it idle for at least 1 second.
- Check DTC.

Is DTC detected?

- YES >> [ECK-181, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289756

1. CHECK FUEL RAIL PRESSURE SENSOR

Check fuel rail pressure sensor. Refer to [ECK-209, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Replace fuel rail.

2. CHECK FUEL INJECTOR

Check fuel injector. Refer to [ECK-211, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. REPLACE FUEL INJECTOR

Replace fuel injector of malfunctioning cylinder.

>> INSPECTION END

4. CHECK FUEL PUMP

Check fuel pump. Refer to [ECK-186, "Component Inspection \(Low Pressure Fuel Pump\)"](#).

Is the inspection result normal?

P0087 FUEL SYSTEM

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 5.
NO >> Replace fuel pump.

5.CHECK HIGH PRESSURE FUEL PUMP

Check high pressure fuel pump. Refer to [ECK-177, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace high pressure fuel pump.

6.CHECK FUEL FILTER

Check fuel filter. Refer to [FL-34, "Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Replace fuel filter.

7.CHECK FUEL LINE

Check fuel line. Refer to [FL-32, "Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> Repair fuel line.

8.PERFORM HIGH PRESSURE SYSTEM CHECK

Perform high pressure system check. Refer to [ECK-153, "Work Procedure"](#).

>> **INSPECTION END**

Component Inspection (Low Pressure Fuel Pump)

INFOID:0000000010508599

1.CHECK FUEL PRESSURE REGULATOR

1. Turn ignition switch OFF.
2. Check low fuel pressure.

Is inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK LOW PRESSURE FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump (main).
3. Check resistance between fuel level sensor unit and fuel pump (main) terminals as follows.

+	–	Continuity
Fuel level sensor unit and fuel pump (main)		
Terminals		
2	3	Existed
	4	

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace fuel level sensor unit and fuel pump (main).

P0089 FUEL PRESSURE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0089 FUEL PRESSURE

DTC Logic

INFOID:000000010289757

DTC DETECTION LOGIC

NOTE:

- If DTC P0089 is displayed with DTC P0001, P0087, P0115, P0180, P0190, P0200, P0201, P0202, P0203, P0204 or P0627, perform the trouble diagnosis for DTC P0001, P0087, P0089, P0115, P0180, P0190, P0200, P0201, P0202, P0203, P0204 or P0627. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0089	RAIL PRESS REGULTIN (Fuel pressure regulator 1 performance) 1.DEF: SIGNAL STUCK LOW 2.DEF: CLOGGED 3.DEF: ABOVE THE MAX LEVEL 4.DEF: PARAMETER AT MINIMUM STOP 5.DEF: PARAMETER AT MAXIMUM STOP 6.DEF: SIGNAL OUTSIDE LOWER LIMIT 7.DEF: IMPLAUSIBLE SIGNAL 8.DEF: COMPONENT PROTECTION TIME-OUT	Fuel pressure is out of the target range	- Harness or connectors - High pressure fuel pump - Fuel leakage - Fuel filter clogged - Fuel tank degassing chamber - Fuel injector

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0089 can not duplicate.

>> Proceed to [ECK-187, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000010289758

1.CHECK FUEL LEVEL

Check that the fuel level is enough.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refuel.

2.PERFORM FUEL FILTER AIR BLEEDING

NOTE:

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

- Turn ignition switch ON.
- Perform fuel filter air bleeding. Refer to [FL-34, "Air Bleeding"](#).
- Erase DTC.
- Perform DTC confirmation procedure again. Refer to [ECK-187, "DTC Logic"](#).

Is the DTC P0089 detected again?

YES >> GO TO 3.
NO >> INSPECTION END

3.CHECK FUEL FILTER

< DTC/CIRCUIT DIAGNOSIS >

Check the correctness of the fuel filter.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace fuel filter.

4.CHECK FUEL RAIL PRESSURE SENSOR CONNECTION

1. Turn ignition switch OFF.

2. Check fuel rail pressure sensor harness connector connection.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK HIGH PRESSURE FUEL PUMP HARNESS CONNECTOR CONNECTION

Check High pressure fuel pump harness connector connection.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK ECM HARNESS CONNECTOR CONNECTION

Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace ECM harness connector connection.

7.CHECK HIGH PRESSURE FUEL PUMP CIRCUIT FOR OPEN AND SHORT

Check high pressure fuel pump circuit for open and short.

+		-		Continuity
ECM		High pressure fuel pump		
Connector	Terminal	Connector	Terminal	
F80	92	F133	2	Existed

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK FUEL FLOW ACTUATOR

Check high pressure fuel pump. Refer to [ECK-189, "Component Inspection \(High Pressure Fuel Pump\)"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace error-detected parts.

9.CHECK FUEL RAIL PRESSURE SENSOR CIRCUIT FOR OPEN AND SHORT

Check fuel rail pressure sensor circuit for open and short.

+		-		Continuity
ECM		Fuel rail pressure sensor		
Connector	Terminal	Connector	Terminal	
F80	45	F40	3	Existed
	68		2	
	72		1	

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

P0089 FUEL PRESSURE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

10.CHECK FOR FUEL LEAK

Check for fuel leakage at fuel circuit.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace malfunctioning parts.

11.CHECK FUEL INJECTOR

Check fuel injector. Refer to [ECK-211, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace error-detected parts.

12.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to [ECK-201, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (High Pressure Fuel Pump)

INFOID:0000000010289759

1.CHECK HIGH PRESSURE FUEL PUMP

1. Disconnect high pressure fuel pump harness connector.
2. Check the resistance between high pressure fuel pump terminals as follows.

High pressure fuel pump		Condition		Resistance
+	-			
Terminal				
1	2	Temperature °C (°F)	20 (68)	2.55 - 2.81 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace high pressure fuel pump.

Component Inspection (Fuel Injector)

INFOID:0000000010289760

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between fuel injector terminals.

Fuel injector		Condition	Resistance
+	–		
Terminal			
1	2	Temperature: 20°C (68°F)	150 – 250k Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel injector.

P0095 IAT SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0095 IAT SENSOR 2

DTC Logic

INFOID:0000000010289761

DTC DETECTION LOGIC

NOTE:

- If DTC P0095 is displayed with DTC P1489, perform the trouble diagnosis for DTC P1489. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0095	AIR TEMP SEN/CIRC (Intake air temperature sensor 2 circuit bank 1) • 1.DEF: VOLTAGE TOO LOW • 2.DEF: VOLTAGE TOO HIGH • 3.DEF: IMPLAUSIBLE SIGNAL • 4.DEF: SIGNAL INCOHERENCE • 5.DEF: IMPROPER SIGNAL SHAPE • 6.DEF: NO SIGNAL SPECIFIC SUBTYPE	• Signal voltage from the intake air temperature sensor 2 remains 4.9 V or more for 1 second or more. • An excessively low voltage from the intake air temperature sensor 2 is sent to ECM. • ECM detects improper signal.	• Harness or connectors (Intake air temperature sensor 2 circuit is open or shorted. • Intake air temperature sensor 2 • ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0095 can not duplicate.

>> Proceed to [ECK-190, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289762

1.CHECK ECM HARNESS CONNECTOR CONNECTION

1. Turn ignition switch OFF.
2. Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK INTAKE AIR TEMPERATURE SENSOR 2 HARNESS CONNECTOR CONNECTION

1. Turn ignition switch OFF.
2. Check turbocharger boost sensor (with intake air temperature sensor 2) harness connector connection F5.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK INTAKE AIR TEMPERATURE SENSOR 2

Refer to [ECK-191, "Component Inspection \(Intake Air Temperature Sensor 2\)"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace error-detected parts.

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

P0095 IAT SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Check intake air temperature sensor 2 circuit for open and short.

+		-		Continuity
ECM		Turbocharger boost sensor (with Intake air temperature sensor 2)		
Connector	Terminal	Connector	Terminal	Existed
F81	102	F5	1	
	145		2	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK EGR TEMPERATURE SENSOR

Refer to [ECK-191. "Component Inspection \(Low Pressure EGR Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (Intake Air Temperature Sensor 2)

INFOID:0000000010289763

1.CHECK INTAKE AIR TEMPERATURE SENSOR 2

1. Disconnect turbocharger boost sensor (with intake air temperature sensor 2) harness connector.
2. Check resistance between turbocharger boost sensor (with intake air temperature sensor 2) harness connector terminals under the following conditions.

Turbocharger boost sensor (with intake air temperature sensor 2)		Condition		Resistance
+	-			
Terminals				
2	1	Temperature° C (°F)	−10 (14)	9.395 – 9.775
			10 (50)	3.791 – 3.927
			20 (68)	2.416 – 2.583
			30 (86)	1.706 – 1.760
			50 (122)	0.833 – 0.857

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace turbocharger boost sensor (with intake air temperature sensor 2).

Component Inspection (Low Pressure EGR Temperature Sensor)

INFOID:0000000010289764

1.CHECK LOW PRESSURE EGR TEMPERATURE SENSOR

1. Disconnect low pressure EGR volume control valve upstream temperature sensor harness connector.
2. Check resistance between low pressure EGR volume control valve upstream temperature sensor terminals under the following conditions.

P0095 IAT SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

EGR temperature sensor		Condition		Resistance (Approx.) kΩ
+	-			
Terminal				
1	2	Temperature° C (°F)	0 (32)	148.9 – 175.5
			20 (68)	57.1 – 65.9
			100 (212)	3.167 – 3.433
			130 (572)	0.062 – 0.068

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace Low pressure EGR temperature sensor.

P0100 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0100 MAF SENSOR

DTC Logic

INFOID:0000000110289765

DTC DETECTION LOGIC

NOTE:

- If DTC P0100 is displayed with DTC P0641, perform the trouble diagnosis for DTC P0641. Refer to [ECK-277, "DTC Logic"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0100	AIR FLOW SENSOR CIRCUIT (Mass or volume air flow "A" circuit) • 1.DEF: VOLTAGE TOO LOW • 2.DEF: VOLTAGE TOO HIGH • 3.DEF: SIGNAL INCOHER- ENCE	• An excessively low voltage from the sensor is sent to ECM for 2 seconds or more. • An excessively high voltage from the sensor is sent to ECM for 0.2 seconds or more. • An excessively difference between minimum and maximum pressure signal from the sensor is sent to ECM while engine running.	• Harness or connectors (Mass air flow sensor circuit is open or shorted.) • Mass air flow sensor • Turbocharger boost sensor • Intake air leaks • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 second.
2. Check DTC.

Is DTC detected?

- YES >> Proceed to [ECK-193, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000110289766

1.CHECK INTAKE SYSTEM

1. Check air cleaner for clogging.
2. Check the following for connection and cracks.
 - Air duct
 - Vacuum hoses
 - Intake air passage between air duct and intake manifold
 - Turbocharger
 - Turbocharger boost sensor (Refer to [ECK-195, "Component Inspection \(Turbocharger Boost Sensor\)"](#))

Is the inspection result normal?

- YES >> Replace mass air flow sensor.
NO >> Repair or replace malfunctioning part, and then GO TO 2.

2.CHECK MASS AIR FLOW SENSOR POWER SUPPLY CIRCUIT

Check the power supply of the mass air flow sensor.

+		-	Voltage
Mass air flow sensor			
Connector	Terminal		
F91	3	Ground	Battery voltage

Is the inspection result normal?

P0100 MAF SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 3.
NO >> Perform trouble diagnosis for power supply circuit.

3.CHECK MASS AIR FLOW SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check mass air flow sensor circuit for open and short.

+		-		Continuity
ECM		Mass air flow sensor		
Connector	Terminal	Connector	Terminal	
F80	46	F91	4	Existed
	86		2	

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK MASS AIR FLOW SENSOR

Refer to [ECK-194, "Component Inspection \(Mass Air Flow Sensor\)"](#).

Is the inspection result normal?

- YES >> Replace error-detected parts.
NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Component Inspection (Mass Air Flow Sensor)

INFOID:0000000010289767

1.CHECK MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. Check the voltage between mass air flow sensor harness connector.

Mass air flow sensor			Voltage
Connector	+	-	
	Terminal		
F91	4 (Mass air flow sensor signal)	2 (Mass air flow sensor ground)	0.3 - 0.7 V

Is the inspection result normal?

- YES >> **INSPECTION END**
NO >> Replace mass air flow sensor.

P0101 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0101 MAF SENSOR

DTC Logic

INFOID:0000000010434423

DTC DETECTION LOGIC

NOTE:

- If DTC P0101 is displayed with DTC P0095 or P0105, perform the trouble diagnosis for DTC P0095 or P0105. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0101	AIR FLOW SENSOR INFORMATION (Mass or volume air flow "A" circuit range/performance) • 1.DEF: SIGNAL OUTSIDE UPPER LIMIT • 2.DEF: SIGNAL OUTSIDE LOWER LIMIT	Improper voltage from the sensor is sent to ECM compared with the driving condition.	• Harness or connectors • Mass air flow sensor • Turbocharger boost sensor • Intake air temperature sensor 1 • Turbocharger • Intake air leaks

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0101 can not duplicate.

>> Proceed to [ECK-195, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010434424

1.CHECK INTAKE SYSTEM

1. Check air cleaner for clogging.
2. Check the following for connection and cracks.
 - Air duct
 - Vacuum hoses
 - Intake air passage between air duct and intake manifold
 - Turbocharger
 - Turbocharger boost sensor (Refer to [ECK-195, "Component Inspection \(Turbocharger Boost Sensor\)"](#))

Is the inspection result normal?

- YES >> Replace mass air flow sensor.
NO >> Repair or replace malfunctioning part, and then GO TO 2.

2.SOAK THE VEHICLE

Turn ignition switch ON and soak the vehicle for 8 hours.

>> GO TO 3.

3.CHECK COHERENCE

1. Check coherence between intake air temperature, ambient air temperature, and engine coolant temperature.
2. Check that intake air temperature is equal to ambient air temperature ($\pm 10^{\circ}\text{C}$).

Is the inspection result normal?

- YES >> Replace mass air flow sensor.
NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Component Inspection (Turbocharger Boost Sensor)

INFOID:0000000010434425

1.CHECK TURBOCHARGER BOOST SENSOR

P0101 MAF SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect turbocharger boost sensor harness connector.
3. Check resistance between turbocharger boost sensor terminals under the following conditions.

Turbocharger boost sensor		Resistance
+	-	
Terminal		
4	1	More than 50 kΩ

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace turbocharger boost sensor.

P0105 TC BOOST SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0105 TC BOOST SENSOR

DTC Logic

INFOID:0000000010289768

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0105	INLET MANIFPRS SEN CIRC (Manifold absolute pressure/ barometric pressure circuit) 1.DEF: VOLTAGE TOO LOW 2.DEF: VOLTAGE TOO HIGH 3.DEF: SIGNAL INCOHERENCE 4.DEF: IMPROPER SIGNAL SHAPE	- An excessively low voltage from Turbocharger Boost sensor is sent to ECM for 1 second or more. - An excessively high voltage from Turbocharger Boost sensor is sent to ECM for 1 second or more. - An excessively difference between minimum and maximum pressure signal from the sensor is sent to ECM while engine running. - ECM detects improper signal.	- Harness or connectors (TC boost sensor circuit is open or shorted.) - TC boost sensor - ECM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

G

H

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-197, "Diagnosis Procedure"](#).
NO >> INSPECTION END

I

J

K

Diagnosis Procedure

INFOID:0000000010289769

1.CHECK TURBOCHARGER BOOST SENSOR

Check turbocharger boost sensor. Refer to [ECK-198, "Component Inspection \(Turbocharger Boost Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace error-detected parts.

L

M

2.CHECK TURBOCHARGER BOOST SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch ON.
- Check the power supply of the turbocharger boost sensor.

N

O

+		-	Voltage (Approx.)
Turbocharger boost sensor			
Connector	Terminal		
F5	3	Ground	5.0 V

P

Is the inspection result normal?

YES >> GO TO 3.
NO >> Perform trouble diagnosis for power supply circuit.

3.CHECK TURBOCHARGER BOOST SENSOR CIRCUIT FOR OPEN AND SHORT

P0105 TC BOOST SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Check turbocharger boost sensor circuit for open and short.

+		-		Continuity
ECM		Turbocharger boost sensor		
Connector	Terminal	Connector	Terminal	
F81	100	F5	4	Existed
	101		3	
	102		1	

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Turbocharger Boost Sensor)

INFOID:0000000010289770

1. CHECK TURBOCHARGER BOOST SENSOR

1. Turn ignition switch OFF.
2. Disconnect turbocharger boost sensor harness connector.
3. Check resistance between turbocharger boost sensor terminals under the following conditions.

Turbocharger boost sensor		Resistance
+	-	
Terminal		
4	1	More than 50 kΩ

Is the inspection result normal?

- YES >> **INSPECTION END**
NO >> Replace turbocharger boost sensor.

P0110 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0110 IAT SENSOR

DTC Logic

INFOID:000000010289774

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0110	AIR TEMP SEN CIRC (Intake air temperature sensor 1 circuit bank 1) • 1.DEF: VOLTAGE TOO LOW • 2.DEF: VOLTAGE TOO HIGH • 3.DEF: SIGNAL INCOHERENCE • 4.DEF: IMPROPER SIGNAL SHAPE • 5.DEF: NO SIGNAL SPECIFIC SUBTYPE	• An excessively low voltage from Intake air temperature sensor 1 is sent to ECM for 1 second. • An excessively high voltage from Intake air temperature sensor 1 is sent to ECM for 1 second. • ECM detects improper signal.	• Harness or connectors (Intake air temperature sensor 1 circuit is open or shorted.) • Intake air temperature sensor 1 • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-199, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289775

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK MASS AIR FLOW SENSOR HARNESS CONNECTOR CONNECTIONS

Check mass air flow sensor (with intake air temperature sensor 1) harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT FOR OPEN AND SHORT

Check intake air temperature sensor 1 sensor circuit for open and short.

+		-		Continuity
ECM		Mass air flow sensor		
Connector	Terminal	Connector	Terminal	
F80	86	F91	2	Existed
	87		1	

P0110 IAT SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK INTAKE AIR TEMPERATURE SENSOR 1

Refer to [ECK-200, "Component Inspection \(Intake Air Temperature Sensor 1\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (Intake Air Temperature Sensor 1)

INFOID:0000000010289776

1.CHECK INTAKE AIR TEMPERATURE SENSOR 1

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

Intake air temperature °C (°F)	Resistance (Approx.) kΩ
-10 (14)	8.716 – 9.689
10 (50)	3.553 – 3.875
20 (68)	2.353 – 2.543
30 (86)	1.613 – 1.729
50 (122)	0.794 – 0.839

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace mass air flow sensor (with intake air temperature sensor).

P0115 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0115 ECT SENSOR

DTC Logic

INFOID:000000010289777

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0115	WATER TEMPERATURE SENSOR CIRC (Engine coolant temperature sensor 1 circuit) 1.DEF: VOLTAGE TOO LOW 2.DEF: VOLTAGE TOO HIGH 3.DEF: INTERMITTENT SIGNAL INCOHERENCE 4.DEF: IMPROPER SIGNAL SHAPE 5.DEF: CIRCUIT QUANTITY NOT PLAUSIBLE	- An excessively low voltage from Engine Coolant Temperature Sensor is sent to ECM for 1 second. - An excessively high voltage from Engine Coolant Temperature Sensor is sent to ECM for 1 second. - Engine coolant temperature changes rapidly for 8 seconds. - ECM detects improper signal.	- Harness or connectors (Engine coolant temperature sensor circuit is open or shorted.) - Engine coolant temperature sensor - ECM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

G

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

H

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

I

- Turn ignition switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

J

YES >> Proceed to [ECK-201, "Diagnosis Procedure"](#).

NO >> INSPECTION END

K

Diagnosis Procedure

INFOID:000000010289778

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

L

- Turn ignition switch OFF.
- Check ECM harness connector connection.

Is the inspection result normal?

M

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK ENGINE COOLANT TEMPERATURE SENSOR HARNESS CONNECTOR CONNECTIONS

N

Check engine coolant temperature sensor harness connector connection.

Is the inspection result normal?

O

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT FOR OPEN AND SHORT

P

Check engine coolant temperature sensor circuit for open and short.

P0115 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
ECM		Engine coolant temperature sensor		
Connector	Terminal	Connector	Terminal	
F81	120	F50	2	Existed
	122		1	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR-I

Refer to [ECK-202. "Component Inspection \(Engine Coolant Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> GO TO 5.

5.CHECK ENGINE COOLANT TEMPERATURE SENSOR-II

1. Replace the engine coolant temperature sensor.
2. Select "DATA MONITOR" mode of "ENGINE" using CONSULT.
3. Check that "WATER TEMP" indicates value grows up.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (Engine Coolant Temperature Sensor)

INFOID:0000000010289779

1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check resistance between engine coolant temperature sensor terminals 2 and 3 under the following conditions.

Terminal	Engine coolant temperature °C (°F)	Resistance (Approx.) kΩ
1 and 2	-10 (14)	11.33 – 13.59
	25 (77)	2.140 – 2.364
	50 (122)	0.771 – 0.849
	80 (176)	0.275 – 0.291
	110 (230)	0.112 – 0.117

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace Engine coolant temperature sensor.

P0120 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0120 TP SENSOR

DTC Logic

INFOID:0000000010289780

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0120	INLET AIR FLAP POSITION SEN (Throttle/pedal position sensor/ switch "A" circuit) 1.DEF: SIGNAL INCOHER- ENCE	- Throttle position sensor voltage sent to ECM is 4.8 V or more for 0.5 second or more. - Throttle position sensor voltage sent to ECM is 0.2 V or less for 0.5 second or more.	- Harness or connectors (Throttle position sensor circuit is open or shorted.) - Throttle position sensor - Electric throttle control actuator - ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [ECK-203, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289781

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

- Turn ignition switch OFF.
- Check ECM harness connector connection.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR HARNESS CONNECTOR CONNECTIONS

Check electric throttle control actuator harness connector connection.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR FITTING CONDITION

Check electric throttle control actuator fitting condition.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Adjust parts fitting condition.

4.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT FOR OPEN AND SHORT

Check electric throttle control actuator circuit for open and short.

P0120 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
ECM		Electric throttle control actuator		
Connector	Terminal	Connector	Terminal	
F80	61	F46	2	Existed
	67		3	
	71		4	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK THROTTLE POSITION SENSOR

Refer to [ECK-204, "Component Inspection \(Throttle Position Sensor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (Throttle Position Sensor)

INFOID:0000000010289782

1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [ECK-136, "Work Procedure"](#).
4. Turn ignition switch ON.
5. Set selector lever to D position.
6. Check the voltage between ECM harness connector terminals under the following conditions.

ECM			Condition	Voltage (V)
Connector	+	–		
	Terminal			
F80	71	67	Accelerator pedal: Fully released	More than 0.425
			Accelerator pedal: Fully depressed	Less than 4.760

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator.

P0180 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0180 FUEL TEMPERATURE SENSOR

DTC Logic

INFOID:0000000010289790

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0180	FUEL TEMPERATURE SENSOR CIRCUIT (Fuel temperature sensor "A" circuit) • 1.DEF: VOLTAGE TOO LOW • 2.DEF: VOLTAGE TOO HIGH • 3.DEF: SIGNAL INCOHERENCE • 4.DEF: IMPROPER SIGNAL SHAPE • 5.DEF: INTERMITTENT SIGNAL INCOHERENCE • 6.DEF: NO SIGNAL SPECIFIC SUBTYPE	• An excessively low voltage from the sensor is sent to ECM. • An excessively high voltage from the sensor is sent to ECM. • An excessively difference between minimum and maximum fuel temperature signal from the sensor is sent to ECM while engine running. • ECM detects improper fuel temperature signal.	• Harness or connectors (Fuel temperature sensor circuit is open or shorted.) • Fuel temperature sensor • ECM

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DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0180 can not duplicate.

G

H

>> Proceed to [ECK-205, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289791

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection F81.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK FUEL TEMPERATURE SENSOR HARNESS CONNECTOR CONNECTIONS

Check fuel temperature sensor harness connector connection F79.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK FUEL TEMPERATURE SENSOR CIRCUIT FOR OPEN AND SHORT

Check fuel temperature sensor circuit for open and short.

+		-		Continuity
ECM		Fuel temperature sensor		
Connector	Terminal	Connector	Terminal	
F81	98	F79	2	Existed
	103		1	

O

P

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK FUEL TEMPERATURE SENSOR

P0180 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Refer to [ECK-206. "Component Inspection \(Fuel Temperature Sensor\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Temperature Sensor)

INFOID:0000000010289792

1.CHECK FUEL TEMPERATURE SENSOR

Check resistance between fuel temperature sensor terminals 1 and 2 under the following conditions.

Fuel temperature °C (°F)	Resistance (Approx.) kΩ
-10 (14)	8.623 – 10.454
25 (77)	1.928 – 2.174
50 (122)	0.764 – 0.858
80 (176)	0.292 – 0.326
110 (230)	0.127 – 0.143

Is the inspection result normal?

- YES >> **INSPECTION END**
NO >> Replace fuel temperature sensor. Refer to [ECK-12. "Component Parts Location"](#).

P018C FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P018C FUEL PRESSURE SENSOR

DTC Logic

INFOID:000000010434248

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P018C	FUEL PRESSURE SENSOR B (Fuel pressure sensor "B" circuit low) 1.DEF: VOLTAGE TOO LOW 2.DEF: VOLTAGE TOO HIGH 3.DEF: IMPROPER SIGNAL SHAPE	- An excessively low voltage from the sensor is sent to ECM. - An excessively high voltage from the sensor is sent to ECM. - ECM detects improper fuel pressure signal.	- Harness or connectors (Fuel rail pressure sensor circuit is open or shorted.) - Fuel rail pressure sensor - ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P018C can not duplicate.

>> Proceed to [ECK-207, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000010434249

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

- Turn ignition switch OFF.
- Check ECM harness connector connection F80.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK FUEL RAIL PRESSURE SENSOR HARNESS CONNECTOR CONNECTIONS

Check fuel rail pressure sensor harness connector connection F40.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK FUEL PIPING

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK FUEL RAIL PRESSURE SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch ON.
- Check the power supply of the fuel rail pressure sensor.

+		-	Voltage (Approx.)
Fuel rail pressure sensor			
Connector	Terminal		
F40	3	Ground	5.0 V

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Perform trouble diagnosis for power supply circuit.

P018C FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

5. CHECK FUEL RAIL PRESSURE SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check fuel rail pressure sensor circuit for open and short.

+		-		Continuity
ECM		Fuel rail pressure sensor		
Connector	Terminal	Connector	Terminal	
F80	45	F40	3	Existed
	68		2	
	72		1	

Is the inspection result normal?

- YES >> Replace fuel rail pressure sensor.
NO >> Repair or replace error-detected parts.

P0190 FRP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0190 FRP SENSOR

DTC Logic

INFOID:0000000010289793

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0190	RAIL PRESSURE SENSOR CIR- CUIT (Fuel rail pressure sensor "A" circuit) • 1.DEF: VOLTAGE TOO LOW • 2.DEF: VOLTAGE TOO HIGH • 3.DEF: ABOVE THE MAX LEVEL • 4.DEF: SIGNAL INCOHERENCE • 5.DEF: INTERMITTENT SIGNAL INCOHERENCE	• An excessively low voltage from the sensor is sent to ECM. • An excessively high voltage from the sensor is sent to ECM. • An improper voltage signal from sensor is sent to ECM.	• Harness or connectors (Fuel rail pressure sensor circuit is open or shorted.) • Fuel rail pressure sensor • ECM

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DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0190 can not duplicate.

F

G

>> Proceed to [ECK-209, "Diagnosis Procedure"](#).

H

Diagnosis Procedure

INFOID:0000000010289794

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection F80.

Is the inspection result normal?

I

J

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK FUEL RAIL PRESSURE SENSOR HARNESS CONNECTOR CONNECTIONS

K

Check fuel rail pressure sensor harness connector connection F40.

Is the inspection result normal?

L

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK FUEL PIPING

M

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

N

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK FUEL RAIL PRESSURE SENSOR POWER SUPPLY CIRCUIT

O

1. Turn ignition switch ON.
2. Check the power supply of the fuel rail pressure sensor.

P

+		-	Voltage (Approx.)
Fuel rail pressure sensor			
Connector	Terminal		
F40	3	Ground	5.0 V

Is the inspection result normal?

P0190 FRP SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 5.
NO >> Perform trouble diagnosis for power supply circuit.

5. CHECK FUEL RAIL PRESSURE SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check fuel rail pressure sensor circuit for open and short.

+		-		Continuity
ECM		Fuel rail pressure sensor		
Connector	Terminal	Connector	Terminal	
F80	45	F40	3	Existed
	68		2	
	72		1	

Is the inspection result normal?

- YES >> Replace fuel rail pressure sensor.
NO >> Repair or replace error-detected parts.

P0200 FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0200 FUEL INJECTOR

DTC Logic

INFOID:0000000010289795

DTC DETECTION LOGIC

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible Cause
P0200	INJECTOR CONTROL CIRCUIT (Injector circuit/open) • 1.DEF: VALUES OUT- SIDE TOLERANCES	• ECM detects fuel injectors circuit malfunction. • Injector code is not stored into ECM.	• Harness or connectors • Injector code error

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> [ECK-211. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289796

1.CHECK FUEL RETURN HOSE

Check Fuel return hose.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK FUEL INJECTOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check fuel injector circuit for open and short.

Cylinder	+		-		Continuity
	ECM		Fuel injector		
	Connector	Terminal	Connector	Terminal	
No.1	F81	156	F155	1	Existed
		160		2	
No.2		153	F156	1	
		157		2	
No.3		155	F157	1	
		159		2	
No.4		154	F158	1	
		158		2	

Is the inspection result normal?

YES >> GO TO 3.

P0200 FUEL INJECTOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

3.CHECK FUEL INJECTOR HARNESS CONNECTOR STATE

Check fuel injector harness connector state.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK FUEL INJECTOR

Refer to [ECK-212. "Component Inspection \(Fuel Injector\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:0000000010289797

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between fuel injector terminals.

Fuel injector		Condition	Resistance
+	−		
Terminal			
1	2	Temperature: 20°C (68°F)	150 – 250kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel injector. Refer to [EM-293. "Removal and Installation"](#).

P0201, P0202, P0203, P0204 FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0201, P0202, P0203, P0204 FUEL INJECTOR

DTC Logic

INFOID:000000010434251

DTC DETECTION LOGIC

NOTE:

- If DTC P0201, P0202, P0203, or P0204 is displayed with DTC P0263, P0266, P0269, or P0272, perform the trouble diagnosis for DTC P0263, P0266, P0269, or P0272. Refer to [ECK-226, "DTC Logic"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0201	CYLINDER 1 INJECTOR CIRC (Injector circuit/open - cylinder 1) 1.DEF: AT MAXIMUM LIMIT 2.DEF: SIGNAL INCOHERENCE 3.DEF: COMPARISON OF CONFORMITY INFORMATION (CHECKSUM) 4.DEF: IMPROPER SIGNAL SHAPE - CO: OPEN CIRCUIT	- ECM detects fuel injectors circuit are open. - ECM error - Injector code is not stored into ECM. - An improper voltage signal from fuel injector is sent to ECM. - ECM detects an improper fuel injection time. - ECM detects an improper fuel injection mass.	- Harness or connectors (The fuel injector circuit is open.) - Fuel injector - Injector code error - ECM
P0202	CYLINDER 1 INJECTOR CIRC (Injector circuit/open - cylinder 2) 1.DEF: AT MAXIMUM LIMIT 2.DEF: SIGNAL INCOHERENCE 3.DEF: COMPARISON OF CONFORMITY INFORMATION (CHECKSUM) 4.DEF: IMPROPER SIGNAL SHAPE - CO: OPEN CIRCUIT		
P0203	CYLINDER 1 INJECTOR CIRC (Injector circuit/open - cylinder 3) 1.DEF: AT MAXIMUM LIMIT 2.DEF: SIGNAL INCOHERENCE 3.DEF: COMPARISON OF CONFORMITY INFORMATION (CHECKSUM) 4.DEF: IMPROPER SIGNAL SHAPE - CO: OPEN CIRCUIT		
P0204	CYLINDER 1 INJECTOR CIRC (Injector circuit/open - cylinder 4) NO. 4 cylinder fuel injector circuit 1.DEF: AT MAXIMUM LIMIT 2.DEF: SIGNAL INCOHERENCE 3.DEF: COMPARISON OF CONFORMITY INFORMATION (CHECKSUM) 4.DEF: IMPROPER SIGNAL SHAPE - CO: OPEN CIRCUIT		

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- Start engine and let it idle for at least 1 second.
- Check DTC.

Is DTC detected?

YES >> [ECK-214, "Diagnosis Procedure"](#).

NO >> INSPECTION END

P0201, P0202, P0203, P0204 FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Diagnosis Procedure

INFOID:0000000010434252

1.CHECK FUEL RETURN HOSE

Check Fuel return hose.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK FUEL INJECTOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check fuel injector circuit for open and short.

Cylinder	+		-		Continuity
	ECM		Fuel injector		
	Connector	Terminal	Connector	Terminal	
No.1	F81	156	F155	1	Existed
		160		2	
No.2		153	F156	1	
		157		2	
No.3		155	F157	1	
		159		2	
No.4		154	F158	1	
		158		2	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK FUEL INJECTOR HARNESS CONNECTOR STATE

Check fuel injector harness connector state.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK FUEL INJECTOR

Refer to [ECK-214, "Component Inspection \(Fuel Injector\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:0000000010434253

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.

2. Disconnect fuel injector harness connector.

3. Check the resistance between fuel injector terminals.

Fuel injector		Condition	Resistance
+	–		
Terminal			
1	2	Temperature: 20°C (68°F)	150 – 250kΩ

Is the inspection result normal?

YES >> INSPECTION END

P0201, P0202, P0203, P0204 FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

NO >> Replace fuel injector. Refer to [EM-293. "Removal and Installation"](#).

- A
- C
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- K
- L
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- O
- P

ECK

P0217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0217 ENGINE OVER TEMPERATURE

DTC Logic

INFOID:0000000010289798

DTC DETECTION LOGIC

If the cooling fan or other component in the cooling system malfunctions, engine coolant temperature will rise. When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

NOTE:

- If DTC P0217 is displayed with DTC P0115, perform the trouble diagnosis for DTC P0115. Refer to [ECK-201, "DTC Logic"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0217	ENGINE OVERHEATING (Engine coolant over temperature condition) • 1.DEF: OPERATION TEMPERATURE TOO HIGH	When engine coolant temperature is 110°C or more for 2 seconds.	• Cooling fan • Radiator hose • Radiator • Radiator cap • Water pump • Thermostat • Engine coolant temperature sensor • ECM

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Also, replace the engine oil.

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio.
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [ECK-216, "Component Function Check"](#).

NOTE:

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [ECK-217, "Diagnosis Procedure"](#).

Component Function Check

INFOID:0000000010289799

1.PERFORM COMPONENT FUNCTION CHECK-1

WARNING:

Never remove the reservoir tank 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.

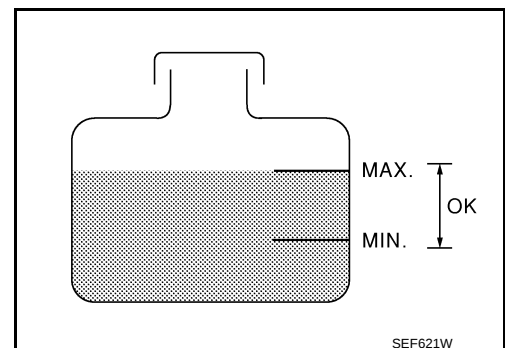
Check the coolant level in the reservoir tank and radiator.

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 [ECK-217, "Diagnosis Procedure"](#).

NO >> GO TO 2.



P0217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

2.PERFORM COMPONENT FUNCTION CHECK-2

Confirm whether customer filled the coolant or not.

Did customer fill the coolant?

- YES >> Proceed to [ECK-217. "Diagnosis Procedure"](#).
NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-3

1. Start engine and let it idle.
2. Turn air conditioner switch and blower fan switch ON.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Proceed to [ECK-217. "Diagnosis Procedure"](#).

4.PERFORM COMPONENT FUNCTION CHECK-4

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Proceed to [ECK-217. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289800

1.CHECK COOLING FAN OPERATION

Check cooling fan operation.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace malfunctioning part.

2.CHECK COOLING SYSTEM FOR LEAK-1

Check cooling system for leak.

Is leakage detected?

- YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK COOLING SYSTEM FOR LEAK-2

Check the following for leak.

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

>> Repair or replace malfunctioning part.

4.CHECK RADIATOR CAP

Check radiator cap.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace radiator cap.

5.CHECK THERMOSTAT

Check thermostat.

P0217 ENGINE OVER TEMPERATURE

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace thermostat.

6. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to [ECK-202, "Component Inspection \(Engine Coolant Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> Perform overheating cause analysis. Refer to [CO-63, "Troubleshooting Chart"](#).

NO >> Replace engine coolant temperature sensor.

P0225 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0225 APP SENSOR

DTC Logic

INFOID:0000000010289801

DTC DETECTION LOGIC

NOTE:

If DTC P0225 is displayed with DTC P0641, first perform the trouble diagnosis for DTC P0641. Refer to [ECK-277, "DTC Logic"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0225	PEDAL POTENTIOMETER CIR- CUIT TRACK 1 (Throttle/pedal position sensor/ switch "C" circuit) 1.DEF: VOLTAGE TOO HIGH 2.DEF: VOLTAGE TOO LOW	- An excessively low voltage from the sen- sor is sent to ECM. - An excessively high voltage from the sen- sor is sent to ECM.	- Harness or connectors (Accelerator pedal position sensor circuit is open or shorted.) - Accelerator pedal position sensor (APP sensor 1) - ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-219, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289802

1.CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

Check the power supply of the accelerator pedal position sensor 1.

+		-	Voltage (Approx.)
APP sensor			
Connector	Terminal		
E20	4	Ground	5.0 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for power supply circuit.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Check accelerator pedal position sensor 1 circuit for open and short.

P0225 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
ECM		APP sensor		
Connector	Terminal	Connector	Terminal	
E59	27	E20	4	Existed
	30		2	
	31		3	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to [ECK-220, "Component Inspection \(Accelerator Pedal Position Sensor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (Accelerator Pedal Position Sensor)

INFOID:0000000010289803

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 as follows.

ECM			Condition		Voltage
Connector	+	-			
	Terminal				
E59	31	30	Accelerator pedal	Fully released	0.6 - 0.9 V
				Fully depressed	3.9 - 4.7 V
	22	21		Fully released	0.3 - 0.6 V
				Fully depressed	1.95 - 2.4 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal assembly.

P0226 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0226 APP SENSOR

DTC Logic

INFOID:0000000010289804

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	Possible cause
P0226	BRAKE/ACCELERATOR PEDAL POSITIONS (Throttle/pedal position sensor/switch "C" circuit range/performance) 1.DEF: JAMMED ACCELERATOR PEDAL DETECTED 2.DEF: JAMMED ACCELERATOR PEDAL DETECTED 3.DEF: IMPLAUSIBLE SIGNAL 4.DEF: FAULT ON GANGS 1 AND 2 OF THE PEDAL POTENTIOMETER	- ECM does not receive a signal sent from APP sensor 1 and 2. - ECM detects a invalid signal sent from APP sensor 1 and 2.	- Harness or connectors (APP sensor 1 and 2 circuit is open or shorted.) - Accelerator pedal position sensor

C

D

E

F

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

G

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

H

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

I

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

J

Is DTC detected?

K

- YES >> Proceed to [ECK-221, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289805

1.CHECK ACCELERATOR PEDAL STATE

L

Check that the accelerator pedal is not stuck with the driver side floor mat.

Is the inspection result normal?

M

- YES >> GO TO 2.
NO >> Repair malfunction.

2.CHECK STOP LAMP SWITCH

N

Refer to [ECK-254, "Component Inspection \(Brake Pedal Position Switch\)"](#).

Is the inspection result normal?

O

- YES >> GO TO 3.
NO >> Replace error-detected parts.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY CIRCUIT

P

Check the power supply of the accelerator pedal position sensor.

P0226 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-	Voltage (Approx.)
APP sensor			
Connector	Terminal		
E20	4	Ground	5.0 V
	5		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for power supply circuit.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check accelerator pedal position sensor circuit for open and short.

Sensor	+		-		Continuity
	ECM		APP sensor		
	Connector	Terminal	Connector	Terminal	
1	E59	27	E20	4	Existed
		30		2	
		31		3	
2		21		1	
		22		6	
		23		5	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5. CHECK ACCELERATOR PEDAL POSITION SENSOR

Refer to [ECK-222. "Component Inspection \(Accelerator Pedal Position Sensor\)".](#)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident".](#)

NO >> Replace error-detected parts.

Component Inspection (Accelerator Pedal Position Sensor)

INFOID:0000000010289806

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 as follows.

ECM			Condition		Voltage
Connector	+	-			
	Terminal				
E59	31	30	Accelerator pedal	Fully released	0.6 - 0.9 V
				Fully depressed	3.9 - 4.7 V
	22	21		Fully released	0.3 - 0.6 V
				Fully depressed	1.95 - 2.4 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal assembly.

P025A FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P025A FUEL PUMP

DTC Logic

INFOID:0000000010289807

DTC DETECTION LOGIC

NOTE:

If DTC P025A is displayed with IPDM E/R DTC, perform the trouble diagnosis for IPDM E/R DTC. Refer to [PCS-37, "DTC Index"](#).

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P025A	FUEL PUMP MODULE A (Fuel pump module control circuit/open)	- Fuel pump relay circuit is open - Fuel pump relay circuit is short to ground or power	- Harness or connectors (Fuel pump relay circuit is open or shorted.) - Fuel pump relay - ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-223, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289808

1.CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E5. Refer to Ground Inspection in [GI-43, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK FUEL PUMP RELAY CIRCUIT-I

Check the voltage between ECM harness connector and ground.

ECM				Voltage
+		−		
Connector	Terminal	Connector	Terminal	
F80	89	E59	25	Battery voltage

Is the inspection result normal?

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

3.CHECK FUEL PUMP RELAY CIRCUIT-II

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

P025A FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F80	89	F90	106	Existed

4. 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 20A FUSE

1. Disconnect 20A fuse (No. 61) from IPDM E/R.

2. Check 20A fuse.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace 20A fuse.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

P025B FUEL PUMP CONTROL MODULE CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P025B FUEL PUMP CONTROL MODULE CONTROL

DTC Logic

INFOID:000000010434254

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P025B	FUEL PUMP MODULE CONTROL CIRCUIT (Fuel pump module control circuit range/performance)	- FPCM command circuit is open or shorted. - ECU temperature is too high.	- Harness or connectors (FPCM command circuit is open or shorted.) - FPCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-225, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010434255

1.CHECK COMMAND VOLTAGE

Check FPCM command voltage as the following conditions.

ECM			Condition	Voltage
Connector	+	–		
	Terminal			
E59	13	29	Ignition switch: OFF ⇒ ON (fuel pump activated)	0 – 6.74 V
			Ignition switch ON (fuel pump not activated)	0.05 V

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> GO TO 2.

2.CHECK FUEL PUMP CONTROL MODULE COMMAND CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector and FPCM harness connector.
- Check the continuity between ECM harness connector and FPCM harness connector.

+		-		Continuity
ECM		FPCM		
Connector	Terminal	Connector	Terminal	
E59	13	B77	9	Existed

Is the inspection result normal?

YES >> Replace FPCM. Refer to [ECK-404, "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

P0263, P0266, P0269, P0272 COMBUSTION DISORDER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0263, P0266, P0269, P0272 COMBUSTION DISORDER

DTC Logic

INFOID:0000000010289809

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0263	FUEL INJECTION CALIBRATION FOR CYLINDER No.1 (Cylinder 1 contribution/balance) • 1.DEF: SIGNAL STUCK LOW • 2.DEF: SIGNAL STUCK HIGH	The fuel calibration value for fuel injector is excessively low or high	• Fuel injector • Injector code error
P0266	FUEL INJECTION CALIBRATION FOR CYLINDER No.2 (Cylinder 2 contribution/balance) • 1.DEF: SIGNAL STUCK LOW • 2.DEF: SIGNAL STUCK HIGH		
P0269	FUEL INJECTION CALIBRATION FOR CYLINDER No.3 (Cylinder 3 contribution/balance) • 1.DEF: SIGNAL STUCK LOW • 2.DEF: SIGNAL STUCK HIGH		
P0272	FUEL INJECTION CALIBRATION FOR CYLINDER No.4 (Cylinder 4 contribution/balance) • 1.DEF: SIGNAL STUCK LOW • 2.DEF: SIGNAL STUCK HIGH		

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 30 second.
2. Select "DATA MONITOR" mode of "ENGINE" using CONSULT.
3. Check that "WATER TEMP" indicates more than 70°C (158°F).
4. Check DTC.

Is DTC detected?

YES >> [ECK-226, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289810

1.PERFORM INJECTOR INSPECTION

Perform injector inspection for malfunctioning cylinder. Refer to [ECK-154, "Work Procedure \(Fuel Injectors Leak Check\)"](#) and [ECK-155, "Work Procedure \(Fuel Injection Quantity Check\)"](#).

Is DTC detected?

YES >> GO TO 2.
NO >> INSPECTION END

2.CHECK FUEL RETURN HOSE

Check Fuel return hose.

Is the inspection result normal?

P0263, P0266, P0269, P0272 COMBUSTION DISORDER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK FUEL INJECTOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check fuel injector circuit for open and short.

Cylinder	+		-		Continuity
	ECM		Fuel injector		
	Connector	Terminal	Connector	Terminal	
No.1	F81	156	F155	1	Existed
		160		2	
No.2		153	F156	1	
		157		2	
No.3		155	F157	1	
		159		2	
No.4		154	F158	1	
		158		2	

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK FUEL INJECTOR HARNESS CONNECTOR STATE

Check fuel injector harness connector state.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE

Check low pressure EGR valve and high pressure EGR valve.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.CHECK INTAKE AIR DUCTS

Check intake air ducts.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK FUEL INJECTOR

Refer to [ECK-202, "Component Inspection \(Engine Coolant Temperature Sensor\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:0000000010289811

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between fuel injector terminals.

P0263, P0266, P0269, P0272 COMBUSTION DISORDER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Fuel injector		Condition	Resistance
+	–		
Terminal			
1	2	Temperature: 20°C (68°F)	150 – 250kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel injector. Refer to [EM-293. "Removal and Installation"](#).

P0335 CKP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0335 CKP SENSOR

DTC Logic

INFOID:0000000010289812

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0335	ENGINE SPEED SENSOR SIGNAL (Crankshaft position sensor "A" circuit) • 1.DEF: NO SIGNAL • 2.DEF: IMPLAUSIBLE SIGNAL • 3.DEF: — • 4.DEF: INCORRECT NUMBER OF CYCLES IN A GIVEN TIME PERIOD • 5.DEF: IMPROPER SIGNAL SHAPE • 6.DEF: FAULT ALERTED VIA THE CONTROL UNIT • 7.DEF: — • 8.DEF: SIGNAL INCOHERENCE • CO: OPEN CIRCUIT	• Crankshaft position sensor signal is not detected by ECM when engine is running. • Crankshaft position sensor signal is not in the normal pattern when engine is running. • The correlation between crankshaft position sensor signal and camshaft position sensor signal is out of the normal range.	• Harness or connectors (The sensor circuit is open or shorted.) • Crankshaft position sensor • Signal plate • ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

1. Start engine.
2. Drive the vehicle as per the following condition for at least 10 seconds.

ENGINE SPEED	2,500 rpm
--------------	-----------

3. Check DTC.

Is DTC detected?

- YES >> Proceed to [ECK-229, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289813

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK CKP SENSOR HARNESS CONNECTOR CONNECTIONS

Check crankshaft position (CKP) sensor harness connector connection.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK CKP SENSOR

Refer to [ECK-230, "Component Inspection \(Crankshaft Position Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace error-detected parts.

P0335 CKP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

4.CHECK GEAR TOOTH

Visually check for chipping flywheel gear tooth.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).
NO >> Replace signal plate.

Component Inspection (Crankshaft Position Sensor)

INFOID:0000000010289814

1.CHECK CRANKSHAFT POSITION (CKP) SENSOR

1. Disconnect CKP sensor harness connector.
2. Check resistance between CKP sensor terminals as follows.

CKP sensor		Condition		Resistance
+	-			
Terminal				
1	2	Temperature °C (°F)	20 (68)	690 Ω

Is the inspection result normal?

- YES >> **INSPECTION END**
NO >> Replace CKP sensor.

P0340 CMP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0340 CMP SENSOR

DTC Logic

INFOID:0000000010289815

DTC DETECTION LOGIC

NOTE:

If DTC P0340 is displayed with DTC P0016, P0335, P0560, P0641, P0651, and P0657, perform the trouble diagnosis for DTC P0016, P0335, P0560, P0641, P0651, and P0657. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0340	CAMSHAFT SENSOR CIRCUIT (Camshaft position sensor "A" circuit bank 1 or single sensor) 1.DEF: IMPLAUSIBLE SIGNAL 2.DEF: NO SIGNAL 3.DEF: INCORRECT NUMBER OF CYCLES IN A GIVEN TIME PERIOD 4.DEF: SIGNAL INCOHERENCE.	- Camshaft position sensor signal is not detected by ECM when engine is running. - Camshaft position sensor signal is not in the normal pattern when engine is running.	- Harness or connectors (The sensor circuit is open or shorted.) - Camshaft position sensor - Signal plate

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0340 can not duplicate.

>> Proceed to [ECK-231, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289816

1.CHECK CMP SENSOR-1

Visually check camshaft position (CMP) sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK CMP SENSOR HARNESS CONNECTOR CONNECTIONS

Check CMP sensor harness connector connection F118.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK CMP SENSOR CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Check CMP sensor circuit for open and short.

+		-		Continuity
ECM		CMP sensor		
Connector	Terminal	Connector	Terminal	
F80	41	F118	1	Existed
	42		3	
	50		2	

Is the inspection result normal?

YES >> GO TO 4.

P0340 CMP SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

4.CHECK CMP SENSOR-2

Refer to [ECK-232, "Component Inspection \(Camshaft Position Sensor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (Camshaft Position Sensor)

INFOID:0000000010289817

1.CHECK CAMSHAFT POSITION (CMP) SENSOR

1. Disconnect CMP sensor harness connector.
2. Check the resistance between CMP sensor terminals as follows.

CMP sensor		Resistance
+	-	
Terminal		
3	2	More than 100 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace CMP sensor.

P0380 GLOW CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0380 GLOW CONTROL SYSTEM

DTC Logic

INFOID:0000000010289818

DTC DETECTION LOGIC

NOTE:

If DTC P0380 is displayed with DTC P0560 and P0657, perform the trouble diagnosis for DTC P0560 and P0657. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0380	PREHEATING UNIT DIAG CONN (Glow plug/heater circuit "A") 1.DEF: FAULT ALERTED VIA THE CONTROL UNIT 2.DEF: OPERATION TEMPERATURE TOO HIGH - CO: OPEN CIRCUIT - CC.0: SHORT CIRCUIT TO EARTH - CC.1: SHORT-CIRCUIT TO +12V	- ECM detects glow plug control unit error. - ECM detects glow plug control circuit is open for 3 seconds or more. - ECM detects glow plug circuit is short to ground for 3 seconds or more. - ECM detects glow plug circuit is short to power for 3 seconds or more.	- Harness or connectors (Glow plug control circuit is open or shorted.) (Glow control unit input signal circuit is open or shorted.) - Glow plug - Glow control unit

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 4 minutes before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-233, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289819

1.CHECK GLOW PLUG CONTROL UNIT POWER SUPPLY CIRCUIT

Check the power supply of the glow plug control unit.

+		-	Voltage
Glow plug control unit			
Connector	Terminal		
F22	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for power supply circuit.

2.CHECK GLOW PLUG CONTROL UNIT CIRCUIT FOR OPEN AND SHORT-1

- Turn ignition switch OFF.
- Check the continuity between glow plug control unit harness connector and ECM harness connector.

P0380 GLOW CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
ECM		Glow plug control unit		
Connector	Terminal	Connector	Terminal	
F80	56	F22	8	Existed
F81	109		3	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK GLOW PLUG CONTROL UNIT CIRCUIT FOR OPEN AND SHORT-2

Check the continuity between glow plug control unit harness connector and glow plug harness connector.

+		-		Continuity
Glow plug control unit		Glow plug		
Connector	Terminal	Connector	Terminal	
F22	2	F129	1	Existed
	7	F130	1	
	1	F131	1	
	6	F132	1	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK GLOW PLUG

Refer to [ECK-234, "Component Inspection \(Glow Plug\)"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace error-detected parts.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace glow relay.

NO >> Repair or replace.

Component Inspection (Glow Plug)

INFOID:0000000010289820

1.CHECK GLOW PLUG

1. Disconnect glow plug harness connector.
2. Check resistance between glow plug terminals as follows.

+	-	Resistance
Glow plug		
Terminal		
1	Ground	0.4 Ω [at 20°C (68°F)]

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace malfunctioning glow plug.

P0402 EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0402 EGR VOLUME CONTROL VALVE

DTC Logic

INFOID:000000010289821

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0402	EGR VALVE JAMMED OPEN (Exhaust gas recirculation "A" flow excessive detected) • 1.DEF: MECHANICAL FAULT	ECM detects an incorrect closed position of EGR valve.	• Harness or connectors • Low pressure EGR valve • High pressure EGR valve • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Maintain the following conditions for at least 10 consecutive seconds. Hold the steady as possible.

ENGINE SPEED	3,500 rpm
--------------	-----------

3. Check DTC.

Is DTC detected?

- YES >> Proceed to [ECK-235. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289822

1.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE

Visually check low pressure EGR valve and high pressure EGR valve for chipping.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR valve and high pressure EGR valve harness connector connection.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check low pressure EGR valve and high pressure EGR valve circuit for open and short.

P0402 EGR VOLUME CONTROL VALVE

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

HIGH PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		High pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F81	147	F60	2	Existed
	148		5	

LOW PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F81	151	F34	6	Existed
	152		5	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-235, "DTC Logic"](#).

Is the DTC P0402 displayed again?

YES >> GO TO 6.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

6.CHECK LOW PRESSURE EGR VALVE MOTOR AND HIGH PRESSURE EGR VALVE MOTOR

Refer to [ECK-239, "Component Inspection \(EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (EGR Volume Control Valve Motor)

INFOID:0000000010289823

1.CHECK LOW PRESSURE EGR VALVE MOTOR AND HIGH PRESSURE EGR VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect low pressure EGR valve and high pressure EGR valve harness connector.
3. Check resistance between low pressure EGR valve terminals and high pressure EGR valve terminals as follows.

HIGH PRESSURE EGR VOLUME CONTROL VALVE

High pressure EGR volume control valve		Condition		Resistance (Approx.)
+	-			
Terminal				
2	5	Temperature °C (°F)	23 (73)	2.4 Ω

LOW PRESSURE EGR VOLUME CONTROL VALVE

Low pressure EGR volume control valve		Condition		Resistance (Approx.)
+	-			
Terminal				
5	6	Temperature °C (°F)	20 (68)	1.69 Ω

Is the inspection result normal?

P0402 EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

YES >> **INSPECTION END**
NO >> Replace low pressure EGR valve or high pressure EGR valve.

A

ECK

C

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P

P0403 EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0403 EGR VOLUME CONTROL VALVE

DTC Logic

INFOID:000000010289824

DTC DETECTION LOGIC

NOTE:

If DTC P0380 is displayed with DTC P0641, first perform the trouble diagnosis for DTC P0641 Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0403	EGR VLV CMD CIRC (Exhaust gas recirculation "A" control circuit) 1.DEF: — 2.DEF: OPERATION TEMPERATURE TOO HIGH	ECM detects EGR valve error.	• Harness or connectors (EGR valve command circuit is open or shorted.) • Low pressure EGR valve • High pressure EGR valve • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-238, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289825

1.CHECK EGR VOLUME CONTROL VALVE

Visually check EGR volume control valve for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK EGR VOLUME CONTROL VALVE HARNESS CONNECTOR CONNECTIONS

Check EGR volume control valve harness connector connection.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK EGR VOLUME CONTROL VALVE CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check EGR volume control valve circuit for open and short.

P0403 EGR VOLUME CONTROL VALVE

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

HIGH PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		High pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F81	147	F60	2	Existed
	148		5	

LOW PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F81	151	F34	6	Existed
	152		5	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-238, "DTC Logic"](#).

Is the DTC P0403 displayed again?

YES >> GO TO 6.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

6.CHECK EGR VOLUME CONTROL VALVE MOTOR

Refer to [ECK-239, "Component Inspection \(EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (EGR Volume Control Valve Motor)

INFOID:0000000010289826

1.CHECK EGR VOLUME CONTROL VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect EGR volume control valve harness connector.
3. Check resistance between EGR volume control valve terminals as follows.

HIGH PRESSURE EGR VOLUME CONTROL VALVE

EGR volume control valve		Resistance (Approx.)
+	-	
Terminal		
2	5	2.4 Ω

LOW PRESSURE EGR VOLUME CONTROL VALVE

EGR volume control valve		Resistance (Approx.)
+	-	
Terminal		
5	6	1.69 Ω

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace EGR volume control valve.

P0409 EGR VOLUME CONTROL VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0409 EGR VOLUME CONTROL VALVE POSITION SENSOR

DTC Logic

INFOID:0000000010289827

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0409	EGR VALVE POSITION SEN CIRC (Exhaust gas recirculation sensor "A" circuit) 1.DEF: SIGNAL INCOHERENCE	- A Voltage of EGR position sensor remains more than 4.8 V. - A Voltage of EGR position sensor remains less than 0.35 V.	- Harness or connectors (High pressure EGR volume control valve position sensor circuit is open or shorted.) (Low pressure EGR volume control valve position sensor circuit is open or shorted.) - High pressure EGR volume control valve position sensor - Low pressure EGR volume control valve position sensor - ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-240, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289828

1.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE

Visually check low pressure EGR valve and high pressure EGR valve for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR valve and high pressure EGR valve harness connector connection.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE POSITION SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

P0409 EGR VOLUME CONTROL VALVE POSITION SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- Check low pressure EGR valve and high pressure EGR valve position sensor circuit for open and short.

HIGH PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		High pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F80	69	F60	6	Existed
	70		3	
	75		1	

LOW PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F80	65	F34	1	Existed
	66		2	
	79		3	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.DTC CONFIRMATION PROCEDURE

- Erase DTC.
- Perform DTC confirmation procedure again. Refer to [ECK-240, "DTC Logic"](#).

Is the DTC P0409 displayed again?

YES >> GO TO 6.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

6.CHECK LOW PRESSURE EGR VALVE MOTOR AND HIGH PRESSURE EGR VALVE MOTOR

Refer to [ECK-241, "Component Inspection \(EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

YES >> Replace high pressure EGR valve position sensor and low pressure EGR valve position sensor.

NO >> Replace error-detected parts.

Component Inspection (EGR Volume Control Valve Motor)

INFOID:0000000010289829

1.CHECK LOW PRESSURE EGR VALVE MOTOR AND HIGH PRESSURE EGR VALVE MOTOR

- Turn ignition switch OFF.
- Disconnect low pressure EGR valve and high pressure EGR valve harness connector.
- Check resistance between low pressure EGR valve and high pressure EGR valve terminals as follows.

HIGH PRESSURE EGR VOLUME CONTROL VALVE

High pressure EGR volume control valve		Condition		Resistance (Approx.)
+	-			
Terminal				
2	5	Temperature °C (°F)	23 (73)	2.4 Ω

P0409 EGR VOLUME CONTROL VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

LOW PRESSURE EGR VOLUME CONTROL VALVE

Low pressure EGR volume control valve		Condition		Resistance (Approx.)
+	-			
Terminal				
5	6	Temperature °C (°F)	20 (68)	1.69 Ω

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace low pressure EGR valve or high pressure EGR valve.

P0470 EXHAUST GAS PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0470 EXHAUST GAS PRESSURE SENSOR

DTC Logic

INFOID:0000000010289830

DTC DETECTION LOGIC

NOTE:

If DTC P0470 is displayed with DTC P0651, and P2263, perform the trouble diagnosis for DTC P0651, and P2263. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0470	TBN UPSTR PRS SEN CIRC (Exhaust pressure sensor "A" circuit) • 1.DEF: VOLTAGE TOO LOW • 2.DEF: VOLTAGE TOO HIGH	• An excessively low voltage from the sensor is sent to ECM. • An excessively high voltage from the sensor is sent to ECM.	• Exhaust gas pressure sensor 1 • Turbocharger • Exhaust manifold • Exhaust tube • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-243, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289831

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection F80.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK EXHAUST GAS PRESSURE SENSOR 1 HARNESS CONNECTOR CONNECTIONS

Check exhaust gas pressure sensor harness connector connection F110.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK EXHAUST GAS PRESSURE SENSOR 1 POWER SUPPLY CIRCUIT

Check the power supply of the exhaust gas pressure sensor 1.

+		-	Continuity
Exhaust gas pressure sensor 1			
Connector	Terminal		
F110	3	Ground	Existed

Is the inspection result normal?

P0470 EXHAUST GAS PRESSURE SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 4.
NO >> Perform trouble diagnosis for power supply circuit.

4.CHECK EXHAUST GAS PRESSURE SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check exhaust gas pressure sensor 1 circuit for open and short.

+		-		Continuity
ECM		Exhaust gas pressure sensor 1		
Connector	Terminal	Connector	Terminal	Existed
F80	77	F110	3	
	78		1	
	83		2	

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK EXHAUST GAS PRESSURE SENSOR 1

Refer to [ECK-244, "Component Inspection \(Exhaust Gas Pressure Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace error-detected parts.

6.DTC CONFIRMATION PROCEDURES

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-243, "DTC Logic"](#).

Is the DTC P0470 displayed again?

- YES >> GO TO 7.
NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

7.CHECK TURBOCHARGER

Check turbocharger.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Repair or replace malfunctioning parts.

Component Inspection (Exhaust Gas Pressure Sensor)

INFOID:0000000010289832

1.CHECK EXHAUST GAS PRESSURE SENSOR

1. Disconnect exhaust gas pressure sensor harness connector.
2. Check the resistance between exhaust gas pressure sensor terminals as follows.

Exhaust gas pressure sensor		Resistance (Approx.)
+	-	
Terminal		
2	1	100 kΩ

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace exhaust gas pressure sensor.

P0471 EXHAUST GAS PRESSURE SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0471 EXHAUST GAS PRESSURE SENSOR 1

DTC Logic

INFOID:0000000110289833

DTC DETECTION LOGIC

NOTE:

If DTC P0471 is displayed with DTC P0335, P0470, and P2226, perform the trouble diagnosis for DTC P0335, P0470, and P2226. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0471	PRS UPSTR OF TBN (Exhaust pressure sensor "A" circuit range/performance) • 1.DEF: SIGNAL INCOHERENCE • 2.DEF: INCORRECT SENSOR MOUNTING	• Difference between barometric pressure and exhaust pressure while engine stopped. • Difference between upstream DPF pressure and exhaust pressure while engine is run- ning at idle.	• Exhaust gas pressure sensor 1 • Turbocharger • Exhaust manifold • Exhaust tube • ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0471 can not duplicate.

>> Proceed to [ECK-245, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000110289834

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK EXHAUST GAS PRESSURE SENSOR 1 HARNESS CONNECTOR CONNECTIONS

Check exhaust gas pressure sensor 1 harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK EXHAUST GAS PRESSURE SENSOR 1 POWER SUPPLY CIRCUIT

Check the power supply of the exhaust gas pressure sensor 1.

+		-	Continuity
Exhaust gas pressure sensor 1			
Connector	Terminal		
F110	3	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for power supply circuit.

4.CHECK EXHAUST GAS PRESSURE SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check exhaust gas pressure sensor 1 circuit for open and short.

P0471 EXHAUST GAS PRESSURE SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
ECM		Exhaust gas pressure sensor 1		
Connector	Terminal	Connector	Terminal	
F80	77	F110	3	Existed
	78		1	
	83		2	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.DTC CONFIRMATION PROCEDURES

1. Erase DTC.

2. Perform DTC confirmation procedure again. Refer to [ECK-245. "DTC Logic"](#).

Is the DTC P0471 displayed again?

YES >> GO TO 6.

NO >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

6.CHECK THE EXHAUST GAS PRESSURE SENSOR 1 FOR LEAK

Visually check the exhaust gas pressure sensor 1 for air leak.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace the malfunctioning part.

7.CHECK EXHAUST GAS PRESSURE SENSOR 1

Refer to [ECK-246. "Component Inspection \(Exhaust Gas Pressure Sensor 1\)"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace error-detected parts.

8.CHECK TURBOCHARGER

Check turbocharger.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Repair or replace malfunctioning parts.

Component Inspection (Exhaust Gas Pressure Sensor 1)

INFOID:0000000010289835

1.CHECK EXHAUST GAS PRESSURE SENSOR 1

1. Disconnect exhaust gas pressure sensor 1 harness connector.

2. Check the resistance between exhaust gas pressure sensor 1 terminals as follows.

Exhaust gas pressure sensor 1		Resistance (Approx.)
+	-	
Terminal		
2	1	100 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace exhaust gas pressure sensor 1.

P0487 EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0487 EGR VOLUME CONTROL VALVE

DTC Logic

INFOID:0000000010289836

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0487	EGR VLV CMD CIRC (Exhaust gas recirculation throttle control circuit "A"/ open) • 1.DEF: OFFSET IM- PLAUSIBLE	ECM detects abnormally closed posi- tion of EGR volume control valve.	• Harness or connectors • High pressure EGR volume control valve • Low pressure EGR volume control valve • High pressure EGR valve position sensor • Low pressure EGR valve position sensor • ECM

C

D

E

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

F

>> GO TO 2.

G

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

H

Is DTC detected?

I

- YES >> Proceed to [ECK-247, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289837

J

1.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE

Visually check low pressure EGR valve and high pressure EGR valve for chipping.

K

Is the inspection result normal?

L

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection F80 and F81.

M

Is the inspection result normal?

N

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR valve and high pressure EGR valve harness connector connection F34 and F60.

O

Is the inspection result normal?

P

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check low pressure EGR valve and high pressure EGR valve circuit for open and short.

P0487 EGR VOLUME CONTROL VALVE

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

HIGH PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		High pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F81	147	F60	2	Existed
	148		5	
F80	69		6	
	70		3	
	75		1	

LOW PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F81	151	F34	6	Existed
	152		5	
F80	65		1	
	66		2	
	79		3	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-247, "DTC Logic"](#).

Is the DTC P0487 displayed again?

YES >> GO TO 6.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

6.CHECK LOW PRESSURE EGR VALVE MOTOR AND HIGH PRESSURE EGR VALVE MOTOR

Refer to [ECK-248, "Component Inspection \(EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (EGR Volume Control Valve Motor)

INFOID:0000000010289838

1.CHECK LOW PRESSURE EGR VALVE MOTOR AND HIGH PRESSURE EGR VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect low pressure EGR valve and high pressure EGR valve harness connector.
3. Check resistance between low pressure EGR valve and high pressure EGR valve terminals as follows.

HIGH PRESSURE EGR VOLUME CONTROL VALVE

High pressure EGR volume control valve		Condition		Resistance (Approx.)
+	-			
Terminal				
2	5	Temperature °C (°F)	23 (73)	2.4 Ω

P0487 EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

LOW PRESSURE EGR VOLUME CONTROL VALVE

Low pressure EGR volume control valve		Condition		Resistance (Approx.)
+	-			
Terminal				
5	6	Temperature °C (°F)	20 (68)	1.69 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace EGR volume control valve.

- A
- ECK
- C
- D
- E
- F
- G
- H
- I
- J
- K
- L
- M
- N
- O
- P

P0488 EGR SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0488 EGR SYSTEM

DTC Logic

INFOID:0000000010289839

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0488	EGR VALVE POSITION CN-TRL (Exhaust gas recirculation throttle control circuit "A" range/performance) • 1.DEF: NO RESPONSE FROM THE VALVE MOTOR • 2.DEF: VALVE LOCKED	ECM detects EGR volume control valve regulation error.	• Harness or connectors • High pressure EGR volume control valve • Low pressure EGR volume control valve • High pressure EGR volume control valve position sensor • Low pressure EGR volume control valve position sensor • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-250, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289840

1.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE

Visually check low pressure EGR valve and high pressure EGR valve for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR valve and high pressure EGR valve harness connector connection.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VALVE AND HIGH PRESSURE EGR VALVE CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check low pressure EGR valve and high pressure EGR valve circuit for open and short.

P0488 EGR SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

HIGH PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		High pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F81	147	F60	2	Existed
	148		5	
F80	69		6	
	70		3	
	75		1	

LOW PRESSURE EGR VOLUME CONTROL VALVE

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F81	151	F34	6	Existed
	152		5	
F80	65		1	
	66		2	
	79		3	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-250, "DTC Logic"](#).

Is the DTC P0488 displayed again?

YES >> GO TO 6.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

6.CHECK EGR VOLUME CONTROL VALVE MOTOR

Refer to [ECK-251, "Component Inspection \(EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (EGR Volume Control Valve Motor)

INFOID:0000000010289841

1.CHECK EGR VOLUME CONTROL VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect EGR volume control valve harness connector.
3. Check resistance between EGR volume control valve terminals as follows.

HIGH PRESSURE EGR VOLUME CONTROL VALVE

EGR volume control valve		Resistance (Approx.)
+	-	
Terminal		
2	5	2.4 Ω

P0488 EGR SYSTEM

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

LOW PRESSURE EGR VOLUME CONTROL VALVE

EGR volume control valve		Resistance (Approx.)
+	-	
Terminal		
5	6	1.69 Ω

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace EGR volume control valve.

P0504 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0504 STOP LAMP SWITCH

DTC Logic

INFOID:0000000010289842

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC Detecting Condition	Possible Cause
P0504	BRAKE SWITCH SIGNAL CONSISTENCY (Brake switch "A"/"B" correlation) 1.DEF: — 2.DEF: OFFSET IMPLAUSIBLE 3.DEF: IMPLAUSIBLE SIGNAL	ECM detects ON signals sent from the stop lamp switch and the brake pedal position switch at the same time.	• Harness or connectors (The stop lamp switch circuit is open or shorted.) (The brake pedal position switch circuit is open or shorted.) • Stop lamp switch • Brake pedal position switch • Incorrect stop lamp switch installation • Incorrect brake pedal position switch installation • ECM

C

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ESP switch OFF. (with ESP)

G

H

>> GO TO 2.

2.DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Drive the vehicle at more than 5 km/h (3 MPH) for at least 5 seconds.
3. Depress the brake pedal and keep vehicle speed more than 5 km/h (3 MPH) for at least 5 seconds.

NOTE:

For M/T models: Clutch pedal is released.

4. Check DTC.

J

K

Is DTC detected?

- YES >> Proceed to [ECK-253, "Diagnosis Procedure"](#).
NO >> INSPECTION END

L

Diagnosis Procedure

INFOID:0000000010289843

1.CHECK STOP LAMP SWITCH FUNCTION

Ⓔ With CONSULT

1. Turn ignition switch ON.
2. Select "BRAKE PEDAL" in "DATA MONITOR" mode of "ENGINE" using CONSULT.
3. Check indication as per the following conditions.

Monitor item	Condition		Indication
BRAKE PEDAL	Brake pedal	Slightly depressed	On
		Fully released	Off

O

P

ⓧ Without CONSULT

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector terminals as per the following.

P0504 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

ECM			Condition		Voltage (Approx.)
Connector	+	−			
	Terminal				
E59	17	25	Brake pedal	Slightly de-pressed	Battery voltage
				Fully released	0 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

+		-	Voltage
Stop lamp switch			
Connector	Terminal		
E50	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform the trouble diagnosis for power supply circuit.

3.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between stop lamp switch harness connector and ECM harness connector.

+		-		Continuity
Stop lamp switch		ECM		
Connector	Terminal	Connector	Terminal	
E50	4	E59	17	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK STOP LAMP SWITCH

Check the stop lamp switch. Refer to [ECK-382, "Component Inspection"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace stop lamp switch.

Component Inspection (Brake Pedal Position Switch)

INFOID:0000000010289844

1.CHECK STOP LAMP SWITCH-1

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

P0504 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Stop lamp switch		Condition		Continuity
+	-			
Terminals				
3	4	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-2

1. Adjust stop lamp switch installation. Refer to [BR-8, "Inspection and Adjustment"](#)(LHD models), [BR-52, "Inspection and Adjustment"](#)(RHD models).
2. Check the continuity between stop lamp switch terminals as per the following conditions.

Stop lamp switch		Condition		Continuity
+	-			
Terminals				
3	4	Brake pedal	Fully released	Not existed
			Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch.

P0525 ASCD SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0525 ASCD SYSTEM

DTC Logic

INFOID:0000000010289845

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P0525	CRUISE CONTROL DATA MONITOR- ING (Cruise control servo control circuit range/performance) 1.DEF: SIGNAL COMPARE FAIL- URE	Correlation between two signals is inconsistency.

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0525 can not duplicate.

>> Proceed to [ECK-256, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289846

1.REPLACE ECM

1. Turn ignition switch OFF and wait at least 1 minute.
2. Replace ECM.
3. Perform [ECK-131, "Work Procedure"](#).

>> INSPECTION END

P0530 REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0530 REFRIGERANT PRESSURE SENSOR

DTC Logic

INFOID:000000010289847

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0530	REFG TEMP PRESS SEN VOLT (A/C refrigerant pressure sensor "A" circuit) • 1.DEF: VOLTAGE TOO LOW • 2.DEF: VOLTAGE TOO HIGH	• Refrigerant pressure sensor signal voltage remains more than 4.75 V for 2 seconds or more. • Refrigerant pressure sensor signal voltage remains less than 0.1 V for 2 seconds or more.	• Harness or connectors (Refrigerant pressure sensor circuit is open or shorted.) • Refrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Go to [ECK-257. "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289848

1.CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Check the voltage between refrigerant pressure sensor connector and ground.

+		-	Voltage (Approx.)
Refrigerant pressure sensor			
Connector	Terminal		
E41	3	Ground	5.0 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 REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Disconnect ECM harness connector.
3. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

+		-		Continuity
Refrigerant pressure sensor		ECM		
Connector	Terminal	Connector	Terminal	
E41	1	F81	125	Existed

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

P0530 REFRIGERANT PRESSURE SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

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 REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

+		-		Continuity
Refrigerant pressure sensor		ECM		
Connector	Terminal	Connector	Terminal	
E41	2	F81	99	Existed

2. 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 INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor.

NO >> Repair or replace.

P0544 EGT SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0544 EGT SENSOR 1

DTC Logic

INFOID:000000010289849

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0544	TBN UPS TEMP SEN CIRC (Exhaust gas temperature sensor circuit bank 1 sensor 1) 1.DEF: VOLTAGE TOO LOW 2.DEF: VOLTAGE TOO HIGH 3.DEF: SIGNAL INCOHERENCE 4.DEF: IMPROPER SIGNAL SHAPE 5.DEF: NO SIGNAL SPECIFIC SUBTYPE	- An excessively low voltage from Exhaust Gas Temperature sensor is sent to ECM for 15 seconds or more. - An excessively high voltage from Exhaust Gas Temperature sensor is sent to ECM for 1 second or more. - ECM detects an improper exhaust gas temperature.	- Harness or connectors (Exhaust gas temperature sensor 1 circuit is open or shorted.) - Exhaust gas temperature sensor 1 - ECM

C

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DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0544 can not duplicate.

F

G

>> Proceed to [ECK-259, "Diagnosis Procedure"](#).

H

Diagnosis Procedure

INFOID:000000010289850

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection F81.

Is the inspection result normal?

I

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

J

2.CHECK EXHAUST GAS TEMPERATURE SENSOR 1 HARNESS CONNECTOR CONNECTIONS

Check exhaust gas temperature sensor 1 control valve harness connector connection F92.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

K

3.CHECK EXHAUST GAS TEMPERATURE SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check exhaust gas temperature sensor 1 circuit for open and short.

L

M

+		-		Continuity
ECM		EGT sensor 1		
Connector	Terminal	Connector	Terminal	
F81	114	F92	1	Existed
	115		2	

N

O

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

P

4.CHECK EXHAUST GAS TEMPERATURE SENSOR 1 CONTROL VALVE MOTOR

Refer to [ECK-260, "Component Inspection \(Exhaust Gas Temperature Sensor 1\)"](#).

P0544 EGT SENSOR 1

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Replace error-detected parts.

Component Inspection (Exhaust Gas Temperature Sensor 1)

INFOID:0000000010289851

1.CHECK EXHAUST GAS TEMPERATURE SENSOR 1

1. Reconnect all harness connectors disconnected.
2. Start the engine.
3. Select "TEMP UPSTREAM TURBINE" in "DATA MONITOR" mode of "ENGINE" with CONSULT.
4. Maintain the following conditions for at least 2 minutes and check the monitor status "TEMP UPSTREAM TURBINE".

Engine speed	Approx. 2,500 rpm
Engine coolant temperature	More than 80°C (176°F)

Does the value of the exhaust gas temperature sensor 1 vary?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Replace exhaust gas temperature sensor 1.

P0560 BATTERY VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0560 BATTERY VOLTAGE

DTC Logic

INFOID:0000000010289855

DTC DETECTION LOGIC

NOTE:

If this DTC is detected, first confirm self-diagnostic result in IPDM E/R.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0560	COMPUTER SUPPLY VOLTAGE (System voltage) • 1.DEF: VOLTAGE TOO LOW • 2.DEF: VOLTAGE TOO HIGH • 3.DEF: —	• A battery power supply voltage remains more than 16 V or more for 2.5 seconds or more. • A battery power supply voltage remains less than 9 V or more for 10 seconds or more. • ECM detects P060A and low battery voltage.	• Harness or connectors (ECM power supply circuit is open or shorted.) • Battery • Battery terminal • Alternator • IPDM E/R

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> Proceed to [ECK-261, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289856

1.CHECK BATTERY VOLTAGE

1. Turn ignition switch ON.
2. Check battery voltage.

Voltage: Above 11 V

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Recharge the battery.

2.CHECK BATTERY TERMINALS

1. Turn ignition switch OFF.
2. Check battery terminals condition.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair the battery terminals.

3.CHECK BATTERY AND ALTERNATOR

Check that the proper type of battery and type of alternator are installed.
Refer to, [PG-158, "Battery"](#) and [CHG-34, "Alternator"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

P0560 BATTERY VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

NO >> Replace with a proper one.

P0564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0564 ASCD STEERING SWITCH

DTC Logic

INFOID:000000010289857

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0564	SL LMTR ICC FNC (Cruise control multi-function input "A" circuit) 1.DEF: VALUES OUTSIDE TOLERANCES 2.DEF: SIGNAL INCOHERENCE - CO.1: OPEN CIRCUIT OR SHORT CIRCUIT TO +12 V	- An ASCD steering switch signal voltage is out of the specified range. - ASCD steering switch signal circuit is open. - ASCD steering switch signal circuit is short to battery. - ECM cannot detect the ASCD steering switch signal.	- Harness or connectors (The switch circuit is open or shorted.) - ASCD steering switch

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 10 seconds.
- Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

- YES >> Go to [ECK-263, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289858

1.CHECK ASCD STEERING SWITCH CIRCUIT

- Turn ignition switch ON.
- Check the voltage between ECM harness connector terminals as follows.

ECM			Condition	Voltage (Approx.)
Connector	+	-		
	Terminal			
E59	15	14	CANCEL switch: Pressed	1.0 V
			SET/COAST switch: Pressed	2.0 V
			RESUME/ACCELERATE switch: Pressed	3.0 V
			All ASCD steering switches: Released	4.0 V

Is the inspection result normal?

- YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF and wait at least 1 minute.

P0564 ASCD STEERING SWITCH

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect combination switch harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between combination switch (spiral cable) and ECM harness connector.

+		-		Continuity
Combination switch (spiral cable)		ECM		
Connector	Terminal	Connector	Terminal	
M66	28	E59	14	Existed

5. 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 ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between combination switch (spiral cable) and ECM harness connector.

+		-		Continuity
Combination switch (spiral cable)		ECM		
Connector	Terminal	Connector	Terminal	
M66	27	E59	15	Existed

2. 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 ASCD STEERING SWITCH

Refer to [ECK-264, "Component Inspection \(ASCD Steering Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace ASCD steering switch.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (ASCD Steering Switch)

INFOID:0000000010289859

1.CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the continuity between combination switch harness connector terminals under following conditions.

Combination switch			Condition	Resistance (Approx.)
Connector	+	-		
	Terminals			
M303	8	9	CANCEL switch: Pressed	250 Ω
			SET/COAST switch: Pressed	660 Ω
			RESUME/ACCELERATE switch: Pressed	1,480 Ω
			All ASCD steering switches: Released	4,000 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch.

P0574 VSS

DTC Logic

INFOID:000000010289862

DTC DETECTION LOGIC

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ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0574	VEHICLE SPEED CONSISTENCY (Cruise control system - vehicle speed too high) • 1.DEF: SIGNAL COMPARE FAILURE	Inconsistency of vehicle speed between display vehicle speed and real vehicle speed.	Vehicle speed signal

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Diagnosis Procedure

INFOID:000000010289863

1.CHECK CAN COMMUNICATION LINE

Check CAN communication line. Refer to [LAN-39, "CAN COMMUNICATION SYSTEM : CAN System Specification Chart"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication system. Refer to [LAN-24, "Trouble Diagnosis Procedure"](#).

2.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

Check the self-diagnosis result of ABS actuator and electric unit (control unit) with CONSULT. Refer to [MWI-29, "CONSULT Function \(METER/M&A\)"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis of detected DTC.

3.CHECK DTC WITH "COMBINATION METER"

Check the self-diagnosis result of combination meter with CONSULT. Refer to [MWI-29, "CONSULT Function \(METER/M&A\)"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis of detected DTC.

4.CHECK WHEEL SENSOR

Refer to [BRC-103, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Repair or Replace error-detected parts.

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P0575 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0575 ASCD STEERING SWITCH

DTC Logic

INFOID:000000010289864

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible Cause
P0575	CC/SL LMTR BUTTONS (Cruise control input circuit) 1.DEF: IMPLAUSIBLE SIGNAL	Signal plausibility error	ASCD steering switch

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 10 seconds.
2. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
3. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Check DTC.

Is DTC detected?

- YES >> Go to [ECK-266. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289865

1.CHECK ASCD STEERING SWITCH CIRCUIT

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

ECM			Condition	Voltage (Approx.)
Conne- ctor	+	-		
	Terminal			
E59	15	14	CANCEL switch: Pressed	1.0 V
			SET/COAST switch: Pressed	2.0 V
			RESUME/ACCELERATE switch: Pressed	3.0 V
			All ASCD steering switches: Released	4.0 V

Is the inspection result normal?

- YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF and wait at least 1 minute.
2. Disconnect combination switch harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between combination switch (spiral cable) and ECM harness connector.

P0575 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
Combination switch (spiral cable)		ECM		
Connector	Terminal	Connector	Terminal	
M66	28	E59	14	Existed

5. 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 ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between combination switch (spiral cable) and ECM harness connector.

+		-		Continuity
Combination switch (spiral cable)		ECM		
Connector	Terminal	Connector	Terminal	
M66	27	E59	15	Existed

2. 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 ASCD STEERING SWITCH

Refer to [ECK-267, "Component Inspection \(ASCD Steering Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace ASCD steering switch.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (ASCD Steering Switch)

INFOID:0000000010792565

1.CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the continuity between combination switch harness connector terminals under following conditions.

Combination switch			Condition	Resistance (Approx.)
Connector	+	-		
	Terminals			
M353	8	9	CANCEL switch: Pressed	250 Ω
			SET/COAST switch: Pressed	660 Ω
			RESUME/ACCELERATE switch: Pressed	1,480 Ω
			All ASCD steering switches: Released	4,000 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch.

P0606 ECM

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0606 ECM

DTC Logic

INFOID:0000000010289869

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	Possible cause
P0606	COMPUTER (Control module processor) 1.DEF: SYSTEM INTERNAL FAILURE	Internal error.	ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P0606 can not duplicate.

>> Proceed to [ECK-268, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289870

1.INSPECTION START

1. Turn ignition switch ON.
2. Erase DTC.
3. Turn ignition switch OFF and wait for 20 seconds.
4. Turn ignition switch ON and perform the self-diagnosis.

Is the DTC P0606 displayed again?

YES >> GO TO 2.

NO >> INSPECTION END

2.REPLACE ECM

Replace ECM. Refer to [ECK-399, "Removal and Installation"](#).

>> INSPECTION END

P060A ECM

DTC Logic

INFOID:000000010289873

DTC DETECTION LOGIC

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ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	Possible cause
P060A	COMPUTER (Internal control module monitoring processor performance) 1.DEF: — 2.DEF: JAMMED ACCELERATOR PEDAL DETECTED 3.DEF: IMPLAUSIBLE SIGNAL 4.DEF: JAMMED ACCELERATOR PEDAL DETECTED	Internal monitoring processor error.	ECM

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DTC CONFIRMATION PROCEDURE

F

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

G

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

H

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

I

Is DTC detected?

J

- YES >> Proceed to [ECK-269, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289874

1.INSPECTION START

K

1. Turn ignition switch ON.
2. Erase DTC.
3. Turn ignition switch OFF and wait for 1 minute.
4. Turn ignition switch ON and wait at least 1 second.
5. Perform the self-diagnosis.

L

Is the DTC P060A displayed again?

M

- YES >> GO TO 2.
 NO >> INSPECTION END

N

2.REPLACE ECM

1. Replace ECM.
2. Perform [ECK-131, "Work Procedure"](#).

O

>> INSPECTION END

P

P060B ECM

DTC Logic

INFOID:0000000010289875

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	Possible cause
P060B	COMPUTER (Internal control module A/D processing performance) • 1.DEF: —	Internal A/D processor error.	ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-270, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289876

1.INSPECTION START

1. Turn ignition switch ON.
2. Erase DTC.
3. Turn ignition switch OFF and wait for 20 seconds.
4. Turn ignition switch ON and perform the self-diagnosis.

Is the DTC P060B displayed again?

YES >> GO TO 2.
 NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM. Refer to [ECK-399, "Removal and Installation"](#).
2. Go to [ECK-131, "Work Procedure"](#).

>> INSPECTION END

P061A ECM

DTC Logic

INFOID:000000010289877

DTC DETECTION LOGIC

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	Possible cause
P061A	COMP (Internal control module torque performance) • 1.DEF: SIGNAL INCOHER- ENCE • 2.DEF: — • 3.DEF: — • 4.DEF: FAULT ALERTED VIA THE CONTROL UNIT • 5.DEF: — • 6.DEF: —	ECM detects internal error.	ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P061A can not duplicate.

>> Proceed to [ECK-271, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000010289878

1.INSPECTION START

1. Turn ignition switch ON.
2. Erase DTC.
3. Turn ignition switch OFF and wait for 1 minute.
4. Turn ignition switch ON and wait at least 1 second.
5. Perform the self-diagnosis.

Is the DTC P061A displayed again?

- YES >> GO TO 2.
 NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Perform [ECK-131, "Work Procedure"](#).

>> INSPECTION END

P0627 FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0627 FUEL PUMP

DTC Logic

INFOID:0000000010289879

DTC DETECTION LOGIC

NOTE:

If this DTC is detected, first confirm self-diagnostic result in IPDM E/R.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0627	LOW PRES PMP REL CIRC (Fuel pump "A" control circuit/ open) • CC.0: SHORT CIRCUIT TO EARTH • CC.1: SHORT-CIRCUIT TO +12V • CO: OPEN CIRCUIT	• ECM detects the fuel pump relay circuit is open. • ECM detects the fuel pump relay circuit is short to ground. • ECM detects the fuel pump relay circuit is short to battery.	• Harness or connectors (Fuel pump relay circuit is open or shorted.) • Fuel pump relay • ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 1 minutes.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-272, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289880

1.CHECK FUEL LEAKAGE

Visually check the fuel leakage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK FUEL PRESSURE SENSOR

Check fuel pressure sensor. Refer to [ECK-209, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace fuel pressure sensor.

3.CHECK FUEL PUMP

Check fuel pump. Refer to [ECK-379, "Component Function Check"](#).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace fuel pressure sensor.

4.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

P0627 FUEL PUMP

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK IPDM E/R HARNESS CONNECTOR CONNECTIONS

Check IPDM E/R harness connector connection.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.CHECK FUEL PUMP RELAY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ECM harness connector and IPDM E/R harness connector.

+		-		Continuity
ECM		IPDM E/R		
Connector	Terminal	Connector	Terminal	
F80	89	F90	106	Existed

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

P062B ECM

DTC Logic

INFOID:000000010289881

DTC DETECTION LOGIC

NOTE:

- If DTC P062B is displayed with DTC P0201, P0202, P0203, or P0204, perform the trouble diagnosis for DTC P0201, P0202, P0203, or P0204. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P062B	COMPUTER (Internal control module fuel injector control performance) • 1.DEF: VALUES OUTSIDE TOLERANCES • 2.DEF: VOLTAGE TOO LOW • 3.DEF: VOLTAGE TOO HIGH • 4.DEF: — • 5.DEF: —	ECM calculation function is malfunctioning.	• ECM • Fuel injector

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

- YES >> Proceed to [ECK-274, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289882

1.INSPECTION START

1. Turn ignition switch ON.
2. Erase DTC.
3. Turn ignition switch OFF and wait for 1 minute.
4. Turn ignition switch ON and wait at least 1 second.
5. Perform the self-diagnosis.

Is the DTC P062B displayed again?

- YES >> GO TO 2.
 NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Perform [ECK-131, "Work Procedure"](#).

>> INSPECTION END

P0638 ELECTRIC THROTTLE CONTROL ACTUATOR FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0638 ELECTRIC THROTTLE CONTROL ACTUATOR FUNCTION

DTC Logic

INFOID:0000000010289883

DTC DETECTION LOGIC

NOTE:

If DTC P0638 is displayed with DTC P0120 or P2100, first perform the trouble diagnosis for DTC P0120 or P2100. Refer to [ECK-203, "DTC Logic"](#) or [ECK-362, "DTC Logic"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0638	INLET AIR FLAP POSITION CTRL (Throttle actuator control range/ performance bank 1) 1.DEF: NO RESPONSE FROM THE VALVE MOTOR 2.DEF: INLET FLAP BLOCKED CLOSED 3.DEF: INLET FLAP BLOCKED OPEN 4.DEF: CLOSING OF AIR IN- LET FLAP	- Throttle valve regulation error - ECM detects an incorrect closed position of the throttle valve. - ECM detects an incorrect fully open position of the throttle valve.	- Electric throttle control actuator - Throttle valve stuck - Throttle chamber clogged

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [ECK-275, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289884

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR HARNESS CONNECTOR CONNECTIONS

Check electric throttle control actuator harness connector connection.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check electric throttle control actuator circuit for open and short.

P0638 ELECTRIC THROTTLE CONTROL ACTUATOR FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
ECM		Electric throttle control actuator		
Connector	Terminal	Connector	Terminal	
F80	61	F46	2	Existed
	67		3	
	71		4	
F81	139		6	
	140		1	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.DTC CONFIRMATION PROCEDURES

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-275, "DTC Logic"](#).

Is the DTC P0638 displayed again?

YES >> GO TO 5.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

5.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR

Perform [ECK-204, "Component Inspection \(Throttle Position Sensor\)"](#) (throttle position sensor), [ECK-363, "Component Inspection"](#) (throttle control motor).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform [ECK-136, "Work Procedure"](#).

>> INSPECTION END

P0641 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0641 SENSOR POWER SUPPLY

DTC Logic

INFOID:000000010289885

DTC DETECTION LOGIC

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ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0641	SEN SUPPLY N1 VOL (Sensor reference voltage "A" circuit/open) 1.DEF: VOLTAGE TOO LOW 2.DEF: VOLTAGE TOO HIGH	- A voltage of sensor power supply is 5.4 V or more. - A voltage of sensor power supply is 4.6 V or less.	- Harness or connectors (The sensor power supply 1 circuit is shorted.) - High pressure EGR volume control valve position sensor - Throttle position sensor - TC boost sensor - Low pressure EGR volume control valve position sensor - Exhaust gas pressure sensor - Camshaft position sensor - APP sensor 1 - Refrigerant pressure sensor - Mass air flow sensor - ECM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

H

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

I

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

J

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

Is DTC detected?

K

YES >> Proceed to [ECK-277, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289886

L

1.CHECK SENSOR POWER SUPPLY

M

- Turn ignition switch ON.
- Check the voltage between ECM harness connector and ground.

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P0641 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-	Voltage (Approx.)
ECM			
Connectors	Terminal		
E59	27	Ground	5.0 V
F80	41		
	61		
	65		
	69		
	73		
	77		
F81	97		
	101		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> GO TO 2.

2.CHECK SENSOR POWER SUPPLY CIRCUITS

1. Turn ignition switch OFF.
2. Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
E59	27	Accelerator pedal position sensor (sensor 1)	E20	4
F80	41	Camshaft position sensor	F118	1
	61	Electric throttle control actuator	F46	2
	65	Low pressure EGR volume control valve position sensor	F34	1
	69	High pressure EGR volume control valve position sensor	F60	6
	73	Mass air flow sensor	F91	3
	77	Exhaust gas pressure sensor	F110	3
F81	97	Refrigerant pressure sensor	E41	3
	101	Turbocharger boost sensor	F5	3

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK COMPONENTS

Check the following.

- Accelerator pedal position sensor (sensor 1). Proceed to [ECK-219, "Diagnosis Procedure"](#).
- Low pressure EGR volume control valve position sensor. Proceed to [ECK-307, "Component Inspection \(Low Pressure EGR Volume Control Valve Motor\)"](#).
- Exhaust gas pressure sensor. Proceed to [ECK-244, "Component Inspection \(Exhaust Gas Pressure Sensor\)"](#).
- Camshaft position sensor. Proceed to [ECK-232, "Component Inspection \(Camshaft Position Sensor\)"](#).
- Mass air flow sensor. Proceed to [ECK-194, "Component Inspection \(Mass Air Flow Sensor\)"](#).
- Turbocharger boost sensor. Proceed to [ECK-198, "Component Inspection \(Turbocharger Boost Sensor\)"](#).
- Throttle position sensor. Proceed to [ECK-204, "Component Inspection \(Throttle Position Sensor\)"](#).
- Refrigerant pressure sensor. Proceed to [ECK-257, "Diagnosis Procedure"](#).
- High pressure EGR volume control valve position sensor. Proceed to [ECK-240, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

P0641 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

NO >> Replace malfunctioning component.

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P0651 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0651 SENSOR POWER SUPPLY

DTC Logic

INFOID:0000000010289890

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0651	SEN SUPPLY N2 VOL (Sensor reference voltage "B" circuit/open) 1.DEF: VOLTAGE TOO LOW 2.DEF: VOLTAGE TOO HIGH	- A voltage of sensor power supply is 5.4 V or more. - A voltage of sensor power supply is 4.6 V or less.	- Harness or connectors (The sensor power supply 2 circuit is shorted.) - Exhaust electric throttle position sensor - Exhaust gas pressure sensor - DPF differential pressure sensor - APP sensor 2 - Refrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-280, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289891

1.CHECK SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

+		-	Voltage (Approx.)
ECM			
Connectors	Terminal		
E59	23	Ground	5.0 V
F80	53		
	57		
	77		
F81	97		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> GO TO 2.

2.CHECK SENSOR POWER SUPPLY CIRCUITS

1. Turn ignition switch OFF.
2. Check harness for short to power and short to ground, between the following terminals.

P0651 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
E59	23	APP sensor 2	E20	5
F80	53	DPF differential pressure sensor	F11	1
	57	Exhaust electric throttle control actuator	F59	1
	77	Exhaust gas pressure sensor	F110	3
F81	97	Refrigerant pressure sensor	E41	3

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK COMPONENTS

Check the following.

- Accelerator pedal position sensor (sensor 2). Proceed to [ECK-365, "Diagnosis Procedure"](#).
- DPF pressure sensor. Proceed to [ECK-295, "Component Inspection \(DPF Differential Pressure Sensor\)"](#).
- Exhaust electric throttle control actuator. Proceed to [ECK-297, "Component Inspection \(Exhaust Throttle Control Motor\)"](#).
- Exhaust gas pressure sensor. Proceed to [ECK-244, "Component Inspection \(Exhaust Gas Pressure Sensor\)"](#).
- Refrigerant pressure sensor. Proceed to [ECK-257, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace malfunctioning component.

P0657 ECM RELAY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0657 ECM RELAY

DTC Logic

INFOID:0000000010289892

DTC DETECTION LOGIC

NOTE:

If this DTC is detected, first confirm self-diagnostic result in IPDM E/R.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0657	MAIN RELAY CONTROL CIRCUIT (Actuator supply voltage "A" circuit/open) - CC.0: SHORT CIRCUIT TO EARTH - CO: OPEN CIRCUIT	ECM detects ECM relay control circuit is short to ground. (ECM relay always ON)	- Harness or connectors (ECM relay control circuit is shorted.) - ECM relay

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-282, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289893

1.CHECK ECM RELAY POWER SUPPLY CIRCUIT

- Turn ignition switch ON.
- Check ECM relay circuit for open and short.

+		-	Voltage
IPDM E/R			
Connector	Terminal		
F90	96	Ground	Battery voltage
	103		

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform trouble diagnosis for power supply circuit.

2.CHECK ECM RELAY CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Check the continuity between ECM harness connector and ground ECM relay harness connector.

P0657 ECM RELAY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
ECM		IPDM E/R		
Connector	Terminal	Connector	Terminal	
F80	93	F90	103	Existed
	94		96	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

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P0697 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0697 SENSOR POWER SUPPLY

DTC Logic

INFOID:0000000010289894

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0697	SEN SUPPLY N-3 VOL (Sensor reference voltage "C" circuit/open) 1.DEF: VOLTAGE TOO LOW 2.DEF: VOLTAGE TOO HIGH	- A voltage of sensor power supply is more than 5.4 V. - A voltage of sensor power supply is less than 4.6 V.	- Harness or connectors - Fuel rail pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-284, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289895

1.CHECK SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect fuel rail pressure (FRP) sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between FRP sensor harness connector and ground.

+		-	Voltage (Approx.)
FRP sensor			
Connectors	Terminal		
F40	3	Ground	5 V

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> GO TO 2.

2.CHECK SENSOR POWER SUPPLY CIRCUITS

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F80	45	Fuel rail pressure sensor	F40	3

Is the inspection result normal?

P0697 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

YES >> GO TO 3.

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

A

3.CHECK COMPONENTS

Check FRP sensor. Proceed to [ECK-209, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace malfunctioning component.

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P0806 CLUTCH SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0806 CLUTCH SWITCH

Description

INFOID:0000000010434259

When the clutch pedal is depressed, clutch interlock switch turns ON and clutch pedal position switch turns OFF. ECM detects the state of the clutch pedal by those two types of input (ON/OFF signal).

DTC Logic

INFOID:0000000010434260

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition		Possible cause
P0806	— (Clutch position sensor circuit range/performance) • 1.DEF: IMPLAUSIBLE SIGNAL	A)	ON signals from the clutch interlock switch and the clutch pedal position switch are sent to the ECM at the same time.	• Harness or connectors (Clutch interlock switch circuit is open or shorted.) (Clutch pedal position switch circuit is open or shorted.) • Clutch interlock switch • Clutch pedal position switch • Incorrect clutch interlock switch installation • Incorrect clutch pedal position switch installation
		B)	Clutch interlock switch ON signal is not sent to ECM for extremely long time.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

1. Turn ignition switch ON.
2. Fully depress clutch pedal.
3. Fully release clutch pedal.
4. Repeat steps 2 and 3 for five times.
5. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-287, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

Perform component function check. Refer to [ECK-286, "Component Function Check"](#).

NOTE:

Use component function check to check the overall function of the clutch switch circuit. During this check, a DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-287, "Diagnosis Procedure"](#).

Component Function Check

INFOID:0000000010434261

1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector terminals as per the following conditions.

P0806 CLUTCH SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

ECM			Condition		Voltage (Approx.)
Connector	+	-			
	Terminal				
E59	9 (Clutch pedal position switch signal)	25	Clutch pedal	Fully released	0 V
	6 (Clutch interlock switch signal)			Fully depressed	Battery voltage
				Fully released	0 V
				Fully depressed	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-287, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000110434262

1.CHECK OVERALL FUNCTION-1

 With CONSULT

1. Turn ignition switch ON.
2. Select "CLUTCH PEDAL SWITCH" in "DATA MONITOR" mode of "ENGINE" using CONSULT.
3. Check "CLUTCH PEDAL SWITCH" indication as per the following conditions.

Monitor item	Condition		Indication
CLUTCH PEDAL SWITCH	Clutch pedal	Fully released	On
		Fully depressed	Off

 Without CONSULT

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector terminals as per the following conditions.

ECM			Condition		Voltage (Approx.)
Connector	+	-			
	Terminal				
E59	9	25	Clutch pedal	Fully released	0 V
				Fully depressed	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK OVERALL FUNCTION-2

Check the voltage between ECM harness connector terminals as per the following conditions.

ECM			Condition		Voltage (Approx.)
Connector	+	-			
	Terminal				
E59	6	25	Clutch pedal	Fully released	0 V
				Fully depressed	Battery voltage

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> GO TO 6.

3.CHECK CLUTCH PEDAL POSITION SWITCH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect clutch pedal position switch harness connector.

P0806 CLUTCH SWITCH

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between clutch pedal position switch harness connector and ground.

+		-	Continuity
Clutch pedal position switch			
Connector	Terminal		
E2	2	Ground	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK CLUTCH PEDAL POSITION SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between clutch pedal position switch harness connector and ECM harness connector.

+		-		Continuity
Clutch pedal position switch		ECM		
Connector	Terminal	Connector	Terminal	
E2	1	E59	9	Existed

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 CLUTCH PEDAL POSITION SWITCH

Check clutch pedal position switch. Refer to [ECK-289, "Component Inspection \(Clutch Pedal Position Switch\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

6.CHECK CLUTCH INTERLOCK SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect clutch interlock switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between clutch interlock switch harness connector and ground.

+		-	Voltage (Approx.)
Clutch interlock switch			
Connector	Terminal		
E52	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.

NO >> Perform the trouble diagnosis for power supply circuit.

7.CHECK CLUTCH INTERLOCK SWITCH INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between clutch interlock switch harness connector and ECM harness connector.

P0806 CLUTCH SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
Clutch interlock switch		ECM		
Connector	Terminal	Connector	Terminal	
E52	2	E59	6	Existed

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

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK CLUTCH INTERLOCK SWITCH

Check clutch interlock switch. Refer to [ECK-289, "Component Inspection \(Clutch Interlock Switch\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (Clutch Interlock Switch)

INFOID:0000000010434263

1.CHECK CLUTCH INTERLOCK SWITCH-1

1. Turn ignition switch OFF.
2. Disconnect clutch interlock switch harness connector.
3. Check the continuity between clutch interlock switch terminals as per the following conditions.

Clutch interlock switch		Condition		Continuity
+	–			
Terminals				
1	2	Clutch pedal	Fully released	Not existed
			Fully depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK CLUTCH INTERLOCK SWITCH-2

1. Adjust clutch interlock switch installation. Refer to [CL-7, "Inspection and Adjustment"](#).
2. Check the continuity between clutch interlock switch terminals as per the following conditions.

Clutch interlock switch		Condition		Continuity
+	—			
Terminals				
1	2	Clutch pedal	Fully released	Not existed
			Fully depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace clutch interlock switch. Refer to [CL-10, "Exploded View"](#).

Component Inspection (Clutch Pedal Position Switch)

INFOID:0000000010434264

1.CHECK CLUTCH PEDAL POSITION SWITCH-1

1. Turn ignition switch OFF.
2. Disconnect clutch pedal position switch harness connector.
3. Check the continuity between clutch pedal position switch terminals as per the following conditions.

P0806 CLUTCH SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Clutch pedal position switch		Condition		Continuity
+	–			
Terminals				
1	2	Clutch pedal	Fully released	Existed
			Fully depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK CLUTCH PEDAL POSITION SWITCH-2

1. Adjust clutch pedal position switch installation. Refer to [CL-10. "Removal and Installation"](#).
2. Check the continuity between clutch pedal position switch terminals as per the following conditions.

Clutch pedal position switch		Condition		Continuity
+	—			
Terminals				
1	2	Clutch pedal	Fully released	Existed
			Fully depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace clutch pedal position switch. Refer to [CL-10. "Exploded View"](#).

P0833 CPP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P0833 CPP SWITCH

DTC Logic

INFOID:0000000010289902

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0833	CLUTCH SWITCH SIGNAL CONSISTENCY (Clutch pedal switch "B" circuit) 1.DEF: SIGNAL INCOHER- ENCE 2.DEF: —	Correlation of two clutch pedal position switch signal is inconsistency.	• Harness and connectors • Clutch pedal position switch

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

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>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

1. Turn ignition switch ON.
2. Fully depress clutch pedal.
3. Fully release clutch pedal.
4. Repeat steps 2 and 3 for five times.
5. Check DTC.

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Is DTC detected?

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YES >> Go to [ECK-292, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

Perform component function check. Refer to [ECK-291, "Component Function Check"](#).

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NOTE:

Use component function check to check the overall function of the clutch switch circuit. During this check, a DTC might not be confirmed.

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Is the inspection result normal?

M

YES >> INSPECTION END

NO >> Go to [ECK-292, "Diagnosis Procedure"](#).

Component Function Check

INFOID:0000000010289903

1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector terminals under the following conditions.

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ECM			Condition		Voltage
Connector	+	—			
	Terminal		Clutch pedal	Fully released	Approx. 0 V
E59	9	25		Fully depressed	Battery voltage

P

Is the inspection result normal?

YES >> INSPECTION END

P0833 CPP SWITCH

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Proceed to [ECK-292, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289904

1.CHECK CLUTCH PEDAL POSITION SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect clutch pedal position switch harness connector.
2. Check the continuity between clutch pedal position switch harness connector and ground.

+		-	Continuity
Clutch pedal position switch			
Connector	Terminal		
E2	2	Ground	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 2.

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

2.CHECK CLUTCH PEDAL POSITION SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connectors.
2. Check the continuity between clutch pedal position switch harness connector and ECM harness connector.

+		-		Continuity
Clutch pedal position switch		ECM		
Connector	Terminal	Connector	Terminal	
E2	1	E59	9	Existed

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

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK CLUTCH PEDAL POSITION SWITCH

Refer to [ECK-292, "Component Inspection \(Clutch Pedal Position Switch\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace clutch pedal position switch.

Component Inspection (Clutch Pedal Position Switch)

INFOID:0000000010289905

1.CHECK CLUTCH PEDAL POSITION SWITCH-1

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

Clutch pedal position switch		Condition		Continuity
+	-			
Terminal				
1	2	Clutch pedal	Fully released	Existed
			Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

P0833 CPP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

2. CHECK CLUTCH PEDAL POSITION SWITCH-2

1. Adjust clutch pedal position switch installation. Refer to [CL-7. "Inspection and Adjustment"](#).
2. Check the continuity between clutch pedal position switch terminals under the following conditions.

Clutch pedal position switch		Condition		Continuity
+	-			
Terminal				
1	2	Clutch pedal	Fully released	Existed
			Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace clutch pedal position switch.

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P1453 DIESEL PARTICULATE FILTER PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1453 DIESEL PARTICULATE FILTER PRESSURE SENSOR

DTC Logic

INFOID:0000000010289919

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1453	DIFF. PRESSURE SENSOR CIRCUIT, PARTICLE FILTER (Differential pressure sensor circuit, particule filter) • 1.DEF: IMPLAUSIBLE SIGNAL • 2.DEF: CLOGGED • 3.DEF: FAULT ALERTED VIA THE CONTROL UNIT • 4.DEF: COMPARISON OF CONFORMITY INFORMATION (CHECKSUM)	ECM detects an abnormal pressure of DPF.	• Harness and connectors • DPF differential pressure sensor

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P1453 can not duplicate.

>> Proceed to [ECK-294. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289920

1.VISUALLY CHECK

Visually check for chipping of DPF (Diesel Particulate Filter) differential pressure sensor tubing.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace malfunctioning parts.

2.CHECK DPF DIFFERENTIAL PRESSURE SENSOR HARNESS CONNECTOR CONNECTIONS

Check DPF differential pressure sensor harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK DPF DIFFERENTIAL PRESSURE SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check DPF differential pressure sensor circuit for open and short.

+		-		Continuity
ECM		DPF differential pressure sensor		
Connector	Terminal	Connector	Terminal	
F80	53	F11	1	Existed
	58		2	
	80		3	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

P1453 DIESEL PARTICULATE FILTER PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

4.CHECK DPF DIFFERENTIAL PRESSURE SENSOR

Refer to [ECK-295, "Component Inspection \(DPF Differential Pressure Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace error-detected parts.

5.CHECK DPF DIFFERENTIAL PRESSURE SENSOR TUBE

1. Remove DPF differential pressure sensor tube.
2. Check DPF differential pressure sensor tube for clogging.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Repair DPF differential pressure sensor tube.

Component Inspection (DPF Differential Pressure Sensor)

INFOID:0000000010289921

1.CHECK DPF DIFFERENTIAL PRESSURE SENSOR

1. Disconnect DPF differential pressure sensor harness connector.
2. Check the resistance between DPF differential pressure sensor terminals as follows.

DPF differential pressure sensor		Resistance
+	-	
Terminals		
3	2	330 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace DPF differential pressure sensor.

P1480 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1480 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

DTC Logic

INFOID:0000000010289922

DTC DETECTION LOGIC

NOTE:

If DTC P1480 is displayed with DTC P1481 and P1482, perform trouble diagnosis for DTC P1481 and P1482. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1480	EXHAUST AIR FLAP (Exhaust air flap) • 1.DEF: NO RESPONSE FROM THE VALVE MOTOR • 2.DEF: INLET FLAP BLOCKED CLOSED • 3.DEF: CLOSING OF AIR IN-LET FLAP • 4.DEF: INLET FLAP BLOCKED OPEN	• Exhaust throttle valve regulation error. • ECM detects an incorrect closed position of the exhaust throttle valve.	• Exhaust throttle valve stuck • Exhaust electric throttle control actuator

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-296, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289923

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR HARNESS CONNECTOR CONNECTIONS

Check exhaust electric throttle control actuator harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR POWER SUPPLY CIRCUIT

Check the power supply of the exhaust electric throttle control actuator.

P1480 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-	Voltage
Exhaust electric throttle control actuator			
Connector	Terminal		
F59	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for power supply circuit.

4.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check exhaust electric throttle control actuator circuit for open and short.

+		+		Continuity
ECM		Exhaust electric throttle control actuator		
Connector	Terminal	Connector	Terminal	
F80	57	F59	1	Existed
	62		2	
	76		3	
F81	149		6	
	150		5	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.DTC CONFIRMATION PROCEDURES

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-296, "DTC Logic"](#).

Is the DTC P1480 displayed again?

YES >> GO TO 6.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

6.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

Perform [ECK-303, "Component Inspection \(Exhaust Throttle Position Sensor\)"](#), [ECK-297, "Component Inspection \(Exhaust Throttle Control Motor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> GO TO 7.

7.REPLACE EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace exhaust electric throttle control actuator.
2. Perform [ECK-137, "Work Procedure"](#).

>> INSPECTION END

Component Inspection (Exhaust Throttle Control Motor)

INFOID:0000000010289924

1.CHECK EXHAUST THROTTLE CONTROL MOTOR

1. Disconnect exhaust electric throttle control actuator harness connector.
2. Check the resistance between exhaust throttle control motor terminals as follows.

P1480 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Exhaust electric throttle control actuator		Resistance
+	-	
Terminal		
5	6	2.65 - 3.25 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace exhaust electric throttle control actuator.

P1481 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1481 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

DTC Logic

INFOID:0000000010289925

DTC DETECTION LOGIC

NOTE:

If DTC P1481 is displayed with DTC P0651, first perform the trouble diagnosis for DTC P0651. Refer to [ECK-280, "DTC Logic"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1481	EXHAUST AIR FLAP CIRCUIT (Exhaust air flap circuit) 1.DEF: — 2.DEF: OPERATION TEMPERATURE TOO HIGH	- ECM detects the exhaust electric throttle control valve command circuit is short to ground. - ECM detects the exhaust electric throttle control valve command circuit is short to power. - ECM detects an over temperature of the exhaust electric throttle control actuator.	- Harness and connectors (Exhaust electric throttle control actuator command circuit is open or shorted.) - Exhaust electric throttle control actuator - Exhaust throttle valve stuck

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> [ECK-299, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289926

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR HARNESS CONNECTOR CONNECTIONS

Check exhaust electric throttle control actuator harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR POWER SUPPLY CIRCUIT

Check the power supply of the exhaust electric throttle control actuator.

P1481 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-	Voltage
Exhaust electric throttle control actuator			
Connector	Terminal		
F59	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for power supply circuit.

4.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check exhaust electric throttle control actuator circuit for open and short.

+		+		Continuity
ECM		Exhaust electric throttle control actuator		
Connector	Terminal	Connector	Terminal	
F80	57	F59	1	Existed
	62		2	
	76		3	
F81	149		6	
	150		5	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

Perform [ECK-303. "Component Inspection \(Exhaust Throttle Position Sensor\)"](#), [ECK-300. "Component Inspection \(Exhaust Throttle Control Motor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> GO TO 6.

6.REPLACE EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace exhaust electric throttle control actuator.
2. Perform [ECK-137. "Work Procedure"](#).

>> INSPECTION END

Component Inspection (Exhaust Throttle Control Motor)

INFOID:0000000010289927

1.CHECK EXHAUST THROTTLE CONTROL MOTOR

1. Disconnect exhaust electric throttle control actuator harness connector.
2. Check the resistance between exhaust throttle control motor terminals as follows.

Exhaust throttle control actuator		Resistance
+	-	
Terminal		
5	6	2.65 - 3.25 Ω

Is the inspection result normal?

YES >> INSPECTION END

P1481 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

NO >> Replace exhaust electric throttle control actuator.

A

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P1482 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1482 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

DTC Logic

INFOID:0000000010289928

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1482	EXHAUST AIR FLAP POSITION SENSOR (Exhaust air flap position sensor) • 1.DEF: SIGNAL INCOHERENCE	- An exhaust throttle valve position sensor voltage is more than 4.8 V. - An exhaust throttle valve position sensor voltage is less than 0.2 V.	- Harness and connectors (Exhaust throttle valve position sensor circuit is open or shorted.) - Exhaust throttle valve position sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-302, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289929

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

- Turn ignition switch OFF.
- Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR HARNESS CONNECTOR CONNECTIONS

Check exhaust electric throttle control actuator harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR POWER SUPPLY CIRCUIT

Check the power supply of the exhaust electric throttle control actuator.

+		-	Voltage
Exhaust electric throttle control actuator			
Connector	Terminal		
F59	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

P1482 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Perform trouble diagnosis for power supply circuit.

4.CHECK EXHAUST THROTTLE POSITION SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check exhaust electric throttle control actuator circuit for open and short.

+		+		Continuity
ECM		Exhaust electric throttle control actuator		
Connector	Terminal	Connector	Terminal	
F80	76	F59	3	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK EXHAUST THROTTLE POSITION SENSOR

Refer to [ECK-303, "Component Inspection \(Exhaust Throttle Position Sensor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> GO TO 6.

6.REPLACE EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace exhaust electric throttle control actuator.
2. Perform [ECK-137, "Work Procedure"](#).

>> INSPECTION END

Component Inspection (Exhaust Throttle Position Sensor)

INFOID:0000000010289930

1.CHECK EXHAUST THROTTLE POSITION SENSOR

1. Turn ignition switch ON.
2. Check the voltage between ECM terminals as follows.

ECM		Voltage
+	-	
Terminal		
76	62	0.2 – 4.8 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace exhaust electric throttle control actuator.

P1483 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1483 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

DTC Logic

INFOID:0000000010289931

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1483	EXHAUST AIR FLAP POSITION SENSOR CIRCUIT (Exhaust air flap position sensor circuit) 1.DEF: OFFSET IMPLAUSIBLE	ECM detects the exhaust throttle valve regulation error.	• Harness and connectors (Exhaust throttle valve position sensor circuit is open or shorted.) • Exhaust throttle valve stuck • Exhaust electric throttle control actuator • Exhaust throttle valve position sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-304, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289932

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

1. Turn ignition switch OFF.
2. Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR HARNESS CONNECTOR CONNECTIONS

Check exhaust electric throttle control actuator harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR POWER SUPPLY CIRCUIT

Check the power supply of the exhaust electric throttle control actuator.

+		-	Voltage
Exhaust electric throttle control actuator			
Connector	Terminal		
F59	5	Ground	Battery voltage

P1483 EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for power supply circuit.

4.CHECK EXHAUST THROTTLE CONTROL ACTUATOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check exhaust electric throttle control actuator circuit for open and short.

+		+		Continuity
ECM		Exhaust electric throttle control actuator		
Connector	Terminal	Connector	Terminal	
F80	57	F59	1	Existed
	62		2	
	76		3	
F81	149		6	
	150		5	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK EXHAUST THROTTLE POSITION SENSOR

Refer to [ECK-305, "Component Inspection \(Exhaust Throttle Position Sensor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> GO TO 6.

6.REPLACE EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace exhaust electric throttle control actuator.
2. Perform [ECK-137, "Work Procedure"](#).

>> INSPECTION END

Component Inspection (Exhaust Throttle Position Sensor)

INFOID:0000000010289933

1.CHECK EXHAUST THROTTLE POSITION SENSOR

1. Turn ignition switch ON.
2. Check the voltage between ECM terminals as follows.

ECM		Voltage
+	-	
Terminal		
76	62	0.2 – 4.8 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace exhaust electric throttle control actuator.

P1484 LOW PRESSURE EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1484 LOW PRESSURE EGR VOLUME CONTROL VALVE

DTC Logic

INFOID:000000010289934

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1484	HIGH PRESSURE EGR VALVE (High pressure EGR valve) 1.DEF: MECHANICAL FAULT	ECM detects an incorrect closed position of the low pressure EGR volume control valve.	- Low pressure EGR volume control valve clogged - Low pressure EGR volume control valve stuck - Low pressure EGR volume control valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Maintain the following conditions for at least 10 consecutive seconds. Hold the steady as possible.

ENGINE SPEED	3,500 rpm
--------------	-----------

3. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-306, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010289935

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE

Visually check low pressure EGR volume control valve for chipping.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK DIESEL PARTICULATE FILTER

Refer to [ECK-359, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace diesel particulate filter.

3.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR volume control valve harness connector connection.

Is the inspection result normal?

P1484 LOW PRESSURE EGR VOLUME CONTROL VALVE

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check low pressure EGR volume control valve circuit for open and short.

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F80	65	F34	1	Existed
	66		2	
	79		3	
F81	151		6	
	152		5	

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-306, "DTC Logic"](#).

Is the DTC P1484 displayed again?

- YES >> GO TO 7.
NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

7.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

Refer to [ECK-307, "Component Inspection \(Low Pressure EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Replace error-detected parts.

Component Inspection (Low Pressure EGR Volume Control Valve Motor)

INFOID:000000010289936

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect low pressure EGR volume control valve harness connector.
3. Check resistance between low pressure EGR volume control valve terminals as follows.

Low pressure EGR volume control valve		Condition		Resistance
+	-			
Terminal				
5	6	Temperature° C (°F)	20 (68)	1.69 Ω

Is the inspection result normal?

- YES >> **INSPECTION END**
NO >> Replace low pressure EGR volume control valve.

P1485 LOW PRESSURE EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1485 LOW PRESSURE EGR VOLUME CONTROL VALVE

DTC Logic

INFOID:0000000010289937

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1485	LOW PRESSURE EGR VALVE COMMAND CIRCUIT (Low pressure EGR valve command circuit) • 1.DEF: — • 2.DEF: OPERATION TEM- PERATURE TOO HIGH	• ECM detects low pressure EGR volume control valve circuit is short circuit to ground. • ECM detects low pressure EGR volume control valve circuit is short circuit to battery. • Low pressure EGR volume control valve circuit temperature is too high.	• Harness or connectors (Low pressure EGR volume control valve circuit is shorted.) • Low pressure EGR volume control valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-308, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010508573

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE

Visually check low pressure EGR volume control valve for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK DIESEL PARTICULATE FILTER

Refer to [ECK-359, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace diesel particulate filter.

3.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR volume control valve harness connector connection.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE CIRCUIT FOR OPEN AND SHORT

P1485 LOW PRESSURE EGR VOLUME CONTROL VALVE

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Check low pressure EGR volume control valve circuit for open and short.

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F80	65	F34	1	Existed
	66		2	
	79		3	
F81	151		6	
	152		5	

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-308, "DTC Logic"](#).

Is the DTC P1485 displayed again?

- YES >> GO TO 7.
NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

7.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

Refer to [ECK-315, "Component Inspection \(Low Pressure EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Replace error-detected parts.

Component Inspection (Low Pressure EGR Volume Control Valve Motor)

INFOID:0000000010508574

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect low pressure EGR volume control valve harness connector.
3. Check resistance between low pressure EGR volume control valve terminals as follows.

Low pressure EGR volume control valve		Condition		Resistance
+	-			
Terminal				
5	6	Temperature° C (°F)	20 (68)	1.69 Ω

Is the inspection result normal?

- YES >> **INSPECTION END**
NO >> Replace low pressure EGR volume control valve.

P1486 LOW PRESSURE EGR VOLUME CONTROL VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1486 LOW PRESSURE EGR VOLUME CONTROL VALVE POSITION SENSOR

DTC Logic

INFOID:000000010289940

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1486	LOW PRES EGR VALVE POSITION SENSOR (Low pressure EGR valve position sensor) • 1.DEF:SIGNAL INCOHERENCE	• An excessively high voltage (more than 4.7 V) from low pressure EGR volume control valve position sensor is sent to ECM. • An excessively low voltage (less than 0.3 V) from low pressure EGR volume control valve position sensor is sent to ECM.	• Harness or connectors (Low pressure EGR volume control valve position sensor circuit is open or shorted.) • Low pressure EGR volume control valve position sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-310, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010508575

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE

Visually check low pressure EGR volume control valve for chipping.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK DIESEL PARTICULATE FILTER

Refer to [ECK-359, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace diesel particulate filter.

3.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR volume control valve harness connector connection.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

P1486 LOW PRESSURE EGR VOLUME CONTROL VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

5.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check low pressure EGR volume control valve circuit for open and short.

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F80	65	F34	1	Existed
	66		2	
	79		3	
F81	151		6	
	152		5	

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-310, "DTC Logic"](#).

Is the DTC P1486 displayed again?

YES >> GO TO 7.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

7.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

Refer to [ECK-315, "Component Inspection \(Low Pressure EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (Low Pressure EGR Volume Control Valve Motor)

INFOID:0000000010508576

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect low pressure EGR volume control valve harness connector.
3. Check resistance between low pressure EGR volume control valve terminals as follows.

Low pressure EGR volume control valve		Condition		Resistance
+	-			
Terminal				
5	6	Temperature° C (°F)	20 (68)	1.69 Ω

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace low pressure EGR volume control valve.

P1487 LOW PRESSURE EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1487 LOW PRESSURE EGR VOLUME CONTROL VALVE

DTC Logic

INFOID:000000010289943

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1487	LOW PRESSURE EGR VALVE POSITION OFFSET (Low pressure EGR valve position offset) • 1.DEF: OFFSET IMPLAUSIBLE	ECM detects the low pressure EGR volume control valve regulation error.	• Harness or connectors (Low pressure EGR volume control valve circuit is open or shorted.) • Low pressure EGR volume control valve stuck • Low pressure EGR volume control valve • Low pressure EGR volume control valve position sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

- YES >> Proceed to [ECK-312, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010508577

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE

Visually check low pressure EGR volume control valve for chipping.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK DIESEL PARTICULATE FILTER

Refer to [ECK-359, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace diesel particulate filter.

3.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR volume control valve harness connector connection.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

P1487 LOW PRESSURE EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

5.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check low pressure EGR volume control valve circuit for open and short.

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F80	65	F34	1	Existed
	66		2	
	79		3	
F81	151		6	
	152		5	

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-312, "DTC Logic"](#).

Is the DTC P1487 displayed again?

- YES >> GO TO 7.
NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

7.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

Refer to [ECK-313, "Component Inspection \(Low Pressure EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Replace error-detected parts.

Component Inspection (Low Pressure EGR Volume Control Valve Motor)

INFOID:0000000010508578

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect low pressure EGR volume control valve harness connector.
3. Check resistance between low pressure EGR volume control valve terminals as follows.

Low pressure EGR volume control valve		Condition		Resistance
+	-			
Terminal				
5	6	Temperature° C (°F)	20 (68)	1.69 Ω

Is the inspection result normal?

- YES >> **INSPECTION END**
NO >> Replace low pressure EGR volume control valve.

P1488 LOW PRESSURE EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1488 LOW PRESSURE EGR VOLUME CONTROL VALVE

DTC Logic

INFOID:000000010289946

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1488	LOW PRESSURE EGR VALVE BLOCKED (Low pressure EGR valve blocked) • 1.DEF: NO RESPONSE FROM THE VALVE MOTOR • 2.DEF: CLOSING OF AIR INLET FLAP	Low pressure EGR volume control valve does not operate.	• Harness or connectors (Low pressure EGR volume control valve circuit is open or shorted.) • Low pressure EGR volume control valve • Low pressure EGR volume control valve position sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-314, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010508580

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE

Visually check low pressure EGR volume control valve for chipping.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK DIESEL PARTICULATE FILTER

Refer to [ECK-359, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace diesel particulate filter.

3.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR volume control valve harness connector connection.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

P1488 LOW PRESSURE EGR VOLUME CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

5.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check low pressure EGR volume control valve circuit for open and short.

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F80	65	F34	1	Existed
	66		2	
	79		3	
F81	151		6	
	152		5	

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-314, "DTC Logic"](#).

Is the DTC P1488 displayed again?

- YES >> GO TO 7.
NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

7.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

Refer to [ECK-315, "Component Inspection \(Low Pressure EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Replace error-detected parts.

Component Inspection (Low Pressure EGR Volume Control Valve Motor)

INFOID:0000000010508581

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect low pressure EGR volume control valve harness connector.
3. Check resistance between low pressure EGR volume control valve terminals as follows.

Low pressure EGR volume control valve		Condition		Resistance
+	-			
Terminal				
5	6	Temperature° C (°F)	20 (68)	1.69 Ω

Is the inspection result normal?

- YES >> **INSPECTION END**
NO >> Replace low pressure EGR volume control valve.

P1489 LOW PRESSURE EGR VOLUME CONTROL VALVE UPSTREAM TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1489 LOW PRESSURE EGR VOLUME CONTROL VALVE UPSTREAM TEMPERATURE SENSOR

DTC Logic

INFOID:000000010289949

DTC DETECTION LOGIC

NOTE:

If DTC P1489 is displayed with following DTC, first perform the trouble diagnosis for following DTC. Refer to [ECK-97, "DTC Index"](#).

- P1480, P1481, P1482, P1483, P1484, P1485, P1486, P1487 and P1488.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1489	LOW PRESSURE EGR VALVE TEMPERATURE SENSOR (Low pressure EGR valve temperature sensor) • 1.DEF: VOLTAGE TOO LOW • 2.DEF: VOLTAGE TOO HIGH • 3.DEF: OPERATION TEMPERATURE TOO HIGH	• ECM detects a short circuit to battery. • ECM detects a short circuit to ground. • EGR cooler (low pressure) temperature is 180 °C (356°F) or more.	• Harness or connectors (EGR temperature sensor circuit is shorted.) • EGR temperature sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [ECK-316, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010508590

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE

Visually check low pressure EGR volume control valve for chipping.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK DIESEL PARTICULATE FILTER

Refer to [ECK-359, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace diesel particulate filter.

3.CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector connection.

Is the inspection result normal?

- YES >> GO TO 4.

P1489 LOW PRESSURE EGR VOLUME CONTROL VALVE UPSTREAM TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

NO >> Repair or replace error-detected parts.

4.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE HARNESS CONNECTOR CONNECTIONS

Check low pressure EGR volume control valve harness connector connection.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check low pressure EGR volume control valve circuit for open and short.

+		-		Continuity
ECM		Low pressure EGR volume control valve		
Connector	Terminal	Connector	Terminal	
F80	65	F34	1	Existed
	66		2	
	79		3	
F81	151		6	
	152		5	

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to [ECK-316, "DTC Logic"](#).

Is the DTC P1489 displayed again?

YES >> GO TO 7.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

7.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

Refer to [ECK-317, "Component Inspection \(Low Pressure EGR Volume Control Valve Motor\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

Component Inspection (Low Pressure EGR Volume Control Valve Motor)

INFOID:0000000010508591

1.CHECK LOW PRESSURE EGR VOLUME CONTROL VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect low pressure EGR volume control valve harness connector.
3. Check resistance between low pressure EGR volume control valve terminals as follows.

Low pressure EGR volume control valve		Condition		Resistance
+	-			
Terminal				
5	6	Temperature° C (°F)	20 (68)	1.69 Ω

Is the inspection result normal?

YES >> **INSPECTION END**

NO >> Replace low pressure EGR volume control valve.

P1503 ACTIVE GRILLE SHUTTER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1503 ACTIVE GRILLE SHUTTER

DTC Logic

INFOID:000000010434271

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1503	AIR VENT CONTROL (Air vent control)	- LIN communication error with active grille shutter - Detects the malfunction of initial position learning or operational malfunctions for specified times. - Detects the temperature of active grille shutter actuator is more than 155°C (311°F) for more than 5 seconds for accumulation. - Detects the temperature of active grille shutter actuator is more than 155°C (311°F) for more than specified times.	- Harness or connectors - Active grille shutter actuator

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-1

- Turn ignition switch ON and wait at least 5 seconds.
- Check DTC.

Is the DTC detected?

YES >> Proceed to [ECK-318, "Diagnosis Procedure"](#).
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-2

- Start the engine and wait at least 60 seconds.
- Check DTC.

Is the DTC detected?

YES >> Proceed to [ECK-318, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010513119

1. CHECK DTC OF IPDM E/R

Check DTC of IPDM E/R.

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [PCS-37, "DTC Index"](#).
NO >> GO TO 2.

2. CHECK ECM HARNESS CONNECTOR CONNECTIONS

Check ECM harness connector and active grille shutter harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3. CHECK ACTIVE GRILLE SHUTTER

- Check if any foreign objects interferes with active grille shutter.
- Check the installation condition of active grille shutter.

Is the inspection result normal?

P1503 ACTIVE GRILLE SHUTTER

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK FUSE

Check #51 fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace the fuse after repairing the applicable circuit.

5.CHECK ACTIVE GRILLE SHUTTER POWER SUPPLY

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

+		–	Voltage
Active grille shutter			
Connector	Terminal		
E115	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 6.

6.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.

+		-		Continuity
Active grille shutter		IPDM E/R		
Connector	Terminal	Connector	Terminal	
E115	1	E37	8	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check IPDM E/R.
NO >> Repair or replace error-detected parts.

7.CHECK ACTIVE GRILLE SHUTTER GROUND CIRCUIT

Check the continuity between active grille shutter harness connector and ground.

+		-	Continuity
Active grille shutter			
Connector	Terminal		
E115	4	Ground	Existed

Is the inspection result normal?

- YES >> GO TO 8.
NO >> Repair or replace error-detected parts.

8.CHECK LIN COMMUNICATION CIRCUIT

1. Disconnect harness connectors the following items.
 - ECM
 - Alternator
 - DC/DC converter
2. Check the continuity between active grille shutter harness connector and ECM harness connector.

P1503 ACTIVE GRILLE SHUTTER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
Active grille shutter		ECM		
Connector	Terminal	Connector	Terminal	
E115	3	F81	141	Existed

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

Is the inspection result normal?

YES >> Replace active grille shutter.

NO >> Repair or replace error-detected parts.

P1512 STARTER MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1512 STARTER MOTOR

Description

INFOID:0000000010289961

ECM multiplies operation counter of starter motor which operated in operation with key switch and operation with restart and memorizes it.

ECK

DTC Logic

INFOID:0000000010289962

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1512	STARTER (Starter)	When starter motor operating counter which ECM memorized is 280,000 times or more.	Starter motor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 10 seconds or more to start this procedure.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [ECK-321. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289963

1.REPLACE STARTER MOTOR

Replace starter motor. Refer to [STR-30. "K9K : Removal and Installation"](#).

>> INSPECTION END

P1516 HIGH PRESSURE FUEL PUMP SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1516 HIGH PRESSURE FUEL PUMP SYSTEM

Description

INFOID:0000000010434274

ECM multiplies operation counter of starter motor which operated in operation with key switch and operation with restart and memorizes it.

DTC Logic

INFOID:0000000010434275

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1516	HIGH PRESSURE FUEL PUMP (High pressure fuel pump)	When high pressure fuel pump operating counter which ECM memorized is 340,000 times or more.	High pressure fuel pump

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 10 seconds or more to start this procedure.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [ECK-322, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010434276

1. REPLACE HIGH PRESSURE FUEL PUMP

Replace high pressure fuel pump. Refer to [EM-300, "Removal and Installation"](#).

>> INSPECTION END

P1525 ASCD SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1525 ASCD SYSTEM

DTC Logic

INFOID:0000000010434279

DTC DETECTION LOGIC

NOTE:

DTC P1525 is displayed with another DTC.

Perform the trouble diagnosis for the corresponding DTC.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1525	CONSISTENT MULTIPLEX SIGNALS FOR CC/SL (Consistent multiplex sig- nals for cruise control/ speed limiter) • 1.DEF: THE DATA SUP- PLIED TO THE CRUISE CONTROL OR SPEED LIMITER ARE NOT CORRECT	Other DTC that illuminates MIL is detected while ASCD is operating.	• Harness or connectors • Others systems • ECM

Diagnosis Procedure

INFOID:0000000010434280

DTC P1525 is displayed with another DTC.

Perform trouble diagnosis for the corresponding DTC. Refer to [ECK-97, "DTC Index"](#).

P1544 EGT SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1544 EGT SENSOR 2

DTC Logic

INFOID:000000010289964

DTC DETECTION LOGIC

NOTE:

If DTC P1544 is displayed with other DTC, perform trouble diagnosis for the other DTC. Refer to [ECK-97, "DTC Index"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1544	TEMP SEN UPSTREAM OF PF (Temperature sensor up- stream of particulate filter) • 1.DEF: SIGNAL OUTSIDE LOWER LIMIT • 2.DEF: SIGNAL OUTSIDE UPPER LIMIT • 3.DEF: OPERATION TEM- PERATURE TOO HIGH • 4.DEF: SIGNAL INCO- HERENCE • 5.DEF: IMPROPER SIG- NAL SHAPE • 6.DEF: NO SIGNAL SPE- CIFIC SUBTYPE	• Diesel particulate filter temperature is more than 790 °C (1,454 °F). • Diesel particulate filter temperature is extremely low.	• Harness or connectors (Exhaust gas temperature sen- sor 2 circuit is open or shorted.) • Exhaust gas temperature sen- sor 2

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P1544 can not duplicate.

>> Proceed to [ECK-324, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000010289965

1.CHECK EXHAUST LEAKAGE

Check exhaust leakage. Refer to [EX-14, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts. And then GO TO 10.

2.CHECK HARNESS CONNECTOR CONNECTIONS

Check harness connector connection of the following items.

- ECM
- Exhaust gas temperature sensor
- TC boost sensor
- A/F sensor
- Exhaust electric throttle control actuator
- Injectors

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts. And then GO TO 10.

3.CHECK EXHAUST GAS TEMPERATURE (EGT) SENSOR 2 POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect EGT sensor 2 harness connector.
3. Turn ignition switch ON.

P1544 EGT SENSOR 2

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

4. Check the voltage between EGT sensor 2 harness connector and ground.

+		-	Voltage (Approx.)
EGT sensor 2			
Connector	Terminal		
F109	1	Ground	5 V

Is the inspection result normal?

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

4.CHECK EXHAUST GAS TEMPERATURE (EGT) SENSOR 2 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EGT sensor 2 harness connector.

+		-		Continuity
ECM		EGT sensor 2		
Connector	Terminal	Connector	Terminal	
F81	108	F109	1	Existed

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts. And then GO TO 10.

5.CHECK EXHAUST GAS TEMPERATURE (EGT) SENSOR 2 SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EGT sensor 2 harness connector.

+		-		Continuity
ECM		EGT sensor 2		
Connector	Terminal	Connector	Terminal	
F81	123	F109	2	Existed

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

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts. And then GO TO 10.

6.CHECK EXHAUST GAS TEMPERATURE SENSOR 2

Refer to [ECK-326, "Component Inspection \(Exhaust Gas Temperature Sensor 2\)"](#).

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Replace error-detected parts. And then GO TO 10.

7.CHECK TC BOOST SENSOR ROUTING CIRCUIT

Refer to [ECK-197, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> Replace error-detected parts. And then GO TO 10.

8.CHECK EXHAUST ELECTRIC THROTTLE CONTROL ACTUATOR ROUTING CIRCUIT

Refer to [ECK-296, "Diagnosis Procedure"](#).

Is the inspection result normal?

P1544 EGT SENSOR 2

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 9.
NO >> Replace error-detected parts. And then GO TO 10.

9.CHECK FUEL INJECTOR ROUTING CIRCUIT

Refer to [ECK-214. "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 10.
NO >> Replace error-detected parts. And then GO TO 10.

10.CHECK DIESEL PARTICULATE FILTER

Refer to [EX-19. "Inspection"](#).

Is the inspection result normal?

- YES-1 (Every inspection result are normal)>>Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).
YES-2 (After repairing any malfunctioning part)>>INSPECTION END
NO >> Replace diesel particulate filter.

Component Inspection (Exhaust Gas Temperature Sensor 2)

INFOID:0000000010289966

1.CHECK EXHAUST GAS TEMPERATURE SENSOR 2

1. Disconnect exhaust gas temperature sensor 2 harness connector.
2. Check resistance between exhaust gas temperature sensor 2 terminals under the following conditions.

Exhaust gas temperature sensor 2		Condition		Resistance kΩ
+	-			
Terminal				
1	2	Temperature° C (°F)	20 (68)	89.309 - 159.795
			100 (212)	22.96 - 51.16
			300 (572)	2.261 - 2.975
			500 (932)	0.640 - 0.709
			600 (1112)	0.406 - 0.442
			750 (1382)	0.230 - 0.254

Is the inspection result normal?

- YES >> **INSPECTION END**
NO >> Replace exhaust gas temperature sensor 2.

P1546 EXHAUST GAS TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1546 EXHAUST GAS TEMPERATURE

DTC Logic

INFOID:0000000010289967

DTC DETECTION LOGIC

NOTE:

If DTC P1546 is displayed with following DTC, first perform the trouble diagnosis for following DTC. Refer to [ECK-97, "DTC Index"](#).

- DTC P0001, P0002, P0101, P0190, P0200, P0201, P0202, P0203, P0204, P0627, P1453, P1544 and P2002.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1546	TEMP. UPSTREAM OF PF (Temperature upstream of particulate filter) • 1.DEF: EXCESSIVE TEMPERATURE	Diesel particulate filter temperature is more than 505 °C (941 °F).	Diesel particulate filter

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P1546 can not duplicate.

>> Proceed to [ECK-327, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289968

1.CHECK OTHER DTC

If DTC P1546 is displayed with other DTC, perform trouble diagnosis for other DTC.

>> INSPECTION END.

P1589 NEUTRAL SWITCH

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

P1589 NEUTRAL SWITCH

DTC Logic

INFOID:0000000010434281

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1589	NEUTRAL POSITION SW/ SENSOR (Neutral position switch/sen- sor) 1.DEF: SIGNAL INCO- HERENCE 2.DEF:IMPLAUSIBLE SIG- NAL	Neutral position switch signal remains ON for a long driving distance.	• Harness and connectors (Neutral position switch circuit is shorted.) • Neutral position switch

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [ECK-328, "Component Function Check"](#).

NOTE:

Use Component Function Check the overall function of the neutral position switch circuit. During this check, the DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-329, "Diagnosis Procedure"](#).

Component Function Check

INFOID:0000000010514760

1.PERFORM COMPONENT FUNCTION CHECK

With CONSULT

1. Turn ignition switch ON.
2. Select "MANUAL GEARBOX LEVER IN NEUTRAL" in "DATA MONITOR" mode of "ENIGNE" using CONSULT.
3. Check the "MANUAL GEARBOX LEVER IN NEUTRAL" indication as per the following conditions.

Selector lever position	Indication
Neutral position	DETECTED
Except above position	NOT DETECTED

Without CONSULT

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connectors as per the following conditions.

+		-	Condition		Voltage (Approx.)
ECM					
Connector	Terminal				
F81	117	Ground	Shift lever	Neutral	Battery voltage
				Except above	0 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-329, "Diagnosis Procedure"](#).

P1589 NEUTRAL SWITCH

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

INFOID:000000010434282

1.CHECK FUSE

Check that the following fuse is not fusing.

Fuse No.	Capacity
#67	10 A

Is the fuse fusing?

- YES >> Replace the fuse after repairing the applicable circuit.
NO >> GO TO 2.

2.CHECK REVERSE/NEUTRAL POSITION SWITCH POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect reverse/neutral position switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between reverse/neutral position switch harness connector and ground.

+		-	Voltage (Approx.)
Reverse/Neutral position switch			
Connector	Terminal		
F100	2	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK REVERSE/NEUTRAL POSITION SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector.
3. Check the continuity between reverse/neutral position switch harness connector and IPDM E/R harness connector.

+		-		Continuity
Reverse/Neutral position switch		IPDM E/R		
Connector	Terminal	Connector	Terminal	
F100	2	F90	101	Existed

Is the inspection result normal?

- YES >> Perform the trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

4.CHECK REVERSE/NEUTRAL POSITION INPUT SIGNAL CIRCUIT-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between reverse/neutral position switch harness connector and ECM harness connector.

+		-		Continuity
Reverse/Neutral position switch		ECM		
Connector	Terminal	Connector	Terminal	
F100	3	F81	117	Existed

4. Also check harness for short to ground.

P1589 NEUTRAL SWITCH

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace reverse/Neutral position switch.

NO >> Repair or replace error-detected parts.

P158A CLUTCH SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P158A CLUTCH SWITCH

DTC Logic

INFOID:0000000010434283

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P158A	CLUTCH PEDAL SWITCH/ SENSOR (Clutch pedal switch/sensor) 1.DEF:SIGNAL INCOHER- ENCE 2.DEF: SIGNAL COM- PARE FAILURE 3.DEF: IMPLAUSIBLE SIGNAL	ECM detects clutch interlock switch malfunction.	• Harness and connectors • Clutch interlock switch

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [ECK-331, "Component Function Check"](#).

NOTE:

Use Component Function Check the overall function of the neutral position switch circuit. During this check, the DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-331, "Diagnosis Procedure"](#).

Component Function Check

INFOID:0000000010514901

1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector terminals under the following conditions.

+		-	Condition		Voltage
ECM					
Connector	Terminal				
E59	6	Ground	Clutch pedal	Fully released	Approx. 0 V
				Fully depressed	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-331, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010434284

1.CHECK CLUTCH INTERLOCK SWITCH POWER SUPPLY

1. Disconnect clutch interlock switch harness connector.
2. Check the voltage between clutch interlock switch harness connector and ground.

+		-	Voltage
Clutch interlock switch			
Connector	Terminal		
E52	1	Ground	Battery voltage

Is the inspection result normal?

P158A CLUTCH SWITCH

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 2.
NO >> Repair open circuit or short to power in harness or connectors.

2.CHECK CLUTCH INTERLOCK SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connectors.
2. Check the continuity between clutch interlock switch harness connector and ECM harness connector.

+		-		Continuity
Clutch interlock switch		ECM		
Connector	Terminal	Connector	Terminal	
E52	2	E59	6	Existed

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

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK CLUTCH INTERLOCK SWITCH

Refer to [ECK-332, "Component Inspection \(Clutch Pedal Position Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace clutch interlock switch.

4.CHECK CLUTCH PEDAL POSITION SWITCH

Check clutch pedal position switch. Refer to [ECK-332, "Component Inspection \(Clutch Pedal Position Switch\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Clutch Pedal Position Switch)

INFOID:0000000010514902

1.CHECK CLUTCH INTERLOCK SWITCH-1

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

Clutch interlock switch		Condition		Continuity
+	-			
Terminal				
1	2	Clutch pedal	Fully released	Not existed
			Slightly depressed	Existed

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK CLUTCH INTERLOCK SWITCH-2

1. Adjust clutch interlock switch installation.
2. Check the continuity between clutch interlock switch terminals under the following conditions.

P158A CLUTCH SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Clutch interlock switch		Condition		Continuity
+	-			
Terminal				
1	2	Clutch pedal	Fully released	Not existed
			Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace clutch interlock switch.

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P160C ECM

DTC Logic

INFOID:0000000010289985

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P160C	COMPUTER (Computer) • 1.DEF: —	ECM function is malfunctioning.	ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-334, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289986

1.CHECK BATTERY TERMINALS

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 1 minute.
3. Check the battery terminals for damage and looseness.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair malfunction(s) and GO TO 2.

2.CHECK OTHER DTC-1

1. Turn ignition switch ON.
2. Check DTC.

Is DTC P160C displayed with P0002, P0101, P0180, P0190, P0217, P0226, P0340, P0471, P0544, P1544, P1545, P2002, P2080 or P2263 displayed?

YES >> Perform the trouble diagnosis for DTC P0002, P0101, P0180, P0190, P0217, P0226, P0340, P0471, P0544, P1544, P1545, P2002, P2080 or P2263, and GO TO 3. Refer to [ECK-97, "DTC Index"](#).
NO >> GO TO 3.

3.CHECK DTC

1. Turn ignition switch OFF and wait at least 1 minute.
2. Turn ignition switch ON.
3. Check DTC.

Is the DTC P160C displayed again?

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

4.REPLACE ECM

1. Replace ECM.

2. Go to [ECK-131, "Work Procedure"](#).

>> INSPECTION END

5. CHECK OTHER DTC-2

1. Start engine and let it idle for at least 1 minutes.
2. Check DTC.

Is the DTC P0002, P0101, P0180, P0190, P0217, P0226, P0340, P0471, P0544, P1544, P1545, P2002, P2080 or P2263 displayed?

YES >> Perform the trouble diagnosis for DTC P0002, P0101, P0180, P0190, P0217, P0226, P0340, P0471, P0544, P1544, P1545, P2002, P2080 or P2263, and GO TO 3. Refer to [ECK-97, "DTC Index"](#).

NO >> GO TO 6.

6. CHECK RESULT OF PROCEDURE 2

Check result of procedure 2.

Is result of procedure 2 "YES"?

YES >> GO TO 7.

NO >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

7. PERFORM DTC CONFIRMATION PROCEDURE

1. Select "DATA MONITOR" mode with CONSULT.
2. Drive the vehicle for at least 15 minutes at 0 - 50 km/h (0 - 31 MPH).

CAUTION:

Always drive vehicle at a safe speed.

3. Check DTC.

Is DTC detected?

YES >> Perform the trouble diagnosis for P0002, P0101, P0180, P0190, P0217, P0226, P0340, P0471, P0544, P1544, P1545, P2002, P2080 or P2263, and GO TO 3. Refer to [ECK-97, "DTC Index"](#).

NO >> INSPECTION END

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P1641 THERMOPLUNGER CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1641 THERMOPLUNGER CONTROL UNIT

DTC Logic

INFOID:0000000010289989

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1641	THMPR 1 RLY C/CIR (Thermoplunger 1 relay control circuit) • 1.DEF:IMPLAUSIBLE SIGNAL • CC.0: SHORT CIRCUIT TO EARTH • CC.1: SHORT-CIRCUIT TO +12V • CO: OPEN CIRCUIT	• ECM detects thermoplunger control unit circuit is open circuit. • ECM detects thermoplunger control unit circuit is short circuit to ground. • ECM detects thermoplunger control unit circuit is short circuit to battery.	• Harness or connectors (Thermoplunger control unit circuit is open or shorted.) • Thermoplunger control unit

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-336, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010289990

1.CHECK ECM HARNESS CONNECTOR CONNECTION

1. Turn ignition switch OFF.
2. Check the ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK THERMOPLUNGER CONTROL UNIT HARNESS CONNECTOR CONNECTION

Check the thermoplunger control unit harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK THERMOPLUNGER CONTROL UNIT POWER SUPPLY

Check the thermoplunger control unit power supply.

+		-	Voltage
Thermoplunger control unit			
Connector	Terminal		
F71	4	Ground	Battery voltage
	5		

P1641 THERMOPLUNGER CONTROL UNIT

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for battery power supply circuit.

4.CHECK THERMOPLUNGER CONTROL UNIT REFERENCE VALUE-1

Check the thermoplunger control unit reference value (thermoplunger control unit side). Refer to [ECK-76. "Reference Value"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5.CHECK THERMOPLUNGER CONTROL UNIT CIRCUIT-1

Check the thermoplunger control unit circuit for open and short.

+		-		Continuity
ECM		Thermoplunger control unit		
Connector	Terminal	Connector	Terminal	
F80	39	F71	8	Existed
	44		1	
	63		2	
F81	111		3	
	121		7	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

6.CHECK THERMOPLUNGER CONTROL UNIT REFERENCE VALUE-2

Check the thermoplunger control unit reference value (ECM side). Refer to [ECK-76. "Reference Value"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7.CHECK THERMOPLUNGER CONTROL UNIT CIRCUIT-2

Check the thermoplunger control unit circuit for open and short.

+		-		Continuity
ECM		Thermoplunger control unit		
Connector	Terminal	Connector	Terminal	
F80	39	F71	8	Existed
	44		1	
	63		2	
F81	111		3	
	121		7	

Is the inspection result normal?

YES >> Replace thermoplunger control unit.

NO >> Repair or replace error-detected parts.

8.CHECK THERMOPLUNGER

Check thermoplunger. Refer to [ECK-338. "Component Inspection \(Thermoplunger\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Replace malfunctioning thermoplunger.

P1641 THERMOPLUNGER CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Component Inspection (Thermoplunger)

INFOID:0000000010289991

1.CHECK THERMOPLUNGER

1. Turn ignition switch OFF.
2. Disconnect thermoplunger harness connector.
3. Check the resistance between thermoplunger terminal and ground.

+	-	Resistance
Thermoplunger		
Terminal		
1	Ground	$608 \pm 61 \text{ m}\Omega$

is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace thermoplunger.

P1642 THERMOPLUNGER CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1642 THERMOPLUNGER CONTROL UNIT

DTC Logic

INFOID:000000010289992

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1642	THMPR 2 RLY C/CIR (Thermoplunger 2 relay control circuit) • 1.DEF: IMPLAUSIBLE SIGNAL • CC.0: SHORT CIRCUIT TO EARTH • CC.1: SHORT-CIRCUIT TO +12V • CO: OPEN CIRCUIT	• ECM detects thermoplunger control unit circuit is open circuit. • ECM detects thermoplunger control unit circuit is short circuit to ground. • ECM detects thermoplunger control unit circuit is short circuit to battery.	• Harness or connectors (Thermoplunger control unit circuit is open or shorted.) • Thermoplunger control unit

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-339, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010514974

1.CHECK ECM HARNESS CONNECTOR CONNECTION

1. Turn ignition switch OFF.
2. Check the ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK THERMOPLUNGER CONTROL UNIT HARNESS CONNECTOR CONNECTION

Check the thermoplunger control unit harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK THERMOPLUNGER CONTROL UNIT POWER SUPPLY

Check the thermoplunger control unit power supply.

+		-	Voltage
Thermoplunger control unit			
Connector	Terminal		
F71	4	Ground	Battery voltage
	5		

P1642 THERMOPLUNGER CONTROL UNIT

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for battery power supply circuit.

4.CHECK THERMOPLUNGER CONTROL UNIT REFERENCE VALUE-1

Check the thermoplunger control unit reference value (thermoplunger control unit side). Refer to [ECK-76. "Reference Value"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5.CHECK THERMOPLUNGER CONTROL UNIT CIRCUIT-1

Check the thermoplunger control unit circuit for open and short.

+		-		Continuity
ECM		Thermoplunger control unit		
Connector	Terminal	Connector	Terminal	
F80	39	F71	8	Existed
	44		1	
	63		2	
F81	111		3	
	121		7	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

6.CHECK THERMOPLUNGER CONTROL UNIT REFERENCE VALUE-2

Check the thermoplunger control unit reference value (ECM side). Refer to [ECK-76. "Reference Value"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7.CHECK THERMOPLUNGER CONTROL UNIT CIRCUIT-2

Check the thermoplunger control unit circuit for open and short.

+		-		Continuity
ECM		Thermoplunger control unit		
Connector	Terminal	Connector	Terminal	
F80	39	F71	8	Existed
	44		1	
	63		2	
F81	111		3	
	121		7	

Is the inspection result normal?

YES >> Replace thermoplunger control unit.

NO >> Repair or replace error-detected parts.

8.CHECK THERMOPLUNGER

Check thermoplunger. Refer to [ECK-344. "Component Inspection \(Thermoplunger\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Replace malfunctioning thermoplunger.

P1642 THERMOPLUNGER CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Component Inspection (Thermoplunger)

INFOID:0000000010514975

1.CHECK THERMOPLUNGER

1. Turn ignition switch OFF.
2. Disconnect thermoplunger harness connector.
3. Check the resistance between thermoplunger terminal and ground.

+	-	Resistance
Thermoplunger		
Terminal		
1	Ground	608 ± 61 mΩ

is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace thermoplunger.

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P1643 THERMOPLUNGER CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1643 THERMOPLUNGER CONTROL UNIT

DTC Logic

INFOID:000000010289995

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1643	THMPR 3 RLY C/CIR (Thermoplunger 3 relay control circuit) • 1.DEF: IMPLAUSIBLE SIGNAL • CC.0: SHORT CIRCUIT TO EARTH • CC.1: SHORT-CIRCUIT TO +12V • CO: OPEN CIRCUIT	• ECM detects thermoplunger control unit circuit is open circuit. • ECM detects thermoplunger control unit circuit is short circuit to ground. • ECM detects thermoplunger control unit circuit is short circuit to battery.	• Harness or connectors (Thermoplunger control unit circuit is open or shorted.) • Thermoplunger control unit

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON at least 1 second.
2. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-342. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010514976

1.CHECK ECM HARNESS CONNECTOR CONNECTION

1. Turn ignition switch OFF.
2. Check the ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK THERMOPLUNGER CONTROL UNIT HARNESS CONNECTOR CONNECTION

Check the thermoplunger control unit harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK THERMOPLUNGER CONTROL UNIT POWER SUPPLY

Check the thermoplunger control unit power supply.

+		-	Voltage
Thermoplunger control unit			
Connector	Terminal		
F71	4	Ground	Battery voltage
	5		

ECK-342

P1643 THERMOPLUNGER CONTROL UNIT

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for battery power supply circuit.

4.CHECK THERMOPLUNGER CONTROL UNIT REFERENCE VALUE-1

Check the thermoplunger control unit reference value (thermoplunger control unit side). Refer to [ECK-76. "Reference Value"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5.CHECK THERMOPLUNGER CONTROL UNIT CIRCUIT-1

Check the thermoplunger control unit circuit for open and short.

+		-		Continuity
ECM		Thermoplunger control unit		
Connector	Terminal	Connector	Terminal	
F80	39	F71	8	Existed
	44		1	
	63		2	
F81	111		3	
	121		7	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

6.CHECK THERMOPLUNGER CONTROL UNIT REFERENCE VALUE-2

Check the thermoplunger control unit reference value (ECM side). Refer to [ECK-76. "Reference Value"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7.CHECK THERMOPLUNGER CONTROL UNIT CIRCUIT-2

Check the thermoplunger control unit circuit for open and short.

+		-		Continuity
ECM		Thermoplunger control unit		
Connector	Terminal	Connector	Terminal	
F80	39	F71	8	Existed
	44		1	
	63		2	
F81	111		3	
	121		7	

Is the inspection result normal?

YES >> Replace thermoplunger control unit.

NO >> Repair or replace error-detected parts.

8.CHECK THERMOPLUNGER

Check thermoplunger. Refer to [ECK-344. "Component Inspection \(Thermoplunger\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Replace malfunctioning thermoplunger.

P1643 THERMOPLUNGER CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Component Inspection (Thermoplunger)

INFOID:0000000010514977

1.CHECK THERMOPLUNGER

1. Turn ignition switch OFF.
2. Disconnect thermoplunger harness connector.
3. Check the resistance between thermoplunger terminal and ground.

+	-	Resistance
Thermoplunger		
Terminal		
1	Ground	$608 \pm 61 \text{ m}\Omega$

is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace thermoplunger.

P1650 STARTER MOTOR RELAY 2

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1650 STARTER MOTOR RELAY 2

DTC Logic

INFOID:0000000010289998

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition		Possible cause
P1650	CNT UNIT -> HEAT ELEM CONN (Control unit -> heat element connection)	A	Engine restart relay is stuck ON.	• Starter control relay • Engine restart relay
		B	Engine restart relay is stuck OFF.	• Harness and connectors (Between engine restart relay and starter motor harness is shorted to ground.) (Between battery and engine restart relay harness is open or shorted to ground.) • IPDM E/R • Engine restart relay

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 1 minute or more to start this procedure.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-1

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON and wait at least 30 seconds
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-345, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-2

Ⓔ With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (engine stop.)
5. Touch "CANCEL" and restart the engine.

ⓧ Without CONSULT

Activate stop/start system. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

CAUTION:

Always drive vehicle at a safe speed.

Is stop/start system activated normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-345, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010289999

1. CHECK ENGINE RESTART RELAY POWER SUPPLY

1. Turn ignition switch OFF.
2. Remove engine restart relay.
3. Check the voltage between engine restart relay harness connector and ground.

P1650 STARTER MOTOR RELAY 2

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-	Voltage
Engine restart relay			
Connector	terminal		
F163	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK ENGINE RESTART RELAY POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R harness connector.
2. Check the continuity between engine restart relay harness connector and IPDM E/R harness connector.

+		-		Continuity
Engine restart relay		IPDM E/R		
Connector	terminal	Connector	terminal	
F163	2	E39	44	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check IPDM E/R.

NO >> Repair or replace error-detected parts.

3.CHECK ENGINE RESTART RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect starter relay.
3. Check the continuity between engine restart relay harness connector and starter relay harness connector.

+		-		Continuity
Starter relay		Engine restart relay		
Connector	terminal	Connector	terminal	
F162	3	F163	5	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform the trouble diagnosis for starter relay routing circuit.

4.CHECK ENGINE RESTART RELAY CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between engine restart relay harness connector and ECM harness connector.

+		-		Continuity
Engine restart relay		ECM		
Connector	terminal	Connector	terminal	
F163	1	F80	48	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 ENGINE RESTART RELAY OUTPUT SIGNAL CIRCUIT

1. Check the continuity between engine restart relay harness connector and IPDM E/R harness connector.

P1650 STARTER MOTOR RELAY 2

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-		Continuity
Engine restart relay		IPDM E/R		
Connector	terminal	Connector	terminal	
F163	3	F88	65	Existed

- Disconnect starter motor terminal.
- Check the continuity between engine restart relay and starter motor.

+		-		Continuity
Engine restart relay		Starter motor		
Connector	terminal	Connector	terminal	
F163	3	F104	1	Existed

- Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK ENGINE RESTART RELAY

Check engine restart relay. Refer to [ECK-347. "Component Inspection"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Replace engine restart relay.

Component Inspection

INFOID:0000000010290000

1.CHECK ENGINE RESTART RELAY

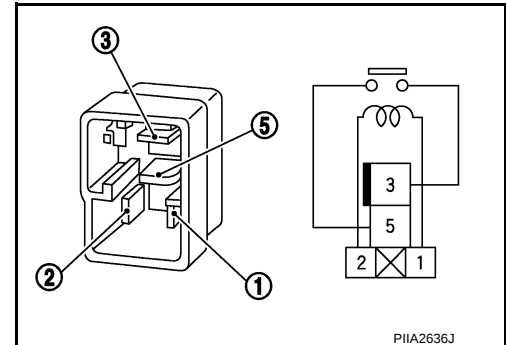
- Turn ignition switch OFF.
- Remove engine restart relay.
- Check the continuity between engine restart relay terminals as per the following conditions.

Engine restart relay		Condition	Continuity
+	—		
terminal			
3	5	12V direct current supply between terminals 1 and 2	Existed
		No supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine restart relay.



P1655 ENGINE RESTART BYPASS RELAY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1655 ENGINE RESTART BYPASS RELAY

DTC Logic

INFOID:000000010290005

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1655	ENGINE RESTART BY- PASS RELAY (Engine restart bypass re- lay)	At an engine restart by stop/start system, the voltage drop allowance is less than Ap- prox. 0.1 V when the engine restart bypass relay becomes closed from the open sta- tus, and this condition is repeated three times in a row.	• Harness or connectors (Engine restart bypass relay circuit is open or shorted.) (Engine restart bypass control relay circuit is open or shorted.) • Engine restart bypass relay • Engine restart bypass control relay

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 10 seconds or more to start this procedure.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (engine stop.)
5. Touch "CANCEL" and restart the engine.
6. Repeat Step 3 and Step 4 twice.

Without CONSULT

1. Activate the stop/start system. Stop the engine. Restart the engine. Refer to [ECK-39, "STOP/START SYS-TEM : System Description"](#).
2. Repeat Step 1 four times.

CAUTION:

Always drive vehicle at a safe speed.

Is DTC detected?

- YES >> Proceed to [ECK-348, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000010290006

1. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that the following fuse is not fusing.

Location	Fuse No.	Capacity
Fuse block (J/B)	7	20 A

Is the fuse fusing?

- YES >> Replace the fuse after repairing the applicable circuit.
NO >> GO TO 2.

2. CHECK ENGINE RESTART BYPASS CONTROL RELAY POWER SUPPLY

1. Turn ignition switch OFF.
2. Remove engine restart bypass control relay.
3. Turn ignition switch ON.

P1655 ENGINE RESTART BYPASS RELAY

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

4. Check the voltage between engine restart bypass control relay harness connector and ground.

+		–	Voltage
Engine restart bypass control relay			
Connector	Terminal	Ground	Battery voltage
F98	1		
	5		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform the trouble diagnosis for power supply circuit.

3.CHECK ENGINE RESTART BYPASS CONTROL RELAY CIRCUIT-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between engine restart bypass control relay harness connector and ECM harness connector.

+		-		Continuity
Engine restart bypass control relay		ECM		
Connector	Terminal	Connector	Terminal	
F98	2	F80	55	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK ENGINE RESTART BYPASS CONTROL RELAY CIRCUIT-2

1. Disconnect engine restart bypass relay harness connector.
2. Check the continuity between engine restart bypass control relay harness connector and engine restart bypass relay harness connector.

+		-		Continuity
Engine restart bypass control relay		Engine restart bypass relay		
Connector	Terminal	Connector	Terminal	
F98	3	F146	1	Existed

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 ENGINE RESTART BYPASS CONTROL RELAY

Check the engine restart bypass control relay. Refer to [ECK-350. "Component Inspection \(Engine Restart Bypass Control Relay\)"](#)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace error-detected parts.

6.CHECK ENGINE RESTART BYPASS RELAY

Check the engine restart bypass relay. Refer to [ECK-350. "Component Inspection \(Engine Restart Bypass Relay\)"](#).

Is the inspection result normal?

P1655 ENGINE RESTART BYPASS RELAY

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
 NO >> Replace error-detected parts.

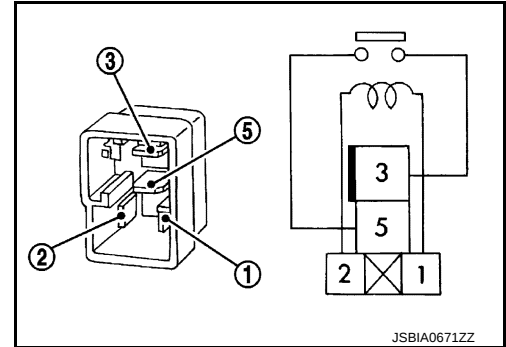
Component Inspection (Engine Restart Bypass Control Relay)

INFOID:0000000010290007

1.CHECK ENGINE RESTART BYPASS CONTROL RELAY

- Turn ignition switch OFF.
- Remove engine restart bypass control relay.
- Check continuity between engine restart bypass control relay terminals as per the following condition.

Engine restart bypass control relay		Condition	Continuity
+	-		
Terminal			
3	5	12 V direct current supply between terminals 1 and 2	Existed
		No current supply	Not existed



Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Replace engine restart bypass control relay.

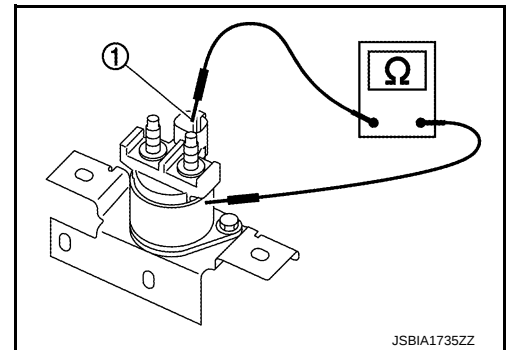
Component Inspection (Engine Restart Bypass Relay)

INFOID:0000000010290008

1.CHECK ENGINE RESTART BYPASS RELAY-1

- Turn ignition switch OFF.
- Disconnect battery cable from negative terminal.
- Remove engine restart bypass relay. Refer to [ECK-403, "Removal and Installation"](#).
- Check the continuity between engine restart bypass relay terminal and engine restart bypass relay body.

+	-	Continuity
Engine restart bypass relay		
Terminal		
1	Engine restart bypass relay body	Existed



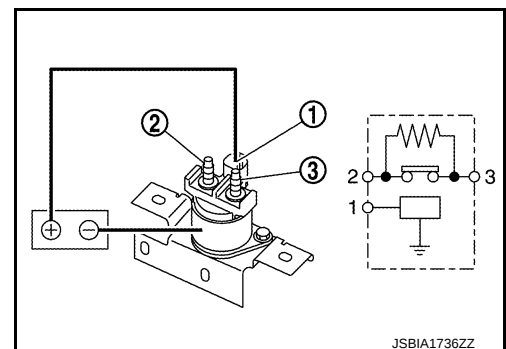
Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Replace engine restart bypass relay. Refer to [ECK-403, "Removal and Installation"](#).

2.CHECK ENGINE RESTART BYPASS RELAY-2

Check the resistance between engine restart bypass relay terminals as per the following conditions.

Engine restart bypass relay		Condition	Resistance (Approx.)
+	-		
Terminal			
2	3	12 V direct current supply between terminal 1 and body	10 mΩ
		No current supply	0 Ω



Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Replace engine restart bypass relay. Refer to [ECK-403, "Removal and Installation"](#).

P1656 ENGINE RESTART BYPASS RELAY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1656 ENGINE RESTART BYPASS RELAY

DTC Logic

INFOID:0000000110290009

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1656	— (—) 1.DEF: INVALID SOURCE COMPUTER MULTIPLEX SIGNALS 2.DEF: INVALID SOURCE COMPUTER MULTIPLEX SIGNALS 3.DEF: IMPLAUSIBLE SIGNAL	At an engine restart by stop/start system, the voltage right after the starter motor activation is less than Approx. 8 V.	- Harness and connectors (Engine restart bypass relay circuit is open or shorted.) (Engine restart bypass control relay circuit is open or shorted.) - Engine restart bypass relay - Engine restart bypass control relay

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If the other DTC Confirmation Procedure is performed right before this procedure, the ignition switch must be turned OFF and wait for 10 seconds or more to start this procedure.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (engine stop.)
5. Touch "CANCEL" and restart the engine.
6. Repeat Step 3 and Step 4 twice.

Without CONSULT

1. Activate the stop/start system. Stop the engine. Restart the engine. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).
2. Repeat Step 1 four times.

CAUTION:

Always drive vehicle at a safe speed.

Is DTC detected?

- YES >> Proceed to [ECK-352, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000110516037

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check that the following fuse is not fusing.

Location	Fuse No.	Capacity
Fuse block (J/B)	7	20 A

Is the fuse fusing?

- YES >> Replace the fuse after repairing the applicable circuit.
NO >> GO TO 2.

2.CHECK ENGINE RESTART BYPASS CONTROL RELAY POWER SUPPLY

P1656 ENGINE RESTART BYPASS RELAY

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Remove engine restart bypass control relay.
3. Turn ignition switch ON.
4. Check the voltage between engine restart bypass control relay harness connector and ground.

+		-	Voltage
Engine restart bypass control relay			
Connector	Terminal	Ground	Battery voltage
F98	1		
	5		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform the trouble diagnosis for power supply circuit.

3.CHECK ENGINE RESTART BYPASS CONTROL RELAY CIRCUIT-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between engine restart bypass control relay harness connector and ECM harness connector.

+		−		Continuity
Engine restart bypass control relay		ECM		
Connector	Terminal	Connector	Terminal	
F98	2	F80	55	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK ENGINE RESTART BYPASS CONTROL RELAY CIRCUIT-2

1. Disconnect engine restart bypass relay harness connector.
2. Check the continuity between engine restart bypass control relay harness connector and engine restart bypass relay harness connector.

+		-		Continuity
Engine restart bypass control relay		Engine restart bypass relay		
Connector	Terminal	Connector	Terminal	
F98	3	F146	1	Existed

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 ENGINE RESTART BYPASS CONTROL RELAY

Check the engine restart bypass control relay. Refer to [ECK-354, "Component Inspection \(Engine Restart Bypass Control Relay\)"](#)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace error-detected parts.

6.CHECK ENGINE RESTART BYPASS RELAY

P1656 ENGINE RESTART BYPASS RELAY

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Check the engine restart bypass relay. Refer to [ECK-354, "Component Inspection \(Engine Restart Bypass Relay\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Replace error-detected parts.

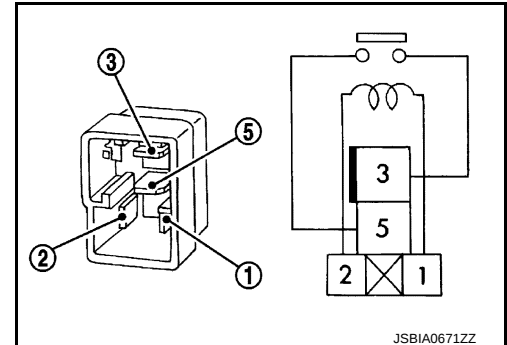
Component Inspection (Engine Restart Bypass Control Relay)

INFOID:000000010516038

1.CHECK ENGINE RESTART BYPASS CONTROL RELAY

1. Turn ignition switch OFF.
2. Remove engine restart bypass control relay.
3. Check continuity between engine restart bypass control relay terminals as per the following condition.

Engine restart bypass control relay		Condition	Continuity
+	-		
Terminal			
3	5	12 V direct current supply between terminals 1 and 2	Existed
		No current supply	Not existed



Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace engine restart bypass control relay.

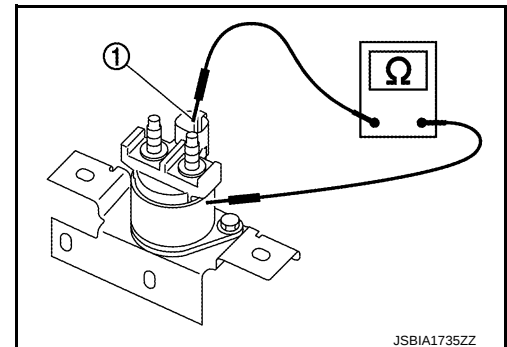
Component Inspection (Engine Restart Bypass Relay)

INFOID:000000010516039

1.CHECK ENGINE RESTART BYPASS RELAY-1

1. Turn ignition switch OFF.
2. Disconnect battery cable from negative terminal.
3. Remove engine restart bypass relay. Refer to [ECK-403, "Removal and Installation"](#).
4. Check the continuity between engine restart bypass relay terminal and engine restart bypass relay body.

+	-	Continuity
Engine restart bypass relay		
Terminal		
1	Engine restart bypass relay body	Existed



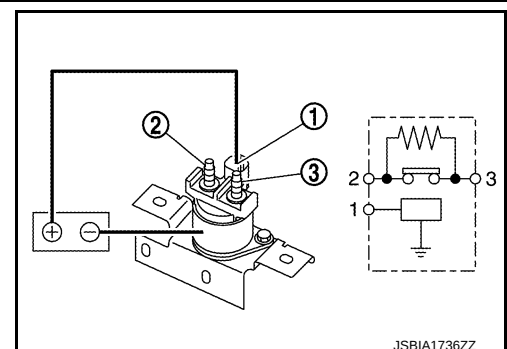
Is the inspection result normal?

- YES >> GO TO 2.
NO >> Replace engine restart bypass relay. Refer to [ECK-403, "Removal and Installation"](#).

2.CHECK ENGINE RESTART BYPASS RELAY-2

Check the resistance between engine restart bypass relay terminals as per the following conditions.

Engine restart bypass relay		Condition	Resistance (Approx.)
+	-		
Terminal			
2	3	12 V direct current supply between terminal 1 and body	10 mΩ
		No current supply	0 Ω



P1656 ENGINE RESTART BYPASS RELAY

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine restart bypass relay. Refer to [ECK-403. "Removal and Installation"](#).

P1675 ENGINE COOLANT TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P1675 ENGINE COOLANT TEMPERATURE

DTC Logic

INFOID:0000000010516041

DTC DETECTION LOGIC

If the cooling fan or other component in the cooling system malfunctions, engine coolant temperature will rise. When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1675	— (—)	When engine coolant temperature is too high.	• Cooling fan • Radiator hose • Radiator • Radiator cap • Water pump • Thermostat • Engine coolant bypass valve • Engine coolant temperature sensor

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Also, replace the engine oil.

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio.
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [ECK-356, "Component Function Check"](#).

NOTE:

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

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [ECK-357, "Diagnosis Procedure"](#).

Component Function Check

INFOID:0000000010516085

1.PERFORM COMPONENT FUNCTION CHECK-1

WARNING:

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

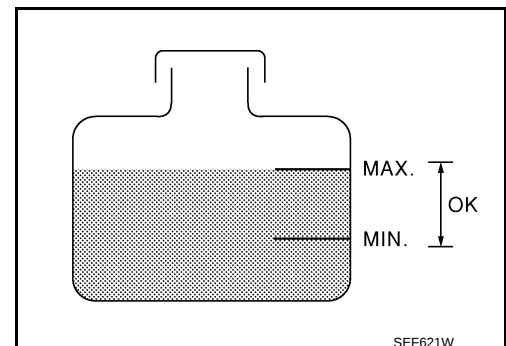
Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

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 [ECK-357, "Diagnosis Procedure"](#).
NO >> GO TO 2.



2.PERFORM COMPONENT FUNCTION CHECK-2

P1675 ENGINE COOLANT TEMPERATURE

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Confirm whether customer filled the coolant or not.

Did customer fill the coolant?

- YES >> Proceed to [ECK-357. "Diagnosis Procedure"](#).
NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-3

1. Start engine and let it idle.
2. Turn air conditioner switch and blower fan switch ON.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Proceed to [ECK-357. "Diagnosis Procedure"](#).

4.PERFORM COMPONENT FUNCTION CHECK-4

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Proceed to [ECK-357. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010516086

1.CHECK COOLING FAN OPERATION

Check cooling fan operation.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace malfunctioning part.

2.CHECK COOLING SYSTEM FOR LEAK-1

Check cooling system for leak.

Is leakage detected?

- YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK COOLING SYSTEM FOR LEAK-2

Check the following for leak.

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

>> Repair or replace malfunctioning part.

4.CHECK RADIATOR CAP

Check radiator cap.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace radiator cap.

5.CHECK THERMOSTAT

Check thermostat.

Is the inspection result normal?

- YES >> GO TO 6.

P1675 ENGINE COOLANT TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

NO >> Replace thermostat.

6.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to [ECK-202, "Component Inspection \(Engine Coolant Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> Perform overheating cause analysis. Refer to [CO-63, "Troubleshooting Chart"](#).

NO >> Replace engine coolant temperature sensor.

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P2002 DIESEL PARTICULATE FILTER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P2002 DIESEL PARTICULATE FILTER

DTC Logic

INFOID:0000000010290019

DTC DETECTION LOGIC

NOTE:

If DTC P2002 is displayed with following DTC, perform the trouble diagnosis for following DTC. Refer to [ECK-97, "DTC Index"](#).

- DTC U0121, U0415, P0001, P0002, P0045, P0100, P0101, P0105, P0115, P0200, P0201, P0202, P0203, P0204, P0225, P0226, P0335, P0402, P0470, P0471, P0487, P0488, P0544, P0560, P060A, P061A, P062B, P0638, P0641, P0651, P0697, P1544, P160C, P1641, P1642, P1643, P1650, P2080, P2100, P2119, P2120, P2226, P2263 and P253F.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2002	PARTICLE FILTER (Diesel particulate filter efficiency below threshold bank 1) • 1.DEF: CLOGGED • 2.DEF: COMPONENT IN POOR CONDITION • 3.DEF: OFFSET IMPLAUSIBLE • 4.DEF: FAULT ALERTED VIA THE CONTROL UNIT	Diesel particulate filter function does not operate properly.	Diesel particulate filter

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P2002 can not duplicate.

>> Proceed to [ECK-359, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010290020

1.CHECK DIESEL PARTICULATE FILTER

Refer to [ECK-359, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace diesel particulate filter.

2.CHECK INTAKE AIR SYSTEM

Check the intake air system for leakage.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts and then GO TO 3.

3.PERFORM SELF-DIAGNOSIS

Perform "Self-diagnostic results" of "ENGINE" using CONSULT.

Is any DTC detected?

YES >> Replace diesel particulate filter.

NO >> Perform SERVICE REGENERATION. Refer to [ECK-149, "Work Procedure"](#).

Component Inspection

INFOID:0000000010290021

1.CHECK DIESEL PARTICULATE FILTER

Check diesel particulate filter for damage.

Is the inspection result normal?

P2002 DIESEL PARTICULATE FILTER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

- YES >> Perform SERVICE REGENERATION. Refer to [ECK-149. "Work Procedure"](#).
- NO >> Replace diesel particulate filter.

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P2080 EGT SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P2080 EGT SENSOR 1

DTC Logic

INFOID:0000000010290022

DTC DETECTION LOGIC

NOTE:

If DTC P2080 is displayed with DTC P0544, first perform the trouble diagnosis for DTC P0544. Refer to [ECK-259, "DTC Logic"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2080	TBN DOWNS TEMP REG (Exhaust gas temperature sensor circuit range/performance bank 1 sensor 1) • 1.DEF: SIGNAL OUTSIDE UPPER LIM- IT	• An excessively high voltage from ex- haust gas temperature sensor 1 is sent to ECM. • Temperature before the turbine is more than 830 °C (1,526 °F) for 180 seconds.	• Intake air leaks • Electric throttle actuator • Fuel injector • Exhaust gas leaks

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P2080 can not be duplicate.

>> Proceed to [ECK-361, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010290023

1.CHECK INTAKE AIR SYSTEM

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK ELECTRIC THROTTLE ACTUATOR

Check the electric throttle actuator. Refer to [ECK-363, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace electric throttle actuator.

3.CHECK FUEL INJECTOR

Check the fuel injector. Refer to [ECK-212, "Component Inspection \(Fuel Injector\)"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace malfunctioning fuel injector.

4.CHECK EXHAUST SYSTEM

Check the exhaust gas leakage.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

P2100 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P2100 THROTTLE CONTROL MOTOR RELAY

DTC Logic

INFOID:0000000010290024

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2100	INLET AIR FLAP CIRCUIT (Throttle actuator "A" control motor circuit/ open) • 1.DEF: — • 2.DEF: OPERATION TEMPERATURE TOO HIGH	- ECM detects throttle control motor circuit is open circuit. - ECM detects throttle control motor circuit is short circuit to ground. - ECM detects throttle control motor circuit is short circuit to battery.	- Harness or connectors (Throttle control motor circuit is open or shorted) - Electric throttle control actuator

C

D

E

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

G

>> GO TO 2.

H

2.PERFORM DTC CONFIRMATION PROCEDURE-1

- Turn ignition ON at least 1 seconds.
- Check DTC.

I

Is DTC detected?

J

YES >> Proceed to [ECK-362, "Diagnosis Procedure"](#).
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

K

- Start engine and let it idle for at least 2 seconds.
- Check DTC.

Is DTC detected?

L

YES >> Proceed to [ECK-362, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010290025

M

1.CHECK ECM HARNESS CONNECTOR CONNECTION

N

- Turn ignition switch OFF.
- Check the ECM harness connector connection.

Is the inspection result normal?

O

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR HARNESS CONNECTOR CONNECTION

P

- Turn ignition switch OFF.
- Check the electric throttle control actuator harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR CIRCUIT

P2100 THROTTLE CONTROL MOTOR RELAY

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Check the electric throttle control actuator circuit for open and short.

+		-		Continuity
ECM		Electric throttle control actuator		
Connector	Terminal	Connector	Terminal	
F80	61	F46	2	Existed
	67		3	
	71		4	
F81	139		6	
	140		1	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK THROTTLE CONTROL MOTOR

Perform [ECK-363. "Component Inspection"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

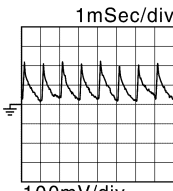
NO >> Replace electric throttle control actuator.

Component Inspection

INFOID:0000000010290026

1.CHECK THROTTLE CONTROL MOTOR

1. Reconnect all harness connectors disconnected.
2. Check the voltage between ECM harness connectors terminals as per the following conditions.

ECM				Condition	Voltage
+		-			
Connector	Terminal	Connector	Terminal		
F81	139	E59	25	[Engine is running] • Warm-up condition • Idle speed	
					[Ignition switch: OFF] • For a few seconds after turning ignition switch OFF
		140			[Engine is running] • Warm-up condition • Idle speed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator.

P2119 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P2119 ELECTRIC THROTTLE CONTROL FUNCTION

DTC Logic

INFOID:0000000010290030

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2119	AIR INLET FLAP (Throttle actuator control throttle body range/perfor- mance) 1.DEF: OFFSET IM- PLAUSIBLE	ECM detects abnormally closed position of throttle control valve.	• Harness or connectors (Throttle control motor circuit is open or shorted) • Electric throttle control actuator

C

D

E

Diagnosis Procedure

INFOID:0000000010290031

1.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

F

G

YES >> GO TO 2.

NO >> Repair or replace.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

H

1. Replace electric throttle control actuator.
2. Perform [ECK-136, "Work Procedure"](#).

I

>> INSPECTION END

J

K

L

M

N

O

P

P2120 APP SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

P2120 APP SENSOR

DTC Logic

INFOID:0000000010290032

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2120	PEDAL POTENTIOMETER CIR- CUIT TRACK 2 (Throttle/pedal position sensor/ switch "D" circuit) 1.DEF: VOLTAGE TOO HIGH 2.DEF: VOLTAGE TOO LOW	- Accelerator pedal position (APP) sensor 2 signal is less than 0.04 V. - Accelerator pedal position (APP) sensor 2 signal is more than 0.74 V.	- Harness or connectors (APP sensor 2 circuit is open or shorted.) - APP sensor 2

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-365, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010290033

1.CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR POWER SUPPLY

Check the power supply of the APP sensor.

+		-	Voltage (Approx.)
APP sensor			
Connector	Terminal		
E20	4	Ground	5.0 V
	5		

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK APP SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Check APP sensor circuit for open and short.

+		-		Continuity
ECM		APP sensor		
Connector	Terminal	Connector	Terminal	Existed
E59	23	E20	5	
	27		4	

Is the inspection result normal?

P2120 APP SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Check ECM power supply circuit. Refer to [ECK-156, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

3.CHECK APP CIRCUIT

1. Turn ignition switch OFF.
2. Check APP sensor circuit for open and short.

+		-		Continuity
ECM		APP sensor		
Connector	Terminal	Connector	Terminal	
E59	21	E20	1	Existed
	22		6	
	30		2	
	31		3	

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK APP SENSOR

Refer to [ECK-366, "Component Inspection \(Accelerator Pedal Position Sensor\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Replace error-detected parts.

Component Inspection (Accelerator Pedal Position Sensor)

INFOID:0000000010290034

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 as follows.

ECM			Condition		Voltage
Connector	+	-			
	Terminal				
E59	31	30	Accelerator pedal	Fully released	0.6 - 0.9 V
				Fully depressed	3.9 - 4.7 V
	22	21		Fully released	0.3 - 0.6 V
				Fully depressed	1.95 - 2.4 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace accelerator pedal assembly.

P2226 BARO SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P2226 BARO SENSOR

DTC Logic

INFOID:0000000010290035

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2226	ATMOS PRESS SEN (Barometric pressure sensor "A" circuit) 1.DEF: VOLTAGE TOO HIGH 2.DEF: VOLTAGE TOO LOW 3.DEF: IMPROPER SIGNAL SHAPE	- Barometric pressure sensor (built-into ECM) signal remains less than 0.3 V for 2.5 seconds. - Barometric pressure sensor (built-into ECM) signal remains more than 4.95 V for 2.5 seconds. - Barometric pressure differs from the calculated value more than 50 hPa (0.05 bar, 0.051 kg/cm², 0.145 psi).	ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to [ECK-367, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010290036

1.CHECK ECM AIR INLET VISUALLY

Check if foreign matter is blocking the air inlet for ECM.

Is the inspection result normal?

YES >> Replace ECM. Refer to [ECK-399, "Removal and Installation"](#).
NO >> Remove foreign matter.

P2263 TC SYSTEM

DTC Logic

INFOID:0000000010290041

DTC DETECTION LOGIC

NOTE:

If DTC P2263 is displayed with following DTC, first perform the trouble diagnosis for following DTC. Refer to [ECK-97, "DTC Index"](#).

- P0001, P0002, P0045, P0105, P0115, P0180, P0190, P0200, P0201, P0202, P0203, P0204, P0217, P0402, P0409, P0487, P0488, P0627, P0641 and P0651.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2263	BOOST PRESSURE CIRCUIT (Turbocharger/supercharger boost system performance) • 1.DEF: SIGNAL OUTSIDE LOWER LIMIT • 2.DEF: SIGNAL OUTSIDE UPPER LIMIT • 3.DEF: PARAMETER AT MAXIMUM STOP • 4.DEF: PARAMETER AT MINIMUM STOP	• Differences between boost pressure and target value are less than -150 hPa. (Boost pressure is too high) • Differences between boost pressure and target value are more than 150 hPa. (Boost pressure is too low)	• Harness or connectors (Turbocharger boost sensor circuit is open or shorted.) • Turbocharger boost sensor (with intake air temperature sensor 2) • Vacuum air circuit • Air filter • Turbocharger • Intake air leaks • Exhaust gas leaks • Low pressure EGR circuit • High pressure EGR circuit • Turbocharger boost control solenoid valve

DTC CONFIRMATION PROCEDURE

1.PERFORM DIAGNOSIS PROCEDURE

NOTE:

DTC P2263 can not be duplicate.

>> Proceed to [ECK-368, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010290042

1.CHECK AIR FILTER

Check that air filter is not obstructed.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK INTAKE AIR DUCT

Check that intake air duct is not obstructed.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK EXHAUST GAS LEAK

Check exhaust gas leak.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK TURBOCHARGER BOOST SENSOR

Check the turbocharger boost sensor. Refer to [ECK-198, "Component Inspection \(Turbocharger Boost Sensor\)"](#).

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 5.
NO >> Replace turbocharger boost sensor.

5.CHECK TURBOCHARGER BOOST CONTROL SOLENOID VALVE

Check the turbocharger boost control solenoid valve. Refer to [ECK-183, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.CHECK TURBOCHARGER

Check the turbocharger.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK HIGH PRESSURE EGR CIRCUIT AND LOW PRESSURE EGR CIRCUIT

Check the low pressure EGR circuit and high pressure EGR circuit.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

P2264 WATER IN FUEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P2264 WATER IN FUEL SENSOR

DTC Logic

INFOID:000000010290043

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2264	WTR DIESEL DETECTR (Water in fuel sensor circuit) CO: OPEN CIRCUIT ON THE LINE OR PRESENCE OF WATER IN THE DIESEL	- A signal from the detection sensor is sent to ECM for 8 seconds. - ECM detects detection sensor circuit is open circuit for 8 seconds.	- Harness or connectors (Detection sensor circuit is open.) - Fuel heater and water in fuel level sensor - Fuel filter

C

D

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

E

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

F

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

G

1. Start engine.
2. Drive the vehicle at least 15 seconds at 5 km/h (3.11 MPH) or more.

H

CAUTION:

Always drive the vehicle at safe speed.

3. Check DTC.

I

Is DTC detected?

YES >> Proceed to [ECK-370, "Diagnosis Procedure"](#).

NO >> INSPECTION END

J

Diagnosis Procedure

INFOID:000000010290044

1.PERFORM DIESEL FUEL FILTER WATER DRAINING

K

Perform diesel fuel filter water draining. Refer to [FL-34, "Water Draining"](#).

Water has been detected in the fuel filter?

YES >> GO TO 2.

NO >> GO TO 3.

L

2.CHECK FUEL CONFORMITY

M

Check fuel conformity.

Is fuel normal?

YES >> Replace fuel filter.

NO >> Drain the fuel circuit and replace the fuel filter.

N

3.CHECK HARNESS CONNECTOR CONNECTIONS

O

Check fuel heater and water level sensor harness connector connections.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

P

4.CHECK FUEL HEATER AND WATER LEVEL SENSOR POWER SUPPLY AND GROUND CIRCUIT

Check water level sensor power supply and ground circuit for open and short.

P2264 WATER IN FUEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-	Voltage
Fuel heater and water level sensor			
Connector	Terminal		
F191	2	Ground	Battery voltage
	5		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK FUEL HEATER AND WATER LEVEL SENSOR CIRCUIT

Check water level sensor circuit for open and short.

+		-		Continuity
ECM		Fuel heater and water level sensor		
Connector	Terminal	Connector	Terminal	
E59	24	F191	1	Existed

+		-	Continuity
Fuel heater and water level sensor			
Connector	Terminal		
E191	3	Ground	Existed
	4		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Perform [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace fuel heater and water level sensor.

NO >> Repair or replace error-detected parts.

P2452 DIESEL PARTICULATE FILTER PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P2452 DIESEL PARTICULATE FILTER PRESSURE SENSOR

DTC Logic

INFOID:0000000010290045

DTC DETECTION LOGIC

NOTE:

If DTC P2452 is displayed with DTC P0651, first perform the trouble diagnosis for DTC P0651. Refer to [ECK-280, "DTC Logic"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2452	P/FLT DIFF PRS SEN (Diesel particulate filter pressure sensor "A" circuit) 1.DEF: VOLTAGE TOO LOW 2.DEF: VOLTAGE TOO HIGH	- An excessively high voltage (more than 4.9 V) from diesel particulate filter pressure sensor is sent to ECM. - An excessively low voltage (less than 0.23 V) from diesel particulate filter pressure sensor is sent to ECM.	- Harness or connectors (DPF differential pressure sensor circuit is open or shorted.) - DPF differential pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 5 second.
- Check DTC.

Is DTC detected?

YES >> Proceed to [ECK-372, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010290046

1.CHECK ECM HARNESS CONNECTOR CONNECTIONS

- Turn ignition switch OFF.
- Check the ECM harness connector connection.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK DPF DIFFERENTIAL PRESSURE SENSOR HARNESS CONNECTOR CONNECTIONS

Check the DPF differential pressure sensor harness connector connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK DPF DIFFERENTIAL PRESSURE SENSOR POWER SUPPLY

Check the DPF differential pressure sensor power supply.

+		-	Voltage (Approx.)
DPF differential pressure sensor			
Connector	Terminal		
F11	1	Ground	5.0 V

Is the inspection result normal?

P2452 DIESEL PARTICULATE FILTER PRESSURE SENSOR

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

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

4.CHECK DPF DIFFERENTIAL PRESSURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

Check the DPF differential pressure sensor power supply and ground circuit for open and short.

+		+		Continuity
ECM		DPF differential pressure sensor		
Connector	Terminal	Connector	Terminal	
F80	53	F11	1	Existed
	58		2	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

5.CHECK DPF DIFFERENTIAL PRESSURE SENSOR SIGNAL CIRCUIT

Check the DPF differential pressure sensor signal circuit for open and short.

+		+		Continuity
ECM		DPF differential pressure sensor		
Connector	Terminal	Connector	Terminal	
F80	80	F11	3	Existed

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.REPLACE DPF DIFFERENTIAL PRESSURE SENSOR

Replace DPF differential pressure sensor.

>> GO TO 7.

7.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC Confirmation Procedure.
See [ECK-372, "DTC Logic"](#).

Is the DTC P2452 detected again?

YES >> Replace ECM. Refer to [ECK-399, "Removal and Installation"](#).
NO >> INSPECTION END

P2504 CHARGING SYSTEM VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P2504 CHARGING SYSTEM VOLTAGE

DTC Logic

INFOID:0000000010518128

DTC DETECTION LOGIC

A

ECK

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2504	CHARGING SYSTEM VOLTAGE (Charging system voltage high) • 1.DEF: SIGNAL OUTSIDE UPPER LIMIT • 2.DEF: SIGNAL OUTSIDE LOWER LIMIT • 3.DEF: — • 4.DEF: MECHANICAL LINKAGE FAILURE • 5.DEF: OPERATION TEMPERATURE TOO HIGH	ECM detects poor performance of alternator.	• Harness or connectors • Alternator

C

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

G

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

H

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

I

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

Is the DTC detected?

J

- YES >> Proceed to [ECK-374, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010624110

K

1.CHECK DRIVE BELT

L

Check drive belt. Refer to [EM-274, "Inspection"](#).

Is the inspection result normal?

M

- YES >> GO TO 2.
NO >> Adjust or replace drive belt.

2.CHECK CHARGING SYSTEM

N

Check charging system. Refer to [CHG-15, "Work Flow"](#).

Is the inspection result normal?

O

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Repair or replace error-detected part.

P

P253F ENGINE OIL DETERIORATED

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P253F ENGINE OIL DETERIORATED

DTC Logic

INFOID:0000000010290047

DTC DETECTION LOGIC

NOTE:

If DTC P253F is displayed with DTC P0115, first perform the trouble diagnosis for DTC P0115. Refer to [ECK-201, "DTC Logic"](#).

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P253F	ENG OIL DILUTION (Engine oil deteriorated) • 1.DEF: SIGNAL INCOHERENCE	When engine oil is too much quantity.	Too much engine oil

DTC CONFIRMATION PROCEDURE

1..PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> Proceed to [ECK-375, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010290048

1.CHECK ENGINE OIL LEVEL

Check the engine oil level. Refer to [LU-35, "Inspection"](#).

CAUTION:

If after performed service regeneration, exchange the engine oil and engine oil filter.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Drain or refill engine oil. Refer to [LU-36, "Draining"](#) or [LU-36, "Refilling"](#).

P2688 FUEL HEATER

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

P2688 FUEL HEATER

DTC Logic

INFOID:0000000010290051

DTC DETECTION LOGIC

A

ECK

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2688	— (Fuel supply heater control circuit low) • CC.0: SHORT CIRCUIT TO EARTH • CC.1: SHORT-CIRCUIT TO +12V • CO: OPEN CIRCUIT	• ECM detects fuel heater circuit is open. • ECM detects fuel heater circuit is short to ground. • ECM detects fuel heater circuit is short to battery.	• Harness or connectors (Fuel heater relay circuit is open or shorted.) • Fuel heater relay

C

D

E

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 1 minute before conducting the next test.

F

G

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON at least 1 second.
2. Check DTC.

Is DTC detected?

I

YES >> Proceed to [ECK-376, "Diagnosis Procedure"](#).
NO >> INSPECTION END

J

Diagnosis Procedure

INFOID:0000000010290052

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check that the following fuse is not fusing.

K

L

Fuse No.	Capacity
#4	10 A
#44	20 A

M

Is the fuse fusing?

YES >> Replace the fuse after repairing the applicable circuit.
NO >> GO TO 2.

N

2.CHECK FUEL HEATER RELAY POWER SUPPLY

1. Turn ignition switch OFF.
2. Remove fuel heater relay.
3. Turn ignition switch ON.
4. Check the voltage between fuel heater relay harness connector and ground.

O

P

+		–	Voltage
Fuel heater relay			
Connector	Terminal		
F164	1	Ground	Battery voltage
	3		

ECK-375

P2688 FUEL HEATER

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform the trouble diagnosis for power supply circuit.

3.CHECK FUEL HEATER RELAY CIRCUIT-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between fuel heater relay harness connector and ECM harness connector.

+		-		Continuity
Fuel heater relay		ECM		
Connector	Terminal	Connector	Terminal	
F164	2	F80	95	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK FUEL HEATER RELAY CIRCUIT-2

1. Disconnect fuel heater and water level sensor harness connector.
2. Check the continuity between fuel heater and water level sensor harness connector and fuel heater relay harness connector.

+		-		Continuity
Fuel heater and water level sensor		Fuel heater relay		
Connector	Terminal	Connector	Terminal	
F191	5	F164	5	Existed

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 FUEL HEATER RELAY

Check the fuel heater relay. Refer to [ECK-377, "Component Inspection \(Fuel Heater Relay\)"](#)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace error-detected parts.

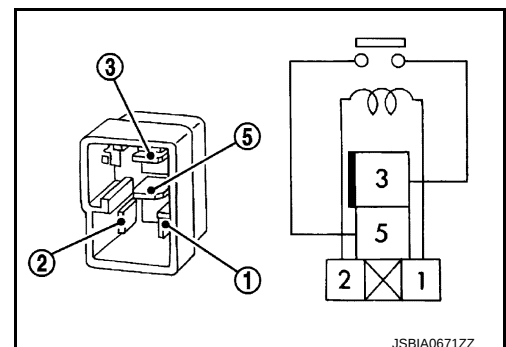
Component Inspection (Fuel Heater Relay)

INFOID:000000010290053

1.CHECK FUEL HEATER RELAY

1. Turn ignition switch OFF.
2. Remove fuel heater relay.
3. Check continuity between fuel heater relay terminals as per the following condition.

Fuel heater relay		Condition	Continuity
+	—		
Terminal			
3	5	12 V direct current supply between terminals 1 and 2	Existed
		No current supply	Not existed



P2688 FUEL HEATER

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace fuel heater relay.

A

ECK

C

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P

LOW PRESSURE FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

LOW PRESSURE FUEL PUMP

Component Function Check

INFOID:0000000010519314

1.CHECK FUEL PUMP FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose with two fingers.

NOTE:

Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> [ECK-379, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010519315

1.CHECK FPCM POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector.
3. Turn ignition switch ON.
4. Check the voltage between FPCM harness connector and ground.

+		-	Voltage
FPCM			
Connector	Terminal		
B76	8	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Perform the trouble diagnosis for power supply circuit.

2.CHECK FPCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between FPCM harness connector and ground.

+		-	Continuity
FPCM			
Connector	Terminal		
B76	7	Ground	Existed

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair open circuit or short to power in harness or connectors.

3.CHECK FPCM INPUT AND OUTPUT CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between FPCM harness connector and ECM harness connector.

+		-		Continuity
FPCM		ECM		
Connector	Terminal	Connector	Terminal	
B77	9	E59	13	Existed
	10		11	

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

Is the inspection result normal?

LOW PRESSURE FUEL PUMP

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK FUEL PUMP CONTROL CIRCUIT

1. Disconnect fuel level sensor unit and fuel pump (main) harness connector.
2. Check the continuity between FPCM harness connector and fuel level sensor unit and fuel pump (main) harness connector.

+		-		Continuity
FPCM		Fuel level sensor unit and fuel pump (main)		
Connector	Terminal	Connector	Terminal	
B75	3	B94	1	Existed
	4		4	
	5		3	
	6		2	

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 LOW PRESSURE FUEL PUMP

Refer to [ECK-380, "Component Inspection \(Low Pressure Fuel Pump\)"](#).

Is the inspection result normal?

- YES >> Replace FPCM.
NO >> Replace low pressure fuel pump.

Component Inspection (Low Pressure Fuel Pump)

INFOID:0000000010519316

1.CHECK FUEL PRESSURE REGULATOR

1. Turn ignition switch OFF.
2. Check low fuel pressure.

Is inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK LOW PRESSURE FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump (main).
3. Check resistance between fuel level sensor unit and fuel pump (main) terminals as follows.

+	—	Continuity
Fuel level sensor unit and fuel pump (main)		
Terminals		
2	3	Existed
	4	

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace fuel level sensor unit and fuel pump (main).

STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

STOP LAMP SWITCH

Component Function Check

INFOID:0000000010290056

1.CHECK STOP LAMP SWITCH FUNCTION

With CONSULT

1. Turn ignition switch ON.
2. Select "BRAKE PEDAL" in "DATA MONITOR" mode of "ENGINE" using CONSULT.
3. Check indication as per the following conditions.

Monitor item	Condition		Indication
BRAKE PEDAL	Brake pedal	Slightly depressed	On
		Fully released	Off

Without CONSULT

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector terminals as per the following.

ECM			Condition	Voltage (Approx.)
Connector	+	-		
	Terminal			
E59	17	25	Brake pedal	Slightly depressed
				Fully released
				0 V
				Battery voltage

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-381, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010290057

1.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

+		-	Voltage
Stop lamp switch			
Connector	Terminal		
E50	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for power supply circuit.

2.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between stop lamp switch harness connector and ECM harness connector.

+		-		Continuity
Stop lamp switch		ECM		
Connector	Terminal	Connector	Terminal	
E50	4	E59	17	Existed

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

STOP LAMP SWITCH

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK STOP LAMP SWITCH

Check the stop lamp switch. Refer to [ECK-382, "Component Inspection"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
NO >> Replace stop lamp switch.

Component Inspection

INFOID:0000000010290058

1.CHECK STOP LAMP SWITCH-1

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

Stop lamp switch		Condition		Continuity
+	-			
Terminals				
3	4	Brake pedal	Fully released	Existed
			Slightly de-pressed	Not existed

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-2

1. Adjust stop lamp switch installation. Refer to [BR-8, "Inspection and Adjustment"](#)(LHD models), [BR-52, "Inspection and Adjustment"](#)(RHD models).
2. Check the continuity between stop lamp switch terminals as per the following conditions.

Stop lamp switch		Condition		Continuity
+	-			
Terminals				
3	4	Brake pedal	Fully released	Existed
			Slightly de-pressed	Not existed

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace stop lamp switch.

HOOD SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

HOOD SWITCH

Component Function Check

INFOID:0000000010290059

1.CHECK HOOD SWITCH FUNCTION

With CONSULT

1. Turn ignition switch ON.
2. Select "HOOD SW" in "DATA MONITOR" mode of "IPDM E/R" using CONSULT.
3. Check indication as per the following conditions.

Monitor item	Condition		Indication
HOOD SW	Engine hood	Close	OPEN
		Open	CLOSE

Without CONSULT

1. Turn ignition switch ON.
2. Check the voltage between hood switch harness connector and ground as per the following conditions.

+		−	Condition		Voltage (Approx.)
Hood switch					
Connector	Terminal				
E100	1	Ground	Engine hood	Close	Battery voltage
				Open	0 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-383, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010290060

1.CHECK IPDM E/R OUTPUT

1. Turn ignition switch OFF.
2. Open the engine hood.
3. Disconnect hood switch harness connector.
4. Turn ignition switch ON.
5. Check the voltage between hood switch harness connector and ground.

+		-	Voltage (Approx.)
Hood switch			
Connector	Terminal		
E100	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK HOOD SWITCH SIGNAL CIRCUIT

1. Disconnect IPDM E/R harness connector.
2. Check the continuity between hood switch harness connector and IPDM E/R harness connector.

+		-		Continuity
Hood switch		IPDM E/R		
Connector	Terminal	Connector	Terminal	
E100	1	E102	60	Existed

HOOD SWITCH

[K9K]

< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair or replace error-detected parts.

3.CHECK HOOD SWITCH GROUND CIRCUIT

Check the continuity between hood switch harness connector and ground.

+		-	Continuity
Hood switch			
Connector	Terminal		
E100	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK HOOD SWITCH

Check the hood switch. Refer to [ECK-384, "Component Inspection"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace hood switch.

Component Inspection

INFOID:0000000010290061

1.CHECK HOOD SWITCH

1. Turn ignition switch OFF.
2. Disconnect hood switch harness connector.
3. Check the continuity between hood switch terminals as per the following conditions.

Hood switch		Condition		Continuity
+	–			
Terminal				
1	2	Hood switch	Released	Not existed
			Depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace hood switch.

STOP/START OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

STOP/START OFF SWITCH

Component Function Check

INFOID:0000000010434291

1.CHECK STOP/START OFF SWITCH FUNCTION

With CONSULT

1. Turn ignition switch ON.
2. Select "AT STOP START SW" in "DATA MONITOR" mode of "BCM" using CONSULT.
3. Check "AT STOP START SW" indication as per the following condition.

Monitor item	Condition		Indication
AT STOP START SW	Stop/start OFF switch	ON	On
		OFF	Off

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [ECK-385, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010434292

1.CHECK STOP/START OFF SWITCH POWER SUPPLY (INDICATOR)

1. Turn ignition switch OFF.
2. Disconnect stop/start OFF switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between stop/start OFF switch harness connector and ground.

+		-	Voltage (Approx.)
Stop/start OFF switch			
Connector	Terminal		
M110	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check power supply circuit.

2.CHECK STOP/START OFF SWITCH GROUND CIRCUIT (INDICATOR)

1. Turn ignition switch OFF.
2. Disconnect combination meter harness connector.
3. Check the continuity between stop/start OFF switch harness connector and ground.

+		-	Continuity
Stop/start OFF switch			
Connector	Terminal		
M110	6	Ground	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK STOP/START OFF SWITCH POWER SUPPLY (SWITCH)

Check the voltage between stop/start OFF switch harness connector and ground.

STOP/START OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

+		-	Voltage (Approx.)
Stop/start OFF switch			
Connector	Terminal		
M110	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.CHECK STOP/START OFF SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect BCM harness connector.
2. Check the continuity between BCM harness connector and stop/start OFF switch harness connector.

+		-		Continuity
BCM		Stop/start OFF switch		
Connector	Terminal	Connector	Terminal	
M69	99	M110	1	Existed

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

Is the inspection result normal?

YES >> Check BCM power supply and ground circuit.

NO >> Repair or replace error-detected parts.

5.CHECK STOP/START OFF SWITCH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between stop/start OFF switch harness connector and ground.

-		-	Continuity
Stop/start OFF switch			
Connector	Terminal		
M110	2	Ground	Existed

3. 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 STOP/START OFF SWITCH

Check the stop/start OFF switch. Refer to [ECK-386. "Component Inspection"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop/start OFF switch.

Component Inspection

INFOID:0000000010434293

1.CHECK STOP/START OFF SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop/start OFF switch harness connector.
3. Check the continuity between stop/start OFF switch harness connectors as per the following condition.

STOP/START OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[K9K]

Stop/start OFF switch		Condition		Continuity
+	–			
Terminal				
1	2	Stop/start OFF switch	Pressed	Existed
			Released	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop/start OFF switch.

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[K9K]

SYMPTOM DIAGNOSIS

ENGINE CONTROL SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000010290070

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ECK

SYSTEM — Basic engine control system	SYMPTOM												Reference page	
	HARD/NO START/RESTART (EXCP. HA)				ENGINE STALL			HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE		LOW IDLE
	NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD	HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING							
Warranty symptom code	AA				AB			AC	AD	AE		AF		
Engine body	x	x	x	x	x	x	x		x	x	x		x	EM-318, "Exploded View"
Air cleaner and duct										x	x			EM-279, "Exploded View"
ECM	x	x	x	x	x	x	x	x	x	x	x	x	x	ECK-268, "DTC Log-ic", ECK-269, "DTC Log-ic", ECK-270, "DTC Log-ic", ECK-271, "DTC Log-ic", ECK-274, "DTC Log-ic"

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ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[K9K]

SYSTEM — Basic engine control system	SYMPTOM												Reference page	
	HARD/NO START/RESTART (EXCP. HA)				ENGINE STALL			HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE		LOW IDLE
NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD		HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING							
Warranty symptom code	AA				AB			AC	AD	AE		AF		
Camshaft position sensor circuit			x	x										ECK-231. "DTC Log-ic"
Crankshaft position sensor circuit		x	x	x	x	x	x	x	x	x	x			ECK-229. "DTC Log-ic"
Mass air flow sensor circuit								x		x	x			ECK-193. "DTC Log-ic" ,
Intake air temperature sensor 1 circuit														ECK-199. "DTC Log-ic" , ECK-199. "DTC Log-ic"
Turbocharger boost sensor circuit								x		x	x			ECK-197. "DTC Log-ic"
Intake air temperature sensor 2 circuit														ECK-190. "DTC Log-ic"
Engine coolant temperature sensor circuit			x		x		x						x	ECK-201. "DTC Log-ic"
Fuel injector circuit	x	x	x	x	x	x	x	x	x	x	x	x	x	ECK-211. "DTC Log-ic"

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[K9K]

SYSTEM — Basic engine control system	SYMPTOM												Reference page			
	HARD/NO START/RESTART (EXCP. HA)				ENGINE STALL			HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE		LOW IDLE		
	NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD	HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING									
	Warranty symptom code	AA				AB			AC	AD	AE			AF		
	High pressure fuel pump	x	x	x	x	x	x	x	x		x	x			x	—
	Fuel rail pressure sensor circuit		x													ECK-209, "DTC Logic"
	Fuel temperature sensor circuit															ECK-205, "DTC Logic"
	Fuel pressure sensor															
	Fuel pump	x	x	x	x	x	x	x	x		x	x			x	
	Fuel heater circuit															—
Turbocharger boost control solenoid valve circuit								x		x	x			ECK-183, "DTC Logic"		
EGR volume control valve circuit								x		x	x			ECK-235, "DTC Logic", ECK-238, "DTC Logic"		

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ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[K9K]

SYSTEM — Basic engine control system	SYMPTOM												Reference page	
	HARD/NO START/RESTART (EXCP. HA)				ENGINE STALL			HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE		LOW IDLE
	NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD	HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING							
Warranty symptom code	AA				AB			AC	AD	AE		AF		
Low pressure EGR volume control valve circuit														ECK-306, "DTC Logic", ECK-308, "DTC Logic", ECK-312, "DTC Logic", ECK-314, "DTC Logic"
Electric throttle control actuator circuit	x	x	x	x	x	x	x			x	x			ECK-275, "DTC Logic", ECK-364, "DTC Logic"
Exhaust electric throttle control actuator circuit										x				ECK-296, "DTC Logic", ECK-299, "DTC Logic", ECK-302, "DTC Logic", ECK-304, "DTC Logic"
DPF (Diesel Particulate Filter)														ECK-359, "DTC Logic"

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[K9K]

SYSTEM — Basic engine control system	SYMPTOM												Reference page	
	HARD/NO START/RESTART (EXCP. HA)				ENGINE STALL			HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE		LOW IDLE
	NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD	HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING							
Warranty symptom code	AA				AB			AC	AD	AE		AF		
Exhaust gas pressure sensor circuit														ECK-243, "DTC Logic", ECK-245, "DTC Logic"
DPF differential pressure sensor circuit														ECK-294, "DTC Logic", ECK-372, "DTC Logic"
Exhaust gas temperature sensor 1 circuit														ECK-259, "DTC Logic", ECK-327, "DTC Logic", ECK-361, "DTC Logic"
Exhaust gas temperature sensor 2 circuit														ECK-324, "DTC Logic"
Glow control unit circuit	x	x	x						x					ECK-233, "DTC Logic"
Glow plug circuit	x	x	x						x					ECK-233, "DTC Logic"
Cooling fan resister circuit					x					x				—

[ECK-243.](#)
["DTC Log-ic"](#), [ECK-245.](#) ["DTC Logic"](#)

[ECK-294.](#)
["DTC Log-ic"](#), [ECK-372.](#) ["DTC Logic"](#)

[ECK-259.](#)
["DTC Log-ic"](#), [ECK-327.](#) ["DTC Logic"](#), [ECK-361.](#) ["DTC Log-ic"](#)

[ECK-324.](#)
["DTC Log-ic"](#)

[ECK-233.](#)
["DTC Log-ic"](#)

[ECK-233.](#)
["DTC Log-ic"](#)

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ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[K9K]

SYSTEM — Basic engine control system	SYMPTOM												Reference page		
	HARD/NO START/RESTART (EXCP. HA)				ENGINE STALL										
	NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD		HARD TO START WHEN ENGINE IS HOT		AT IDLE	DURING DRIVING	WHEN DECELERATING	HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	LACK OF POWER	POOR ACCELERATION	HI IDLE	LOW IDLE
Warranty symptom code	AA				AB			AC	AD	AE		AF			
Thermoplunger unit circuit															—
Thermoplunger control unit circuit															ECK-336 , "DTC Log-ic" , ECK-339 , "DTC Logic" , ECK-342 , "DTC Log-ic" ,
Accelerator pedal position sensor circuit										x		x	x		ECK-219 , "DTC Log-ic" , ECK-221 , "DTC Logic" , ECK-365 , "DTC Log-ic"
Refrigerant pressure sensor circuit						x	x	x							ECK-257 , "DTC Log-ic"
NATS (Nissan Anti-theft System)		x													SEC-77 , "Work Flow" , SEC-231 , "Work Flow"

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

STOP/START SYSTEM

< SYMPTOM DIAGNOSIS >

[K9K]

STOP/START SYSTEM

Diagnosis Procedure

INFOID:000000010290071

1.CHECK STOP/START SYSTEM FUNCTION-1

Activate stop/start system. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

Is the stop/start system activated?

YES >> GO TO 2.

NO >> Proceed to [ECK-395, "Diagnosis Procedure"](#).

2.CHECK STOP/START INDICATOR LAMP

Check the stop/start indicator lamp during stop/start system operation.

Is stop/start indicator lamp turned ON?

YES >> GO TO 3.

NO >> Check the combination meter. Refer to [MWI-54, "Work flow"](#).

3.CHECK STOP/START SYSTEM FUNCTION-2

Check the engine status during stop/start system operation.

Is the engine stalled during stop/start system operation?

YES >> Perform "All DTC Reading" with CONSULT and perform trouble diagnosis for DTC indicated.

NO >> GO TO 4.

4.CHECK STOP/START SYSTEM FUNCTION-3

Check the engine restart operation during stop/start system operation. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

Is the engine restarted?

YES >> INSPECTION END

NO >> GO TO 5.

5.CHECK STARTER MOTOR OPERATION

Check the starter motor operation (cranking) when engine restart during stop/start system operation.

Is the starter motor operated (cranking)?

YES >> Refer to "HARD/NO START/RESTART" in [ECK-388, "Symptom Table"](#).

NO >> Perform the trouble diagnosis for starting system. Refer to [STR-18, "Work Flow"](#).

STOP/START SYSTEM NOT ACTIVATED

< SYMPTOM DIAGNOSIS >

[K9K]

STOP/START SYSTEM NOT ACTIVATED

Diagnosis Procedure

INFOID:000000010290072

NOTE:

To use the stop/start system, the vehicle needs to recognize the status of battery. For this reason, the stop/start system may not be activated immediately after battery change.

1.CHECK DTC

① With CONSULT

Perform "All DTC Reading" with CONSULT.

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC.

NO >> GO TO 2.

2.CHECK STOP/START INDICATOR LAMP

Check stop/start indicator lamp.

Is stop/start indicator lamp blinks slowly?

YES >> Perform "All DTC Reading" with CONSULT and perform trouble diagnosis for detected DTC.

NO >> GO TO 3.

3.PERFORM ACTIVE TEST

① With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. Press start/stop OFF switch and check that the switch indicator is ON.
3. Select "AUTO STOP START" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.
4. Touch "START" and operate stop/start system. (engine stop.)
5. Touch "CANCEL" and restart the engine.

Is stop/ start system activated normal?

YES >> GO TO 9.

NO >> GO TO 4.

4.CHECK HIGH PRESSURE FUEL PUMP OPERATION COUNTER

① With CONSULT

1. Select "ENGINE REV COUNT" in "DATA MONITOR" mode of "ENGINE" using CONSULT.
2. Check that the "ENGINE REV COUNT" indication.

Monitor item	Indication
ENGINE REV COUNT	Less than 340,000

Is the indication less than 340.000?

YES >> GO TO 5.

NO >> Replace high pressure fuel pump. Refer to [EM-300, "Removal and Installation"](#).

5.CHECK STARTER MOTOR OPERATION COUNTER

① With CONSULT

1. Select "STRT OPRTN CNTR" in "DATA MONITOR" mode of "ENGINE" using CONSULT.
2. Check that the "STRT OPRTN CNTR" indication.

Monitor item	Indication
STRT OPRTN CNTR	Less than 280,000

Is the indication less than 280.000?

YES >> GO TO 6.

NO >> Replace starter motor. Refer to [STR-30, "K9K : Removal and Installation"](#).

6.CHECK IPDM E/R STATUS

① With CONSULT

STOP/START SYSTEM NOT ACTIVATED

[K9K]

< SYMPTOM DIAGNOSIS >

1. On CONSULT screen, select "IPDM E/R" >> "DATA MONITOR" >> "STOP/START STATUS".
2. Check that "STOP/START STATUS" indicates "PERMIT".

Is "PERMIT" indicated?

- YES >> GO TO 10.
NO >> GO TO 7.

7.CHECK CUMULATIVE BATTERY DISCHARGE CURRENT

Ⓜ WITH CONSULT

1. Select "DATA MONITOR" mode of "IPDM E/R" using CONSULT.
2. Check that the "BAT DISCHARGE COUNT" indication.

Monitor item	Indication
BAT DISCHARGE COUNT	Less than 65,000

Is the indication less than 65,000?

- YES >> GO TO 8.
NO >> Replace battery designed for the stop/start system. Refer to [PG-155, "Removal and Installation"](#).

8.CHARGE BATTERY

Charge battery. Refer to [PG-136, "FOR MAINTENANCE REQUIRED BATTERY MODELS : How to Handle Battery"](#) (for maintenance required battery models) or [PG-142, "FOR MAINTENANCE FREE BATTERY MODELS : How to Handle Battery"](#) (for maintenance free battery models).

>> GO TO 9.

9.CHECK BATTERY STATUS

Ⓜ WITH CONSULT

1. Start the engine and warm up the engine coolant temperature to 45°C (113°F) or more.
2. Check the temperature of battery fluid is 0°C (32°F) or more.
3. Select "BATTERY STATUS" in "DATA MONITOR" mode of "IPDM E/R" using CONSULT.
4. Check the "BATTERY STATUS" indication.

Is "OK" displayed on CONSULT screen?

- YES >> GO TO 10.
NO >> Check battery. Refer to [PG-136, "FOR MAINTENANCE REQUIRED BATTERY MODELS : How to Handle Battery"](#) (maintenance required battery) or [PG-142, "FOR MAINTENANCE FREE BATTERY MODELS : How to Handle Battery"](#) (maintenance free battery).

10.CHECK STOP/START OFF SWITCH

Check the stop/start OFF switch. Refer to [ECK-385, "Component Function Check"](#).

Is the inspection normal?

- YES >> GO TO 11.
NO >> Repair or replace error-detected parts.

11.CHECK HOOD SWITCH

Check the hood switch. Refer to [ECK-383, "Component Function Check"](#).

Is the inspection normal?

- YES >> GO TO 12.
NO >> Repair or replace error-detected parts.

12.CHECK STOP/START SYSTEM OPERATION CONDITION

Check the stop/start system operation condition. Refer to [ECK-39, "STOP/START SYSTEM : System Description"](#).

>> INSPECTION END

PERIODIC MAINTENANCE

IDLE SPEED

Inspection

INFOID:0000000010290073

1. CHECK IDLE SPEED

 **With CONSULT**

Check "ENGINE SPEED" in "DATA MONITOR" mode with CONSULT.

Idle speed: Refer to [ECK-405, "Idle Speed"](#).

>> INSPECTION END

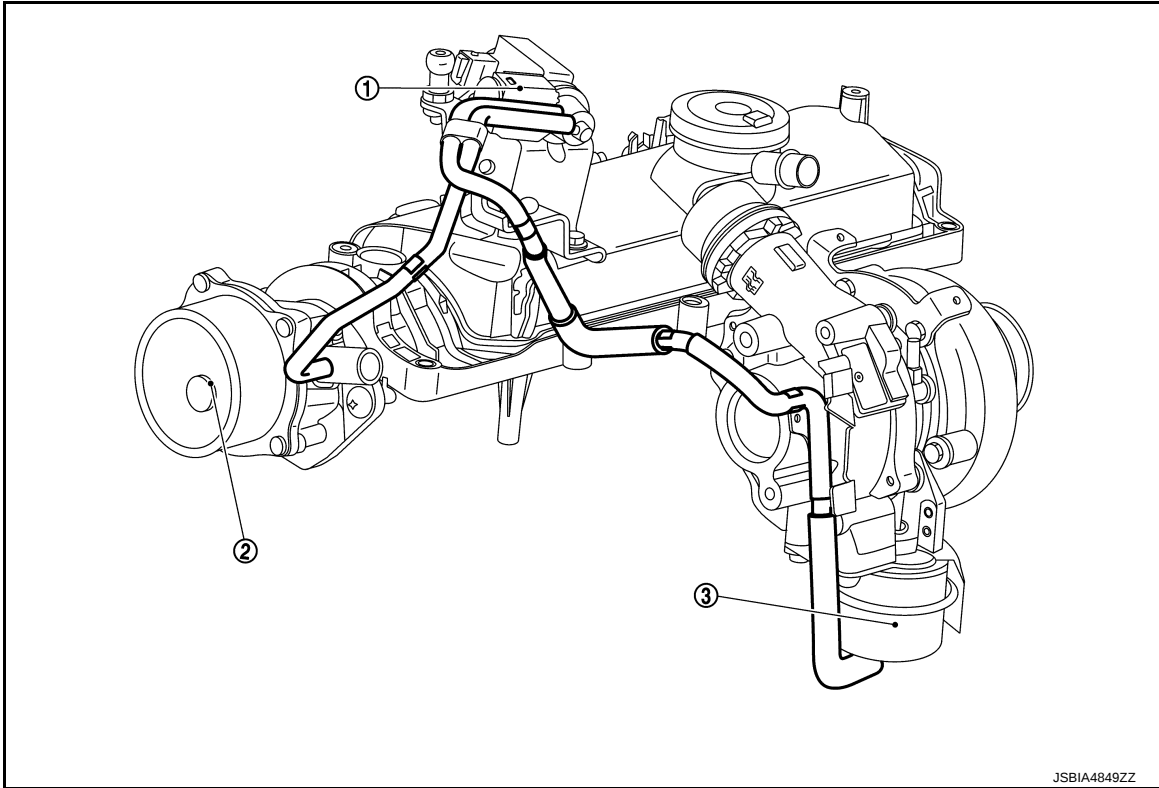
REMOVAL AND INSTALLATION

VACUUM LINES

Vacuum Layout

INFOID:0000000010501141

ECK



1. TC boost control solenoid valve
2. Vacuum pump
3. TC boost control actuator

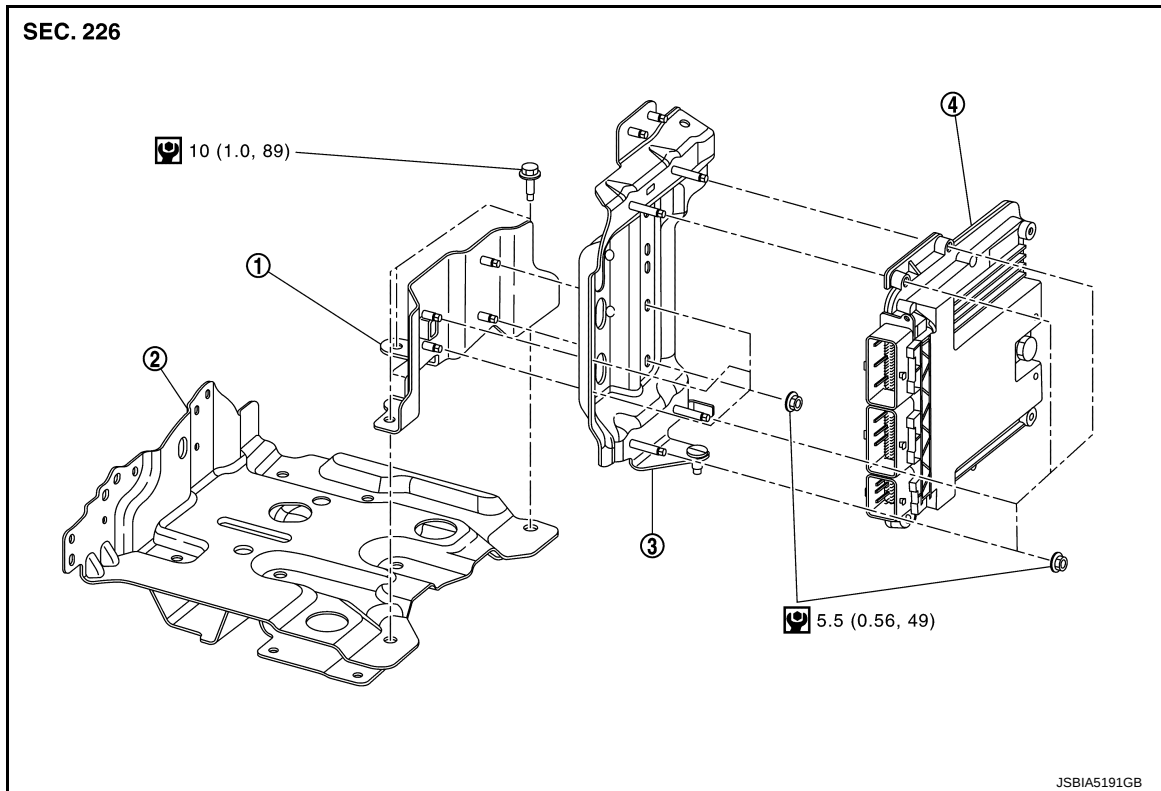
CAUTION:

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

ECM

Exploded View

INFOID:0000000010501142



1. Battery mounting bracket

2. Bracket A

3. Bracket B

4. ECM

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000010501143

CAUTION:

Perform **ADDITIONAL SERVICE WHEN REPLACING ECM**. Refer to [ECK-131, "Work Procedure"](#).

REMOVAL

1. Disconnect battery negative terminal.
2. Remove air duct (inlet). Refer to [EM-380, "Removal and Installation"](#).
3. Disconnect ECM harness connectors.
4. Remove battery, battery cover and battery tray. Refer to [PG-155, "Removal and Installation"](#).
5. Remove bracket A with ECM.
6. Remove ECM from bracket B.

INSTALLATION

Install in the reverse order of removal.

GLOW CONTROL UNIT

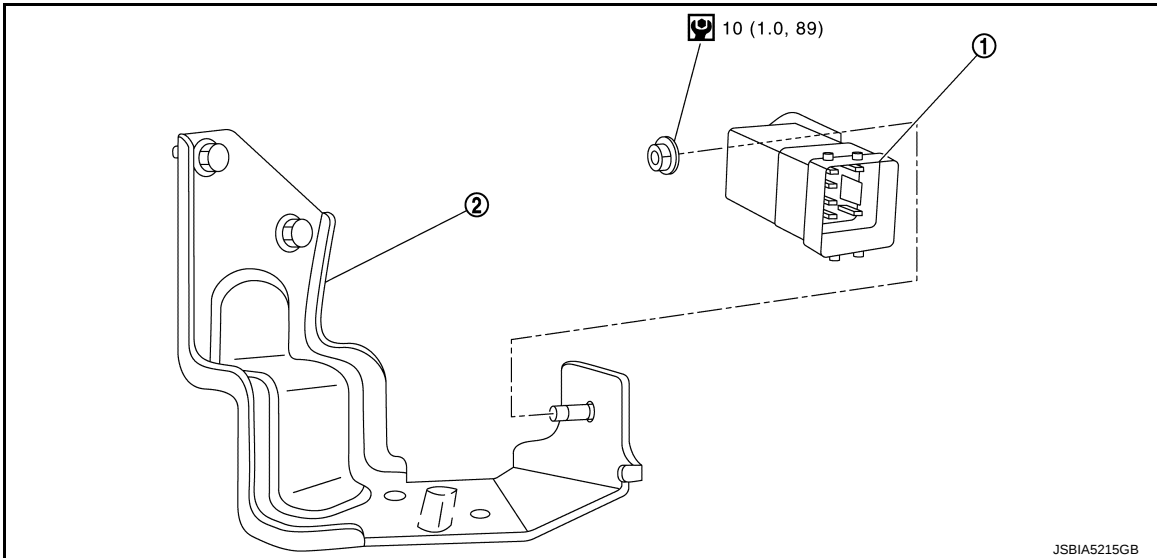
< REMOVAL AND INSTALLATION >

[K9K]

GLOW CONTROL UNIT

Exploded View

INFOID:0000000010501144



1. Glow control unit

2. Bracket

 : N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000010501145

REMOVAL

1. Remove front bumper. Refer to [EXT-19. "Removal and Installation"](#).
2. Disconnect glow control unit harness connector.
3. Remove glow control unit from bracket.

INSTALLATION

Install in the reverse order of removal.

THERMOPLUNGER CONTROL UNIT

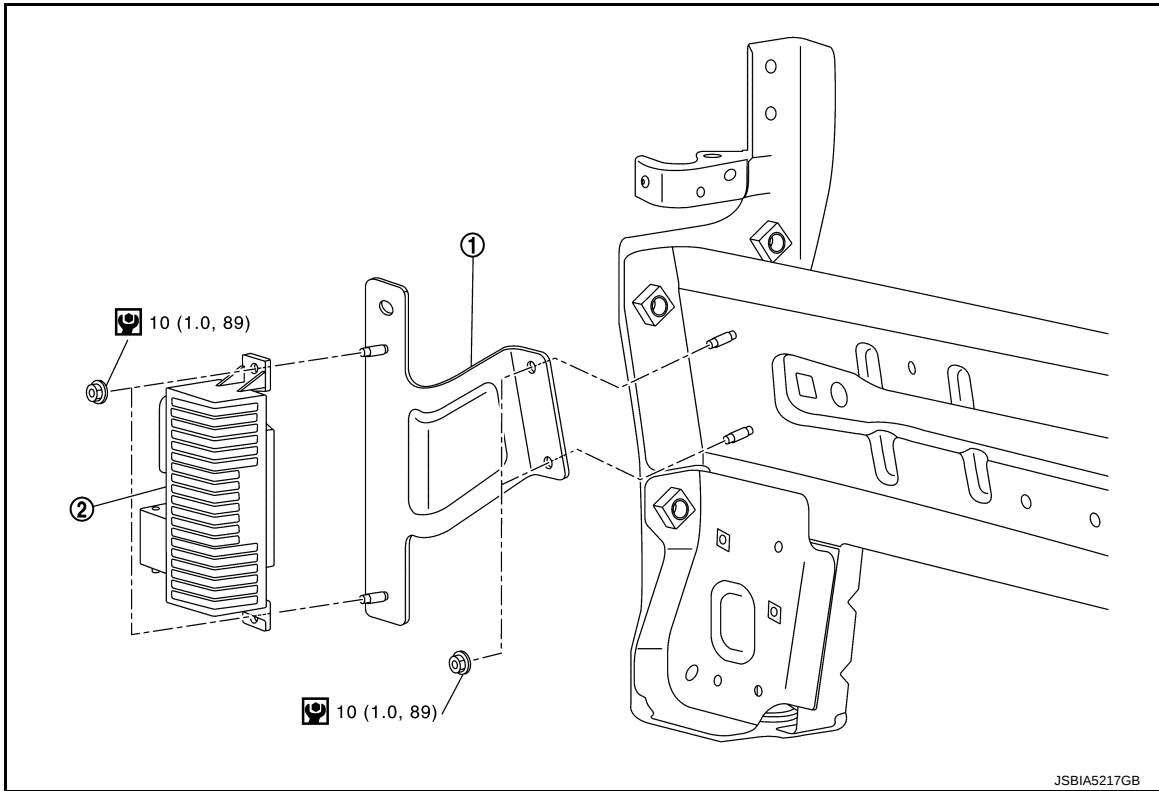
< REMOVAL AND INSTALLATION >

[K9K]

THERMOPLUNGER CONTROL UNIT

Exploded View

INFOID:000000010501146



1. Bracket

2. Thermoplunger control unit

 : N·m (kg-m, ft-lb)

Removal and Installation

INFOID:000000010501147

REMOVAL

1. Remove front bumper. Refer to [EXT-19, "Removal and Installation"](#).
2. Disconnect thermoplunger control unit harness connector.
3. Remove thermoplunger control unit from bracket.

INSTALLATION

Install in the reverse order of removal.

DC/DC CONVERTER

< REMOVAL AND INSTALLATION >

[K9K]

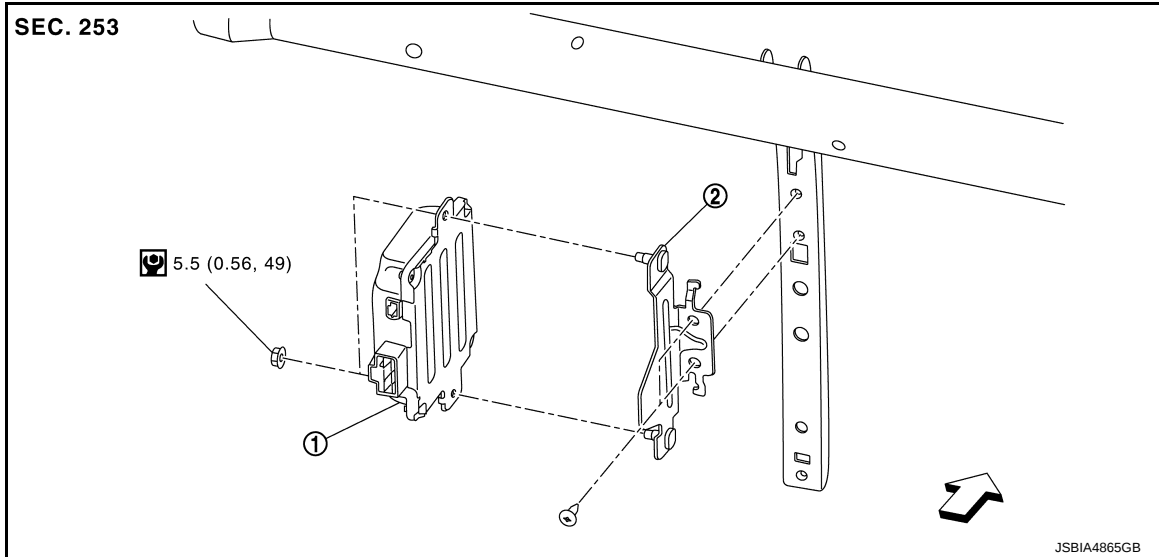
DC/DC CONVERTER

Exploded View

INFOID:0000000010501148

NOTE:

The below figure shows LHD models. RHD models are the mirror image.



1. DC/DC converter

2. Bracket

: N·m (kg-m, in-lb)

: Vehicle front

Removal and Installation

INFOID:0000000010501149

REMOVAL

1. Disconnect battery negative terminal. Refer to [ECK-9, "Precautions for Removing Battery Terminal"](#).
2. Remove glove box cover. Refer to [IP-12, "Exploded View"](#).
3. Disconnect DC/DC converter harness connectors.
4. Remove DC/DC converter bracket mounting screws.
5. Remove bracket with DC/DC converter.
6. Remove DC/DC converter mounting nuts.
7. Remove DC/DC converter.

INSTALLATION

Install in the reverse order of removal.

ENGINE RESTART BYPASS RELAY

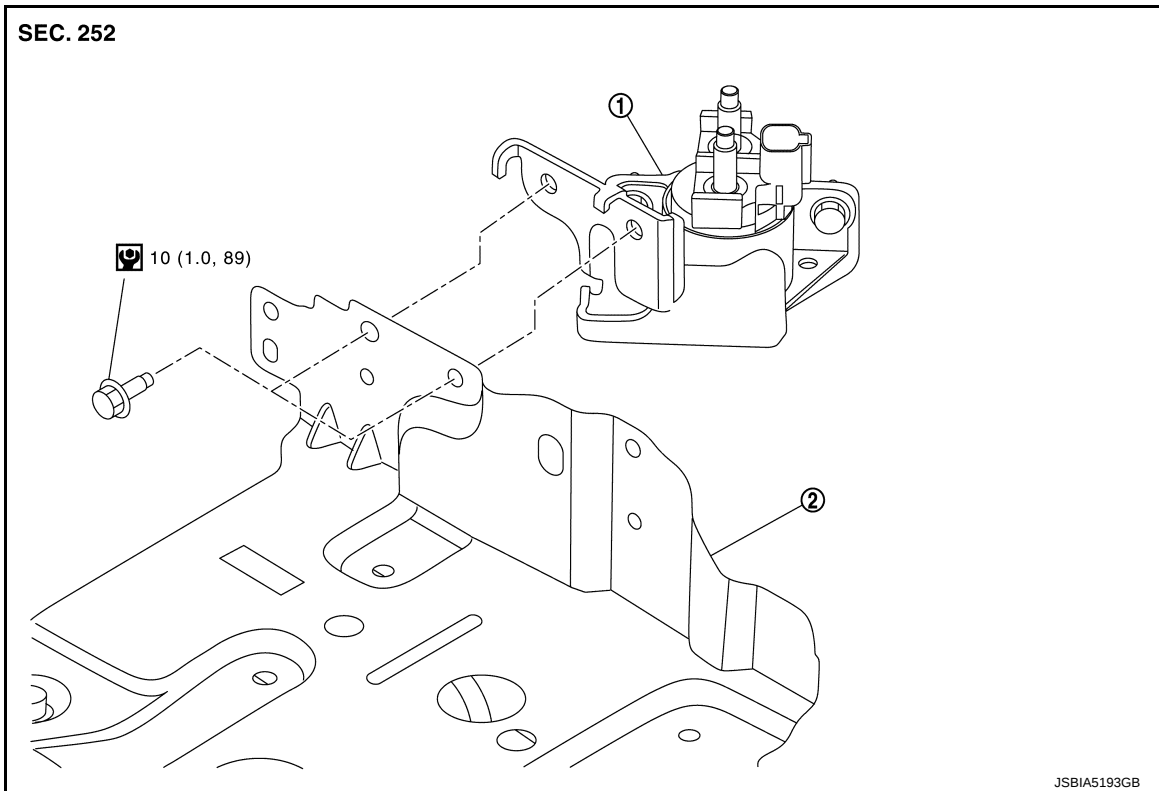
< REMOVAL AND INSTALLATION >

[K9K]

ENGINE RESTART BYPASS RELAY

Exploded View

INFOID:000000010501150



1. Engine restart bypass relay

2. Battery mounting bracket

 : N·m (kg-m, ft-lb)

Removal and Installation

INFOID:000000010501151

REMOVAL

1. Remove battery, battery cover and battery tray. Refer to [PG-155, "Removal and Installation"](#).
2. Disconnect engine restart bypass relay harness connectors.
3. Remove bracket with engine restart bypass relay.

INSTALLATION

Install in the reverse order of removal.

FUEL PUMP CONTROL MODULE (FPCM)

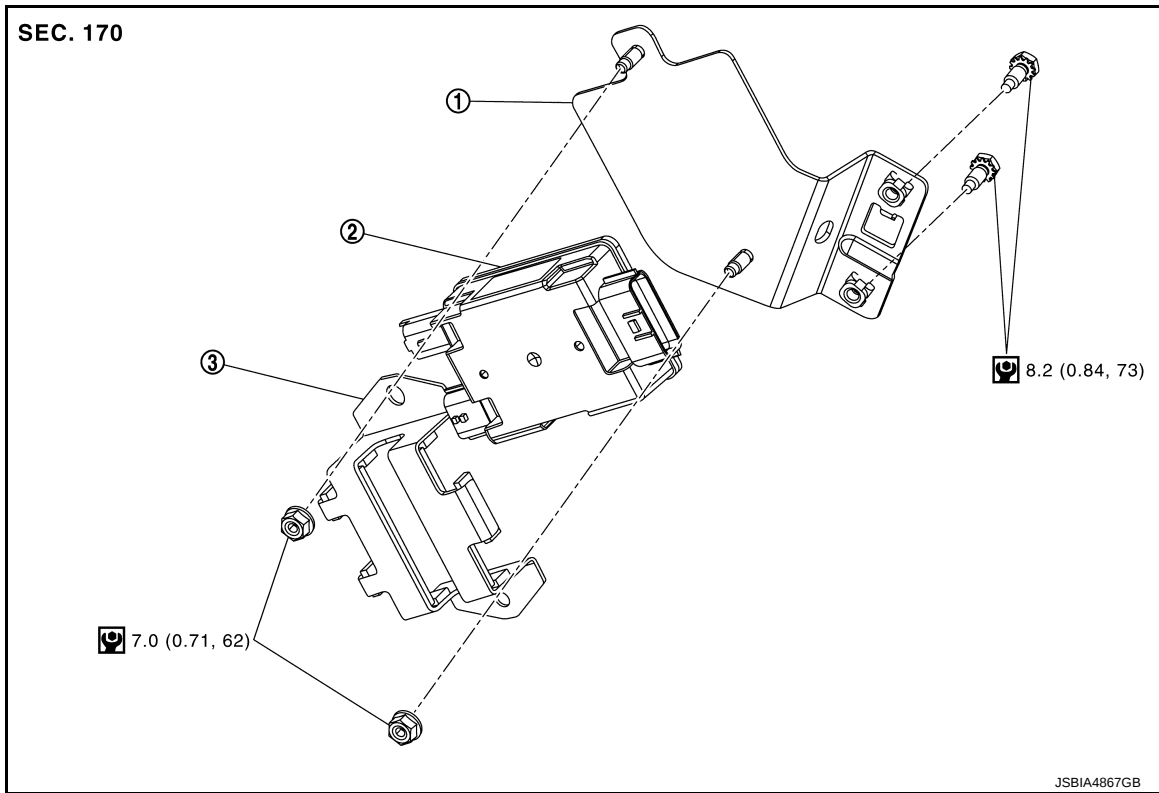
< REMOVAL AND INSTALLATION >

[K9K]

FUEL PUMP CONTROL MODULE (FPCM)

Exploded View

INFOID:0000000010501152



1. Bracket

2. Fuel pump control module (FPCM)

3. Cover

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000010501153

REMOVAL

1. Remove luggage side finisher (RH). Refer to [INT-28, "Exploded View"](#).
2. Remove bracket with fuel pump control module (FPCM).
3. Disconnect fuel pump control module (FPCM) harness connectors.
4. Remove cover and fuel pump control module (FPCM) from bracket.

INSTALLATION

Install in the reverse order of removal.

SERVICE DATA AND SPECIFICATIONS (SDS)**SERVICE DATA AND SPECIFICATIONS (SDS)****Idle Speed**

INFOID:0000000010290085

Condition	Specification
No load* (in Neutral position)	850 ± 50 rpm

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, glow plug, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

A

ECK

C

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