

SECTION EC4

ENGINE CONTROL SYSTEM [GASOLINE ENGINE (IN-LINE 4)]

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PRECAUTION

PRECAUTIONS

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

INFOID:000000013446801

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. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. 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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "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:

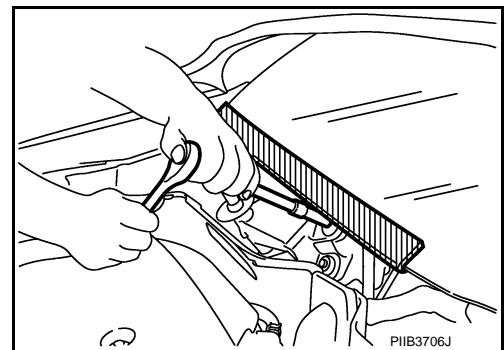
Always observe the following items for preventing accidental activation.

- 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 or batteries, and wait at least 3 minutes before performing any service.

Precaution for Procedure without Cowl Top Cover

INFOID:000000013289739

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:000000013446802

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.

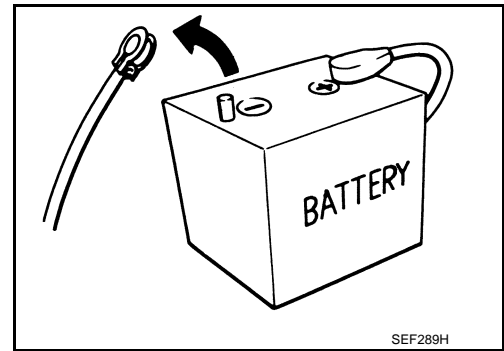
PRECAUTIONS

< PRECAUTION >

[2.0L TURBO GASOLINE ENGINE]

- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

BR08DE	: 4 minutes	V9X engine	: 4 minutes
D4D engine	: 20 minutes	YD25DDTi	: 2 minutes
HR09DET	: 12 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		



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NOTE:

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

NOTE:

- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
 - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
 - Driving for 30 minutes or more on a steep slope.
- 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.

Precautions for Performing 2-wheel Drive Test

INFOID:0000000013289741

A vehicle with 2.2L diesel engine or 2.0L turbo gasoline engine of this model limits torque when a difference occurs in each wheel speed. For this reason, it is necessary to use Chassis Dynamometer Mode when performing the 2-wheel drive test (e.g. with 2-wheel chassis dynamometer, speedometer tester).

For Chassis Dynamometer Mode, refer to ENGINE >> ENGINE CONTROL SYSTEM >> BASIC INSPECTION >> CHASSIS DYNAMOMETER MODE >> Description.

Precaution for Stop/Start System Service

INFOID:0000000013289742

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.

Precaution for Risk of Explosion and Injury

INFOID:0000000013289743

FUEL SYSTEM

Risk of Explosion, Poisoning and Injury

- When working on the fuel injection system (e.g. fuel injectors, pressure lines, rail, high pressure pump, etc.) when the engine is running, or within 30 seconds after switching the engine OFF, fuel may flow out at a high pressure. When opening the pressurized system, there is a risk of explosion due to very finely sprayed fuel coming into contact with an ignition source.
- Fuels are highly flammable and poisonous when ingested.

Risk of Injury

Highly pressurized fuel may penetrate deep into the skin and destroy the tissue. Fuel can get into blood circulation and can lead blood poisoning.

Safety Instructions/Precautions

- Keep sources of ignition such as sparks, cigarettes or open flames away from fuel.
- Never carry out any work on the system when it is pressurized.

PRECAUTIONS

[2.0L TURBO GASOLINE ENGINE]

< PRECAUTION >

- Wear suitable protective clothing.

IGNITION SYSTEM

Risk of Death Due to High Voltage in Ignition System

Electric ignition systems operate both in the primary circuit as well as in the secondary electric circuit at a dangerous output stage. Contact with such parts can result in burns, heart fibrillation or cardiac arrest.

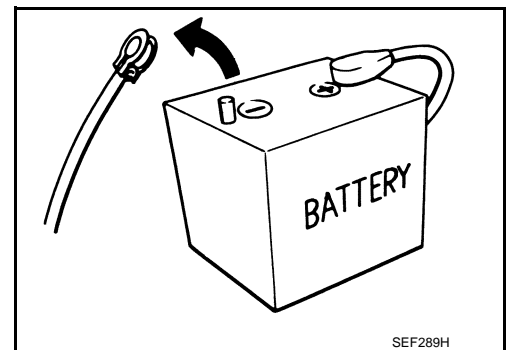
Safety Instructions/Precautions

- Persons with a cardiac pacemaker may not perform any work on the ignition system.
- Switch OFF ignition before performing work on the ignition system.
- Never touch or dismantle components of ignition system when working on an engine which is running or turning at cranking speed.
- Wear safety shoes (with rubber soles).
- Disconnect female contact from crankshaft position sensor either on the control unit or on the position sensor.
- Never install any electrically conducting, uninsulated adapters or built-in sensors into the ignition cable.

General Precautions

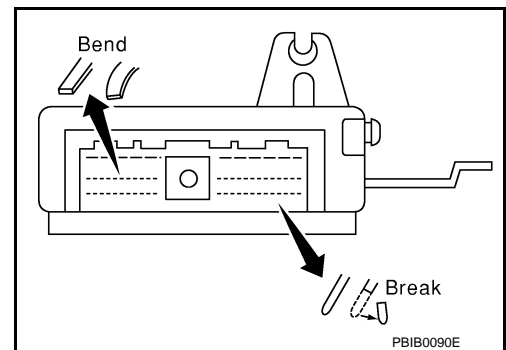
INFOID:000000013289744

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

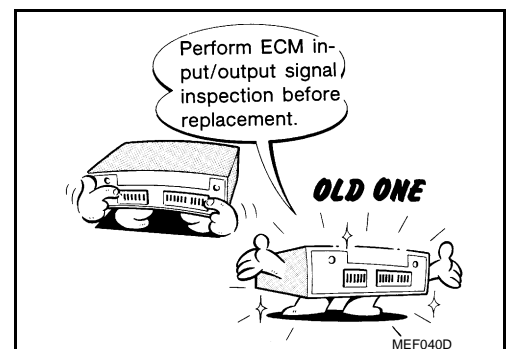


- Never disassemble ECM.

- When connecting or disconnecting pin connectors into or from ECM, be careful not to damage pin terminals (bend or break).
Check that there are not any bends or breaks on ECM pin terminal when connecting pin connectors.
- Securely connect ECM harness connectors.
A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, which cause damage to IC's.
- Keep engine control system harness at least 10cm (4 in) away from adjacent harness to prevent engine control system malfunctions from receiving external noise, degraded operation of IC's, etc.
- Keep engine control system parts and harness dry.



- Before replacing ECM, perform ECM Terminals and Reference Value inspection and check that ECM functions normally. Refer to [EC4-124, "Reference Value"](#).
- Even a slight leakage in the air intake system can cause serious incidents.
- Never shock or jar the camshaft position sensor and crankshaft position sensor.

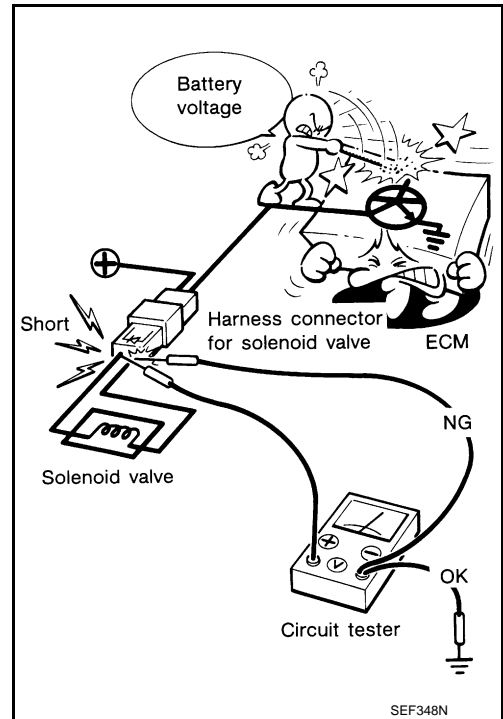


PRECAUTIONS

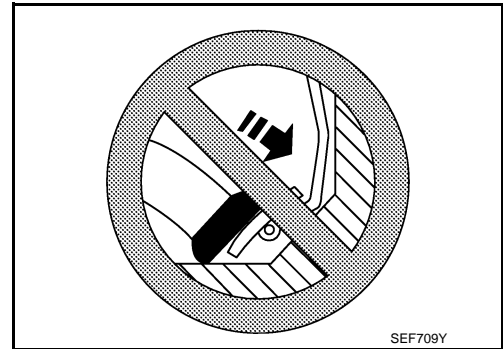
[2.0L TURBO GASOLINE ENGINE]

< PRECAUTION >

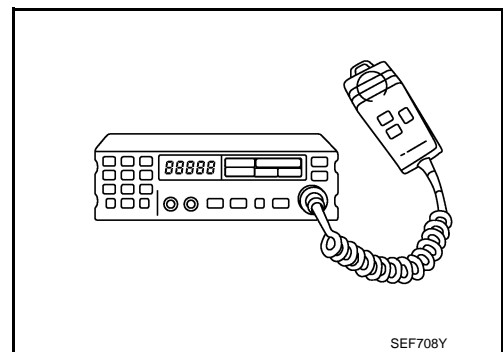
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes cause a short circuit and damage the ECM power transistor.
- Never disassemble fuel pump. If NG, take proper action.
- Never disassemble fuel injector. If NG, replace fuel injector.



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



- When installing C.B. ham radio or a mobile phone, always observe the following as it may adversely affect electronic control systems depending on installation location.
 - Keep the antenna as far as possible from the electronic control units.
 - Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls. Never let them run parallel for a long distance.
 - Adjust the antenna and feeder line so that the standingwave ratio can be kept smaller.
 - Always ground the radio to vehicle body.



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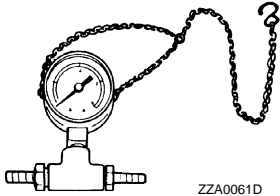
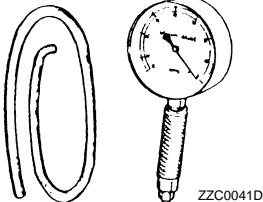
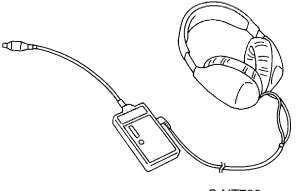
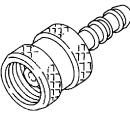
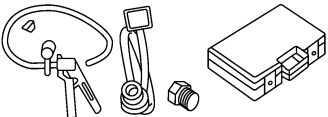
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PREPARATION

PREPARATION

Commercial Service Tool

INFOID:000000013289745

Tool name (TechMate No.)	Description
Pressure gauge i.e.: (—)  ZZA0061D	Checking fuel pressure
Vacuum gauge i.e.: (—)  ZZC0041D	Checking vacuum pressure
Leak detector i.e.: (J-41416)  S-NT703	Locates the EVAP leak
EVAP service port adapter i.e.: (J-41413-OB)  S-NT704	Applies positive pressure through EVAP service port
Fuel filler cap adapter i.e.: (J-42909)  ALBIA1353ZZ	Checks fuel tank vacuum relief valve opening pressure

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

SYSTEM DESCRIPTION

COMPONENT PARTS

ENGINE CONTROL SYSTEM

ENGINE CONTROL SYSTEM : Component Parts Location

VEHICLE COMPARTMENT

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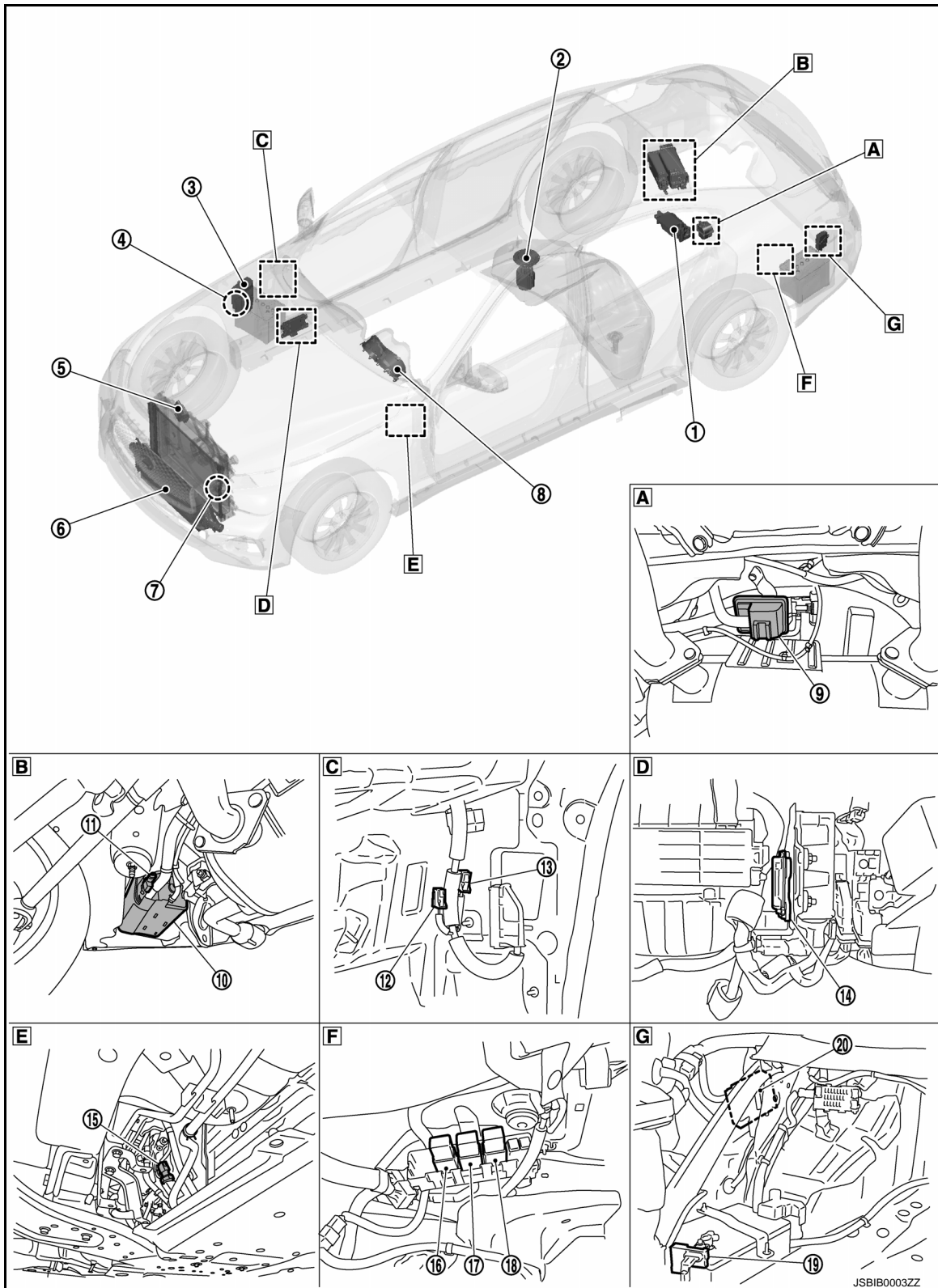
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COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]



A Center of main muffler

B Right side of main muffler

C Behind of glove box

D Behind of glove box

E Left side of transmission

F Upper left side of trunk room

G Left side of trunk room

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

No.	Component	Function
①	Sub battery relay	EC4-39. "Sub Battery Relay"
②	Fuel pump	EC4-37. "Fuel Pump"
③	IPDM E/R	IPDM E/R controls the internal relays. When CAN communication with ECM is impossible, IPDM E/R performs fail-safe control. <ul style="list-style-type: none"> • PCS-6. "RELAY CONTROL SYSTEM : System Description" • PCS-24. "Fail-safe"
④	Main battery current sensor (With main battery temperature sensor)	EC4-38. "Main Battery Current Sensor (With Main Battery Temperature Sensor)"
⑤	Cooling fan control module	EC4-35. "Cooling Fan Control Module"
⑥	Charge air cooler	EC4-44. "ENGINE CONTROL SYSTEM : System Description"
⑦	Refrigerant pressure sensor	EC4-38. "Refrigerant Pressure Sensor"
⑧	Combination meter	MWI-8. "METER SYSTEM : Component Parts Location"
⑨	Fuel tank pressure sensor	Senses fuel tank pressure.
⑩	EVAP canister	EVAP canister stores the generated fuel vapors in the sealed fuel tank to activated charcoals of EVAP canister when the engine is not operating or when refueling to the fuel tank.
⑪	EVAP canister vent control valve	The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components. This solenoid valve is used only for diagnosis, and usually remains opened.
⑫	Resistor 2	EC4-95. "CAN COMMUNICATION : System Description"
⑬	Resistor 1	EC4-95. "CAN COMMUNICATION : System Description"
⑭	EMCM (Energy Management Control Module)	EC4-35. "EMCM (Energy Management Control Module)"
⑮	Fuel pressure sensor	EC4-37. "Fuel Pressure Sensor"
⑯	Engine restart bypass control relay	EC4-36. "Engine Restart Bypass Control Relay"
⑰	EMCM relay	EC4-95. "CAN COMMUNICATION : System Description"
⑱	Ignition relay	PCS-6. "RELAY CONTROL SYSTEM : System Description"
⑲	Sub battery current sensor (With sub battery temperature sensor)	EC4-39. "Sub Battery Current Sensor (With Sub Battery Temperature Sensor)"
⑳	FPCM (Fuel Pump Control Module)	EC4-36. "FPCM (Fuel Pump Control Module)"

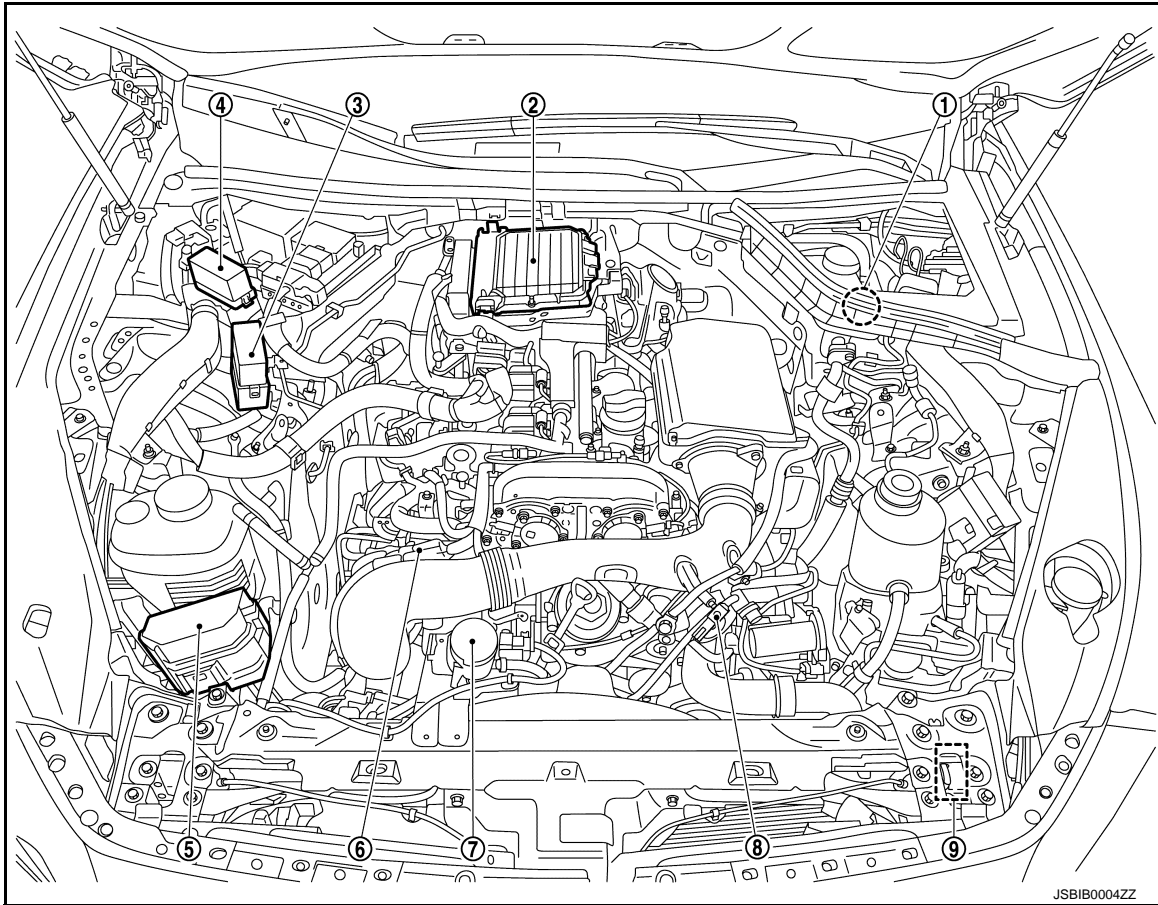
ENGINE ROOM COMPARTMENT

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COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]



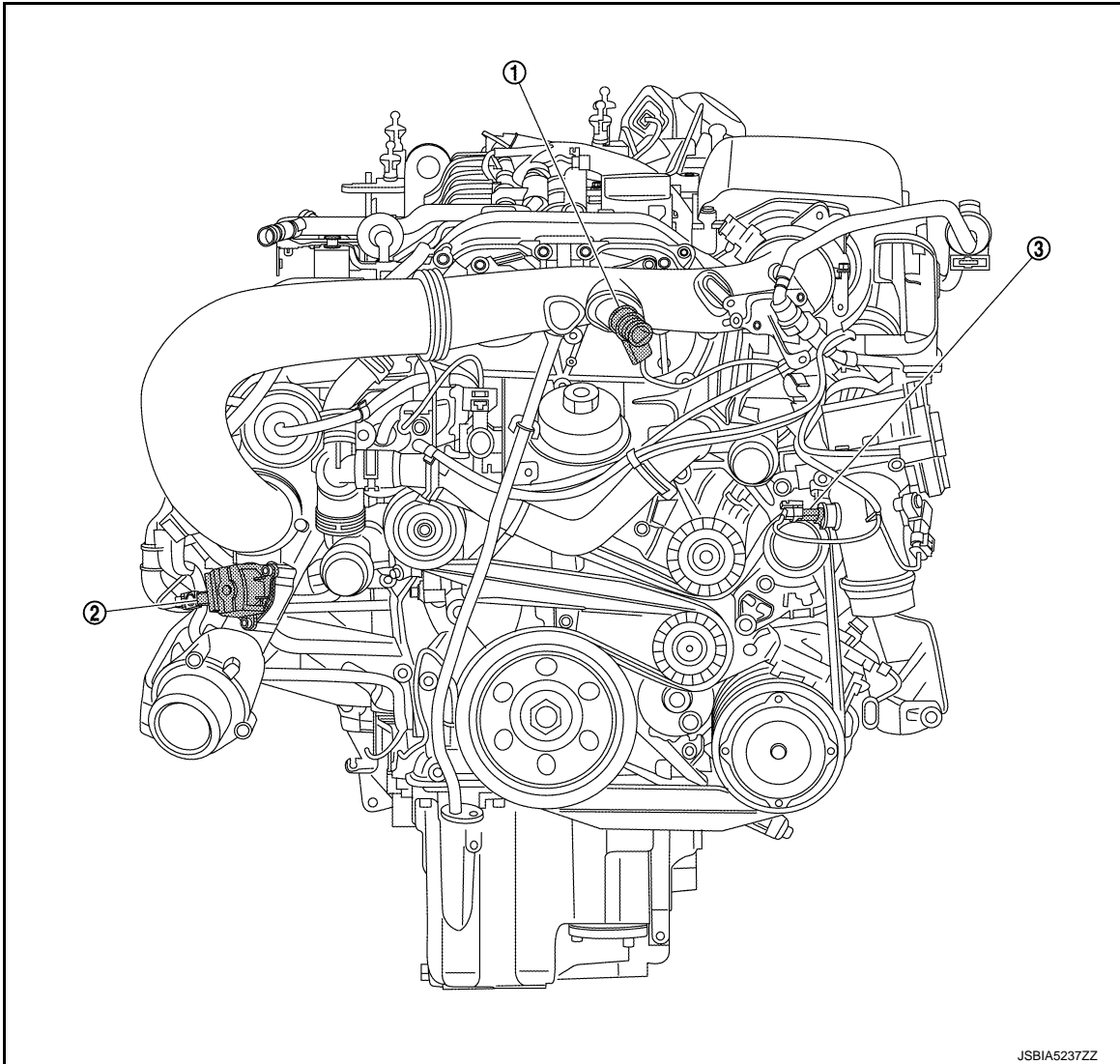
No.	Component	Function
①	Vacuum sensor	EC4-41. "Vacuum Sensor"
②	ECM	EC4-35. "ECM"
③	Starter relay	EC4-95. "CAN COMMUNICATION : System Description"
④	Main relay	Supply power to ECM.
⑤	Ignition relay	PCS-6. "RELAY CONTROL SYSTEM : System Description"
⑥	Pressure sensor downstream of air filter	EC4-38. "Pressure Sensor Downstream of Air Filter"
⑦	EVAP purge control valve	FL-27. "Hydraulic Layout"
⑧	EVAP control system pressure sensor	The EVAP control system pressure sensor detects pressure in the purge line.
⑨	Hood switch	EC4-37. "Hood Switch"

ENGINE COMPARTMENT (FRONT VIEW)

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]



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No.	Component	Function
①	Full-load operation vent line heater element	EC4-37. "Full-load Operation Vent Line Heater Element"
②	Divert air switchover valve	EC4-67. "CHARGE AIR CONTROL : System Description"
③	Charge air temperature sensor upstream of throttle valve	Senses a charge air temperature upstream of throttle.

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ENGINE COMPARTMENT (TOP VIEW)

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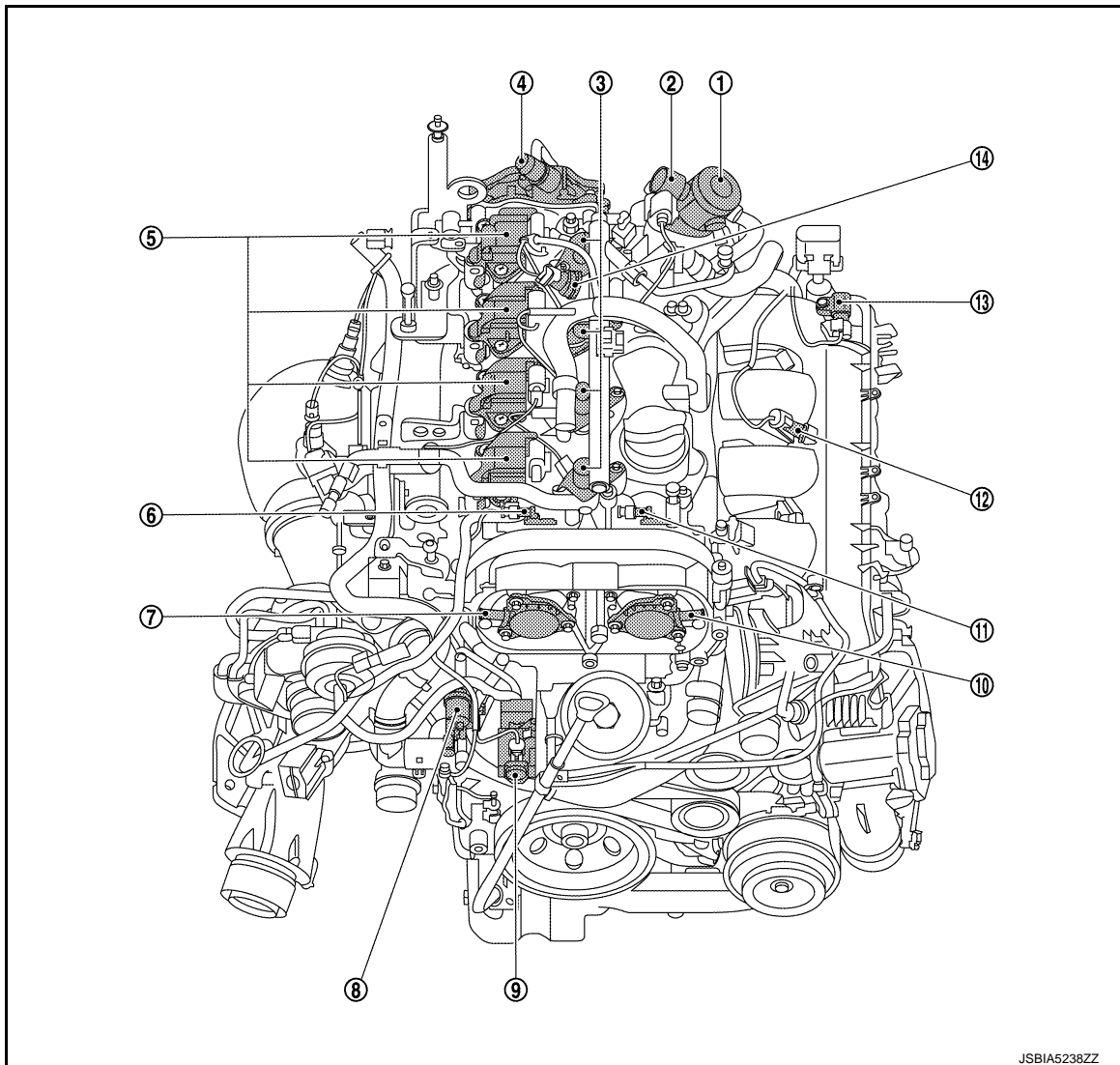
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COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]



JSBIA5238ZZ

No.	Component	Function
①	High pressure fuel pump	EC4-70, "FUEL SUPPLY CONTROL : System Description"
②	Quantity control valve	EC4-70, "FUEL SUPPLY CONTROL : System Description"
③	Fuel injector	EC4-36, "Fuel Injector"
④	Vacuum pump	EC4-966, "Vacuum Line Layout"
⑤	Ignition coil	EC4-56, "IGNITION SYSTEM CONTROL : System Description"
⑥	Exhaust camshaft position sensor	Detects exhaust camshaft position.
⑦	Exhaust camshaft actuator	EC4-64, "COLD START MIXTURE ENRICHMENT CONTROL : System Description"
⑧	Coolant pump switchover valve	EC4-35, "Coolant Pump Switchover Valve"
⑨	Boost pressure control vacuum transducer	EC4-67, "CHARGE AIR CONTROL : System Description"
⑩	Intake camshaft actuator	EC4-64, "COLD START MIXTURE ENRICHMENT CONTROL : System Description"
⑪	Intake camshaft position sensor	EC4-34, "Intake Camshaft Position Sensor"
⑫	Charge air temperature sensor downstream of throttle valve	Senses a charge air temperature downstream of throttle valve

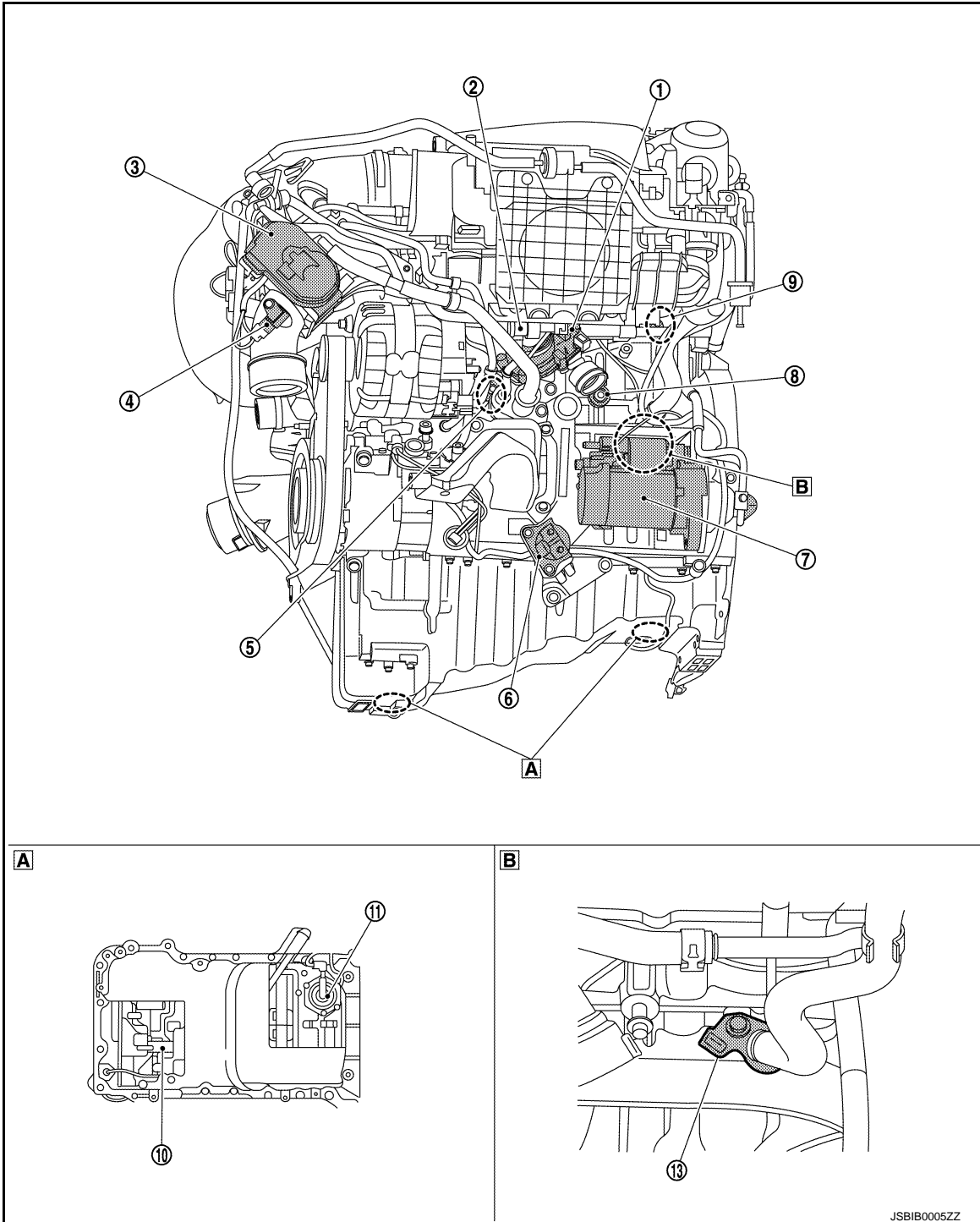
COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

No.	Component	Function
⑬	Pressure sensor downstream of throttle valve	EC4-38. "Pressure Sensor Downstream of Air Filter"
⑭	Fuel pressure and temperature sensor	Senses a fuel pressure and fuel temperature in fuel rail.

ENGINE COMPARTMENT (LEFT SIDE)



A Oil pan

B Left side of cylinder block

JSBIB0005ZZ

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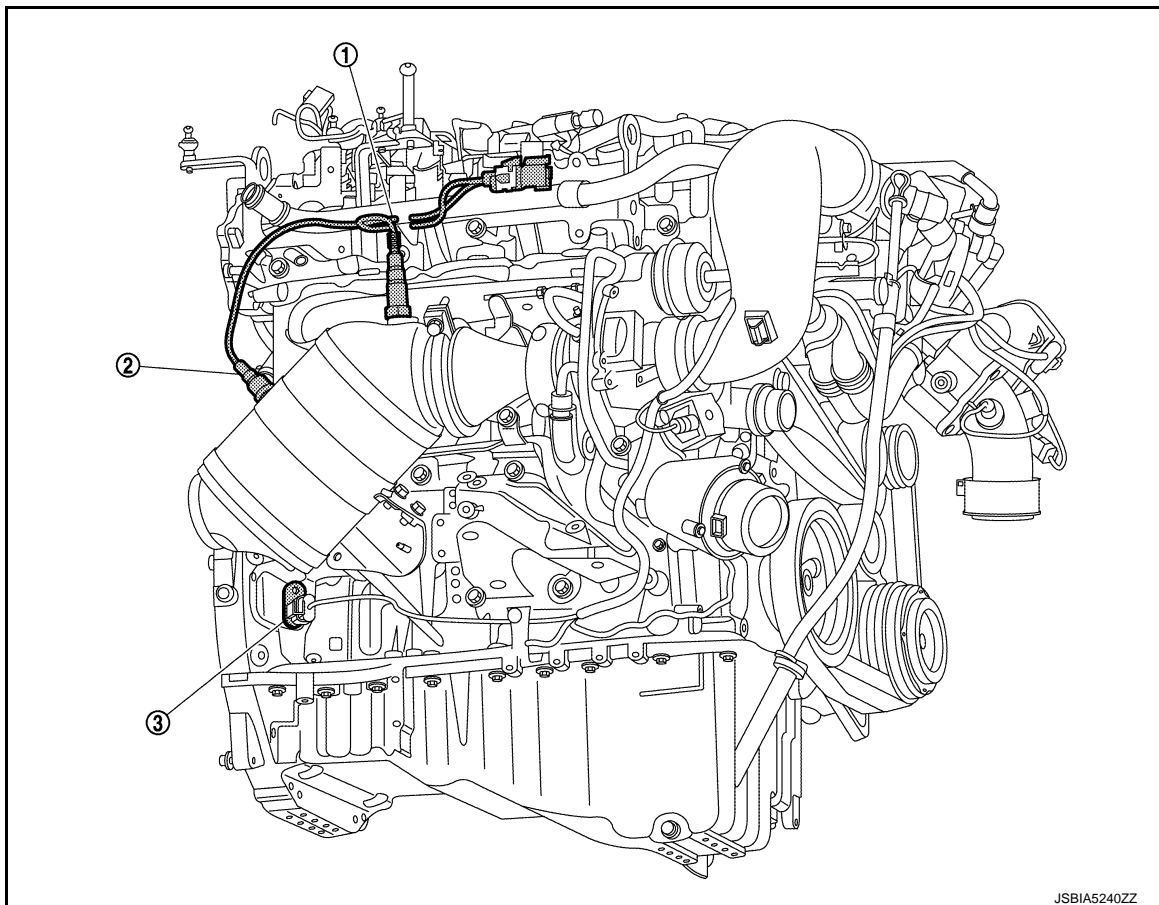
COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

No.	Component	Function
①	Coolant thermostat heater element	EC4-35, "Coolant Thermostat Heater Element"
②	Partial load operation crankcase ventilation valve	EC4-42, "Crankcase Ventilation System"
③	Throttle valve actuator	EC4-40, "Throttle Valve Actuator"
④	Pressure sensor upstream of throttle valve	Senses charge air pressure downstream of throttle valve.
⑤	Knock sensor 1	EC4-37, "Knock Sensor"
⑥	Engine restart bypass relay	EC4-36, "Engine Restart Bypass Relay"
⑦	Starter motor	STR-7, "Starter motor"
⑧	Knock sensor 2	EC4-37, "Knock Sensor"
⑨	Engine coolant temperature sensor	Senses a engine coolant temperature.
⑩	Engine oil pump valve	—
⑪	Engine oil level switch	—
⑫	—	—
⑬	Blow by sensor	Senses a leak of blow-by hose.

ENGINE COMPARTMENT (RIGHT SIDE)



JSBIA5240ZZ

No.	Component	Function
①	A/F sensor	EC4-34, "Air-Fuel Ratio (A/F) Sensor"

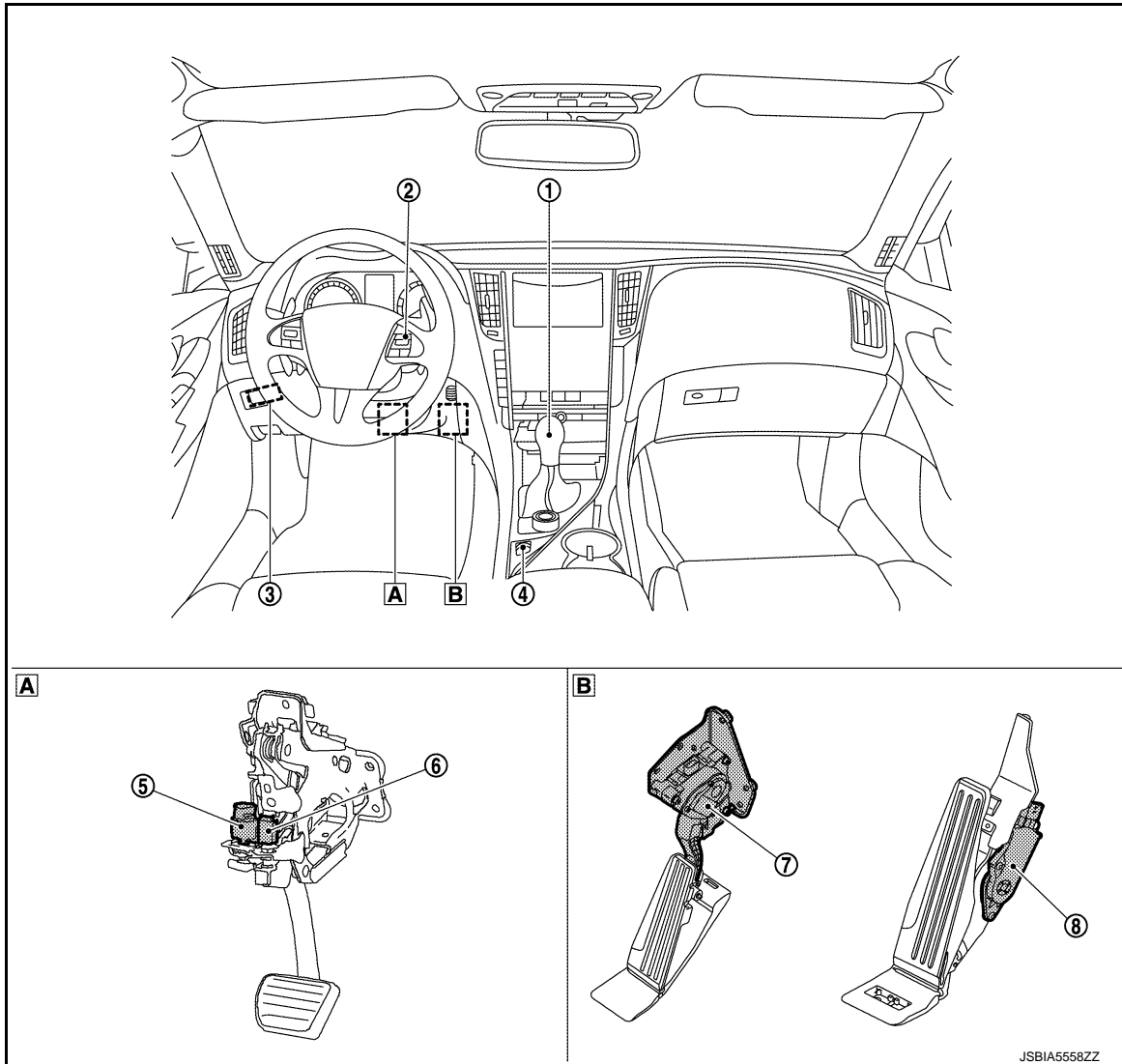
COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

No.	Component	Function
②	Heated oxygen sensor	EC4-62, "AIR-FUEL MIXTURE RATIO CONTROL : System Description"
③	Crankshaft position sensor	EC4-35, "Crankshaft Position Sensor"

INTERIOR COMPERTMENT



A Around the brake pedal

B Around the accelerator pedal

No.	Component	Function
①	Shift selector	Select the shift position.
②	ASCD steering switch/ICC steering switch	CCS-171, "Component Parts Location" or CCS-9, "Component Parts Location"
③	Stop/Start OFF switch	EC4-39, "Stop/Start OFF Switch"
④	Drive mode select switch	DMS-11, "Drive Mode Select Switch"
⑤	Stop lamp switch	EC4-39, "Stop Lamp Switch & Brake Pedal Position Switch"
⑥	Brake pedal position switch	

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

No.	Component	Function
⑦	Accelerator pedal position sensor (With ICC models)	EC4-34. "Accelerator Pedal Position Sensor"
⑧	Accelerator pedal position sensor (Without ICC models)	

Accelerator Pedal Position Sensor

INFOID:0000000013289747

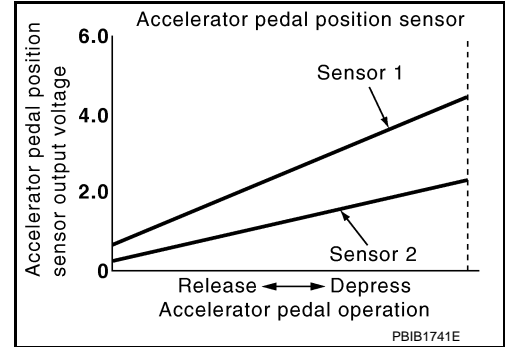
The accelerator pedal position (APP) sensor is installed on the upper end of the accelerator pedal assembly. The sensors detect the accelerator pedal position and transmits a signal to the ECM. The ECM uses the signal to determine the amount of fuel to be injected.

NOTE:

When one of the accelerator pedal position sensors has a malfunction, ECM uses a signal from another accelerator pedal position sensor.

In this case, ECM controls as follows.

- Limits throttle valve angle to approximately 60% or less
- Delays the throttle valve opening speed
- Fixes engine speed at an idling standard value when the brake pedal is depressed
- Fixes idle speed

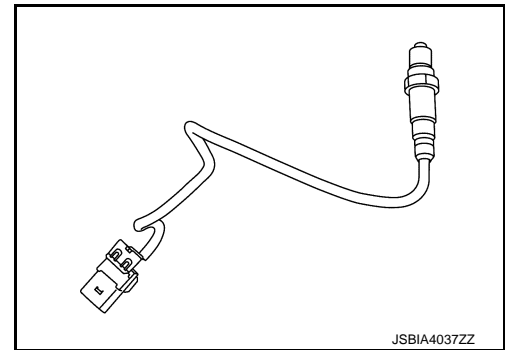


Air-Fuel Ratio (A/F) Sensor

INFOID:0000000013289748

Air fuel ratio (A/F) sensor is installed on the upstream of catalyst converter. A/F sensor measures the oxygen level in the exhaust gas and converts it into a voltage signal. A/F sensor transmits the signal to ECM. Based on the signal from A/F sensor, ECM calculates the air fuel mixture ratio.

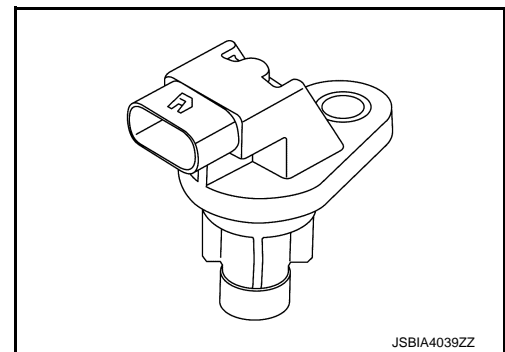
A heater is integrated in A/F sensor to ensure the required operating temperature.



Intake Camshaft Position Sensor

INFOID:0000000013289749

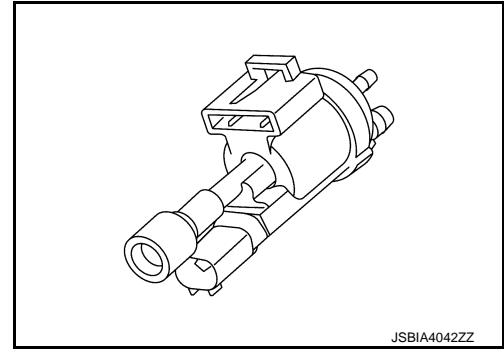
The intake camshaft position sensor is the Hall principle sensor. Distinct characteristic is the output signal in the form of a square-wave on the induction principle. It is thus already conditioned and directly and qualitatively usable for the control unit.



Coolant Pump Switchover Valve

INFOID:000000013289750

The coolant pump is used to allow the coolant to circulate in the circuit. To ensure that an active intervention in the thermal management is possible, the coolant feed is lockable by means of a slide. The actuation is performed via the coolant pump switchover valve using a vacuum. ECM takes on the actuation of the switchover valve.



Coolant Thermostat Heater Element

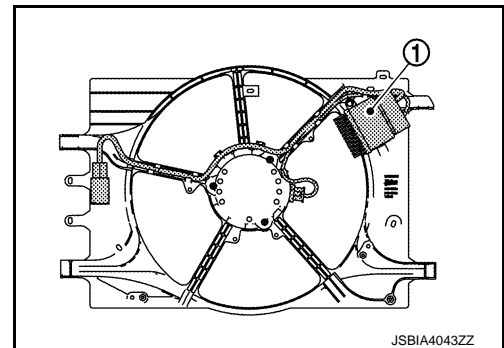
INFOID:000000013289751

The coolant thermostat heater element is located on the thermostat housing.

Cooling Fan Control Module

INFOID:000000013289752

The cooling fan control module ① is mounted on the cooling fan housing and drives the cooling fan motor. The cooling fan control module conducts communication between ECM via the PWM communication. The cooling fan control module drives the cooling fan motor so that the cooling fan speed is controlled in accordance with the control signal from ECM.



Crankshaft Position Sensor

INFOID:000000013289753

The crankshaft position sensor is the hall principle sensor.

Since the crankshaft position sensor is installed opposed to the multi-pulse wheel, pulse signals of 5 V and 0 V are generated during the rotation of crankshaft. ECM transmits a short-resistant engine speed signal via CAN communication based on a signal of crankshaft position sensor.

NOTE:

When ECM can not receive the crankshaft position sensor signal, commute the intake camshaft position sensor signal and exhaust camshaft position sensor signal to enable driving.

ECM

INFOID:000000013289754

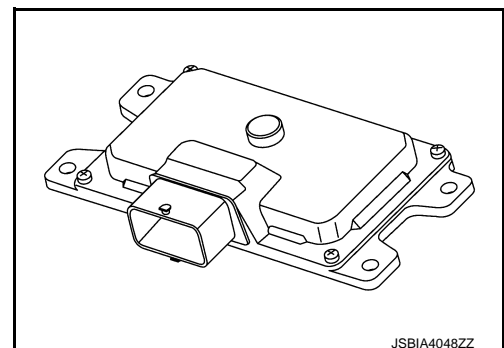
ECM controls the engine in a comprehensive manner according to signals from various sensors and ECUs. ECM has a gateway function for the drivetrain and other CAN communications. The function enables an ECU performing drivetrain CAN communication and an ECU performing CAN communication to communicate. In addition, ECM contains the altitude pressure sensor.

EMCM (Energy Management Control Module)

INFOID:000000013289755

EMCM is an ECU which controls the stop/start system and alternator regeneration. EMCM judges vehicle condition based on signals from each sensor and information from each ECU via CAN communication and controls the stop/start system and alternator regeneration in cooperation with ECM.

EMCM is connected to the CAN communication circuit and receives signals directly from each ECU. EMCM transmits signals via ECM to each ECU.



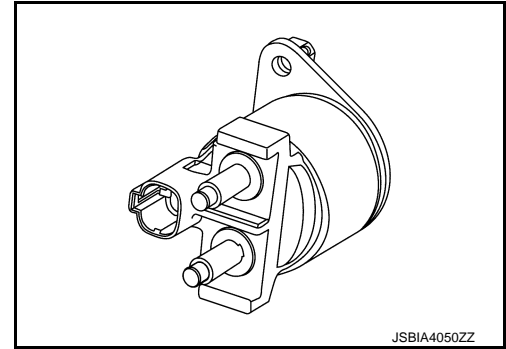
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< SYSTEM DESCRIPTION >

Engine Restart Bypass Relay

INFOID:000000013289756

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 [EC4-78](#), "[STOP/START SYSTEM : System Description](#)".



Engine Restart Bypass Control Relay

INFOID:000000013289757

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

FPCM (Fuel Pump Control Module)

INFOID:000000013289758

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. FPCM is connected to the fuel pump, the fuel pressure sensor, and drivetrain CAN communication line.

FPCM regulates the fuel pump as required and transmits information on the current fuel pressure to ECM.

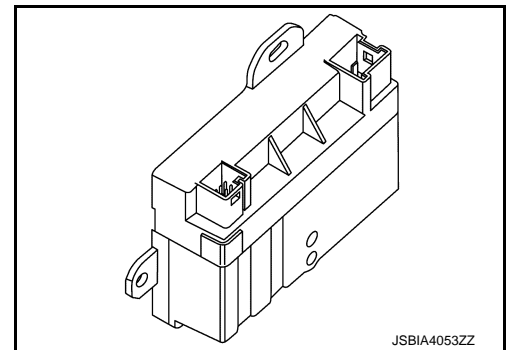
The fuel pump is switched ON when a fuel pump ON signal is received by the FPCM. The signal is transmitted by ECM as a CAN signal via the drivetrain CAN communication line and as a ground signal.

FPCM additionally receives the fuel requirements signal from ECM via drivetrain CAN communication. FPCM registers the current fuel pressure via a voltage signal from the fuel pressure sensor and transmits this information via the drivetrain CAN to ECM.

FPCM evaluates the current fuel pressure, compares it to the specified fuel pressure, and actuates the fuel pump with a PWM signal so that the actual value corresponds to the specified value.

NOTE:

The vehicle and engine variants are stored in FPCM. After replacing FPCM, it is necessary to perform the variant coding registration.



Fuel Injector

INFOID:000000013289759

Fuel injector actuator contains piezo element. The special property of the piezo ceramics is that the structure (length) changes within a microsecond under electrical voltage.

The distinctive feature of this injector is its inverse actuation. Inverse means that the injection nozzle opens when a voltage drop is performed at the injector. For this reason, the electrical injector connector may never be disconnected or switched to ground when the engine is running. An uncontrolled injection would be triggered by this.

WARNING:

During operation, 200 V of high voltage are present at the injector. This is to be noted during testing and repair work at the vehicle.

< SYSTEM DESCRIPTION >

Fuel Pressure Sensor

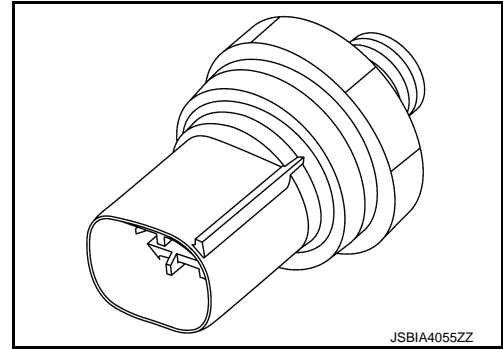
INFOID:000000013289760

The fuel pressure sensor detects the fuel pressure (actual pressure) of the fuel pump.

The fuel pressure measured by a measuring capacitor coupled with the fuel pressure sensor.

When fuel pressure increase, the gap between the capacitor electrodes decreases. The capacitance, and therefore the signal voltage, thus increase in proportion to the fuel pressure.

The signal voltage serves the FPCM as information about the fuel pressure.

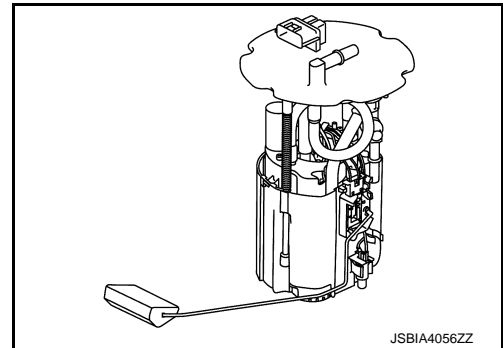


Fuel Pump

INFOID:000000013289761

Fuel pump is integrated with a fuel pressure regulator and a fuel filter. This pump is built into the fuel tank.

ECM controls the fuel pressure via FPCM.



Full-load Operation Vent Line Heater Element

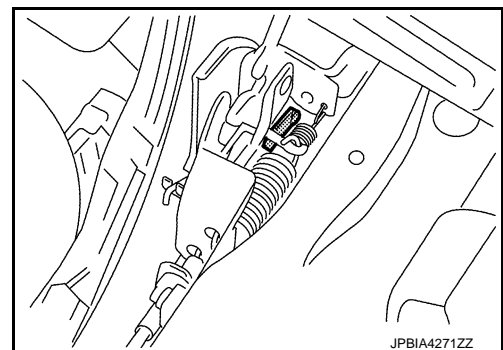
INFOID:000000013289762

The vent line heater element is installed at blow-by gas introducing port on air duct in order to prevent damage to the crankcase ventilation system from freezing and cold temperature condition.

Hood Switch

INFOID:000000013289763

Hood switch is located in the hood lock assembly. Hood switch detects open/close condition of hood and input the hood switch signal to IPDM E/R.

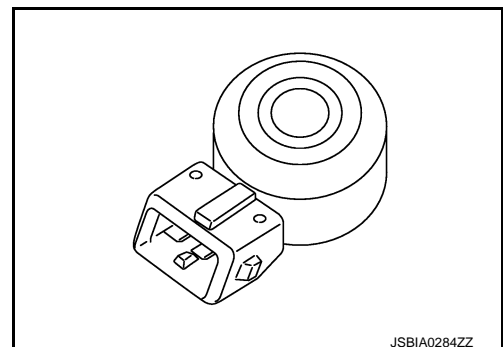


Knock Sensor

INFOID:000000013289764

This engine has two knock sensors. The knock sensors are located on left side on crankcase. The knock sensors detect the vibrations on the crankcase which occur due to injection and associated combustion in the individual cylinders.

The vibrations on the crankcase are transmitted over a seismic mass on an inner piezo element and are converted into electrical voltage pulses.



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COMPONENT PARTS

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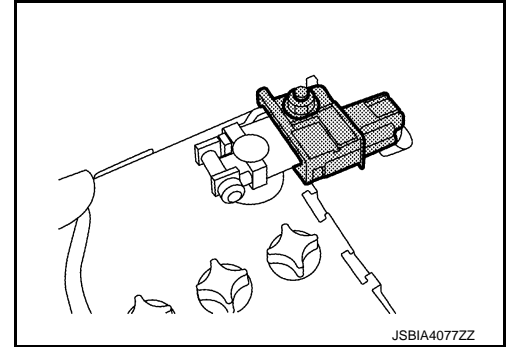
[2.0L TURBO GASOLINE ENGINE]

Main Battery Current Sensor (With Main Battery Temperature Sensor)

INFOID:000000013289765

MAIN BATTERY CURRENT SENSOR

The main battery current sensor is installed to the battery negative cable. The sensor measures the charging/discharging current of the main battery.



MAIN BATTERY TEMPERATURE SENSOR

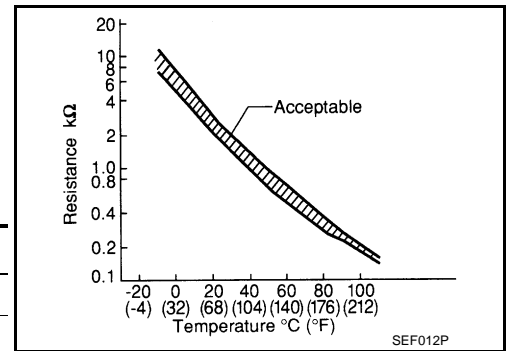
Main battery temperature sensor is integrated in main battery current sensor.

The sensor measures temperature around the main battery. The electrical resistance of the thermistor decreases as temperature increases.

<Reference data>

Temperature [°C (°F)]	Voltage ^{*)} (V)	Resistance (kΩ)
25 (77)	3.333	1.9 - 2.1
90 (194)	0.969	0.222 - 0.258

*: These data are reference values and are measured between battery temperature sensor signal terminal and sensor ground.



Pressure Sensor Downstream of Air Filter

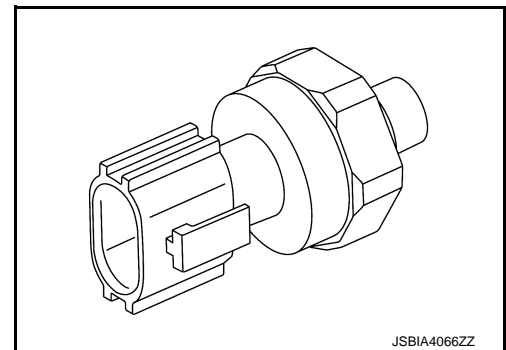
INFOID:000000013289766

The pressure sensor downstream of air filter is located on intake air duct and detects intake air pressure downstream of the air filter.

Refrigerant Pressure Sensor

INFOID:000000013289767

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



COMPONENT PARTS

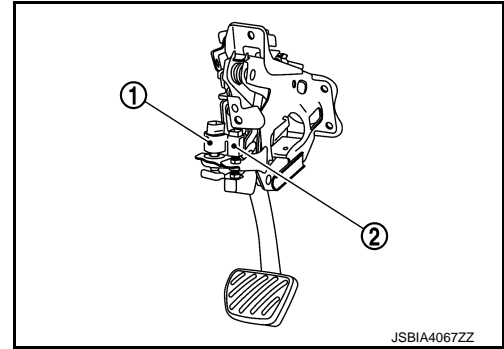
< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

Stop Lamp Switch & Brake Pedal Position Switch

INFOID:000000013289768

Stop lamp switch ① and brake pedal position switch ② are installed to brake pedal bracket.
EMCM detects the state of the brake pedal according to those two types of input (ON/OFF signal).



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

Stop/Start OFF Switch

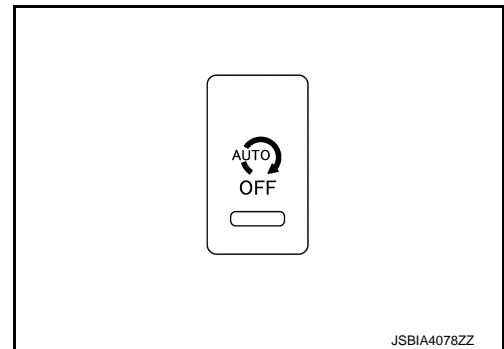
INFOID:000000013289769

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 [EC4-96. "STOP/START SYSTEM : Switch Name and Function"](#).

NOTE:

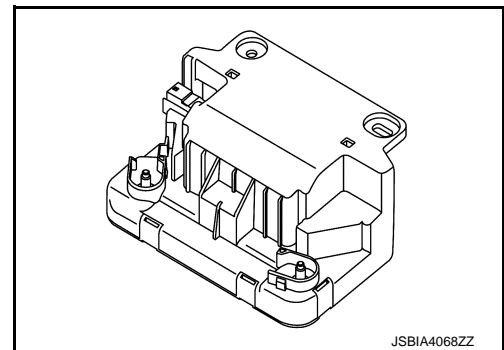
If a stop/start system related malfunction is detected, the stop/start OFF switch indicator lamp stays ON.



Sub Battery Relay

INFOID:000000013289770

The sub battery relay is controlled by EMCM. The sub battery relay connects/interrupts the circuit between the main battery power supply circuit and the sub battery power supply circuit.



Sub Battery Current Sensor (With Sub Battery Temperature Sensor)

INFOID:000000013289771

SUB BATTERY CURRENT SENSOR

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COMPONENT PARTS

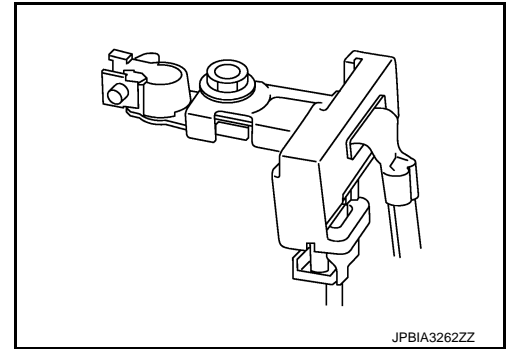
< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

The sub battery current sensor is installed to the negative cable of the sub battery. The battery current sensor detects the sub battery charge/discharge current and transmits a signal to EMCM. EMCM judges the sub battery load based on the signal.

CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power voltage variable control, and may cause the battery to discharge.



SUB BATTERY TEMPERATURE SENSOR

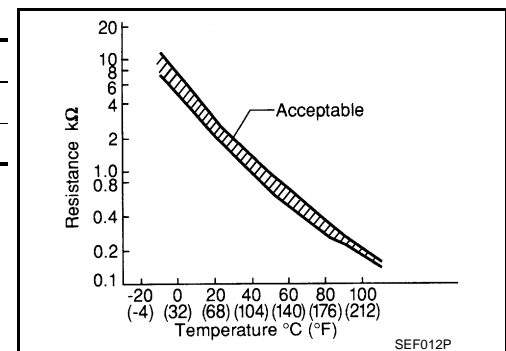
Sub battery temperature sensor is integrated in battery current sensor.

The sensor measures temperature around the battery.

This sensor uses a thermistor and its electrical resistance varies as the temperature varies. EMCM detects a voltage change caused by the change in electrical resistance.

<Reference data>

Temperature [°C (°F)]	Voltage (V)	Resistance (kΩ)
25 (77)	3.333	1.9 - 2.1
90 (194)	0.969	0.222 - 0.258



Throttle Valve Actuator

INFOID:0000000013289772

THROTTLE VALVE ACTUATOR

Throttle valve actuator consists of throttle valve motor, throttle position sensor, etc. The throttle valve motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening angle properly in response to driving condition via the throttle valve motor.

NOTE:

When detecting an electrical malfunction in throttle valve actuator, ECM stops the throttle valve control. Consequently, the throttle valve angle is fixed at 10% by the spring force, enabling emergency driving.

When detecting a mechanical malfunction in throttle valve actuator according to the throttle position sensor 1 and 2 signals, ECM limits the fuel injector operation to control the engine speeds as follows.

- At idling: 1,400 rpm
- At driving: 1,800 rpm
- Fixes engine speed at an idling standard value when the brake pedal is depressed

THROTTLE POSITION SENSOR

The throttle position sensor responds to the throttle valve movement. The throttle position sensor has two sensors. These sensors are a kind of potentiometer which transform the throttle valve position into output voltage, and emit the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening angle properly in response to driving condition via the throttle valve motor.

NOTE:

When one of the accelerator pedal position sensors has a malfunction, ECM uses a signal from another accelerator pedal position sensor. Furthermore, ECM monitors the amount of intake air and corrects throttle position. When both position sensors have a malfunction, ECM stops the throttle valve control. Consequently, the throttle valve angle is fixed at 10% by the spring force, enabling emergency driving.

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

Vacuum Sensor

INFOID:000000013289773

Vacuum sensor is connected to brake booster. The sensor detects brake booster pressure and sends the voltage signal to the ABS actuator and electric unit (control unit). The sensor uses a silicon diaphragm which is sensitive to the change in pressure. As the pressure increases, the voltage rises. EMCM judges force to depress a brake pedal for the stop/start system according to brake booster pressure sensor signal sent from ABS actuator and electric unit via CAN communication.

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STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

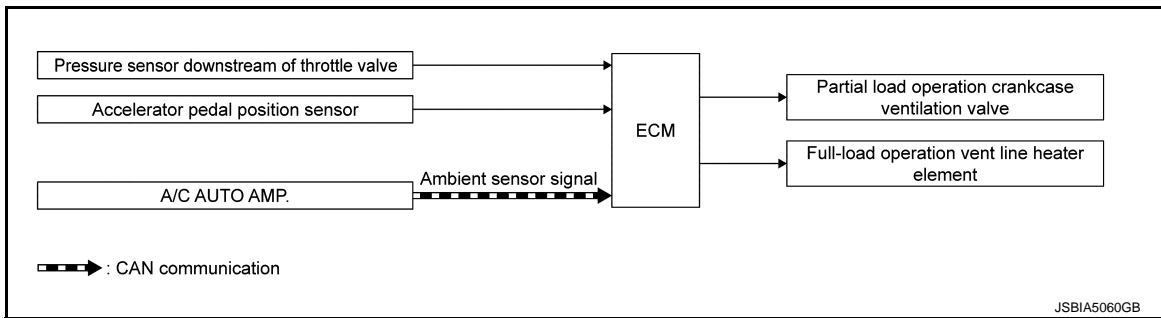
[2.0L TURBO GASOLINE ENGINE]

STRUCTURE AND OPERATION

Crankcase Ventilation System

INFOID:000000013289774

SYSTEM DIAGRAM

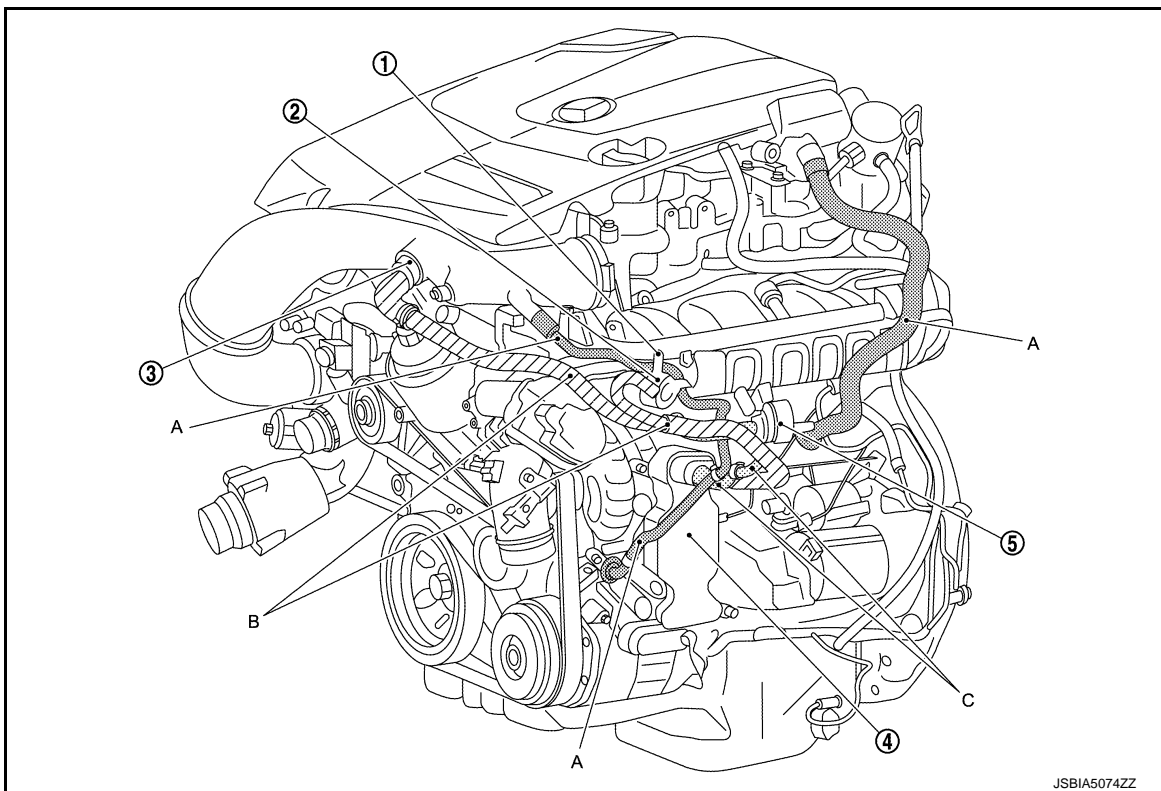


SYSTEM DESCRIPTION

Description

The crankcase ventilation system allows the discharging of excess pressure and excessive gas sent from the crankcase, feeding them back to the engine through the induction system, and combusting them under any engine operating condition.

- Pressure sensor downstream of throttle valve (Engine load)
- Accelerator pedal position sensor (Accelerator pedal position)
- A/C auto amp. (Ambient temperature)



- | | | |
|------------------------------------|--|--|
| ① Fuel tank ventilation connector | ② Vent valve | ③ Full-load operation vent line heater element |
| ④ Oil separator | ⑤ Partial load operation crankcase ventilation valve | |
| A Air admission line and vent line | B Wide open throttle bleed line | C Partial load bleed line |

Crankcase Ventilation Description of Function

The crankcase ventilation has functions as follows:

STRUCTURE AND OPERATION

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

- Normal mode crankcase ventilation function
- Full-load mode crankcase ventilation function

NORMAL MODE CRANKCASE VENTILATION FUNCTION

The partial load operation crankcase ventilation valve is usually open, and blow-by gas is sucked into the boost air distributor pipe from the oil separator.

During deceleration, the partial load operation crankcase ventilation valve is closed according to a signal from ECM. This stops blow-by gas flow from crankcase to intake air system and reduces noise.

FULL-LOAD MODE CRANKCASE VENTILATION FUNCTION

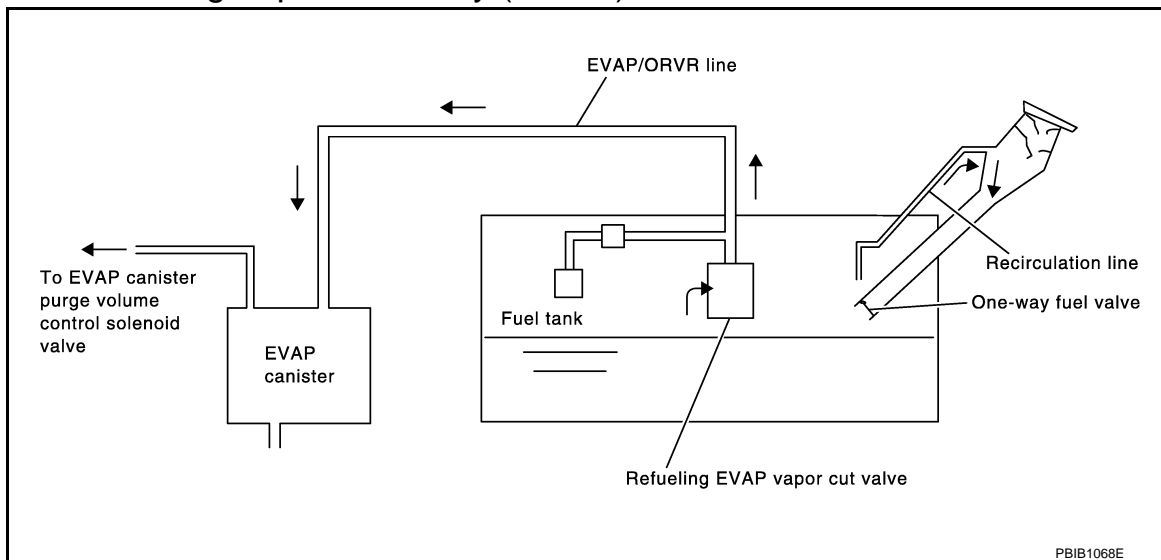
Blow-by gas is sucked into the air intake pipe from the oil separator.

The full-load operation vent line heater element is installed to the ventilation line connected to the air filter downstream and heats excessive gas according to a signal from ECM when ambient air temperature becomes less than 7°C (44.6°F).

This prevents damage to engine caused by frozen excessive gas.

On Board Refueling Vapor Recovery (ORVR)

INFOID:000000013447605



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

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

WARNING:

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

- Put a "CAUTION: FLAMMABLE" sign in workshop.
- Never smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Always furnish the workshop with a CO₂ fire extinguisher.

CAUTION:

- Before removing fuel line parts, carry out the following procedures:
 - Put drained fuel in an explosion-proof container and put lid on securely.
 - Release fuel pressure from fuel line. Refer to [FL-30, "Removal and Installation"](#).
 - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Never kink or twist hose and tube when they are installed.
- Never tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connections.
- Never attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

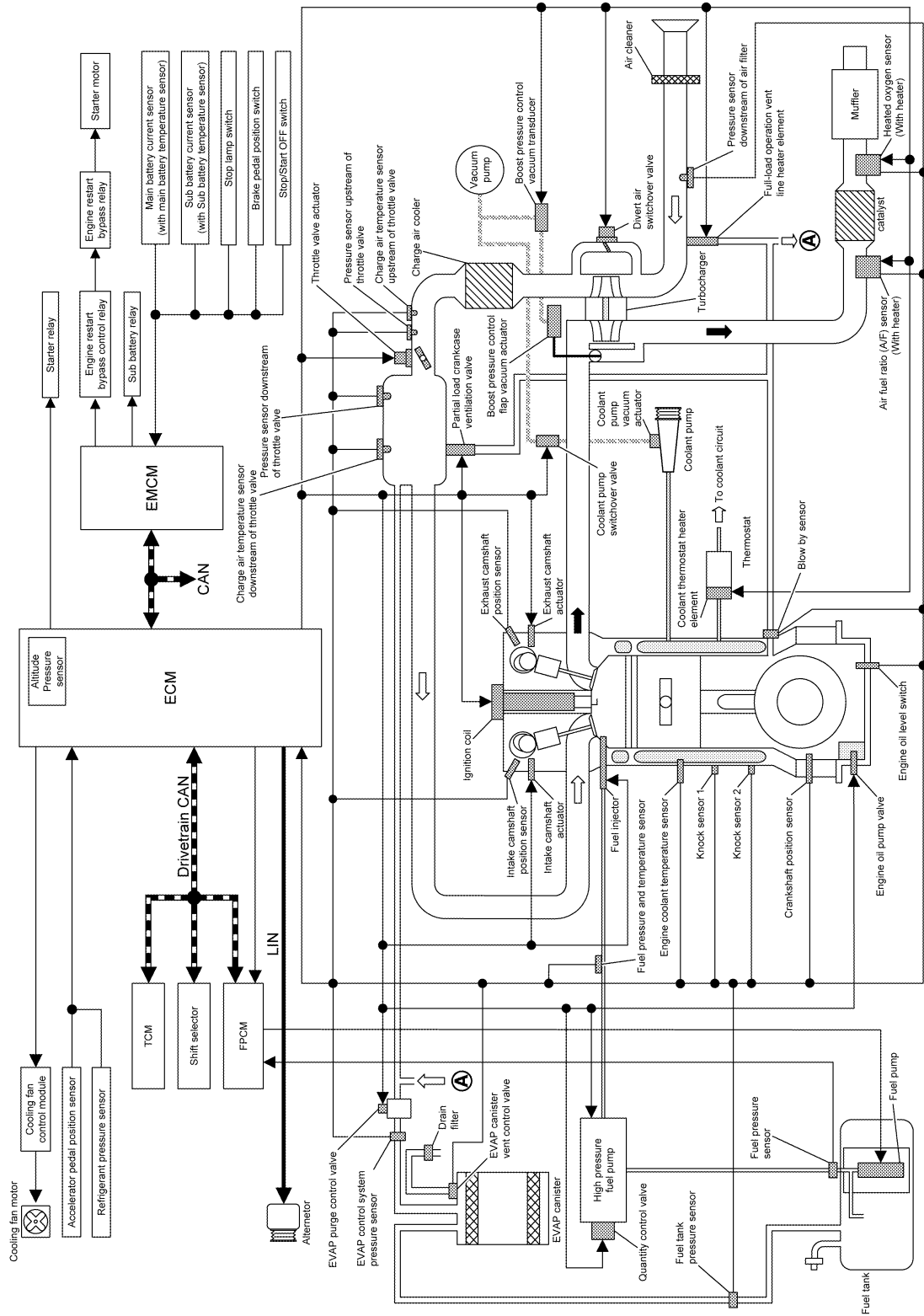
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SYSTEM
ENGINE CONTROL SYSTEM

ENGINE CONTROL SYSTEM : System Description

INFOID:000000013289775

SYSTEM DIAGRAM



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SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

Function	Reference
Ignition ON control	EC4-50. "IGNITION ON CONTROL : System Description"
Engine start control	EC4-51. "ENGINE START CONTROL : System Description"
RPM control	EC4-52. "RPM CONTROL : System Description"
Smooth running control	EC4-53. "SMOOTH RUNNING CONTROL : System Description"
Injection regulation control	EC4-55. "INJECTION REGULATION CONTROL : System Description"
Ignition system control	EC4-56. "IGNITION SYSTEM CONTROL : System Description"
Synchronize fuel injection and ignition order function	EC4-57. "SYNCHRONIZE FUEL INJECTION AND IGNITION ORDER FUNCTION : System Description"
Camshaft adjustment function	EC4-59. "CAMSHAFT ADJUSTMENT FUNCTION : System Description"
Torque control	EC4-60. "TORQUE CONTROL : System Description"
Knock control	EC4-61. "KNOCK CONTROL : System Description"
Air-fuel mixture ratio control	EC4-62. "AIR-FUEL MIXTURE RATIO CONTROL : System Description"
Cold start mixture enrichment control	EC4-64. "COLD START MIXTURE ENRICHMENT CONTROL : System Description"
Deceleration fuel shutoff function	EC4-66. "DECELERATION FUEL SHUTOFF CONTROL : System Description"
Charge air control	EC4-67. "CHARGE AIR CONTROL : System Description"
Ignition OFF control	EC4-69. "IGNITION OFF CONTROL : System Description"
Fuel supply control	EC4-70. "FUEL SUPPLY CONTROL : System Description"
Thermal management control	EC4-72. "THERMAL MANAGEMENT CONTROL : System Description"
Exhaust treatment function	EC4-75. "EXHAUST TREATMENT FUNCTION : System Description"
Evaporative emission system	EC4-76. "EVAPORATIVE EMISSION SYSTEM : System Description"
Stop/Start system	EC4-78. "STOP/START SYSTEM : System Description"
Starter motor drive control	EC4-86. "STARTER MOTOR DRIVE CONTROL : System Description"
Engine on energy management function	EC4-88. "ENGINE ON ENERGY MANAGEMENT FUNCTION : System Description"
ASCD (Automatic Speed Control Device) control*	EC4-91. "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : Information"
Fuel filler cap warning system	EC4-91. "FUEL FILLER CAP WARNING SYSTEM : System Description"
Infiniti drive mode selector	EC4-92. "Infiniti Drive Mode Selector : System Description"
Warning/Indicator/Chime	EC4-94. "WARNING/INDICATOR/CHIME LIST : Warning lamps/Indicator lamps", EC4-95. "WARNING/INDICATOR/CHIME LIST : Warning Chime", EC4-95. "WARNING/INDICATOR/CHIME LIST : Warning/Indicator (On Information Display)"
CAN communication	EC4-95. "CAN COMMUNICATION : System Description"

*: Controlled by ADAS control unit

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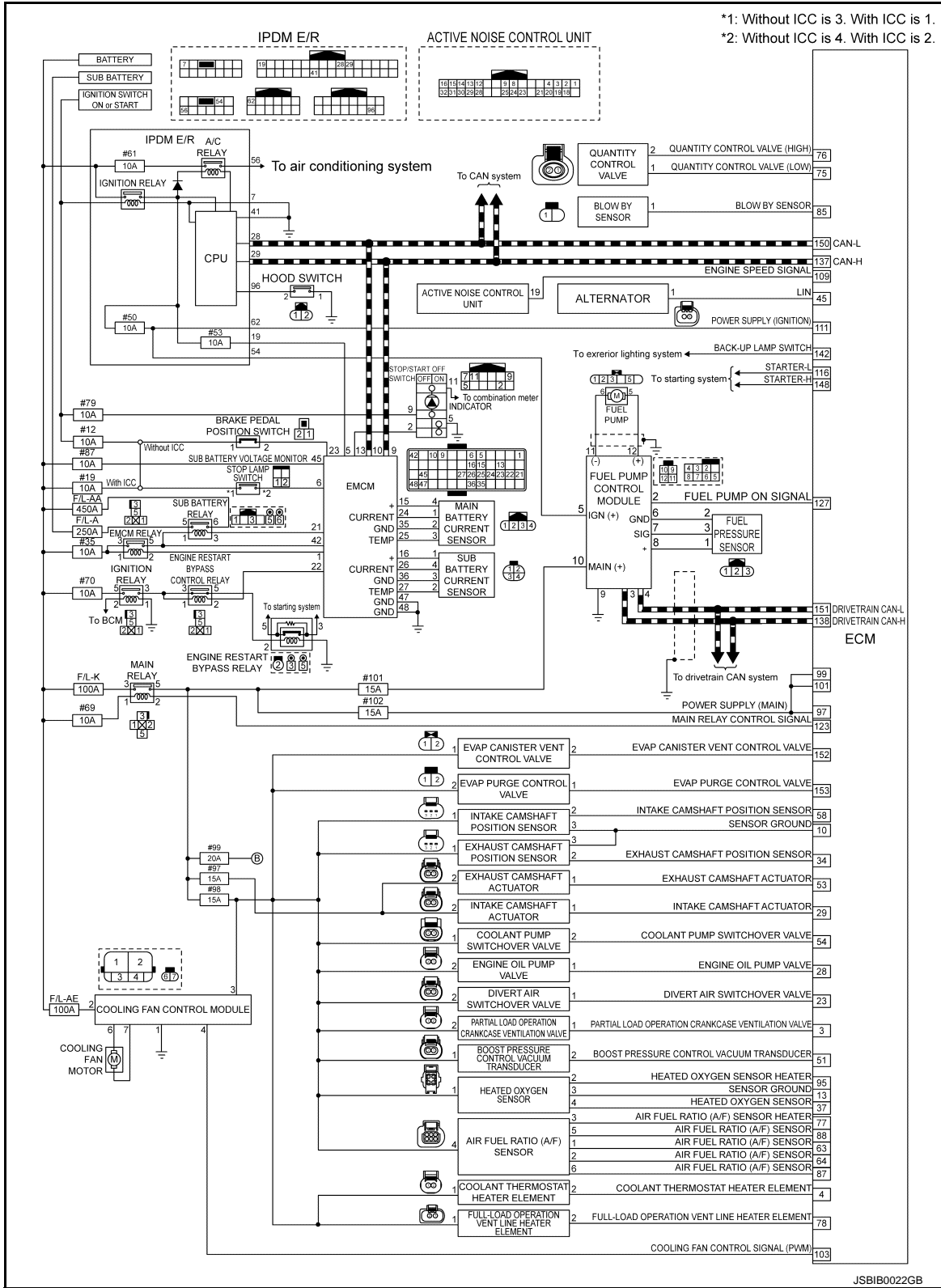
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[2.0L TURBO GASOLINE ENGINE]

ENGINE CONTROL SYSTEM : Circuit Diagram

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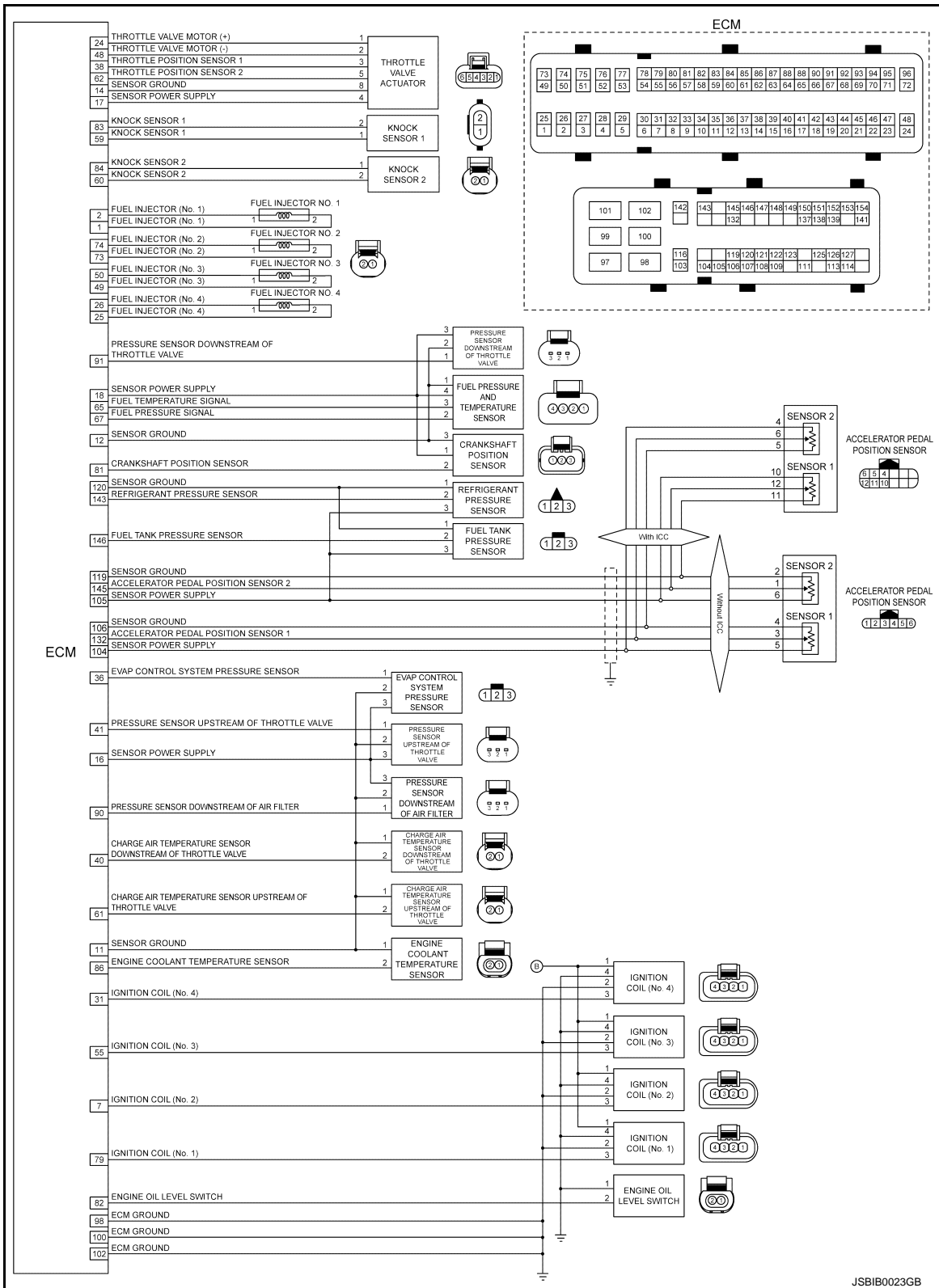


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[2.0L TURBO GASOLINE ENGINE]



ENGINE CONTROL SYSTEM : Fail-safe (ECM)

INFOID:000000013289777

STOP/START SYSTEM

DTC No.	Malfunction type	Engine operating condition in fail-safe mode
P0001	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0003	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.

SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

DTC No.	Malfunction type	Engine operating condition in fail-safe mode
P0004	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0011	SIGNAL PLAUSIBILITY ERROR	Prohibits the stop/start operation.
P0012	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0016	SIGNAL PLAUSIBILITY ERROR	Prohibits the stop/start operation.
	SIG ABOVE ALLOWABLE RANGE	Prohibits the stop/start operation.
P0017	SIGNAL PLAUSIBILITY ERROR	Prohibits the stop/start operation.
	SIG ABOVE ALLOWABLE RANGE	Prohibits the stop/start operation.
P0087	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
	MISSING MESSAGE	Prohibits the stop/start operation.
P0088	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0106	SG BS LVL O-OF RNG/ZR AJST ERR	Prohibits the stop/start operation.
	SIGNAL STUCK IN RANGE	Prohibits the stop/start operation.
P0107	CIRCUIT SHORT TO GROUND	Prohibits the stop/start operation.
P0108	CIRCUIT SHORT TO BATTERY	Prohibits the stop/start operation.
P0115	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0116	SIGNAL COMPARE ERROR	Prohibits the stop/start operation.
	SIGNAL PLAUSIBILITY ERROR	Prohibits the stop/start operation.
	SIG BELOW ALLOWABLE RANGE	Prohibits the stop/start operation.
	SIG ABOVE ALLOWABLE RANGE	Prohibits the stop/start operation.
	SIGNAL INVALID	Prohibits the stop/start operation.
P0117	CIRCUIT SHORT TO GROUND	Prohibits the stop/start operation.
P0118	CIRCUIT SHORT TO BATTERY	Prohibits the stop/start operation.
P0119	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0119	SIG RTE OF CHNG ABV THRESHLD	Prohibits the stop/start operation.
P0190	CIRC VOLT BELOW THRESHOLD	Prohibits the stop/start operation.
	CIRC VOLT ABOVE THRESHOLD	Prohibits the stop/start operation.
P0191	CIRC VOLT BELOW THRESHOLD	Prohibits the stop/start operation.
	CIRC VOLT ABOVE THRESHOLD	Prohibits the stop/start operation.
P0192	CIRCUIT SHORT TO GROUND	Prohibits the stop/start operation.
P0193	CIRCUIT SHORT TO BATTERY	Prohibits the stop/start operation.
P0300	SIG ABOVE ALLOWABLE RANGE	Prohibits the stop/start operation.
P0335	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0339	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0341	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0342	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0343	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0366	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0367	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0368	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0697	SYSTEM INTERNAL MALFUNCTN	Prohibits the stop/start operation.
P167B	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1CDE	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1CDF	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1CE2	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.

SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

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DTC No.	Malfunction type	Engine operating condition in fail-safe mode
P1D04	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1D05	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1D06	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1D07	SUPERVISION SOFTWARE ERROR	Prohibits the stop/start operation.
P2617	CIRCUIT OPEN	Prohibits the stop/start operation.

ENGINE CONTROL SYSTEM : Fail-safe (FPCM)

INFOID:000000013289778

DTC No.	Operating condition in fail-safe mode
U0100	pressure control on substitute value
P2539 P2540 P2541 P2542	open loop pressure control

ENGINE CONTROL SYSTEM : Fail-safe (EMCM)

INFOID:000000013289779

STOP/START SYSTEM

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)
B1910 B1911	Sub battery relay	Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time
P0120	Sensor power supply	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P0605 P0607	EMCM	Prohibit the stop/start system operation	Restart the engine —	Prohibit the stop/start system operation from the next time
P0643	Sensor power supply	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1540 P1543 P1544 P1541 P1542	Sub battery current sensor	Prohibit the stop/start system operation	— Restart the engine	Prohibit the stop/start system operation from the next time
P1546 P1547	Sub battery temperature sensor	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1550 P1553 P1554 P1551 P1552	Main battery current sensor	Prohibit the stop/start system operation	— Restart the engine	Prohibit the stop/start system operation from the next time
P1556 P1557	Main battery temperature sensor	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

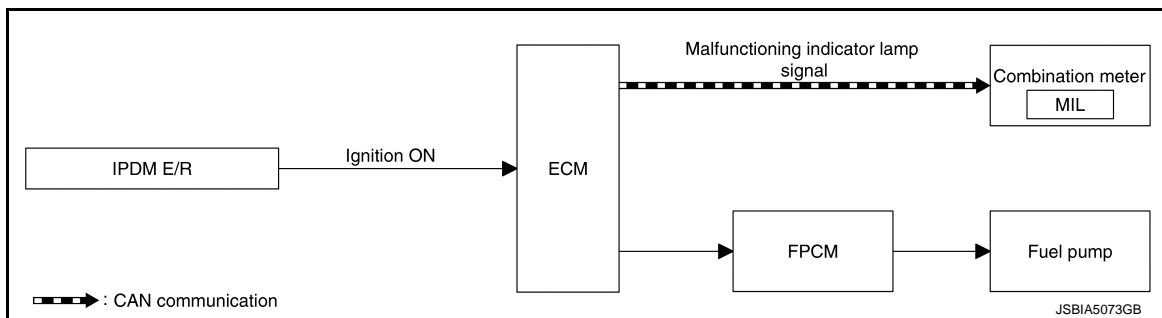
DTC No.	Detected items	Stop/start system operating condition in fail safe mode		
		Idling or driving the vehicle	Stop/start system operating	
			Stop	During cranking (Restart)
P1575	Brake switch	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1576 P1577	Brake pedal position switch	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1655	Engine restart bypass relay	Prohibit the stop/start system operation	Prohibit the stop/start system operation	Prohibit the stop/start system operation from the next time
P1656	Engine restart bypass relay	Prohibit the stop/start system operation	Prohibit the stop/start system operation	Prohibit the stop/start system operation from the next time
P1805	Brake switch	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
U1000	CAN communication line	Prohibit the stop/start system operation	Restart the engine NOTE: Does not start the engine by the CAN communication abnormal status	Prohibit the stop/start system operation from the next time

IGNITION ON CONTROL

IGNITION ON CONTROL : System Description

INFOID:000000013289780

SYSTEM DIAGRAM



SYSTEM DIAGRAM

When ignition switch is turned ON, ECM performs the following functions:

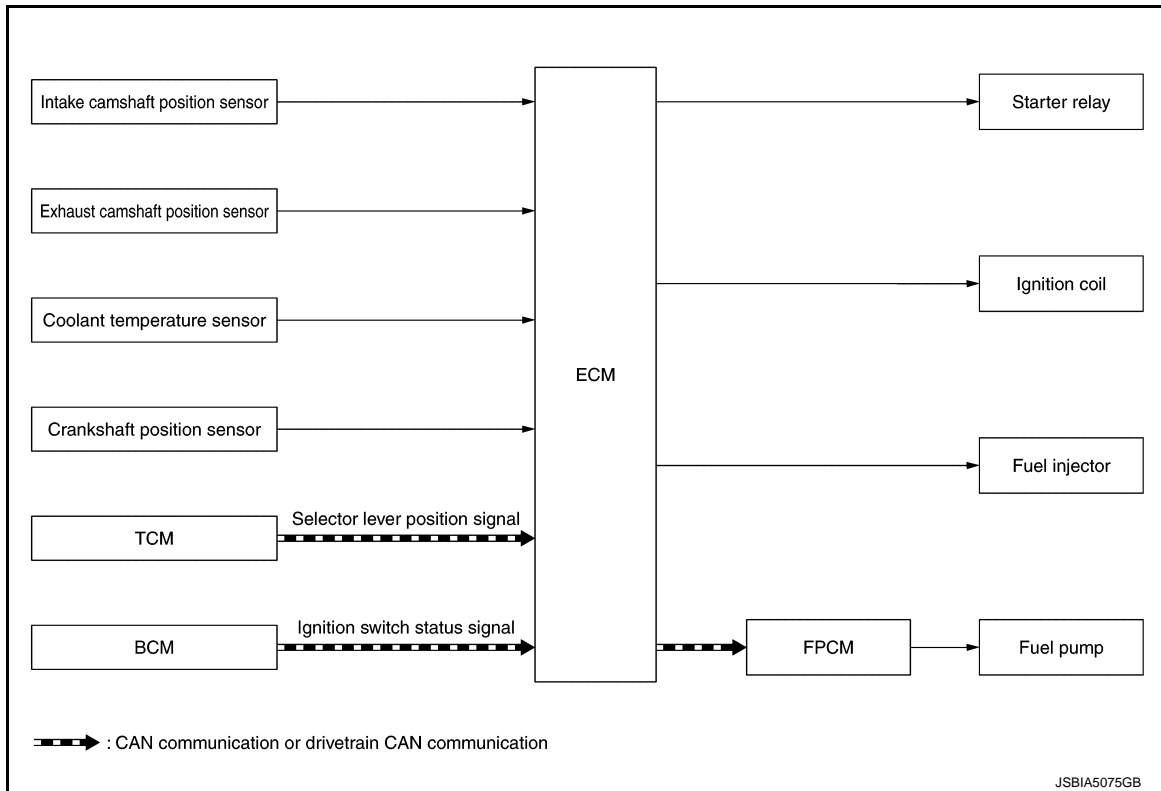
- To ensure full flow, the fuel pump is actuated via the FPCM (only at first time ignition ON after unlocking the vehicle).
- MIL (Malfunction Indicator Lamp) is actuated for the lamp check by the ECM via CAN communication.
- Malfunction memory in the ECM can be read out and deleted via the diagnosis tool.
- The throttle valve actuator checks its return spring (by the position of the throttle valve) and adapts the position of the actuator, if necessary.

ENGINE START CONTROL

ENGINE START CONTROL : System Description

INFOID:000000013289781

SYSTEM DIAGRAM



CONTROL OUTLINE

When ignition switch is turned to the START position, the ECM receives the start signal (ignition switch status signal) from BCM and actuates the starter relay, pressure regulating valve, fuel injectors, quantity control valve, and fuel pump (via FPCM).

The ECM coordinates the injection sequence when it start to use signals from the crankshaft position sensor and camshaft position sensor.

The start injection quantity control in the ECM serves to calculate a specific start injection quantity at engine start irrespective of the position of the accelerator pedal position sensor.

With automatic transmission, when the engine cranking speed reaches 400 to 700 rpm, or it takes 5 to 40 seconds to start (depending on coolant temperature), the ECM interrupts the negative activation of the starter relay and thus terminates the starting procedure.

With manual transmission, when the engine cranking speed reaches 400 to 700 rpm, the ECM interrupts the negative activation of the starter relay and thus terminates the starting procedure.

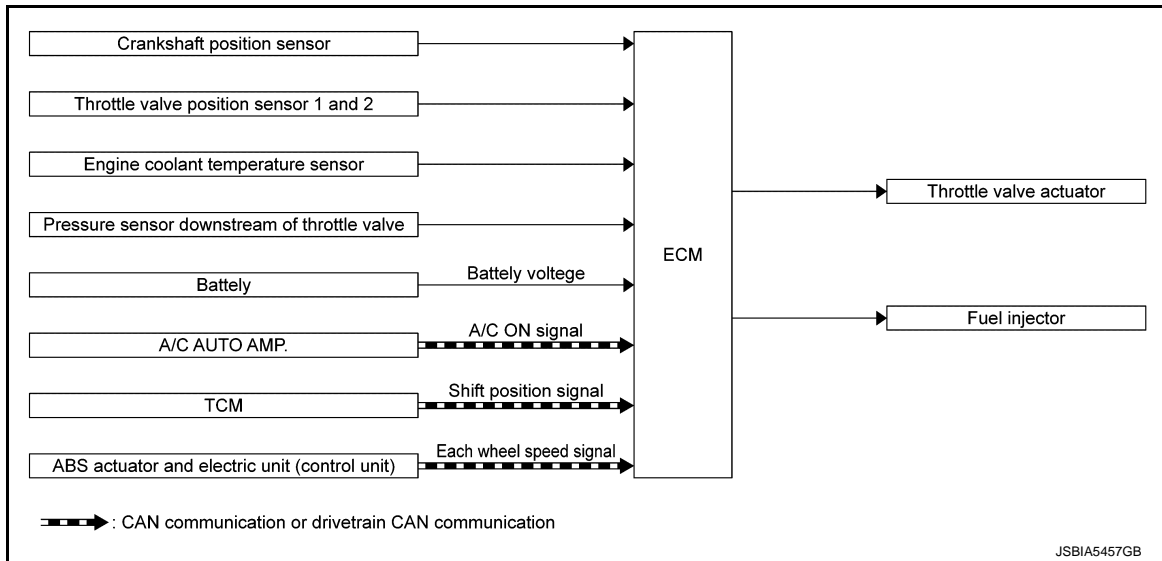
RPM CONTROL

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RPM CONTROL : System Description

INFOID:000000013289782

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

ECM stabilizes idle speeds to protect the engine, drivetrain, and vehicle and limits engine speeds. ECM controls engine speeds according to the following sensors and signals.

- Crankshaft position sensor (Engine speeds)
- Throttle position sensor 1 and 2 (Throttle valve position)
- TCM (Shift position)
- ABS actuator and electric unit (control unit) (Each wheel speed)

In addition, conditions for the following control items and functions are added:

- Throttle control
 - Ignition timing control
 - Fuel shut-off function
 - Adaptation of the injection time of the fuel injectors (Idle speeds control)
- The ENGINE SPEEDS CONTROL has functions and control items as follows.

- Function for torque converter protection
- Malfunction in throttle valve actuator
- Speeds limiting function
- Maximum speed limiting function
- Configuration function
- Idle speeds control

FUNCTION FOR TORQUE CONVERTER PROTECTION

Engine speed is limited up to approximately 4,200 rpm to prevent the increase in static internal pressure of the torque converter when the select lever is in P or N position.

MALFUNCTION IN THROTTLE VALVE ACTUATOR

For details, refer to SHUT-OFF FUNCTION in FUEL SUPPLY CONTROL, Refer to [EC4-70, "FUEL SUPPLY CONTROL : System Description"](#).

SPEEDS LIMITING FUNCTION

ECM detects driving condition of the vehicle according to each wheel speed signal transmitted from the ABS actuator and electric unit (control unit). While driving the vehicle, engine speed is limited to 6,000 rpm or less to protect the engine.

MAXIMUM SPEED LIMITING FUNCTION

When vehicle speed reaches 190 km/h (118 MPH), ECM immediately decreases the throttle valve angle and fuel injection time to reduce engine torque. Vehicle speed is limited through this method.

CONFIGURATION FUNCTION

If "Configuration" is not performed on CONSULT, maximum engine speed is limited to 2,400 rpm.

IDLE SPEEDS CONTROL

SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Idling is maintained steady by controlling idle speed according to the operating condition of the engine and engine load when the accelerator pedal is not depressed.

ECM controls idle speeds according to the following sensors and signals.

- Engine coolant temperature sensor
- Pressure sensor downstream of throttle valve (Engine load)
- Battery voltage
- A/C auto amp. (air conditioner activation status)

ECM adjusts idle speed through the throttle valve control and determines fuel injection time according to the amount of intake air. In addition, ECM can adjust the ignition timing up to 20 degrees in retard or advance direction to stabilize idle speed.

NOTE:

The ignition timing control responds faster than the throttle valve control. ECM controls idle speed according to the following operating conditions and engine load.

- During warm-up
- Shifting to D or R range
- Turning on air conditioner compressor
- Purge

During Warm-up

During warm-up, ECM controls idle speed according to coolant temperature to quickly increase the catalyst temperature to the operating temperature after engine start.

Prerequisites for warm-up stage

- Engine coolant temperature is 40°C (104°F) or less
- N or P range

ECM increases idle speed to approximately 1,100 – 1,300 rpm for approximately 20 seconds after engine start. After this, if coolant temperature is less than 70°C (158°F), ECM increases idle speed 50 – 100 rpm more than the standard idle speed additionally for approximately 50 seconds.

Shifting to D or R Range

ECM receives a shift position signal from TCM via drivetrain CAN communication, and when the shift position is in D or R range, ECM decreases idle speed to reduce creeping of the vehicle.

Turning on Air Conditioner Compressor

To prevent engine speed from decreasing due to the activation of air conditioner compressor during idling, the A/C auto amplifier transmits an A/C status signal to ECM before turning ON the air conditioner compressor. ECM controls idle speed according to the signal.

Purge

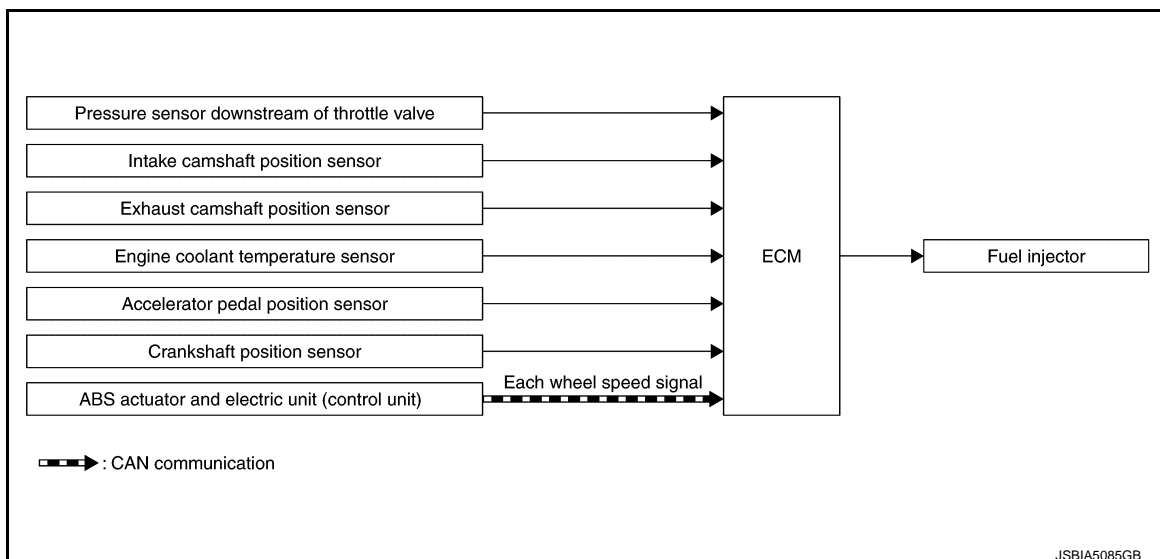
The idle speed control reduces speed fluctuation resulting from purge.

SMOOTH RUNNING CONTROL

SMOOTH RUNNING CONTROL : System Description

INFOID:000000013289783

SYSTEM DIAGRAM



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< SYSTEM DESCRIPTION >

Description

ECM constantly monitors engine speed to protect the catalyst from excessive heat load resulting from an misfire.

ECM performs smooth running control according to the following sensors and signals.

- Pressure sensor downstream of throttle valve (Engine load)
- Intake camshaft position sensor (Intake camshaft position)
- Exhaust camshaft position sensor (Exhaust camshaft position)
- Engine coolant temperature sensor
- Accelerator pedal position sensor (Accelerator pedal position)
- Crankshaft position sensor (Engine speeds)
- ABS actuator and electric unit (control unit) (Each wheel speed signal)

The smooth running control has functions as follows.

- Misfire detecting function
- Misfire counting function
- Factors of smooth running control

MISFIRE DETECTING FUNCTION

For the smooth running control, ECM monitors a crankshaft position sensor signal to check that the signal synchronizes exactly with the combustion timing of each cylinder. For the crankshaft position sensor signal, distinctive acceleration must be generated at the combustion process of each cylinder. Regarding misfire, each signal has different acceleration. This allows ECM to detect an misfire. If the number of occurrences of misfire exceeds the specified value, ECM deactivates the fuel indicator. Up to two fuel indicators can be deactivated simultaneously.

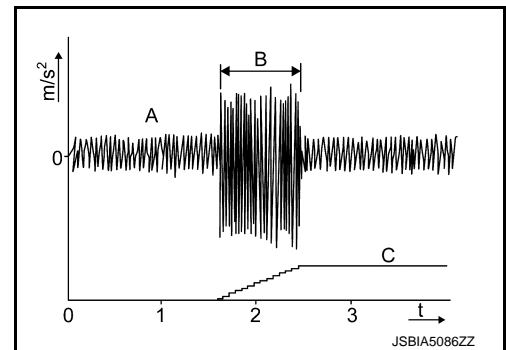
MISFIRE COUNTING FUNCTION

ECM memorizes misfire counts by categorizing types of misfire as shown below.

- “Cylinder-specific” combustion misfires
- “Emission limit” combustion misfires
- “Catalyst damage” combustion misfires

Smooth Running Signal

- m/s² : Acceleration
- t : Time
- A : Engine running without combustion misfiring → Acceleration values within tolerance range
- B : Engine running with combustion misfiring → acceleration values too high
- C : Misfire counter → starts with misfire detection



Main factors of misfire occurrence

- Ignition system
- Injection system
- Mechanical engine components (e.g. valve seats, valve springs, air suction)
- Fuel starvation

FACTORS FOR SMOOTH RUNNING CONTROL

Factors affecting the smooth running control:

- Engine speeds and engine load
- Engine coolant temperature
- Detection of rough roads
- Synchronization of injection and ignition order
- Crankshaft position sensor adjustment

Engine Speeds And Engine Load

ECM sets a standard value of the time between two combustions, according to engine speed and engine load.

Engine Coolant Temperature

Since the cold start permits more misfires compared with warm-up, ECM measures engine coolant temperature.

Detection of Rough Roads

Vibrations from the drive train resulting from rough roads adversely affect the revolution under the specific engine speed and engine load. Therefore, it is required to extend the tolerance of smooth running control

< SYSTEM DESCRIPTION >

when driving on rough roads. ECM receives a wheel speed signal (detecting rotational differences among wheels) from the ABS actuator and electric unit (control unit) unit via CAN communication.

Synchronization of Injection and Ignition Order

ECM monitors misfire in each cylinder according to signals from crankshaft position sensor, intake camshaft position sensor, and exhaust camshaft position sensor.

Crankshaft Position Sensor Adjustment

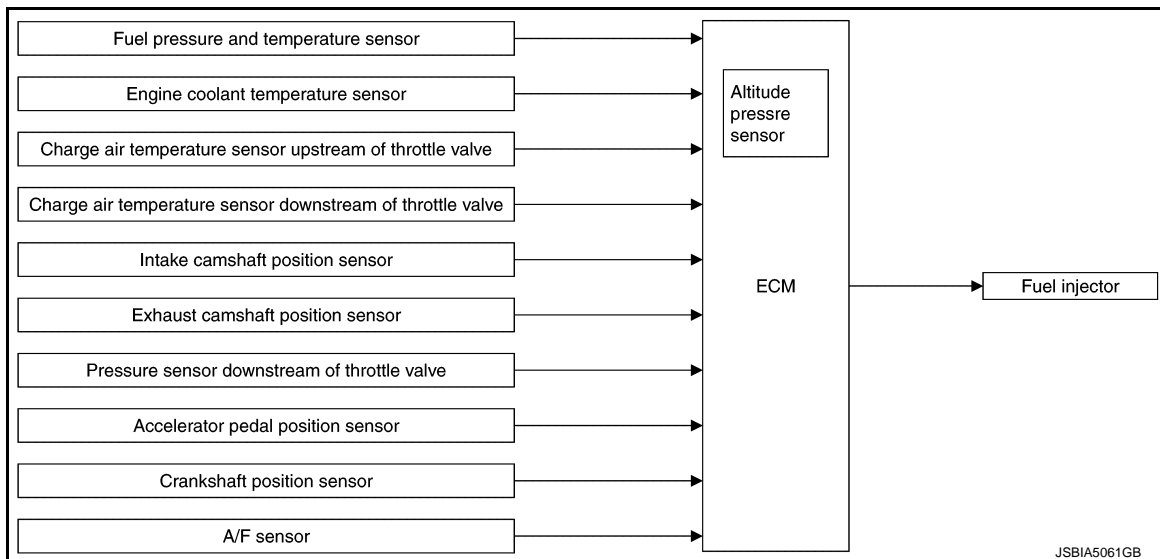
The tolerance of the smooth running control is decreased after the completion of crankshaft position sensor adjustment. This allows the smooth running control to be adapted to rough idle of engine. ECM memorizes normal engine speeds of the deceleration timing (accelerator pedal not depressed) and uses the memorized speeds as comparison data for misfire detection.

INJECTION REGULATION CONTROL

INJECTION REGULATION CONTROL : System Description

INFOID:000000013289784

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

Description

The fuel injection control determines injection time and pressure according to the ECM characteristics map. ECM controls the fuel injection according to the following sensors and signals.

- Fuel pressure and temperature sensor
- Engine coolant temperature sensor
- Charge air temperature sensor upstream of throttle valve
- Charge air temperature sensor downstream of throttle valve
- Intake camshaft position sensor (Intake camshaft position)
- Exhaust camshaft position sensor (Exhaust camshaft position)
- Pressure sensor downstream of throttle valve (Engine load)
- Accelerator pedal position sensor 1 and 2 [engine load request from the driver, accelerator pedal position, and accelerator pedal operation (fast or slow) (acceleration)]
- Crankshaft position sensor (Engine speed)
- A/F sensor

Fuel injection control has following controls:

- Normal mode control
- Full-load mode control
- Acceleration control

NORMAL MODE CONTROL

ECM controls injection time of fuel injector according to the following items.

- Air fuel ratio
- Fuel pressure in the fuel rail
- Requested engine torque

NOTE:

Normal mode means the accelerator pedal effort range of approximately 10–90%.

FULL-LOAD MODE CONTROL

When in full load mode, ECM extends the injection time and increases fuel injection pressure to achieve the maximum engine torque.

NOTE:

Full load mode means the accelerator pedal effort range of approximately 90% or more.

ACCELERATION CONTROL

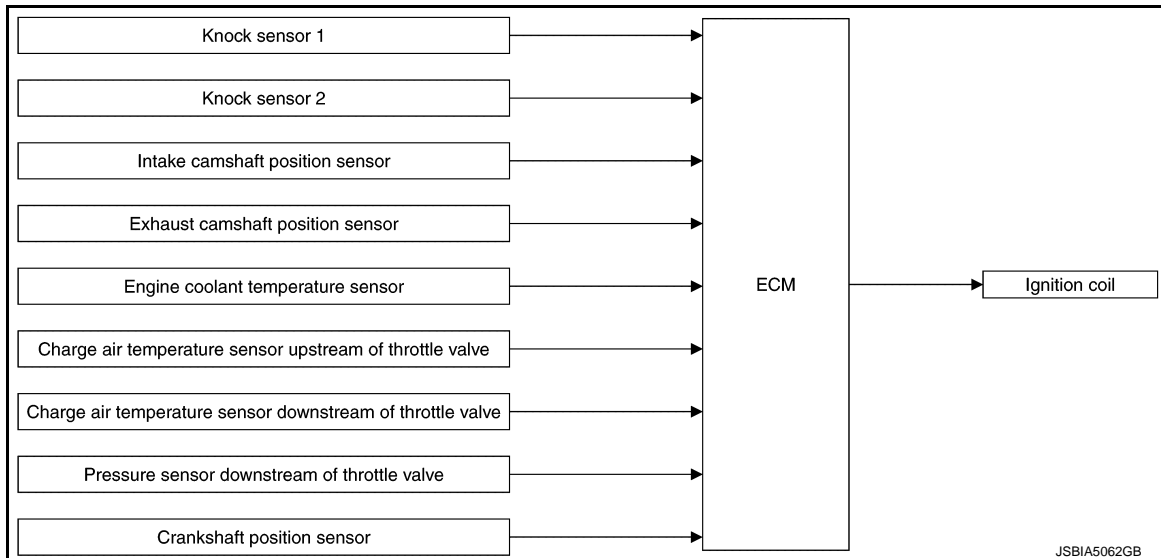
When rapidly operating the accelerator pedal, the throttle valve also opens/closes rapidly. When this happens, air-fuel mixture temporarily becomes lean/rich. To prevent this from occurring, ECM changes the fuel injector control time to adjust the air-fuel mixture according to the characteristics map. This prevents vibrations during rapid acceleration.

IGNITION SYSTEM CONTROL

IGNITION SYSTEM CONTROL : System Description

INFOID:0000000013289785

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

ECM controls ignition coils inserted into each cylinder, according to the following sensors and signals.

- Knock sensor 1
- Knock sensor 2
- Intake camshaft position sensor (Intake camshaft position)
- Exhaust camshaft position sensor (Exhaust camshaft position)
- Engine coolant temperature sensor
- Charge air temperature sensor upstream of throttle valve
- Charge air temperature sensor downstream of throttle valve
- Pressure sensor downstream of throttle valve (Engine load)
- Crankshaft position sensor (Engine speed)

In addition, conditions of the torque adjustment function are added.

Under the following conditions, ECM adjusts the ignition timing in the retard or advance angle direction.

- Idle speed control
- Deceleration shut off
- Overload protection of the transmission
- Torque control

NOTE:

The ignition timing is 1 → 3 → 4 → 2.

THE OPERATING MODE OF IGNITION COIL

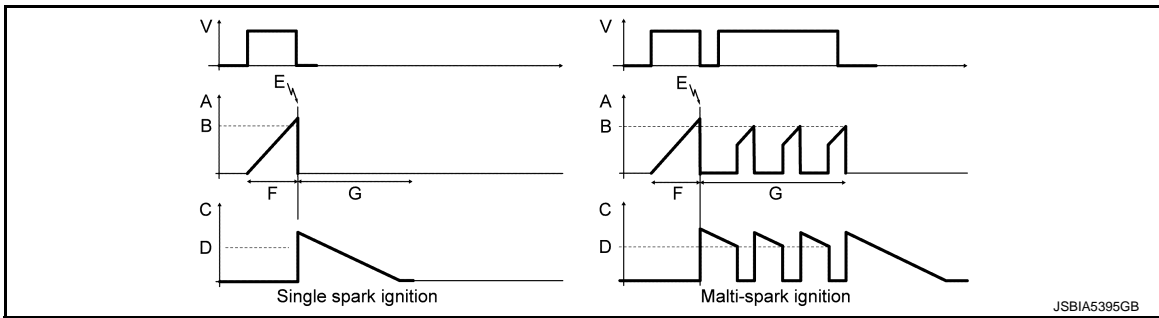
The operating mode of ignition is as follows.

- Single spark -single spark ignition
- Multi-spark - multi-spark ignition

SYSTEM

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[2.0L TURBO GASOLINE ENGINE]



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|---|--------------------------|---|----------------------|---|----------------------------|
| A | Primary charging current | B | Recharging threshold | C | Secondary charging current |
| D | Discharging threshold | E | Ignition timing | F | Dwell time |
| G | Spark duration | V | Operating voltage | | |

Single Spark -single spark ignition

The ignition coil is normally charged one time per ignition process when the engine is warm, and ignition sparks are emitted. Even when performing a cold start, the high-energy ignition coil is used for securely igniting air-fuel mixture, achieving a long spark combustion time.

Multi-spark - multi-spark ignition

Unlike the single spark mode that sparks occur only one time, the multi-spark mode allows multiple times of ignition. At this time, only necessary sparks are emitted plural times, not continuous large sparks.

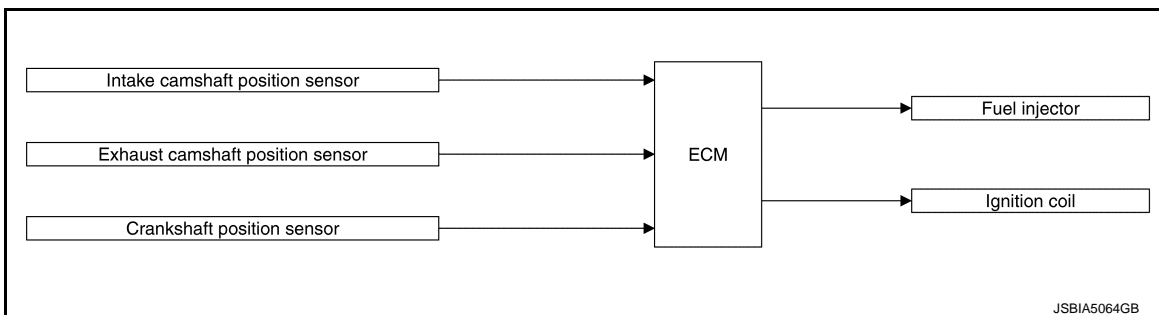
The multi-spark ignition enables the passing of a charge current again after the charge current is cut off and ignition sparks are emitted at ignition timing. When ECM measures this primary current and judges that primary current limit is reached, charge current is cut off and ignition sparks are emitted. Multiple ignitions are performed by repeating the above.

SYNCHRONIZE FUEL INJECTION AND IGNITION ORDER FUNCTION

SYNCHRONIZE FUEL INJECTION AND IGNITION ORDER FUNCTION : System Description

INFOID:000000013289786

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

Description

ECM controls ignition coil and fuel injector and synchronizes the order of fuel injection with that of ignition. The synchronization is necessary for the knock control and the fuel shut-off control for each cylinder.

ECM synchronizes injection timing with ignition order according to the following sensors and signals.

- Intake camshaft position sensor (Intake camshaft position)
- Exhaust camshaft position sensor (Exhaust camshaft position)
- Crankshaft position sensor (Engine speeds, crankshaft position)

Synchronization for the injection and ignition order has control items and functions as follows.

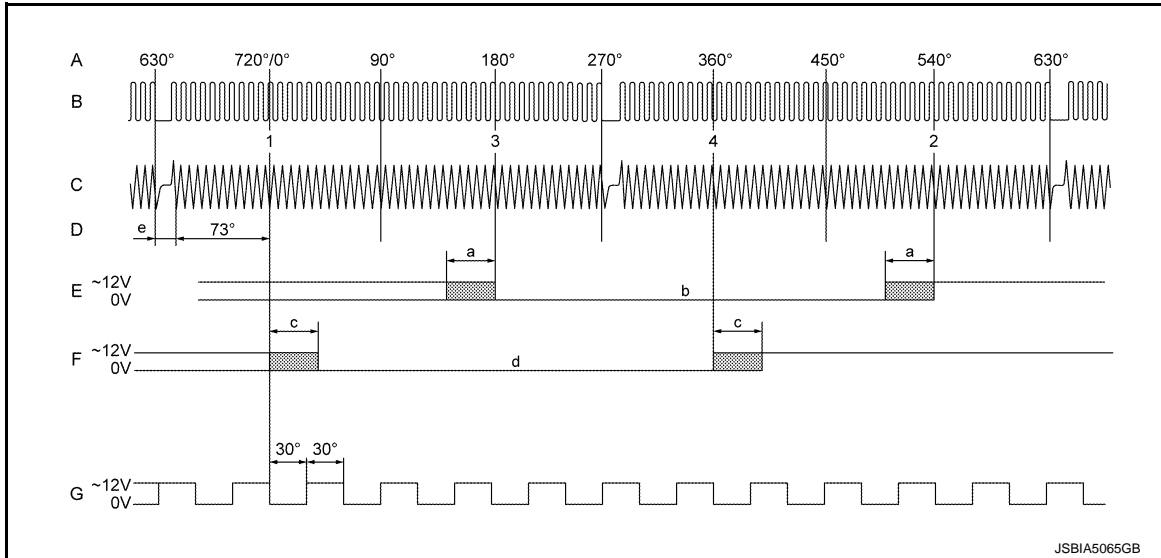
- Synchronization function for the injection and ignition order
- Engine speed signal control

SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

SYNCHRONIZATION OF THE INJECTION AND IGNITION ORDER



- | | | | | | |
|---|---|---|--|---|---|
| 1 | Top dead center of cylinder 1 | 2 | Top dead center of cylinder 2 | 3 | Top dead center of cylinder 3 |
| 4 | Top dead center of cylinder 4 | | | | |
| A | Crank angle | B | Multi-pulse wheel | C | Crankshaft position sensor signal |
| D | Cylinder 1 discriminate signal | E | Intake camshaft position sensor signal | F | Exhaust camshaft position sensor signal |
| G | Engine speed signal | | | | |
| a | Intake camshaft adjustment range | b | Intake camshaft position sensor (low signal) | c | Exhaust camshaft adjustment range |
| d | Exhaust camshaft position sensor (low signal) | e | Polarities at intervals of crank angle 18° | | |

Synchronization of The Injection and Ignition Order

ECM reads voltage signals of intake camshaft position sensor, exhaust camshaft position sensor, and crankshaft position sensor to synchronize the order of fuel injections with that of ignitions when starting the engine. ECM detects the top dead center of Cylinder 1 according to a signal of crankshaft position sensor.

Engine Speed Signal Control

Multi-pulse wheels with different polarities are installed to the crankshaft at intervals of crank angle 6°. Since the crankshaft position sensor is installed opposed to the multi-pulse wheel, pulse signals of 5 V and 0 V are generated during the rotation of crankshaft. In addition, the multi-pulse wheels have polarities at intervals of crank angle 18° to completely match the crank position.

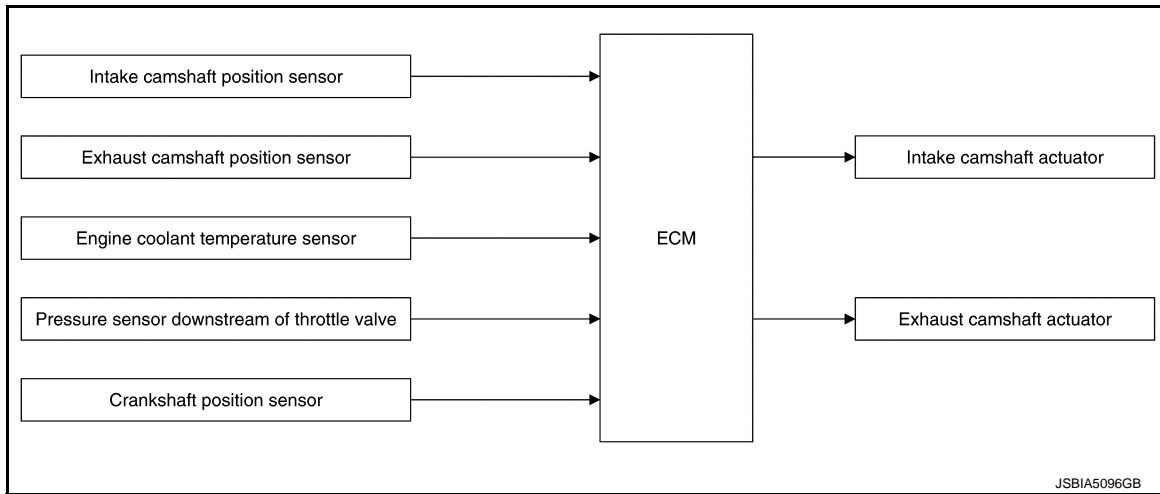
ECM transmits a short-resistant engine speed signal via CAN communication based on a signal of crankshaft position sensor.

NOTE:

- Detection of rotation direction: When the engine stops or temporarily rotates in the opposite direction immediately before stopping, a pulse signal of the crankshaft position sensor changes. Since ECM detects the change in rotation direction through the above mechanism, crankshaft angle position can be accurately detected any time.
- When ECM cannot receive a crankshaft position sensor signal, ECM uses an intake camshaft position sensor signal or exhaust camshaft position sensor signal to enable the vehicle to be driven.
- When ECM cannot receive an intake camshaft position sensor signal, ECM uses an exhaust camshaft position sensor signal to detect the position of the top dead center of Cylinder 1. When both camshaft position sensor signals cannot be received, ECM performs ignition and injection to execute an emergency start after detecting crank angle 360°.

CAMSHAFT ADJUSTMENT FUNCTION

SYSTEM DIAGRAM



DESCRIPTION

With the camshaft adjustment function, intake camshaft is adjusted up to crank angle 40° in advance direction, and exhaust camshaft is adjusted up to crank angle 40° in retard direction. This enables the achievement of optimum valve overlap according to engine load. Furthermore, engine performance curves are optimized, fuel economy is improved, and toxic exhaust gas is reduced.

ECM controls camshaft adjustment according to the following sensors and signals.

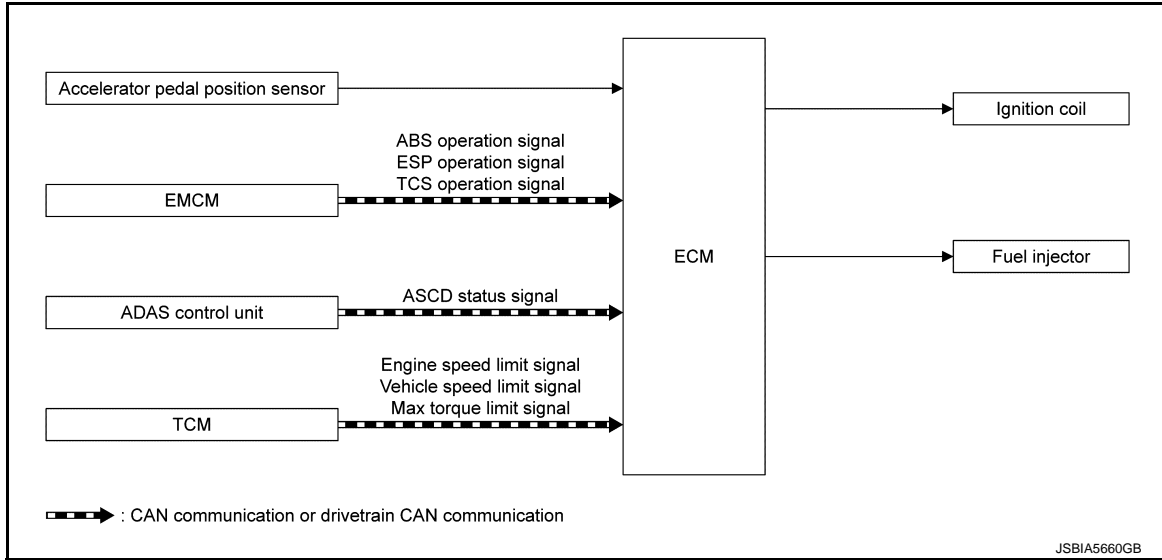
- Intake camshaft position sensor
- Exhaust camshaft position sensor
- Engine coolant temperature sensor
- Pressure sensor downstream of throttle valve (Engine load)
- Crankshaft position sensor (Engine speeds)

ECM adjusts camshaft position by controlling intake camshaft actuator and exhaust camshaft actuator according to a PWM signal. ECM continuously adjusts the duty ratio of signal according to the characteristics map consistent with engine load. The control piston of camshaft actuator moves as the magnetic force increases. This allows engine oil to flow into the control plunger. Accordingly, the control plunger moves rearward (axial direction) and rotates each camshaft in the camshaft rotation direction via helical gear. The camshaft position is detected by the intake camshaft position sensor and the exhaust camshaft position sensor and transmitted to ECM as a voltage signal.

TORQUE CONTROL

TORQUE CONTROL : System Description

SYSTEM DIAGRAM



DESCRIPTION

ECM prioritizes requests from all systems performing engine torque request and adjusts torque (according to drivability and specified priorities). In addition, ECM determines the method of satisfying each request and adjusting torque.

ECM controls torque according to the following items.

- Accelerator pedal position sensor (Accelerator pedal effort)
- EMC (ABS operation, ESP operation, TCS operation)
- ADAS control unit (ASCD control)
- TCM (Engine speed limit signal, vehicle speed limit signal, max torque limit signal)

ECM adjusts torque according to the following controls.

- Injection time adjustment: for details, refer to [EC4-55, "INJECTION REGULATION CONTROL : System Description"](#).
- Advance/retard angle of ignition timing adjustment (Torque varies quickly.): For details, refer to [EC4-59, "CAMSHAFT ADJUSTMENT FUNCTION : System Description"](#).
- Synchronization of the injection and ignition order: For details, refer to [EC4-70, "FUEL SUPPLY CONTROL : System Description"](#).

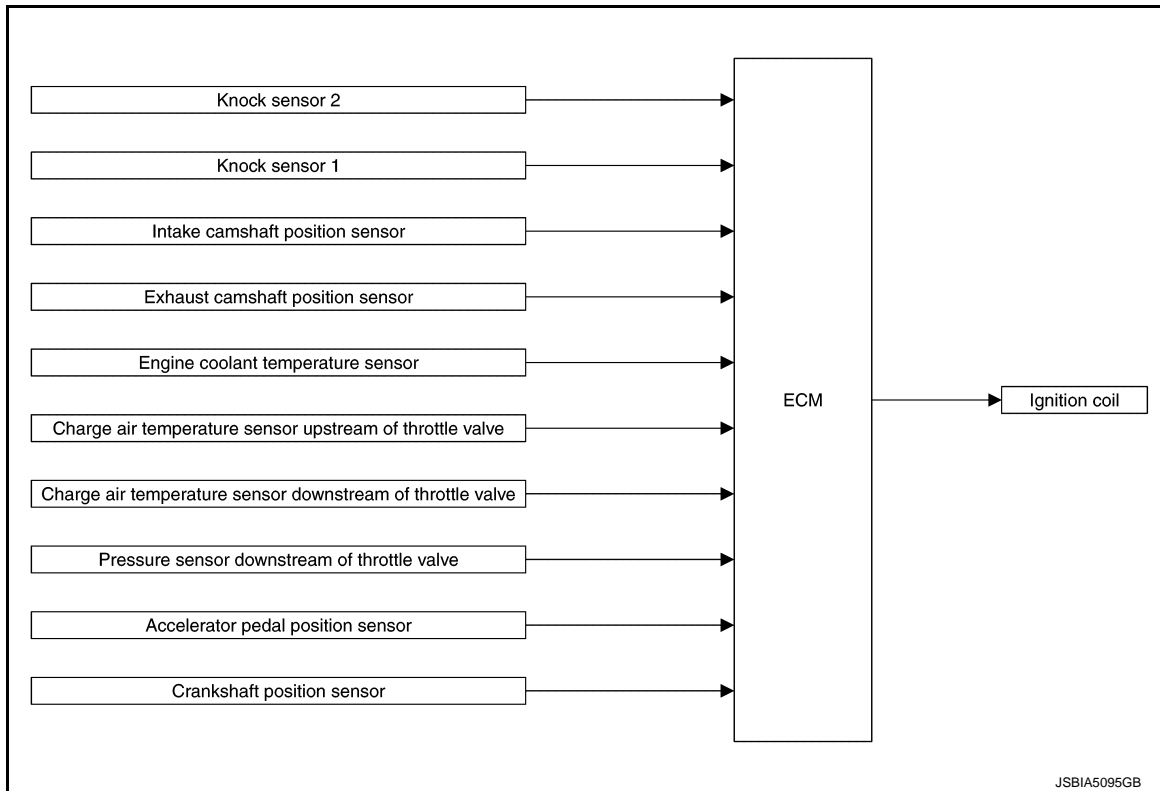
NOTE:

Extending fuel injection time and adjusting ignition timing in retard direction do not allow engine torque to be changed so soon. When ignition timing is adjusted in advance direction, engine torque can be changed soon.

KNOCK CONTROL

KNOCK CONTROL : System Description

SYSTEM DIAGRAM



DESCRIPTION

The knock control prevents the occurrence of knock caused by fuel quality and operating conditions and securely starts the engine. When knock occurs, the ignition timing of applicable cylinder is adjusted in retard direction.

ECM performs the knock control according to the following sensors and signals.

- Knock sensor 1 and 2
- Intake camshaft position sensor (intake camshaft position)
- Exhaust camshaft position sensor (exhaust camshaft position)
- Engine coolant temperature sensor
- Charge air temperature sensor upstream of throttle valve
- Charge air temperature sensor downstream of throttle valve
- Pressure sensor downstream of throttle valve (Engine load)
- Accelerator pedal position sensor (Load requirement from the driver)
- Crankshaft position sensor (Engine speeds and crankshaft position)

In addition, torque control conditions are added.

Knock control has control items and functions as follows.

- Ignition timing adjustment
- Knock control adjustment
- Functions for knock sensors malfunction

IGNITION TIMING ADJUSTMENT

If knock continues to occur, ignition timing is adjusted in retard direction until it reaches the maximum adjustment value. When knock stops occurring, the retard adjustment is returned in stages until normal characteristics map value is satisfied.

ECM adjusts ignition timing by cylinder according to input signals. When the knock sensor detects knock in the cylinders, the ignition timing of the applicable cylinder is adjusted in retard direction (according to engine speed), starting from consequent ignition.

If knock continues to occur relatively long, ECM decreases engine output to protect the engine.

KNOCK CONTROL ADJUSTMENT

The adjustment function of the knock control operates at coolant temperature 75°C (167°F) or more. Correction values of Ignition timing necessary at the occurrence of knock are continuously recorded by cylinder

SYSTEM

[2.0L TURBO GASOLINE ENGINE]

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together with data containing various engine operating conditions (engine load and engine speed). The optimum ignition timing can be immediately determined for each cylinder, based on the recorded data.

FUNCTIONS FOR KNOCK SENSORS MALFUNCTION

When there is no knock sensor signal, the ignition timing of all cylinders is adjusted in retard direction up to 15° (crankshaft angle) according to coolant temperature and engine speed. ECM deactivates the knock control and records malfunctions.

NOTE:

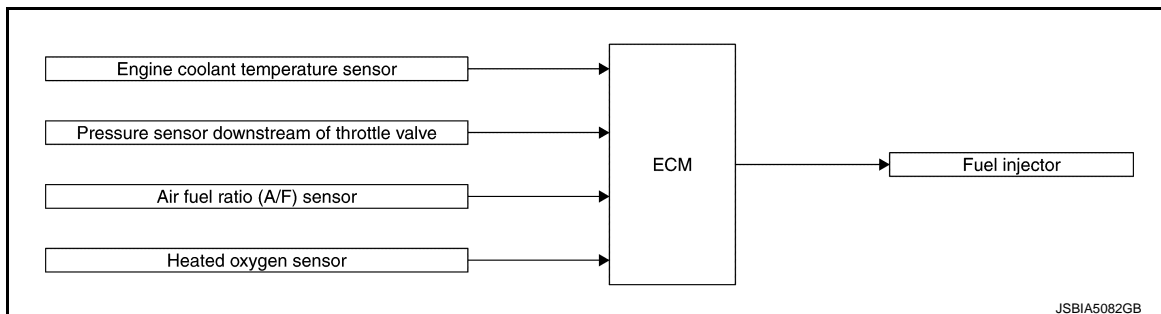
Ignition timing correction of the temperature management control and the knock control are controlled according to the characteristics map.

AIR-FUEL MIXTURE RATIO CONTROL

AIR-FUEL MIXTURE RATIO CONTROL : System Description

INFOID:000000013289790

SYSTEM DIAGRAM



DESCRIPTION

The air-fuel mixture ratio control is performed when the following conditions are satisfied.

- During the engine is running
- Engine coolant temperature: Changes according to driving condition.
- Operating temperature of A/F sensor must be satisfied.
- The deceleration fuel shut-off function must be deactivated.

ECM performs control for satisfying the theoretical air-fuel ratio as much as possible to allow the catalyst to effectively purge exhaust gas.

ECM controls the air-fuel mixture ratio corrections according to the following sensors.

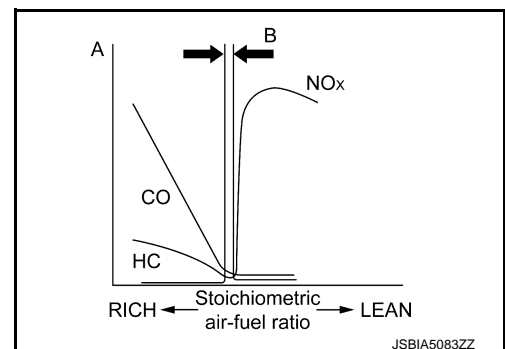
- Engine coolant temperature sensor
- Pressure sensor downstream of throttle valve (Engine load)
- Air fuel ratio (A/F) sensor
- Heated oxygen sensor

Effective purge of exhaust gas in the three way catalyst

A	: Content in exhaust gas
B	: Theoretical air-fuel ratio control range (near the catalyst)
CO	: Carbon monoxide
HC	: Hydrocarbon
NOx	: Nitrogen oxides

The air-fuel mixture ratio control has functions as follows.

- Air-fuel mixture ratio corrections closed-loop control
- A/F sensor control
- Sensor heater control
- Air-fuel mixture ratio corrections adjustment control
- Catalyst monitoring function



AIR-FUEL MIXTURE RATIO CORRECTIONS CLOSED-LOOP CONTROL

The air-fuel ratio sensor reacts to oxygen content in exhaust gas and transmits a signal corresponding to the oxygen content to ECM.

When air-fuel mixture is richer than the theoretical air-fuel ratio, the oxygen content in exhaust gas is low, and the A/F sensor transmits a rich signal to ECM. ECM controls the fuel injector to decrease fuel injection amount

< SYSTEM DESCRIPTION >

and controls air-fuel mixture to the rich side. This allows the oxygen content in exhaust gas to increase and air-fuel ratio to approach the theoretical air-fuel ratio.

When air-fuel mixture is leaner than the theoretical air-fuel ratio, oxygen content in exhaust gas is high, and A/F sensor transmits a lean signal to ECM. ECM controls the fuel injector to increase fuel injection amount and controls air-fuel mixture to the rich side. This allows the oxygen content in exhaust gas to decrease and air-fuel ratio to approach the theoretical air-fuel ratio.

This process is constantly repeated (Loop Control). ECM slowly changes air-fuel ratio to prevent engine surge from occurring.

AIR FUEL RATIO SENSOR CONTROL

ECM monitors the function of A/F sensor and the performance of catalyst.

ECM controls the A/F sensor according to the following sensors.

- A/F sensor (Oxygen level in the upstream of the catalyst)
- Heated oxygen sensor (Oxygen level in the downstream of the catalyst)

ECM determines the mean value of air-fuel ratio corrections according to a signal from the heated oxygen sensor and compares the determined value with the ECM-stored theoretical air-fuel ratio for optimal exhaust gas. If the multiple measurements deviate from the theoretical air-fuel ratio, a correction value for air-fuel mixture ratio control is determined. With the use of the correction value (the value of a new A/F sensor: approximately 0), the deterioration in A/F sensor can be corrected within a specified limit. Correction values are influenced by the characteristics map and the fuel injection time controlled by ECM.

Possible malfunctions occurring during the generation of air-fuel mixture are as follows.

- Air suction in the exhaust system due to leakage from the upstream of the heated oxygen sensor.
- Fuel injector wear or carbon accumulation
- Malfunction in A/F sensor/heated oxygen sensor
- Engine-related wear (e.g. worn-out valve)

If a correction value is outside the specified limit or an A/F sensor/heated oxygen sensor signal is inappropriate, ECM transmits a malfunction indicator lamp (MIL) signal to the combination meter via CAN communication.

Sensor heater control

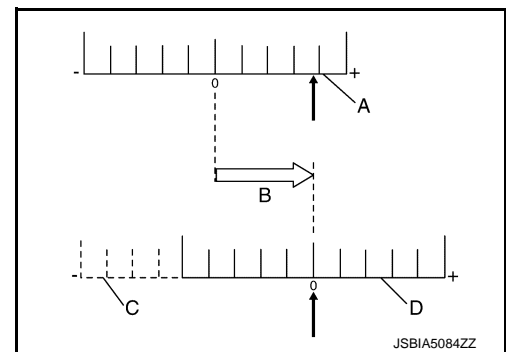
The A/F sensor heater and the heated oxygen sensor heater allow the sensors to reach the operating temperature faster. In addition, damage to the sensor ceramic part can be prevented by controlling the heat of sensor heaters. When the inside of exhaust pipe is extremely cold (e.g. due to the adhesion of water droplets), the sensor heaters turn OFF to prevent damage (heat shock) to sensors.

AIR-FUEL MIXTURE RATIO CORRECTIONS ADJUSTMENT CONTROL

Through the use of catalyst with the control function, the injection time is determined accurately by the air-fuel ratio correction control. This maintains the theoretical air-fuel ratio under any driving conditions.

SHIFTING OF THE AIR-FUEL MIXTURE RATIO CHARACTERISTICS MAP

- A : Control range of the air-fuel mixture ratio corrections factor
- B : Shifting of the air-fuel mixture ratio characteristics map
- C : Unadjusted air-fuel mixture ratio characteristics map
- D : Adjusted air-fuel mixture ratio characteristics map



When air-fuel mixture deviates from the control range all the time, ECM shifts the air-fuel mixture ratio characteristics map under the specified operating conditions until the air-fuel mixture ratio control factor becomes 0% again.

Catalyst monitoring function

Description

The catalyst stores oxygen when air-fuel mixture is lean (during air-fuel ratio correction loop control) and emits oxygen again for the HC conversion when air-fuel mixture becomes rich.

The catalyst oxygen storage capacity decreases due to aged deterioration, resulting in the decrease in conversion performance. For this reason, it is necessary to always monitor the catalyst deterioration status.

To monitor the oxygen storage capacity, ECM controls air-fuel mixture to the rich side until the value of the heated oxygen sensor reaches the maximum value. This removes most of the oxygen in the catalyst. After

SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

this, ECM controls air-fuel mixture to the lean side and measures the length of time required for the heated oxygen sensor value to reach the specified minimum value.

If the measured time is shorter than the stored specific time, ECM judges that the stored oxygen amount is insufficient and records it as an error.

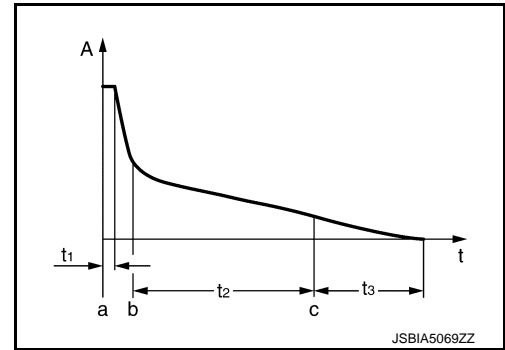
COLD START MIXTURE ENRICHMENT CONTROL

COLD START MIXTURE ENRICHMENT CONTROL : System Description INFOID:000000013289791

DESCRIPTION

ECM controls fuel-air mixture to the rich side to achieve quiet and stable engine revolution.

- A Enrichment rate
- a Start
- b Start of post-start enrichment
- c Start of warm-up enrichment
- t Time
- t1 Starting mixture enrichment (Duration: 2 seconds)
- Post-start enrichment control
- t2 [Duration e.g. 15 seconds at coolant temperature of 15°C (59°F)]
- t3 Warm-up enrichment control (Duration depends on the coolant temperature)

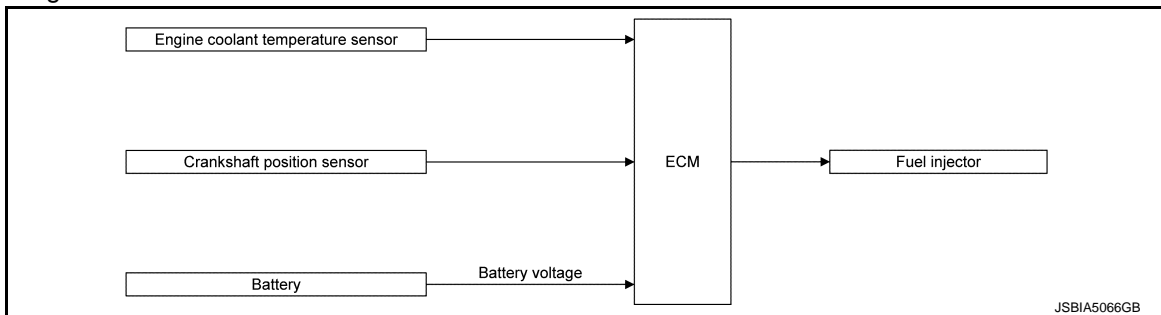


Cold starting mixture enrichment control has functions as follows.

- Starting mixture enrichment control
- Post-start enrichment control
- Warm-up enrichment control

STARTING MIXTURE ENRICHMENT CONTROL

System Diagram



System Diagram

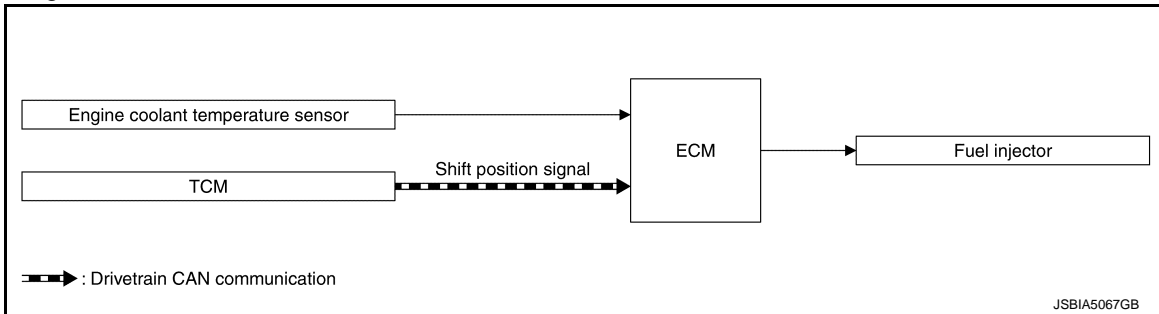
During cold start, ECM enables the injection of more fuel than normal start to perform a smooth engine start. ECM calculates the injection time of the starting mixture enrichment control, based on the following sensors and signals.

- Engine coolant temperature sensor
- Crankshaft position sensor (Engine speeds, Crankshaft position)
- Battery (Battery voltage)

The starting mixture enrichment control continues operating until coolant temperature and engine speed exceed the specified value. Fuel injection time calculated by ECM decreases as the coolant temperature rises. In addition, fuel injection time changes, depending on battery voltage. ECM extends fuel injection time to achieve sufficient fuel injection when the battery voltage is low.

POST-START ENRICHMENT CONTROL

System Diagram



System Diagram

After a cold start, ECM adjusts air-fuel mixture to the rich side for smooth engine revolution. At this time, fuel condensed on the cold piston sliding surface vapors according to the rise in temperature.

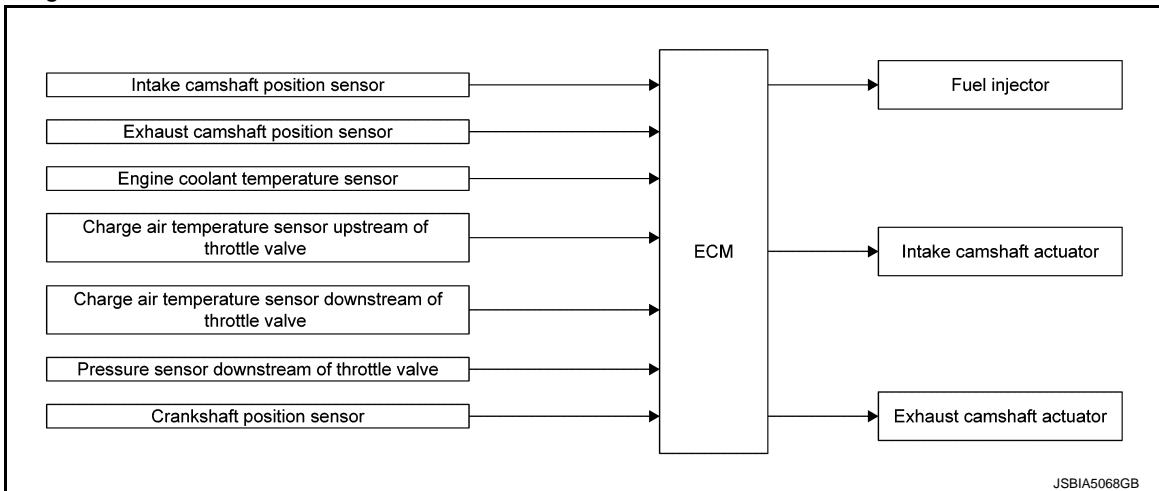
ECM calculates the injection time of the post-start enrichment control according to the following sensors and signals.

- Engine coolant temperature sensor
- TCM (Shift position)

ECM extends fuel injection time for injecting more fuel according to the characteristics map.

WARM-UP ENRICHMENT CONTROL

System Diagram



System Diagram

After the starting mixture enrichment control and the post-start enrichment control, air-fuel mixture continues being adjusted to the rich side by the warm-up enrichment control. Further increase in temperature evaporates fuel still-condensed on the piston sliding surface.

ECM calculates the injection time of the warm-up enrichment control according to the following sensors and signals.

- Intake camshaft position sensor (Intake camshaft position)
- Exhaust camshaft position sensor (Exhaust camshaft position)
- Engine coolant temperature sensor
- Charge air temperature sensor upstream of throttle valve
- Charge air temperature sensor downstream of throttle valve
- Pressure sensor downstream of throttle valve (Engine load)
- Crankshaft position sensor (Engine speeds, crankshaft position)

ECM extends fuel injection time for injecting more fuel according to the characteristics map. At this time, ignition timing is controlled according to the dedicated characteristics map. ECM allows exhaust gas to flow from the exhaust valve to the combustion chamber by controlling the intake camshaft actuator and the exhaust camshaft actuator for performing valve overlap. Accordingly, hot exhaust gas heats up the combustion chamber, and fuel evaporation is accelerated. This reduces increasing amount of fuel.

In the range of idle speed, fuel injection time is influenced mainly by coolant temperature at a startup. During low/medium load, fuel injection time is influenced by engine load.

At the completion of the cold starting mixture enrichment control, the control is switched to the air-fuel ratio control to adjust fuel injection time.

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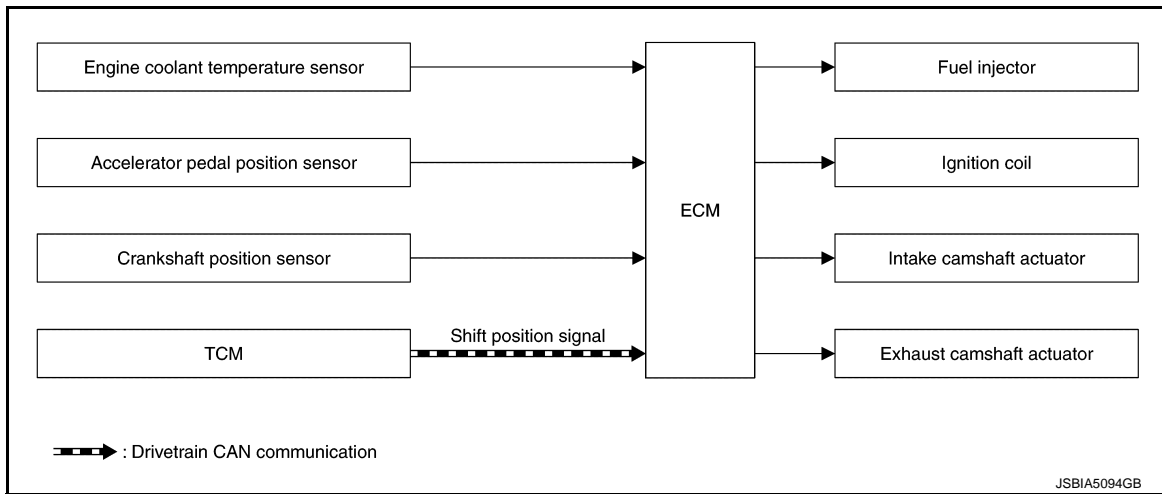
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DECELERATION FUEL SHUTOFF CONTROL

DECELERATION FUEL SHUTOFF CONTROL : System Description

INFOID:000000013289792

SYSTEM DIAGRAM



DESCRIPTION

Deceleration fuel shut-off control is performed when the following conditions are satisfied.

- Engine is running
- Driving the vehicle
- When accelerator pedal is not depressed
- Selector lever is in D or R range
- ASCD mode: OFF
- Exhaust gas temperature: within specified value

Deceleration fuel shut-off control has advantages as follows.

- Improving engine brake effort
- Improving fuel efficiency
- Reduction in toxic exhaust gas

ECM controls the deceleration fuel shut-off according to the following sensors and signals.

- Engine coolant temperature sensor
- Accelerator pedal position sensor (Accelerator pedal position)
- Crankshaft position sensor (Engine speeds)
- TCM (Shift position)

When decelerating with the accelerator pedal not depressed, ECM turns OFF the fuel injector according to coolant temperature, shift position, and engine speed. In addition, ECM adjusts valve overlap to the minimum via intake camshaft actuator and exhaust camshaft actuator. This reduces toxic exhaust gas. After deceleration fuel shutoff control, ECM extends the injection time and temporarily controls air-fuel mixture to the rich side to remove excess oxygen from the catalyst addition, ECM adjusts ignition timing in retard direction to prevent a rapid torque increase when the combustion is restarted.

If exhaust gas has high oxygen content during deceleration, the catalyst may overheat due to accelerated oxidation of carbon monoxide and carbon hydrate. For this reason, ECM does not perform deceleration fuel shut-off control when exhaust gas temperature is too high.

CHARGE AIR CONTROL

SYSTEM

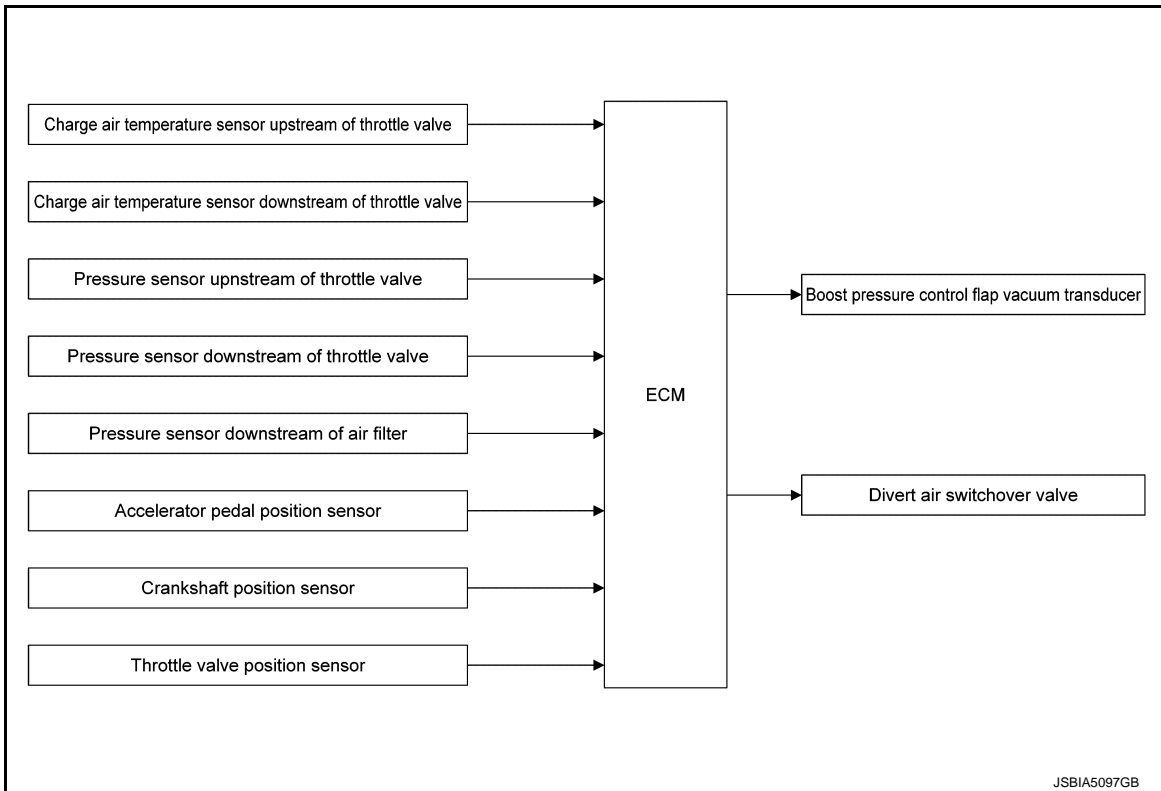
[2.0L TURBO GASOLINE ENGINE]

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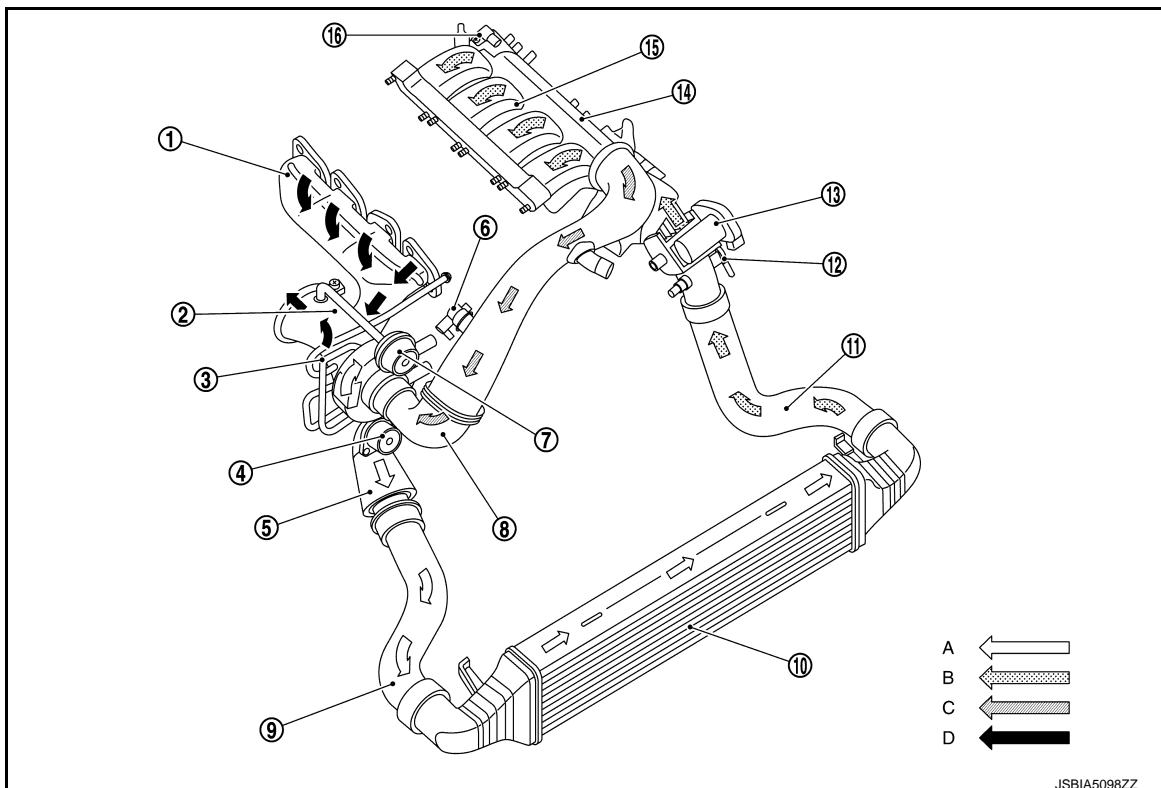
CHARGE AIR CONTROL : System Description

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SYSTEM DIAGRAM



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< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

- | | | |
|--|-------------------------------|--|
| ① Exhaust manifold | ② Boost pressure control flap | ③ Turbocharger |
| ④ Divert air switchover valve | ⑤ Noise damper | ⑥ Pressure sensor downstream of air filter |
| ⑦ Boost pressure control flap vacuum actuator | ⑧ Air duct | ⑨ Charge air hose |
| ⑩ Charge air cooler | ⑪ Charge air hose | ⑫ Pressure sensor upstream of throttle valve |
| ⑬ Throttle valve actuator | ⑭ Charge air manifold | ⑮ Charge air temperature sensor downstream of throttle valve |
| ⑯ Pressure sensor downstream of throttle valve | | |
| A Charge air (Uncooled) | B Charge air (Cooled) | C Intake air |
| D Exhaust gas | | |

The charge air control improves the maximum torque and maximum output by improving the efficiency of suction performed by supercharge. The turbocharger takes in ambient air through air cleaner by using the pressure energy of exhaust gas and rotating the turbine of turbocharger and sends the ambient air to the charge air manifold. When turbine speed increases and air flow grows, air in the pipe located upstream of the inter cooler is compressed and sent to the intercooler. Since the maximum boost pressure becomes 80 – 120 kPa (0.8 – 1.2 bar, 0.816 – 1.224 kg/cm², 11.6 – 17.4 psi) at this time according to the engine status and temperature rises, charge air is cooled by the intercooler to send to the boost distributor pipe.

The noise insulator reduces boost pressure variation and flow noise caused by sudden change in engine speed.

The charge air control has control items as follows.

- Charge air control
- Bypass air control

CHARGE AIR CONTROL

The charge air control is performed by the electropneumatic boost pressure control vacuum transducer. ECM controls the boost pressure control vacuum transducer and adjusts negative pressure placed on the boost pressure control flap vacuum actuator. ECM adjusts boost pressure by controlling the boost pressure control vacuum transducer according to the characteristics map and negative pressure.

ECM performs the charge air control, according to the following sensors, signals and control items.

- Charge air temperature sensor upstream of throttle valve
- Charge air temperature sensor downstream of throttle valve
- Pressure sensor upstream of throttle valve (boost pressure)
- Pressure sensor downstream of throttle valve (boost pressure)
- Pressure sensor downstream of air filter (intake air pressure)
- Accelerator pedal position sensor (load requirement from the driver)
- Crankshaft position sensor (engine speeds)
- Knock control
- transmission overload protective function
- Overheat protective function

Under the full load condition, the maximum boost pressure is formed. ECM controls the boost pressure control vacuum transducer to decrease the boost pressure. The transducer activates the boost pressure control flap vacuum actuator by using negative pressure of the vacuum pump and opens the boost pressure control flap via linkage.

Through this process, exhaust gas pressure placed on the turbocharger turbine is released to the catalyst, and consequently, turbine speed is reduced and boost pressure is weakened. As a result, boost pressure of 80 – 120 kPa (0.8 – 1.2 bar, 0.816 – 1.224 kg/cm², 11.6 – 17.4 psi) is controlled to a current engine load request, according to the engine condition.

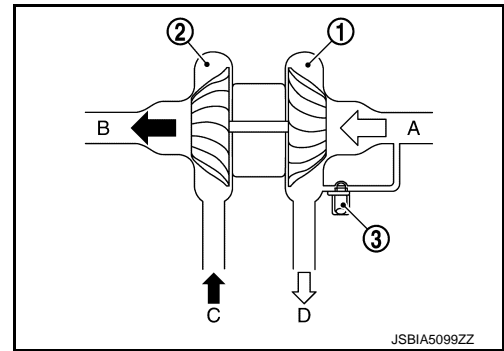
BYPASS AIR CONTROL

SYSTEM

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[2.0L TURBO GASOLINE ENGINE]

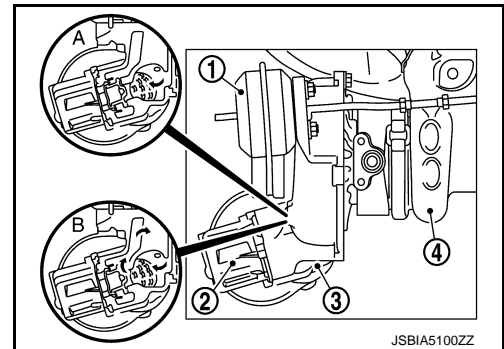
When in deceleration mode, the turbocharger rotates additionally due to the inertial mass of shaft, compressor, and turbine wheel ②. When the throttle valve quickly closes, the throttle valve upstream condition becomes low discharge rate and high charge rate, resulting in backflow of extra pressure to pressurized air. This places counter-rotating force on compressor wheel ①. (Brief beat noise and mechanical stress.) To prevent this pumping, ECM opens the divert air switchover valve ③ to release surplus pressure to the upstream of turbocharger.



- A Intake air
- B Exhaust gas
- C From exhaust manifold
- D To Throttle valve

When the engine is not running, the divert air switchover valve is closed because the diaphragm is pushed back by the spring built in divert air switchover valve ②. When in engine load mode, the divert air switchover valve is kept closed by the boost pressure- placed diaphragm. When the throttle valve is closed and ECM detects deceleration mode, ECM controls the divert air switchover valve. The diaphragm is turned down against spring force and boost pressure, and the divert air switchover valve is opened to release surplus pressure.

When the engine mode is switched from deceleration mode to load mode, the divert air switchover valve is not controlled anymore. The diaphragm is pushed back by the spring and boost pressure, and the bypass switchover valve is closed again.



- ① Boost pressure control flap vacuum actuator
- ③ Noise damper
- ④ Turbocharger
- A Status: Closed
- B Status: Opened

IGNITION OFF CONTROL

IGNITION OFF CONTROL : System Description

INFOID:000000013289794

DESCRIPTION

First, turn the ignition OFF and then the engine stops and ECM is switched OFF.

FUNCTION SEQUENCE FOR IGNITION OFF

When ECM receives ignition switch OFF signal (i.e. cut off the ignition power supply), the following components is switched off and the processor power-down is started:

- Pressure regulating valve
- Fuel injectors
- Quantity control valve
- Fuel pump over the FPCM (Fuel Pump Control Module)

Processor power-down is determined by ECM and performed for approximately four seconds. Processor power-down may continue for a few minutes depending on a function, such as on-board diagnosis system and thermal management.

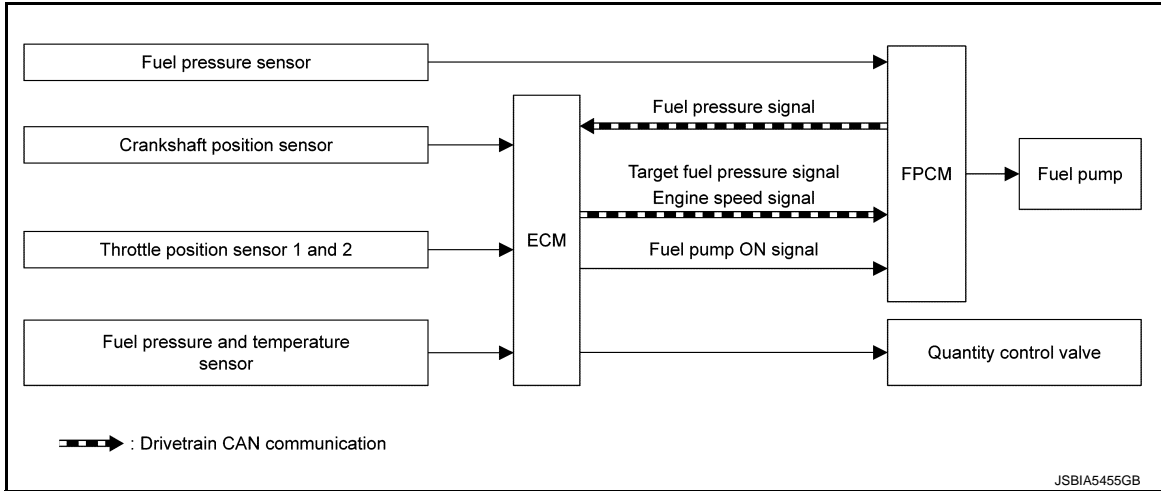
During processor power-down, System Test is performed by ECM and Malfunctioning Memory is updated.

FUEL SUPPLY CONTROL

FUEL SUPPLY CONTROL : System Description

INFOID:000000013289795

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

The FUEL SUPPLY CONTROL has circuits and functions as follow.

- Low pressure fuel circuit
- High pressure fuel circuit
- Fuel-shut off function

LOW PRESSURE FUEL CIRCUIT

The low pressure fuel circuit pumps fuel of pressure approximately 360 – 465 kPa (3.6 – 4.65 bar, 3.672 – 4.743 kg/cm², 52.2 – 67.425 psi) to the high pressure fuel pump from the fuel tank through the fuel filter under any conditions. The fuel pump control module (FPCM) controls fuel pump according to the following sensors and signals.

- Fuel pressure sensor (Fuel pressure in the low pressure fuel circuit)
- ECM (Target fuel pressure)

The fuel pump is activated when the fuel pump control module (FPCM) receives a fuel pump ON signal from ECM. FPCM detects current fuel pressure according to a voltage signal from the fuel pressure sensor and send the information to ECM via drivetrain CAN communication. ECM calculates a target fuel pressure based on fuel pressure and load requirement and transmits a target fuel pressure signal to FPCM via drivetrain CAN communication. FPCM controls the fuel pump so that the target fuel pressure can be satisfied.

NOTE:

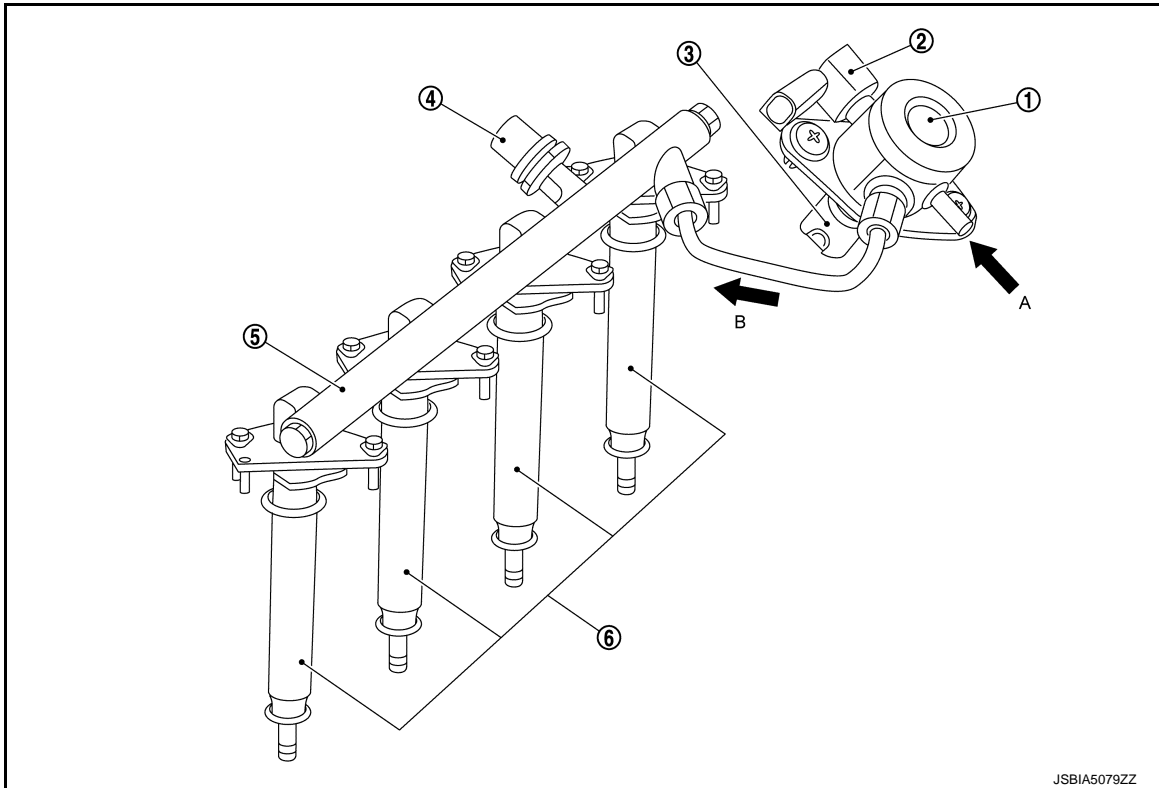
For the fuel system in the fuel tank, refer to [FL-25, "FUEL TRANSPORTATION IN FUEL TANK : System Description"](#).

SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

HIGH PRESSURE FUEL CIRCUIT



- | | | |
|--|--|-----------------|
| ① High pressure fuel pump | ② Quantity control valve | ③ Drive plate |
| ④ Fuel pressure and temperature sensor | ⑤ Fuel rail | ⑥ Fuel injector |
| A Fuel feed from fuel tank (low pressure fuel) | B Fuel feed to the rail (high pressure fuel) | |

ECM controls fuel rail pressure by controlling the quantity control valve according to a signal transmitted from the fuel pressure and temperature sensor and adjusting fuel pressure necessary to the direct injection in the high pressure circuit to approximately 20 MPa (200 bar, 204 kg/cm², 2,900 psi).

The high pressure circuit has control items as follow.

- Fuel feed
- Fuel pressure control

Fuel Feed

The high pressure fuel pump pressurizes fuel sent from the fuel pump up to approximately 20 MPa (200 bar, 204 kg/cm², 2900 psi) and pumps the pressurized fuel to the fuel rail. In addition, the high pressure fuel pump has a fuel pressure damper to control pressure fluctuation occurring at rapid acceleration, contributing to the reduction in fuel fluctuation. Since the high pressure fuel circuit does not have a return circuit, the pressure increases up to 27 MPa (270 bar, 275.4 kg/cm², 3,915 psi) due to temperature rise in the high pressure fuel circuit after engine stop or in deceleration mode.

Fuel Pressure Control

The fuel pressure and temperature sensor detects fuel pressure in the fuel rail and converts the detected fuel into a voltage signal to transmit it to ECM. ECM controls the quantity control valve according to a PWM signal and adjusts fuel pumped to the high pressure fuel pump. This adjusts fuel pressure in the fuel rail to approximately 3 – 14 MPa (30 – 140 bar, 30.6 – 142.8 kg/cm², 435 – 2,030 psi) according to the operating state of the engine. After the engine stops, the power is not distributed to the quantity control valve. Accordingly, the high pressure fuel pump stops pumping fuel. For fuel pressure, it is maintained even after the engine stop.

THE FUEL-SHUT OFF FUNCTION

The fuel-shut off function secures occupant's safety.

ECM or FPCM controls the fuel-shut off function according to the following sensors and signals.

- Throttle position sensor 1 and 2 (Throttle valve position)
- ECM (Engine speed)

SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

ECM or FPCM performs the fuel shut-off function when detecting the conditions below.

- Mechanical malfunction in throttle position sensor 1 and 2
- Abnormal engine speed signal

Mechanical Malfunction in Throttle Valve Actuator

When detecting a mechanical malfunction in the throttle valve according to signals from throttle position sensor 1 and 2, ECM controls the operation of the fuel injector and controls engine speed as follows.

- At idle: 1,400 rpm
- At driving: 1,800 rpm

Abnormal Engine Speed Signal

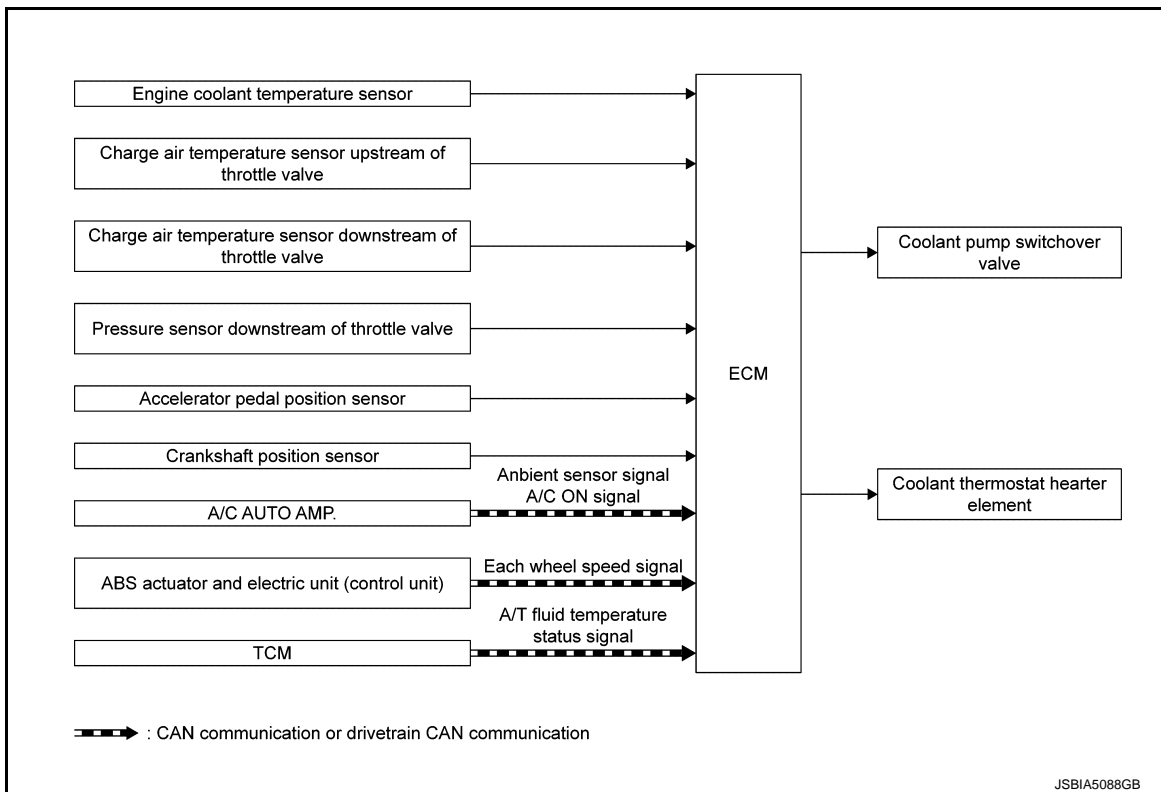
FPCM controls the operation of the fuel pump when an engine speed signal is not transmitted from ECM.

THERMAL MANAGEMENT CONTROL

THERMAL MANAGEMENT CONTROL : System Description

INFOID:000000013289796

SYSTEM DIAGRAM



DESCRIPTION

ECM controls engine coolant temperature by the thermal management control.

For details of engine coolant circuit, refer to [CO-6. "Engine Cooling System Schematic"](#).

The thermal management control has advantages as listed below.

- Enhancing warm-up
 - Reducing toxic exhaust gas
 - Improving fuel economy
 - Increasing comfort of air condition
- ECM controls engine coolant temperature according to the following sensors and signals.

- Engine coolant temperature sensor
- Charge air temperature sensor upstream of throttle valve
- Charge air temperature sensor downstream of throttle valve
- Pressure sensor downstream of throttle valve (engine load)
- Accelerator pedal position sensor
- Crankshaft position sensor (engine speeds)
- A/C auto amp. (ambient temperature and A/C status)
- ABS actuator and electric unit (control unit) (each wheel speed)
- TCM (A/T oil temperature status)

< SYSTEM DESCRIPTION >

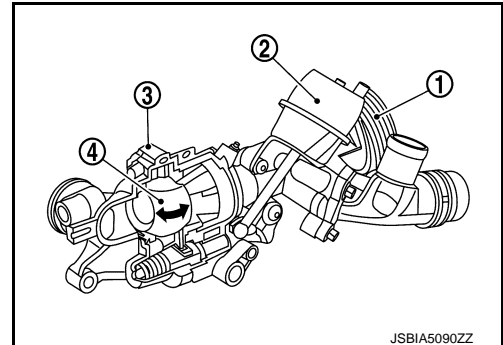
The thermal management control has following control items and function.

- Control after start
- Coolant thermostat control
- Overheat protection function
- Cooling fan motor control

CONTROL AFTER START

After engine start, ECM turns ON the coolant pump switchover valve to turn OFF the coolant pump. This stops the coolant circulation. ECM controls the coolant switchover valve to adjust negative pressure on the vacuum actuator ② installed to the coolant pump. Via the vacuum actuator rod, ball rotary valve ④ is closed allowing the coolant flow to be stopped. This stops coolant to flow to the cylinder head.

- ① Belt pulley
- ③ Coolant pump housing



When all of the following conditions are satisfied, ECM performs the cold start control to deactivate the coolant pump.

- Engine coolant temperature: 85°C (185°F) or less
- Charge air temperature: below threshold limit
- Engine speeds: 4,000 rpm or less
- No heater request from A/C auto amp.

When coolant pump stop conditions are not satisfied, ECM turns OFF the coolant pump switchover valve. Negative pressure on the coolant pump switchover valve is ventilated through the air vent. The spring force returns the ball rotary valve in the direction flowing coolant. This turns ON the coolant pump, allowing coolant circulation again.

Coolant Thermostat Control

Reacting to coolant temperature, wax in the wax element expands or contracts. This opens and closes the ball rotary valve in the coolant thermostat housing. [Temperature range: approx. 98 – 108°C (208.4 – 226.4°F)] Furthermore, by distributing power to the coolant thermostat heater element, the ball rotary valve is opened and closed according to engine requests. ECM controls the thermostat heater element by closing the circuit according to the operating conditions (characteristics map). The coolant thermostat operates as follows, according to coolant temperature and control performed by ECM.

- Close
- Start opening (mix mode)
- Open (cooler mode)

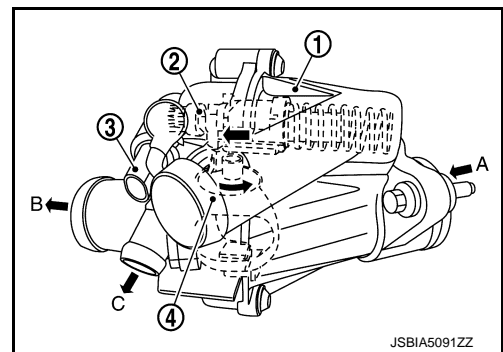
Close

The ball rotary valve is closed under the following conditions.

- Engine coolant temperature: 95°C (203°F) or less
- Coolant thermostat heater element: No power distribution
- No full load request

In the closed position, coolant circulates in the engine. Coolant flows to the heater core, if necessary, but not to radiator. This increases coolant temperature rapidly and accelerates warm-up, improving fuel economy and reducing toxic exhaust gas.

- ① Coolant thermostat housing
- ② Wax element
- ③ Coolant thermostat heater element
- ④ Ball rotary valve
- A From engine
- B To radiator
- C To heater heat exchanger



Start Opening (Mix mode)

The ball rotary valve opens according to the following conditions.

- Engine coolant temperature after engine start (no full load request): reaches 98°C (208.4°F)

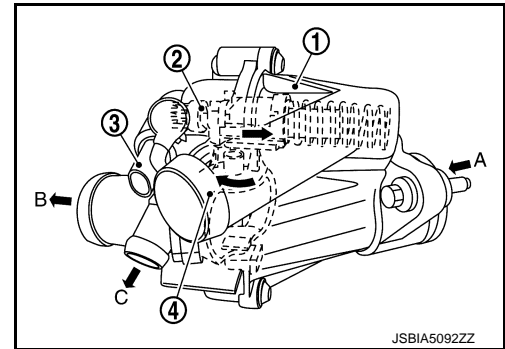
SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

- Coolant thermostat heater element: power distribution

In the range of coolant temperature approximately 98°C – 108°C (208.4°F – 226.4°F), the wax in wax element ② is expanded or the wax element is heated by distributing power to coolant thermostat heater element ③. This opens ball rotary valve ④ and coolant flows to the radiator. The degree of the opening of ball rotary valve changes according to wax temperature or coolant temperature. This adjusts the coolant flow to the radiator.



- ① Coolant thermostat housing
- A From engine
- B To radiator
- C To heater heat exchanger

Open (Cooler Mode)

When coolant temperature is 108°C (226.4°F) or more, the ball rotary valve opens fully, allowing the maximum amount of coolant to flow to the radiator.

When coolant temperature is 85°C (185°F) or more under the full load request condition, ECM fully opens the ball rotary valve by controlling the thermostat heater element to heat the wax element. Accordingly, the maximum amount of coolant flows to the radiator.

Under the following conditions, coolant temperature is adjusted to prevent it from reaching the hazardous temperature range.

- Intake air temperature: 38°C (100.4°F)
- Engine speeds: 3,000 rpm or more
- Engine load: 30%

ECM circulates coolant to the radiator to lower the coolant temperature by controlling the coolant thermostat heater element and opening the ball rotary valve according to ambient temperature. When ambient temperature is less than 12°C, ECM adjusts coolant temperature at approximately 90°C (194°F). When ambient temperature is 12°C (53.6°F) or more, ECM adjust coolant temperature at approximately 80°C (176°F).

OVERHEAT PROTECTION FUNCTION

The overheat protection function protect the engine and catalyst from damage caused by overload heat.

The overheat protection function performs following controls.

- Characteristics map-dependent ignition timing adjustment towards retard angle direction, as of a coolant temperature at approximately 90°C (194°F) and the ambient temperature at 20°C (68°F)
- Reduced opening of the throttle valve actuator
- Shortening of the injection time of the fuel injectors according to the lower air mass
- Full opening of the ball rotary valve in coolant thermostat

COOLING FAN MOTOR CONTROL

ECM controls the A/C auto amplifier and cooling fan motor. At this time, the reference revolution of the cooling fan motor is controlled by a PWN signal from ECM.

The cooling fan motor operates according to the duty cycle of PWM signal from ECM as follows.

- 10%: Cooling fan motor OFF
- 20% Cooling fan motor ON (minimum speeds)
- 90%: Cooling fan motor ON (maximum speeds)

When abnormal control occurs, the cooling fan motor operates at the maximum speed.

Cooling Fan Operation After Engine Stop

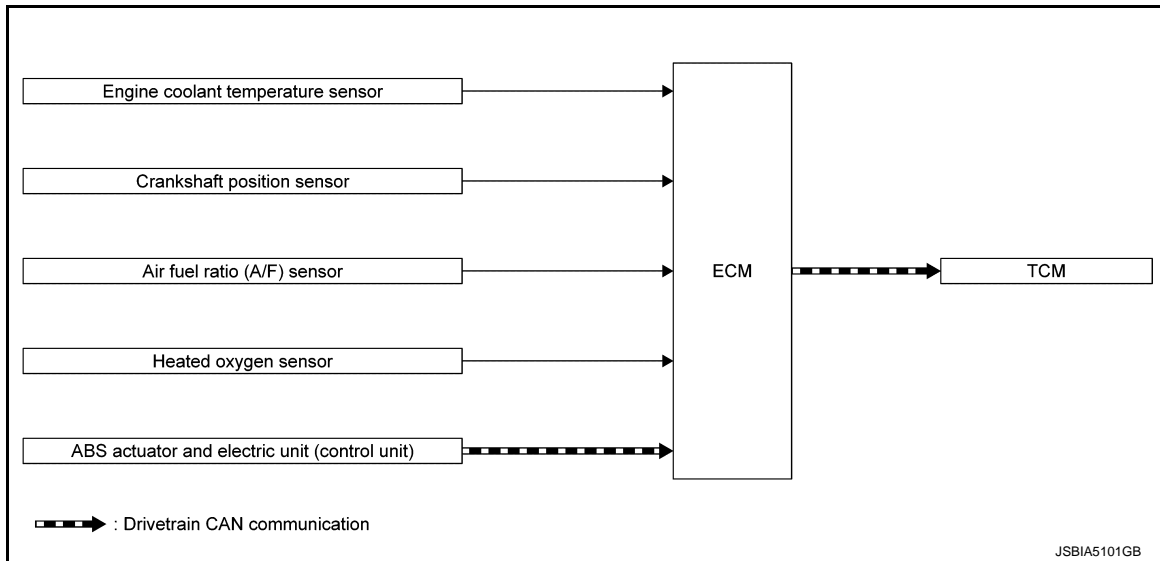
If coolant temperature or engine oil temperature (calculated from reference temperature) is outside the threshold when the key is turned OFF, the fan motor is activated for 5 minutes at the maximum. At this time, the duty cycle of PWM signal is 40% at the maximum. If the battery voltage level is too low, the fan motor is not activated.

EXHAUST TREATMENT FUNCTION

EXHAUST TREATMENT FUNCTION : System Description

INFOID:000000013289797

SYSTEM DIAGRAM



DESCRIPTION

The exhaust treatment function reduces the following exhaust emissions included in exhaust gas.

- Nitrogen oxide (NOx)
- Carbon hydrate
- Carbon monoxide

To reduce exhaust emissions, it is necessary to quickly raise catalyst temperature to the operating temperature especially when performing cold start.

NOTE:

ECM controls the solenoid actuators of intake camshaft and exhaust camshaft and determines valve overlap. Exhaust gas recirculation rate is controlled by interior EGR.

The exhaust treatment function has a control item and functions as follows.

- Three way catalyst function
- Shift performance curve control
- Catalyst efficiency monitor function

THREE WAY CATALYST FUNCTION

Exhaust emissions emitted from engine cause chemical change (conversion) the most effectively when having the theoretical air-fuel ratio by three-way catalyst. Due to the oxidation, carbon monoxide changes to carbon dioxide and hydrocarbon changes to water and carbon dioxide. Nitrogen oxides changes to nitrogen and carbon dioxide by the reduction.

SHIFT PERFORMANCE CURVE CONTROL

The shift performance curve control performs when the following conditions are satisfied.

- Engine coolant temperature at starting: 50°C (122°F) or less
- Vehicle speed: 53 km/h (32.9 MPH) or less

The shift performance curve control is performed to raise the temperature of catalyst to the operating temperature in a short period of time after engine start.

ECM requests TCM to change shift performance curves according to the following sensor and signal.

- Engine coolant temperature sensor
- ABS actuator and electric unit (control unit) (each wheel speed)

The shift performance curve control works only electrically and operates for 160 seconds at a maximum. ECM requests TCM to change shift performance curves via drivetrain CAN communication. For low or medium load state, gear shifting is performed when engine speed is higher or vehicle speed is faster.

CATALYST EFFICIENCY MONITOR FUNCTION

The catalyst efficiency monitor function is performed when the following conditions are satisfied.

- The three way catalyst temperature is in operating temperature range
- The air-fuel ratio correction control satisfies the operating conditions

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SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

The catalyst efficiency monitor function that the air-fuel ratio correction control satisfies the operating conditions monitors the degree of deterioration in catalyst and that of hydrocarbon conversion according to the oxygen adsorption rate of catalyst.

ECM monitors the catalyst efficiency according to the following sensors.

- Crankshaft position sensor (Engine speeds)
- Air-fuel ratio (A/F) sensor
- Heated oxygen sensor

NOTE:

Oxygen of the catalyst is stored when air-fuel mixture is lean and reduced when air-fuel mixture is rich.

Due to high oxygen adsorption amount of the three-way catalyst, exhaust emissions decrease, and accordingly, oxygen content in the downstream of catalyst becomes almost steady. Accordingly, the signal amplitude of the O₂ sensor is reduced and almost steady.

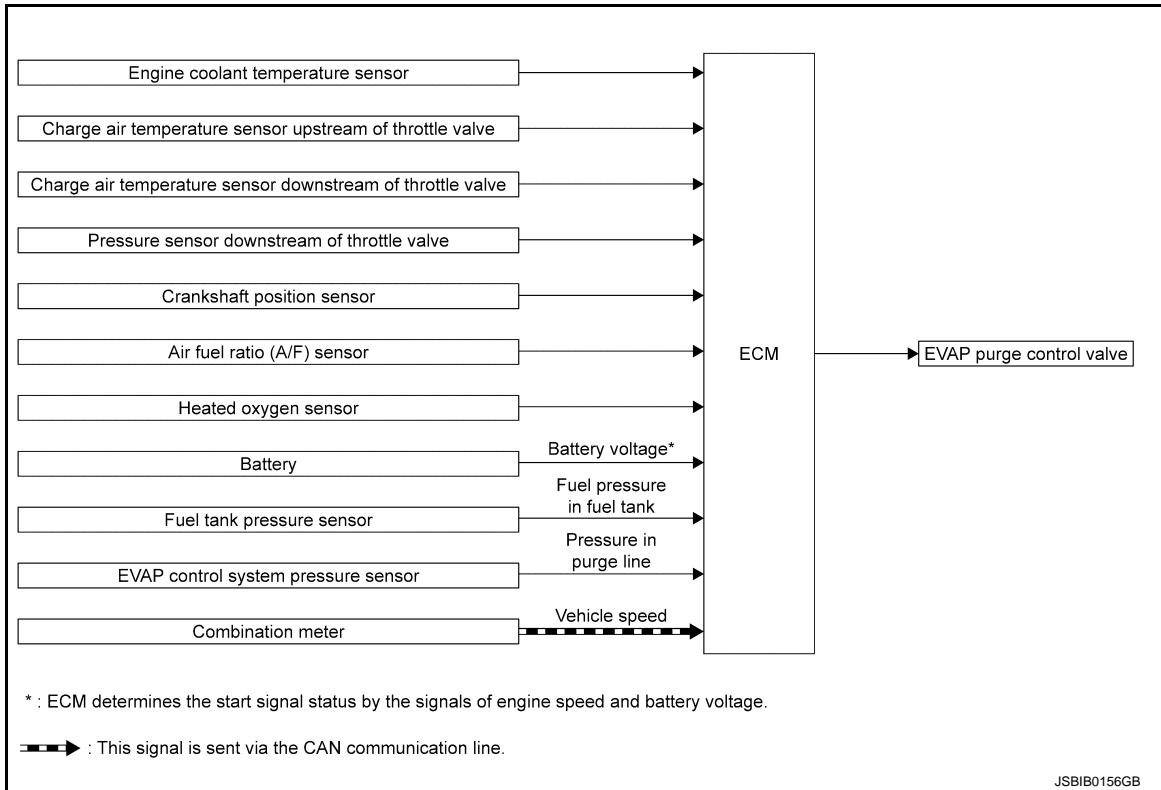
When the three-way catalyst reaches the operating temperature and the air-fuel ratio correction starts, the signal amplitude of air-fuel ratio sensor upstream of the three-way catalyst is compared to that of the O₂ sensor downstream of the three-way catalyst. When three-way catalyst does not function, the signal amplitude of air-fuel ratio sensor and O₂ sensor becomes equal. Multiple measurements are performed in the low load area within the specified engine speeds. ECM compares the measurement results with the characteristics map. When a malfunction is detected in the catalyst based on the comparison, ECM requests the combination meter to turn ON the malfunction indicator lamp (MIL) and records the malfunction.

EVAPORATIVE EMISSION SYSTEM

EVAPORATIVE EMISSION SYSTEM : System Description

INFOID:000000013289798

SYSTEM DIAGRAM

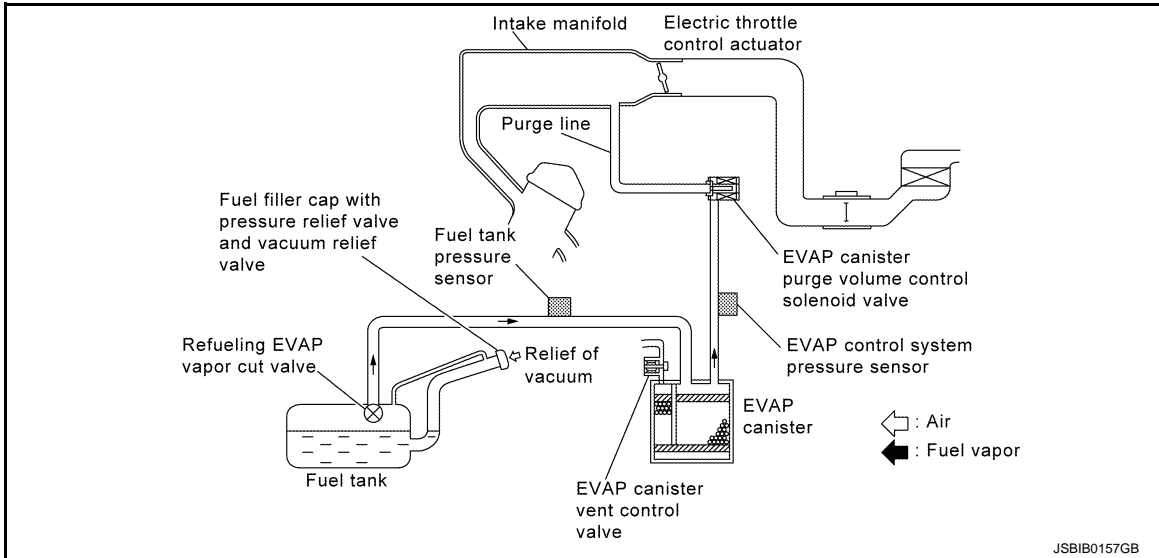


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[2.0L TURBO GASOLINE ENGINE]

SYSTEM DESCRIPTION



The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank. The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases. EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

STOP/START SYSTEM

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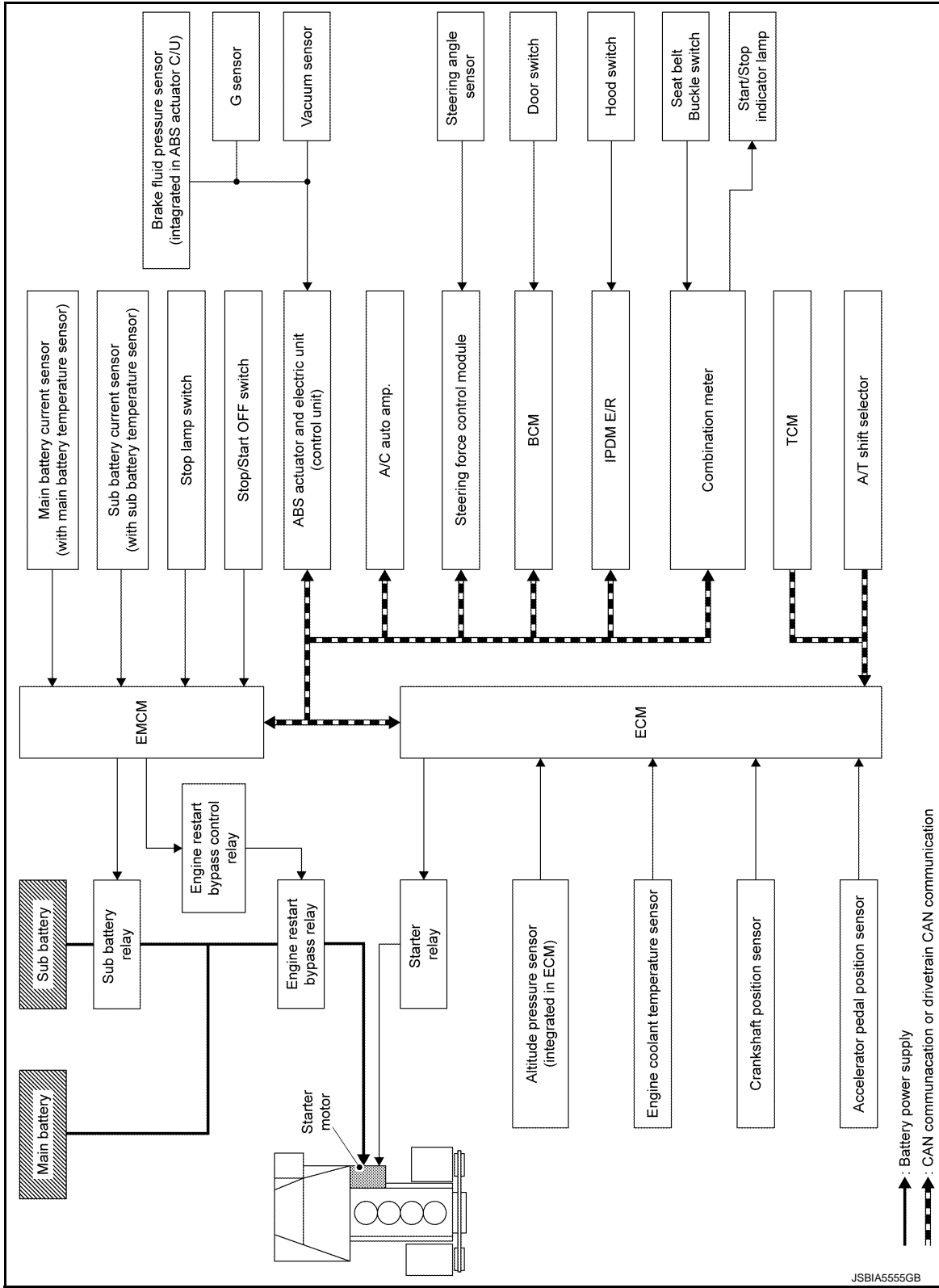
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STOP/START SYSTEM : System Description

INFOID:000000013289799

SYSTEM DIAGRAM



*: Steering force control module is power steering control module.

INPUT/OUTPUT SIGNAL CHART

ECM

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< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

Input/ Output	Transmits/Receives component	Signal name	Description	
Input	Atmospheric pressure sensor (integrated in ECM)	Atmospheric pressure sensor signal	Detects an atmospheric pressure.	
	Engine coolant temperature sensor	Engine coolant temperature sensor signal	Detects an engine coolant temperature.	
	Crankshaft position sensor	Crankshaft position sensor signal	Detects an engine speed.	
	Accelerator pedal position sensor	Accelerator pedal position sensor signal	Detects an accelerator pedal position.	
	TCM	Drivetrain CAN communication	TCM power voltage signal	Detects a power supply voltage of TCM.
			Transmission oil temperature signal	Detects a transmission oil temperature.
			Stop/Start permit signal	Detects the transmission is ready to operate the stop/start system.
	A/T shift selector	Drivetrain CAN communication	Shift position signal	Detects a shift position.
	Combination meter	CAN communication	Seat belt buckle switch signal	Detects driver is sitting on the driver seat.
	BCM	CAN communication	Ignition switch status signal	Detects ignition switch status.
			Door switch signal	Detects the door status of driver side.
	EMCM	CAN communication	Brake hold request signal	Detects the brake hold/release request according to the stop/start system.
			Stop/Start OFF switch signal	Detects the stop/start OFF switch status.
			Stop/Start system ready signal	Detects the vehicle is ready to operate the stop/start system.
			Brake torque signal	Detects a brake torque.
Brake pedal position signal			Detects a brake pedal position.	
IPDM E/R	CAN communication	Hood switch signal	Detects engine hood status.	
A/C auto amp.	CAN communication	Stop/Start permit signal	Detects the air conditioning system is ready to operate the stop/start system.	
ABS actuator and electric unit (control unit)	CAN communication	Vehicle speed signal	Detects vehicle speed.	

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[2.0L TURBO GASOLINE ENGINE]

Input/Output	Transmits/Receives component	Signal name		Description
Output	BCM	CAN communication	Stop/Start status signal	Transmits a stop/start status signal
	EMCM	CAN communication	Intake air temperature signal	Transmits intake air temperature.
			Engine coolant temperature signal	Transmits engine coolant temperature.
			Stop/Start status signal	Transmits a stop/start status signal
	Power steering control module	CAN communication	Stop/Start status signal	Transmits a stop/start status signal
	ABS actuator and electric unit (control unit)	CAN communication	Brake hold request signal	Transmits the brake hold/release request according to the stop/start system.
			Stop/Start status signal	Transmits a stop/start status signal
	Combination meter	CAN communication	Stop/Start indicator lamp request signal	Transmits request signal which turn ON the stop/start indicator lamp.
			Stop/Start status signal	Transmits a stop/start status signal

EMCM

Input/Output	Transmits/Receives component	Signal name		Description
Input	ABS actuator and electric unit (control unit)	CAN communication	Vehicle speed signal	Detects a vehicle speed
			G sensor signal	Receives G sensor signal.
			Brake fluid pressure sensor signal	Detects brake fluid pressure.
			Brake booster pressure sensor	Detects a pressure in brake booster.
			ESP operation signal	Detects ESP operation.
			ABS operation signal	Detects ABS operation.
	ECM	CAN communication	Stop/Start status signal	Receives a stop/start status signal
	IPDM E/R	CAN communication	Hood switch signal	Receives engine hood status (open/close).
			Rear window defogger control signal	Detects the rear window defogger operation status.
			Low beam status signal	Detects exterior lamp lighting-up.
	High beam status signal			
	A/C auto amp.	CAN communication	Blower fan ON signal	Detects the blower fan operation.
	Power steering control module	CAN communication	Stop/Start permit signal	Detects that the driver does not turn the steering wheel.
	Stop lamp switch	Stop lamp switch signal		Detects the brake pedal is depressed.
Stop/Start OFF switch	Stop/Start OFF switch signal		Detects the stop/start OFF switch status.	

SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

Input/ Output	Transmits/Receives component	Signal name	Description	
Output	ECM	CAN communica- tion	Stop/Start OFF switch signal	Transmits the stop/start OFF switch status.
			Stop/start system ready signal	Transmits the vehicle is ready to operate the stop/start system.
			Brake hold request signal	Transmits the brake hold/release request according to the stop/start system.
			Brake torque signal	Transmits the braking torque calculated based on the brake fluid pressure signal.
			Brake pedal position signal	Transmits the brake pedal position calculated based on the brake pedal position switch signal and the brake fluid pressure sensor signal.

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.

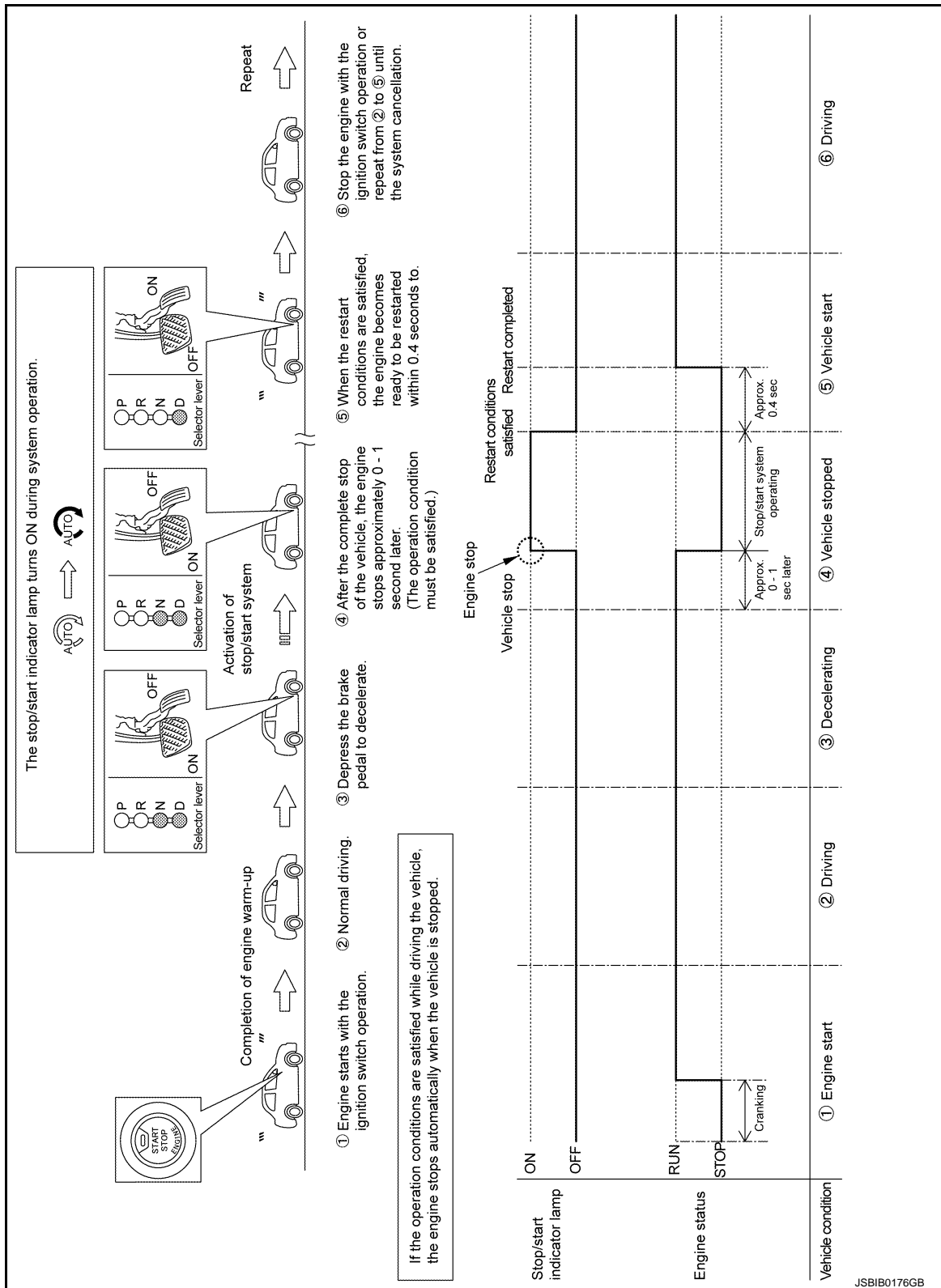
ECM and EMCM detect a vehicle condition, engine condition and driver's operation condition based on signals sent from each unit and the sensors to comprehensively control the stop/start system.

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 [MWI-48. "WARNING LAMPS/INDICATOR LAMPS : 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



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-61, "INFORMATION DISPLAY : System Description"](#).)

When the engine restart conditions are satisfied, ECM and EMCM activate relays to restart the engine. After restarting the engine, the stop/start indicator lamp and the indication on the information display turn OFF.

SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Stop/Start Readiness Condition

ECM and EMCM judge stop/start system is ready when the following conditions are satisfied.

NOTE:

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.

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System	Judgement ECU	Item	Condition	
Vehicle	ECM	Stop/start OFF switch	OFF (Switch indicator: OFF)	
		Elevation	Approximately 2,500 m (8,202 ft) or less	
		Door (driver side)	Close	
		Seat belt (driver side)	Fastened	
		Stop/start indicator Lamp	Not blink (Malfunction non-detection)	
		Driving history	Drive the vehicle at 13 km/h (8 MPH) or more after start the engine with ignition switch.	
			Drive the vehicle at 8 km/h (5 MPH) or more. NOTE: When shift the selector lever R to D, drive the vehicle at 10 km/h (6.3 MPH) or more.	
			Passes 5 seconds or more after restart	
		Hood	Close	
		Air conditioning	Automatic air conditioning	Not in DEF mode
	In-vehicle temperature		More than Approx. 20°C (68°F)	
			Less than 30°C (86°F) (A/C switch: ON)	
	Stop/Start permit (for details, refer to HAC-34, "STOP/START SYSTEM : System Description".)	Permit		
	EMCM	Rear window defogger		OFF
		ABS actuator and electric unit (control unit)		ABS not activated ^{*1}
				ESP not activated
		Power steering control system		System is normal
		Main battery	Main battery voltage	Ignition switch ON: 11.5 V or more ^{*4}
				When start the engine with ignition switch: 7.68 V or more ^{*3}
			Main battery temperature	2 °C (36 °F) or more ^{*2}
		Charge condition		Charged enough
Sub battery		Sub battery voltage		Ignition switch ON: 11.5 V or more ^{*4}
		Sub battery temperature		2 °C (36 °F) or more ^{*2}
	Charge condition		Charged enough	
Electrical load ^{*5}		<ul style="list-style-type: none"> • Exterior light: OFF • Blower fan: OFF 		
Engine	ECM	Engine control system	System is normal (DTC is not detected)	
		Engine coolant temperature	40 - 115 °C (104 -239 °F)	
		Number of the starter motor operation	Under the threshold ^{*6}	

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< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

System	Judgement ECU	Item	Condition
Transmission	ECM	Selector lever position	Except R range
		Sub electric oil pump	System is normal
		Stop/Start permit (for details, refer to TM-82. "STOP/START SYSTEM : System Description".)	Permit

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

*2: Stop/Start system might not be activated at ambient temperature of 2°C (36°F) or more because a battery temperature varies with driving conditions.

*3: EMCM judges a battery deterioration condition.

*4: The voltage varies with a electric load when the ignition switch is turned ON.

*5: This condition is monitored when the battery is judged to be deterioration by EMCM.

*6: If the operation count reaches the threshold, ECM detects related DTC P1D06.

Stop/Start Operation Condition

When all of the following conditions is satisfied, ECM stops the engine.

	Item	Condition
Vehicle	Stop/start readiness condition	Ready
	Vehicle speed	0 km/h (0 MPH)
	Steering wheel	Not steer (steering force does not occur)
	Accelerator pedal	Released
	Brake pedal	Depressed*
	Brake fluid pressure	0.7 MPa (7 bar, 7.14 kg/cm ² , 101 psi) or more
	Brake booster vacuum	Presence of sufficient negative pressure to a brake force.
	Vehicle angularity	Approx. 14% or less
Engine	Engine speed	1,200 rpm or less
Transmission	Selector lever position	Except R range

*: EMCM calculates a brake pedal status based on the brake pedal position switch signal and the brake fluid pressure sensor signal. And then, EMCM transmits a brake pedal position signal to ECM via CAN communication.

Restart Condition

When any of the following conditions is satisfied, 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)
Steering wheel	Steer (steering force occurs)
Air conditioning	Cannot maintain comfort in the vehicle compartment
Rear window defogger switch	ON
Door (driver side)	Open
Seat belt (driver side)	Release
Brake pedal	Influenced by a selector lever position*
Accelerator pedal	
Selector lever position	
Brake booster pressure	Insufficient pressure for braking force
Vehicle speed	2 km/h (1.3 MPH) or more

SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

*: For details, refer to RESTART CONDITION (EACH SELECTOR LEVER, THE BRAKE PEDAL AND THE ACCELERATOR PEDAL OPERATION).

Restart Inhibit Mode

When open the "hood" under the stop/start system operating condition (engine stop), ECM inhibits restarting the engine (engine stall). In this case, start the engine with ignition switch for restart.

RESTART CONDITION (EACH SELECTOR LEVER, THE BRAKE PEDAL AND THE ACCELERATOR PEDAL OPERATION)

P Position

- STOP/START system operation performs when the selector lever is shifted from P position.

Selector lever position	P	→	R	→	N	→	D
Engine status	Stop	→	Restart	→	Stop	→	Restart

- STOP/START system operation by the brake pedal and accelerator pedal operation in the select lever P position.

Vehicle speed	0 km/h								
Brake pedal	ON				→	OFF			
Accelerator pedal	OFF	→	ON	→	OFF	→	ON*	→	OFF
Engine status	Stop	Restart		Stop	Restart		Stop		

*: During the brake pedal and accelerator pedal are depressed, the engine is running.

N Position

- STOP/START system operation performs when the selector lever is shifted from N position.

Selector lever position	P	←	R	←	N	→	D
Engine status	Stop	←	Restart	←	Stop	→	Restart

- STOP/START system operation by the brake pedal and accelerator pedal operation in the select lever N position.

Vehicle speed	0 km/h								
Brake pedal	ON				→	OFF		→	ON
Accelerator pedal	OFF	→	ON	→	OFF	→	ON*	→	OFF
Engine status	Stop	Restart		Stop	Restart	Run		Stop	

*: During the brake pedal and accelerator pedal are depressed, the engine is running.

D Position

- STOP/START system operation performs when the selector lever is shifted from D position.

Selector lever position	P	←	R	←	N	←	D
Engine status	Stop	←	Restart	←	Stop	←	Stop

- STOP/START system operation by the brake pedal and accelerator pedal operation in the select lever D position.

When driving the vehicle at 8km/h (5 MPH) or less after restart

Vehicle speed	0 km/h				8 km/h or less			0 km/h	
Brake pedal	ON				→	OFF		→	ON
Accelerator pedal	OFF	→	ON	→	OFF	→	ON	→	OFF
Engine status	Stop	Restart		Run					

When driving the vehicle at 8km/h (5 MPH) or more after restart

Vehicle speed	0 km/h				8 km/h or more			0 km/h	
Brake pedal	ON				→	OFF		→	ON

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[2.0L TURBO GASOLINE ENGINE]

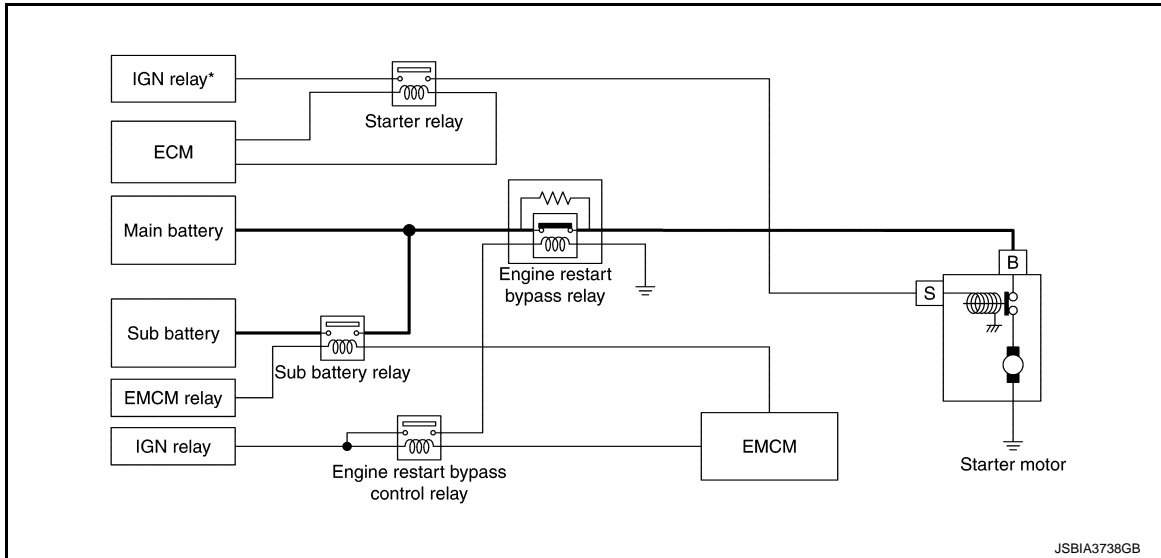
Accelerator pedal	OFF	→	ON	→	OFF	→	ON	→	OFF
Engine status	Stop	Restart			Run				Stop

STARTER MOTOR DRIVE CONTROL

STARTER MOTOR DRIVE CONTROL : System Description

INFOID:000000013289800

SYSTEM DIAGRAM



*: Fuse and Fusible Link Block

SYSTEM DESCRIPTION

Starter system consists of following items:

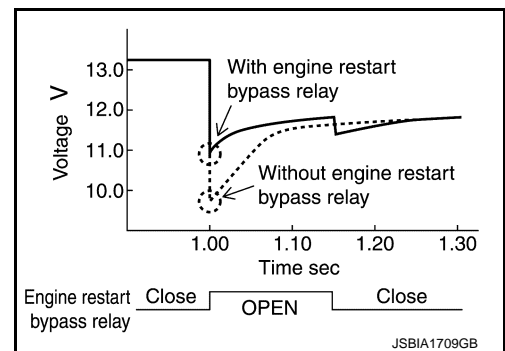
- ECM
- EMCM
- Starter relay
- Sub battery relay
- Engine restart bypass relay
- Engine restart bypass control relay
- Starter motor

Sub Battery Relay Control

Sub battery relay prevents a loss in supply voltage to each system due to a battery voltage loss during engine start and restart. EMCM turns OFF the sub battery relay to interrupt the connection between the main battery power supply circuit and the sub battery power supply circuit during the engine start and the restart. This protects the electric equipment connected to the sub battery power supply circuit from an impact (e.g. memory reset) of a loss in supply voltage. After the engine is started normally, EMCM turns ON the sub battery relay to connect the main battery power supply circuit and the sub battery power supply circuit. This allows the alternator to supply the generated power to all of the systems and to charge the main battery and sub battery.

Engine Restart Bypass Relay Control

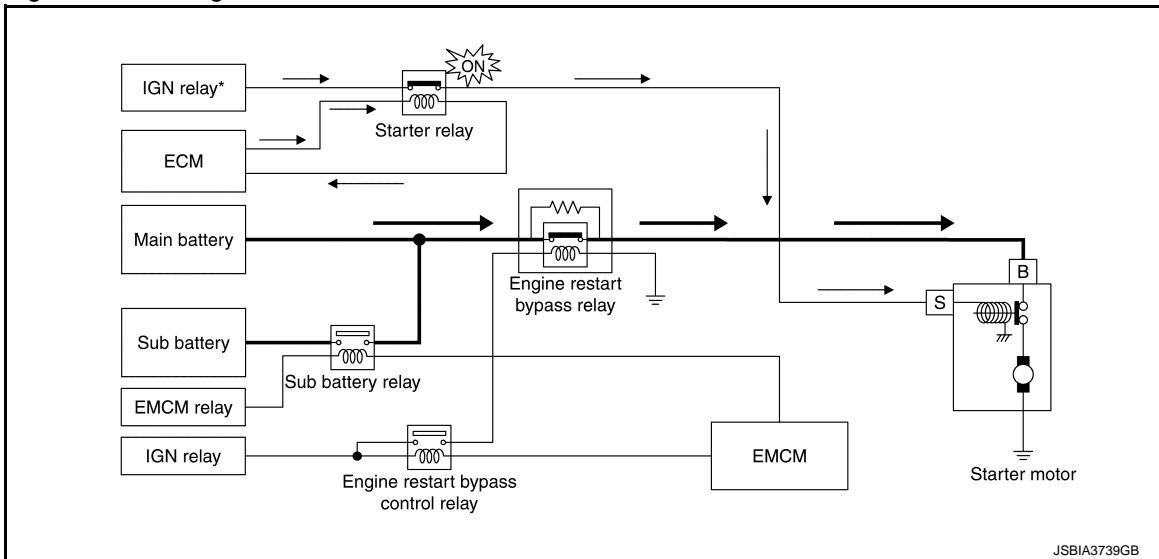
EMCM controls the engine restart bypass control relay and activates the engine restart bypass relay. When the restart conditions are satisfied, EMCM turns ON the engine restart bypass control relay instantaneously right after the restart and opens the engine restart bypass relay for a moment. This allows 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, EMCM enables the battery voltage stabilization and reduces the battery deterioration rate by decreasing the battery voltage drop resulted from cranking at an engine restart.



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CONTROL FLOW

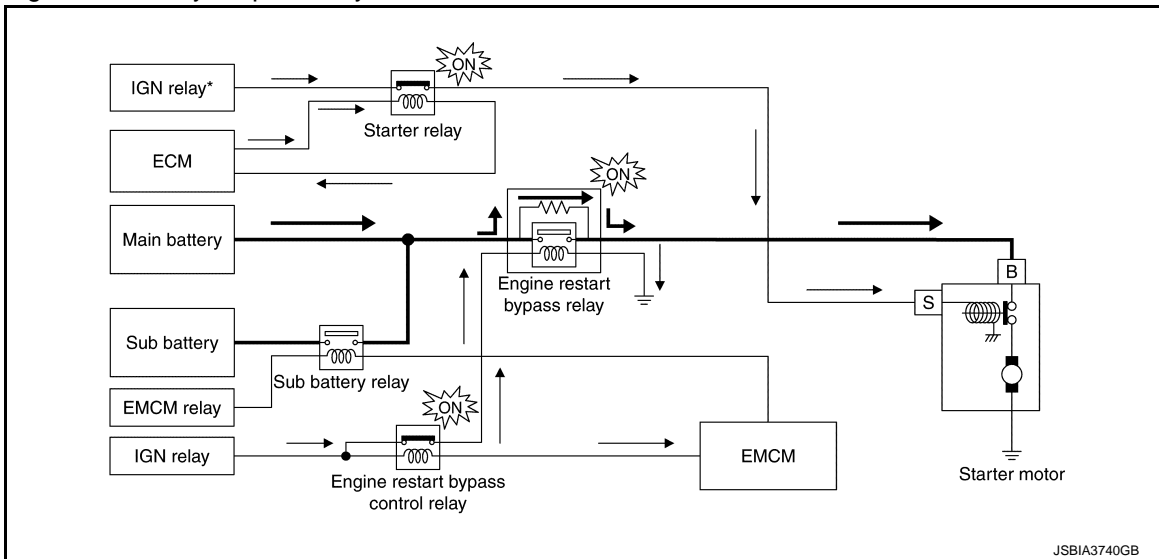
During Engine Start with Ignition Switch



*: Fuse and Fusible Link Block

When the engine is started with ignition switch operation, ECM turns ON the starter relay to activate the starter motor. This allows the starter motor to start the engine.

During Engine Restart by Stop/Start System



*: Fuse and Fusible Link Block

When engine is restarted, ECM turns ON the starter relay. At the same time, EMCM turns ON the engine restart bypass relay and activates the engine restart bypass relay. When the starter motor is rotating, EMCM turns OFF the engine restart bypass control relay to deactivate the engine restart bypass relay.

Relay Activation Matrix

Condition	Relay		
	Starter relay	Engine restart bypass relay	Sub battery relay
Engine start with ignition switch	ON	OFF	OFF
Engine restart by start/stop system	ON	ON* → OFF	OFF
Engine running	OFF	OFF	ON

*: Instantaneously right after the restart.

ENGINE ON ENERGY MANAGEMENT FUNCTION

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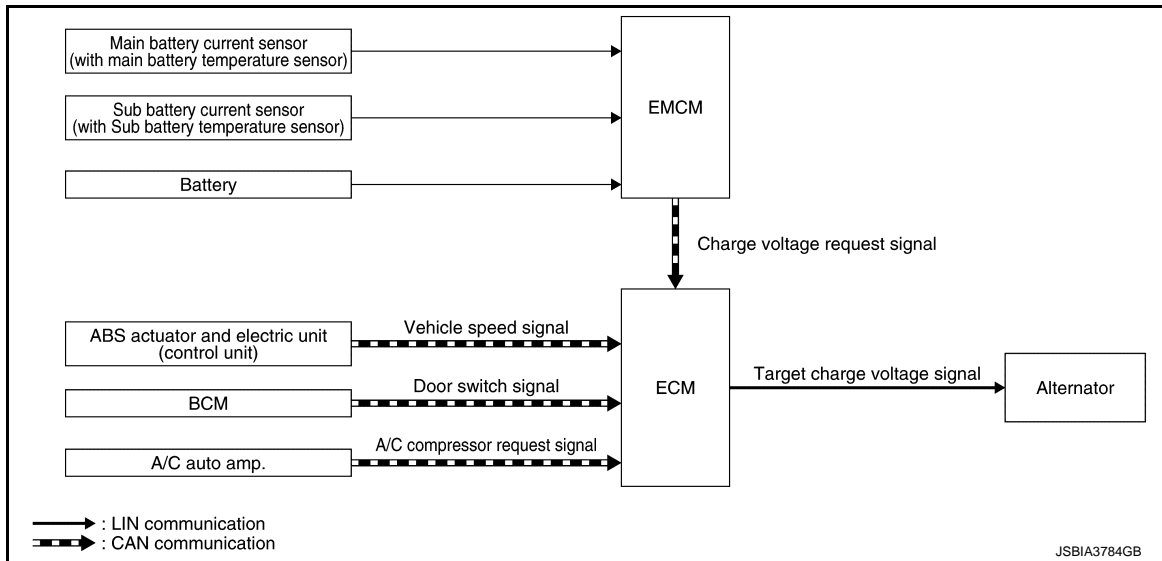
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SYSTEM DIAGRAM



DESCRIPTION

The engine on energy management function ensures the stability of the on-board electrical system as well as an even charge balance in battery.

Given that the power output of the alternator is dependent on engine speed and temperature, plus the fact that many consumers use simultaneously, overload situations can arise that need to be buffered by the battery. When such an overload situation lasts for an extended period or when the charging capacity of the battery is low, a negative charge/discharge ratio may result that could impair the engine's starting capability.

In situations where the on-board electrical system is overloaded for prolonged periods, engine ON energy management works to increase the power output of the alternator in order to balance the charge/discharge ratio of the battery.

Energy management for driving encompasses the following sub functions:

- Function sequence for voltage provision
- Function sequence for dynamic idle speed control
- Function sequence for consumer reduction

FUNCTION SEQUENCE FOR VOLTAGE PROVISION

The voltage provision function sequence encompasses the following:

- Function sequence for determine charge state of battery
- Charge battery function sequence
- Function sequence for alternator regulation

Function Sequence for Determine Charge State of Battery

The state of the battery is detected by the main battery current sensor and the sub battery current sensor. This calculates corresponding parameters on the voltage, current and temperature measurements on the battery.

The charge level of the battery is the ratio of the current charge to the maximum storable charge. This is based on the calculation of the internal resistance of the battery. This value can be used to determine the acid density of the battery. This, along with the battery capacity, is then used to compute the charge stored in the battery. EMCM reads the computed data from the main battery current sensor and sub-battery current sensor, while also the battery voltage, and computes the alternator voltage required to provide the energy requested by consumers.

Charge Battery Function Sequence

Charging of the battery requires that the specified voltage be determined. The specified voltage is the voltage that must be present at the terminals of the battery in an optimal manner.

Depending on various factors, the specified voltage is determined using the alternator management or using the temperature-dependent charging characteristic including the fast charge function.

After the engine is started, immediate charging is performed first at high battery is recognized as being sufficient.

NOTE:

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< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

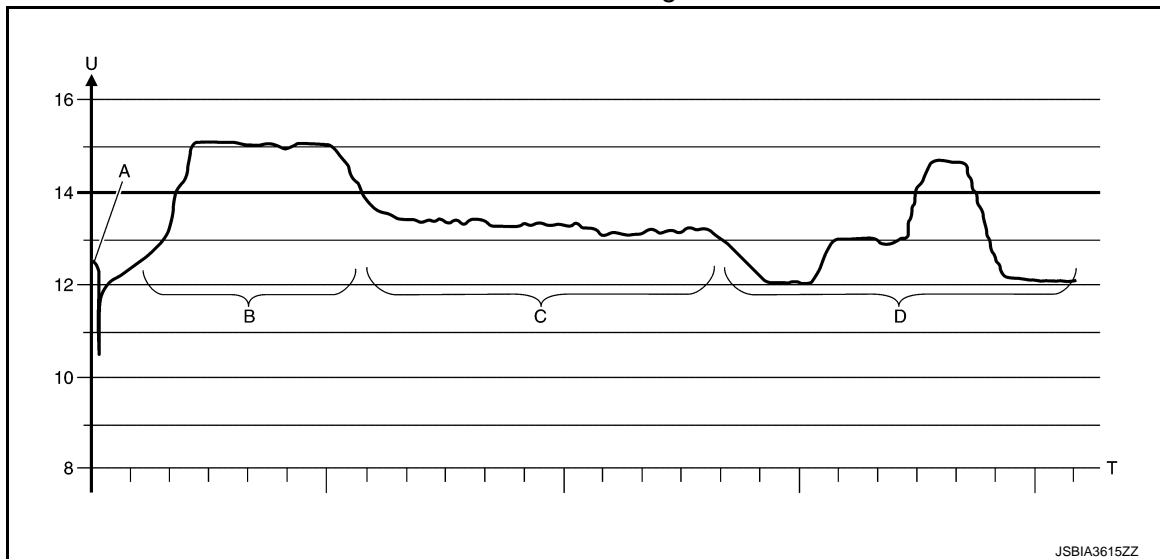
Immediate charging is done at least 20 seconds or more. Beside, the fast charging is not finished until the vehicle speed is more than 4 km/h (2.5 MPH). After this, a switch is made to a temperature-specific charging characteristic or alternator management.

Alternator management includes lowering of the charging voltage is approximately 12 V and a regenerative braking (energy recovery) option when the engine is in deceleration mode.

A safety cutout is activated when driving down long hills in order to avoid overcharging of the battery resulting from long periods of deceleration fuel shutoff. This protective cutout deactivates regenerative braking (energy recovery) in cases of high voltage combined with low power consumption.

When the battery becomes fully charged (for example after driving in the cold or long downhill travel), the voltage is lowered further to return the battery to its optimum charge level.

Various Phases of Voltage Provision



- A: Engine start
- B: Fast charging
- C: Temperature-based charging
- D: Alternator management
- U: Voltage
- T: Time

Function	Outline
Fast charging	<ul style="list-style-type: none"> Voltage up to 13.5 – 14.7 V Once after engine starting Optimized charging of battery (including during short trips) Duration time: 20 seconds or more. Fast charging ends when charge of battery is sufficient No fast charging with trailer operation No fast charging when the battery is too warm Not finished until vehicle speed is more than 4 km/h (2.5 MPH)
Transition to alternator management	<ul style="list-style-type: none"> Fast charging ended Battery temperature: more than 2°C (36°F) Ambient temperature: more than 2°C (36°F) Charge level of the battery is sufficient. No trailer operation
Temperature-based charging	<ul style="list-style-type: none"> Fast charging ended, alternator management not possible Voltage range: between 13.5 V and 14.7 V Linear charging characteristic
Alternator management	<ul style="list-style-type: none"> Battery voltage is: <ul style="list-style-type: none"> - Approx. 12 – 13V (According to charge level of battery) - Approx. 13.0 – 13.7 (for some light functions ON) - Approx. 13.8 V (With wiper ON) - Approx. 13.5 – 14.7 V (Re generative condition)

Function Sequence for Alternator Regulation

Alternator regulation (alternator management)

- Takes place in ECM
- Sets the specified voltage of the battery management

< SYSTEM DESCRIPTION >

- Switches to regenerative braking voltage in deceleration mode
- Sets a lower voltage in exceptional cases (e.g. stall prevention, cold start at high altitude, catalytic converter heating)

The alternator control actuates the alternator's power output. EMCM reads-in the battery parameter as provided by the main battery current sensor and sub battery current sensor and calculates the required alternator specified voltage.

EMCM transmits this value over the CAN communication to ECM. ECM evaluates this, taking additional input factors (e.g. A/C ON) into consideration, and calculates the ideal specified voltage for the alternator.

Then, ECM transmits an alternator specified voltage to alternator via the LIN communication and set it. In addition, ECM checks the input factors in order to rule out any overcharging or faulty charging of the battery.

ECM compares the alternator's specified voltage values with the alternator's output values in order to recognize the energy stage of the electrical system. This comparison is termed power management.

ECM transmits information on this over CAN communication to EMCM.

As soon as it becomes apparent that the electrical system voltage is not high enough, the energy management is gradually reduced. The alternator can then makes its full output available.

The energy management in ECM adopts the alternator specified voltage values for EMCM as a guideline value only, because certain vehicle conditions, (e.g. engine comfort, idle stability, engine start, irregular engine operation) have to be taken into consideration. The actual specified voltage of the alternator is therefore obtained by receiving the specified voltages transmitted from EMCM, thus the energy is managed.

If a malfunction is found in the battery sensor, the on-board power supply management switches to a fixed voltage of 14.3 V. This behavior can also be activated using a diagnosis service in order to check the alternator, for example.

FUNCTION SEQUENCE FOR DYNAMIC IDLE SPEED CONTROL

Dynamic idle speed control sets the engine's idle speed such that no current needs to be drawn from the battery when the vehicle is idling. The idle speed is increased for a higher consumer load. Idle speed increase is done in a preventive manner. The system adopts the required idle speed based on the present load.

The following factors are used for dynamic idle speed control computations:

- Alternator excitation current
- Alternator operating rate
- Battery voltage
- Battery current
- Engine speed
- Consumer reduction shutoff stage
- State of battery
- Engine start

The maximum possible excitation current is calculated from the current excitation current and the alternator utilization.

The maximum possible excitation current is used to calculate the maximum possible alternator current at different idle speeds.

EMCM transmits corresponding requests via CAN communication to ECM, which then raises the idle speed accordingly.

The idle speed is reversed under the following circumstances:

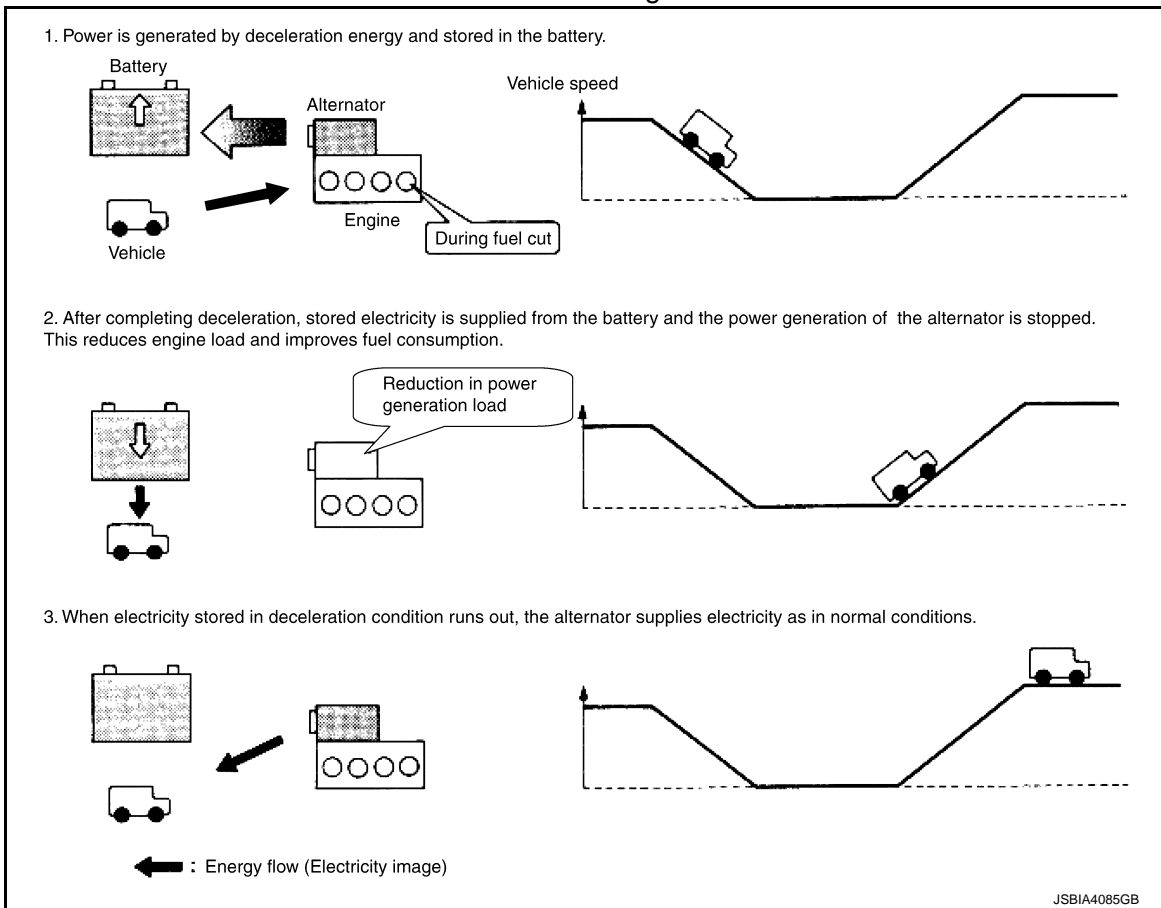
- Consumer load no longer high

REGENERATION CONTROL

When ECM judges the vehicle is in the deceleration condition, ECM increases the target voltage calculated by each sensor signal to charge the battery with regeneration power.

When the vehicle goes out of deceleration condition, ECM stops the alternator generation to reduce engine load if the battery is charged enough. As the result, the fuel consumption is reduced.

Control Image



AUTOMATIC SPEED CONTROL DEVICE (ASCD)

AUTOMATIC SPEED CONTROL DEVICE (ASCD) : Information

INFOID:0000000013289802

Automatic Speed Control Device (ASCD) system is controlled by ADAS control unit.

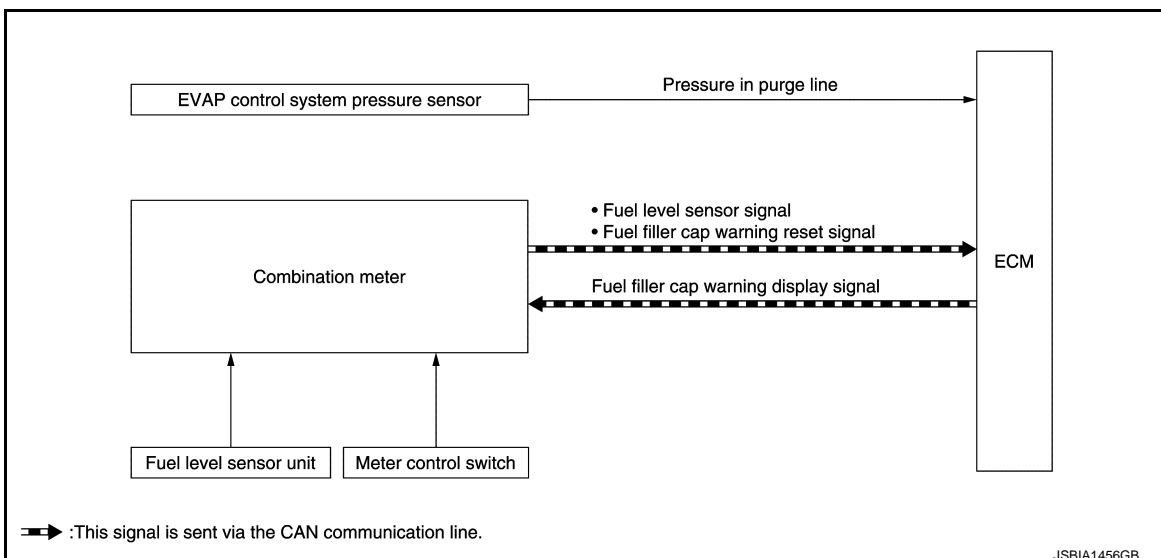
Regarding the information for ASCD system, refer to [CCS-174. "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\) : System Description"](#).

FUEL FILLER CAP WARNING SYSTEM

FUEL FILLER CAP WARNING SYSTEM : System Description

INFOID:0000000013447610

SYSTEM DIAGRAM



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SYSTEM DESCRIPTION

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

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

When a very small leak is detected through the EVAP leak diagnosis performed after judging the refueled state, ECM transmits a fuel filler cap warning display signal (request for display ON) to the combination meter via CAN communication.

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

CAUTION:

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

Reset Operation

The fuel filler cap warning lamp turns OFF, according to any condition listed below:

- Reset operation is performed by operating the meter control switch on the combination meter. Refer to [MWI-61, "INFORMATION DISPLAY : System Description"](#).
- When the reset operation is performed, the combination meter transmits a fuel filler cap warning reset signal to ECM via CAN communication. ECM transmits a fuel filler cap warning display signal (request for display OFF) to the combination meter via CAN communication. When receiving the signal, the combination meter turns OFF the fuel filler cap warning display.
- EVAP leak diagnosis result is normal.
- Fuel refilled.
- DTC erased by using CONSULT.

NOTE:

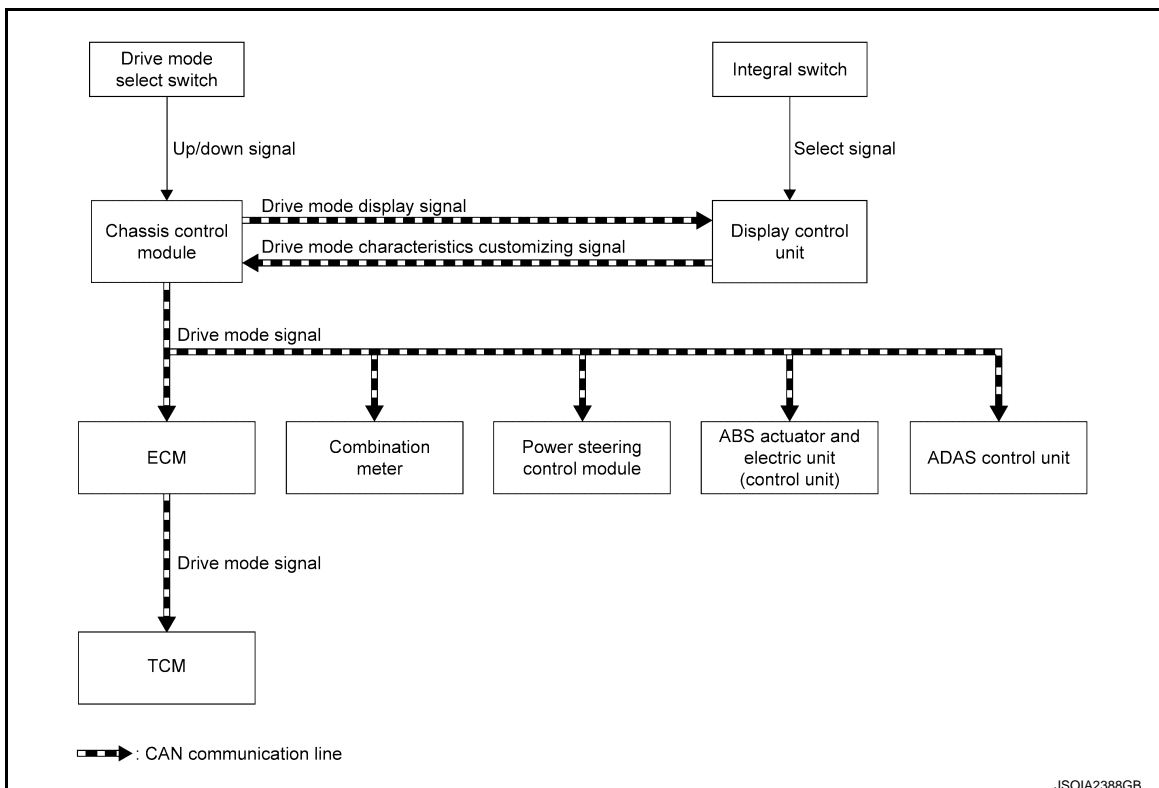
MIL turns ON if a malfunction is detected in leak diagnosis results again at the trip after the fuel filler cap warning display turns ON/OFF.

Infiniti Drive Mode Selector

Infiniti Drive Mode Selector : System Description

INFOID:000000013289804

SYSTEM DIAGRAM



NOTE:

- This section provides descriptions only about the control by ECM.

SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

For overall control, refer to [DMS-13, "Infiniti Drive Mode Selector : System Description \(For 2.0L Turbo Gasoline Engine Models\)"](#).

Infiniti drive mode selector

- Chassis control module receives an operation state signal of the drive mode select switch and transmits a mode signal to ECM via CAN communication.

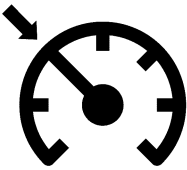


Control

ECM transmits a drive mode signal to TCM via CAN communication.

In SNOW mode, ECM changes the throttle opening angle to enhance the driving performance on a road which is low coefficient of friction.

INFORMATION DISPLAY (COMBINATION METER)

INFORMATION DISPLAY (COMBINATION METER) : Indicator/Information INFOID:000000013289805



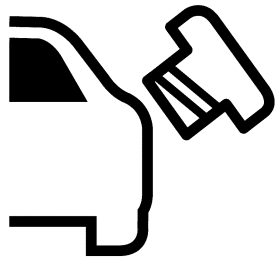
Item	Symbol	Function
ASCD indicator	 <p style="text-align: right; font-size: small;">JSCIA0831ZZ</p> <p>Message: - - Km/h / - - MPH</p>	<p>For detail of ASCD function, refer to CCS-174, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description".</p>
Stop/Start status indicator	<p style="text-align: center; font-size: 2em; font-weight: bold;">Start / Stop</p>  <p style="text-align: right; font-size: small;">JSBIA4032GB</p> <p>Message:</p> <ul style="list-style-type: none"> • ON • OFF 	<p>Indicates the status of stop/start system operation.</p> <ul style="list-style-type: none"> • ON: Stop/start system ON. (Engine stopped) • OFF: Stop/start system is OFF. (Engine restart or running) <p>For detail of Stop/Start status indicator function, refer to EC4-78, "STOP/START SYSTEM : System Description".</p>
Stop/Start warning indicator	<p style="text-align: center; font-size: 2em; font-weight: bold;">Start / Stop</p>  <p style="text-align: right; font-size: small;">JSBIA4032GB</p> <p>Message: System fault</p>	<p>Indicates the message when a malfunction is detected in stop/start system.</p> <p>For detail of Stop/Start warning indicator function, refer to EC4-78, "STOP/START SYSTEM : System Description".</p>

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SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

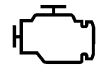

Item	Symbol	Function
Stop/Start guidance indicator	<h2 style="margin: 0;">Start / Stop</h2>  <p style="text-align: right; font-size: small;">JSBIA4030GB</p>	<p>Indicates the message when the driver performs a dangerous operation shown below:</p> <ul style="list-style-type: none"> • Hood is opened. <p>For detail of Stop/Start guidance indicator function, refer to EC4-78, "STOP/START SYSTEM : System Description".</p>
	Message: Not available	<h2 style="margin: 0;">Start / Stop</h2>  <p style="text-align: right; font-size: small;">JSBIA4031GB</p>
Fuel filler cap warning	 <p style="text-align: right; font-size: small;">JSBIA3176GB</p>	<p>For detail of Fuel filler cap warning system, refer to EC4-91, "FUEL FILLER CAP WARNING SYSTEM : System Description".</p>
	Message: Loose Fuel Cap	

WARNING/INDICATOR/CHIME LIST

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

INFOID:000000013289806

Regarding the arrangement. Refer to [MWI-9, "METER SYSTEM : Design"](#).

Item	Design	Reference
Malfunction indicator lamp (MIL)		For function, refer to MWI-35, "WARNING LAMPS/INDICATOR LAMPS : Malfunction Indicator Lamp (MIL)" .
Stop/Start indicator lamp		For function, refer to MWI-48, "WARNING LAMPS/INDICATOR LAMPS : Stop/Start Indicator Lamp" .

SYSTEM

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

WARNING/INDICATOR/CHIME LIST : Warning Chime

INFOID:000000013289807

Item	Reference
Stop/Start warning	Refer to WCS-20. "WARNING CHIME : Stop/Start warning" .

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

INFOID:000000013289808

Item	Reference
ASCD indicator	Refer to EC4-93. "INFORMATION DISPLAY (COMBINATION METER) : Indicator/Information" .
Stop/Start status indicator	Refer to EC4-93. "INFORMATION DISPLAY (COMBINATION METER) : Indicator/Information" .
Stop/Start warning indicator	Refer to EC4-93. "INFORMATION DISPLAY (COMBINATION METER) : Indicator/Information" .
Fuel filler cap warning	Refer to EC4-93. "INFORMATION DISPLAY (COMBINATION METER) : Indicator/Information" .

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CAN COMMUNICATION

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CAN COMMUNICATION : System Description

INFOID:000000013289809

DESCRIPTION

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- 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.
- This vehicle has two CAN communication. One is CAN communication, the other is Drivetrain CAN communication. ECM includes a gateway function and communicates signals between the CAN communication circuit and Drivetrain CAN communication circuit.
Drivetrain CAN communication circuit connects the following ECU:
 - ECM
 - TCM
 - Electric oil pump
 - A/T shift selector
 - Resistor

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OPERATION

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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

INFOID:000000013289810

INFORMATION

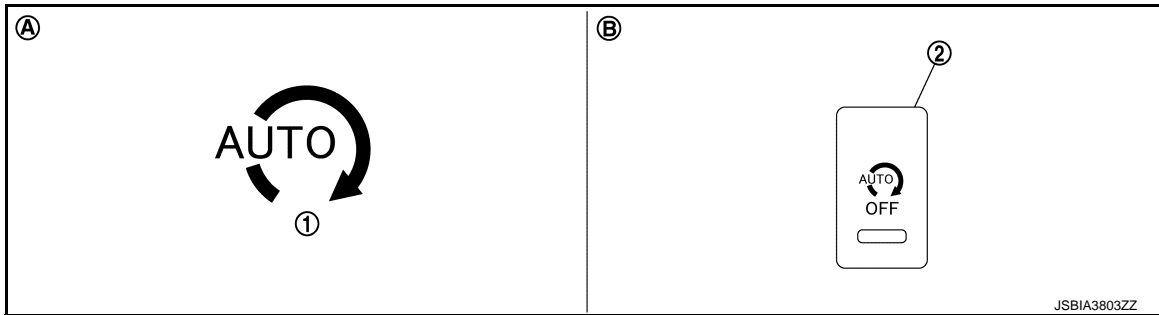
For details of ASCD steering switch, refer to [CCS-177, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\) : Switch Name and Function"](#).

STOP/START SYSTEM

STOP/START SYSTEM : Switch Name and Function

INFOID:000000013289812

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, LED turns ON and the stop/start system can be deactivated.

HANDLING PRECAUTION

Precaution for Stop/Start System

INFOID:000000013289813

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 [EC4-78, "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.
- 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

- 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.

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

ECM

ECM : Diagnosis Description

INFOID:000000013289814

DESCRIPTION

An OBD (on-board diagnosis) system of the second generation uses OBD II. In Europe, the OBD II, with appropriate adaptation for the European market, is called European On-Board Diagnosis (EOBD).

The OBD system is integrated in the ECM and constantly monitors all emissions-relevant components and systems of the vehicle.

The OBD has the following tasks:

- Monitor emissions- relevant components and systems while traveling
- Identify and store malfunctions
- Display of malfunctions via the engine diagnosis indicator lamp (Malfunction Indicator Lamp)
- Detected faults are transmitted over a uniform interface (diagnostic connector) to a diagnostic unit (e.g. CONSULT)

OBD follows the list as below:

- Ensuring permanently low exhaust emissions
- Protect components at risk (such as catalytic converters) against backfires

The following components and systems are monitored:

- Catalytic converter heating
- Smooth running analysis (recognition of combustion misfire)
- Oxygen sensors
- Purge control
- Smooth running control
- Other components which related to emission or which can cause malfunction in the diagnosis of other components.
- Efficiency of the CAT (catalytic converter function)

FUNCTION SEQUENCE FOR ON-BOARD DIAGNOSIS (OBD)

Function Sequence for Fault Detection

The ECM checks itself and its input and output signals for accuracy and detects possible malfunctions.

Malfunctions and the way they are stored are classified as follows:

- Malfunction permanently present
- Loose contact that occurred while driving

The following malfunctions are recognized in their frequency and duration:

- Signals above or below a limit value (for example, open circuit, short circuit, sensor malfunction)
- Illogical combination of various signals
- Closed-loop control circuit (e.g. lambda control) at lower or upper limit of regulation interval
- Malfunctions in function chains (faulty test processes, e.g. for purging)
- Malfunction messages via the CAN data buses

Function Sequence for Test Procedure

The component testing and function chain testing are differentiated on test procedures.

Component test

- Component testing is direct testing of a component. It includes:
 - Monitoring of the power supply and electric circuits
 - Comparison of the sensor signals with other sensor signals and stored comparative values
- The following three test results can occur:
 - Signal present (test passed)
 - Signal not present (malfunction)
 - Signal present, but implausible (malfunction)

Function chain test

- The function chain test is indirect testing of the effect of a controlled change.

In this process individual components and systems are checked which cannot be tested by means of component testing.

The function chain is a controlled process studying cause and effect.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

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The ECM controls one or more components (cause) and evaluates the resulting sensor signals (effect). In the process the ECM compares the sensor signals with stored comparative values and thus recognizes trouble-free or faulty functioning of components and systems.

- The following are monitored by means of function chain tests:
 - Self adaptation of mixture formation
 - Smooth running analysis (recognition of combustion misfire)
 - Catalytic converter function
 - Oxygen sensor (aging and regulation)
 - Oxygen sensor heater
 - Purge control

Function Sequence for Cyclic Monitoring

Cyclic monitoring takes place for components and system which are not permanently active. Regeneration, for example, only takes place when the vehicle is being operated in partial-load range and can therefore only be monitored during this operating phase.

The following components and systems are monitored cyclically:

- Catalytic converter function
- Catalytic converter heating
- Oxygen sensor (aging and regulation)
- Oxygen sensor heater
- Purge control

Function Sequence for Continuous Monitoring

Continuous monitoring means constant monitoring from engine start up to "ignition OFF".

The following components and systems are monitored continuously:

- Smooth running analysis (recognition of combustion misfire)
- Self adaptation of mixture formation

Function Sequence for Readiness Code

In order to gain reliable information as to the trouble-free status of cyclically monitored components and systems when reading out the malfunctioning memory, these components and systems must be test ready.

The test readiness of a component or a system is shown by the readiness code. The readiness code indicates whether the malfunction detecting test is performed at least once or the component or the system is activated. Test readiness is checked at least once per driving cycle. If test readiness exists, the readiness code is set. In order to set the components of the system at least once.

The test result is not significant in setting the readiness code. This means that it is also set if a fault in the system or the component is found.

The readiness code is set for the following components and systems once they are tested:

- Catalytic converter function
- Catalytic converter heating
- Oxygen sensor (aging and regulation)
- Oxygen sensor heater
- Purge control

If test readiness does not exist for individual systems or components, it can be established using the diagnostic unit (e.g. CONSULT). To do this the function chain process is started manually using a menu item in the diagnostic software.

NOTE:

All readiness codes are reset automatically when the error code is deleted.

Function Sequence for Fault Storage

Emissions-relevant malfunctions just found from the current and previous driving cycle are temporarily stored in the OBD until confirmed (through occurrence in two consecutive driving cycles) in the form of a error code, also called a DTC (diagnostic trouble code).

When an established fault occurs in two consecutive driving cycles the error code is stored in the malfunctioning memory of the ECM after ending the second driving cycle.

Driving cycle

- A driving cycle consists of an engine start, vehicle journey and stopping the engine, whereby an increase in coolant temperature by at least 22°C (71°F) up to at least 70°C (158°F) must occur during travel.

Function Sequence for Avoiding Consequential Faults

When a error signal is detected and shorted, all tests where this signal is required as a reference parameter are aborted (interlock). This prevents consequential errors from being stored.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Function Sequence for Saving the Error Freeze Frame Data

Besides the malfunctions, the operating conditions under which they occur are also stored (error freeze frame data).

When the malfunction occurs second time, the associated error freeze frame data is stored again. When the malfunction continues to occur then the last stored error freeze frame data from the first and last occurrence of a malfunction can be read out.

For error freeze frame data items, refer to [EC4-101, "CONSULT Function"](#).

Function Sequence for Fault Display

MIL (Malfunction Indicator Lamp) in the instrument cluster is actuated by the ECM via CAN communication.

When a malfunction occurs in two driving cycles, one after the other, MIL lights up.

In case of catalytic converter damage is caused by ignition misfires, MIL flashes during (remaining) driving cycle.

Fault message by means of MIL cases automatically after 3 consecutive trouble-free driving cycles.

Function sequence for Reading Out Fault Memory

Stored error codes and their error freeze frame data as well as the readiness codes can be read out with the ignition ON or engine running using CONSULT or a commercially available diagnosis tool.

Function Sequence for Erasing Faults

The system automatically clear any stored malfunctions from the fault memory only after 40 consecutive trouble-free driving cycles have occurred. They can, however, also be deleted (after repair work has been done) using commercially available diagnostic equipment or the CONSULT.

EMCM

EMCM : Diagnosis Description

INFOID:000000013289815

This system is an on-board diagnostic system that detects a malfunction automatically. A malfunction is stored in ECU memory as a DTC. The diagnostic information can be obtained with CONSULT.

After the detection of a malfunction and storing of DTC by EMCM, if a different malfunction is detected, multiple DTCs can be identified.

DTC is deleted when the self-diagnostic result is deleted.

EMCM : Counter System

INFOID:000000013289816

In this system, "ignition switch is turned OFF⇒ON" is defined as 1 trip. EMCM detects malfunctions while saving the DTC and continues saving this data for a maximum of 40 trips. In addition, if a DTC that is the same as the saved DTC is detected again, the counter is reset and the count up starts from "0" again.

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Description

INFOID:000000013289817

This system is an on-board diagnostic system that detects a malfunction automatically. A malfunction is stored in ECU memory as a DTC. The diagnostic information can be obtained with CONSULT.

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (ECM)

CONSULT Function

INFOID:000000013289818

FUNCTION

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Diagnostic test mode	Function
ECU Identification	ECM part number can be read.
Self Diagnostic Result	Self-diagnostic results can be read and erased.
Data Monitor	Input/Output data in 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.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from ECM and also shifts some parameters in a specified range.
Configuration	Vehicle configuration can be set.

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SELF DIAGNOSTIC RESULT MODE

Self Diagnostic Item

Regarding items of DTC, refer to [EC4-146. "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.

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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.

Freeze Frame Data Item List

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
FILL LV ACTIVATD CHARCOAL FILTR (LAST)	Fill level activated charcoal filter (last)	—	—
SPECIFIED ENGINE TORQUE (LAST)	Specified engine torque (last)	%	—
INDICATED ENGINE TORQUE (LAST)	Indicated engine torque (last)	%	—
COOLANT TEMP SENSOR SIGNAL 1 (LAST)	Coolant temperature sensor signal 1 (last)	°C	—
TORQUE REQUEST (LAST)	Torque request (last)	—	—
ACCEL PEDAL SENSOR SUPPLY VOLTAGE 1	Accelerator pedal sensor supply voltage 1	V	—
CAN BUS STATUS (VDC) (LAST)	Controller area network bus status (vehicle dynamics control) (last)	—	—
AMBIENT PRESSURE (LAST)	Ambient pressure (last)	hPa	—
ENGINE START TEMPERATURE SIGNAL 1	Engine start temperature signal 1	°C	—
IGN ANGL OUTPT: ACTUAL CRNT GIVEN ANGL 1	Ignition angle output: actual in the current liner given angle 1	°	—
INTAKE PIPE ABSOLUTE PRESSURE 1	Intake pipe absolute pressure 1	hPa	—
COOLANT TEMP SENSOR SIG 1 (LAST)	Coolant temperature sensor signal 2 (last)	°C	—

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DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
ENGINE START TEMPERATURE SIGNAL 2	Engine start temperature signal 2	°C	—
EXH VALVE CLOSE ANGLE IN RELATION TO LWOT 1	Exhaust valve close angle in relation to LWOT 1	°	—
EXH VALVE CLOSE ANGLE IN RELATION TO LWOT 2	Exhaust valve close angle in relation to LWOT 2	°	—
EXHAUST VALVE CLOSE ANGLE 1 (NOMINAL)	Exhaust valve close angle 1 (nominal)	°	—
ENGINE OIL TEMPERATURE SENSOR (LAST)	Engine oil temperature sensor (last)	°C	—
INT VALVE OPEN ANGLE IN RELATION TO LWOT 1	Intake valve open angle in relation to LWOT 1	°	—
EXHAUST VALVE CLOSE ANGLE 2 (NOMINAL)	Exhaust valve close angle 2 (nominal)	°	—
IGN CYCL CNTR? DELETE CNTR? --> DFES CTDEL	Ignition cycle counter? delete counter? --> DFES CTDEL	—	—
CAN BUS STATUS (SCCM) (LAST)	Controller area network bus status (SCCM) (last)	—	—
INT VALVE OPEN ANGLE IN RELATION TO LWOT 2	Intake valve open angle in relation to LWOT 2	°	—
EXH CAMSHAFT OPEN ANGLE 1 (NOMINAL)	Exhaust camshaft open angle 1 (nominal)	°	—
CAN BUS STATUS (SCR) (LAST)	Controller area network bus status (selective catalytic reduction) (last)	—	—
INTAKE PIPE ABSOLUTE PRESSURE 2	Intake pipe absolute pressure 2	hPa	—
EXH CAMSHAFT OPEN ANGLE 2 (NOMINAL)	Exhaust camshaft open angle 2 (nominal)	°	—
FUEL PRESSURE IN FUNCTION MONITORING 1	Fuel pressure in function monitoring 1	MPa	—
ENGINE OIL TEMPERATURE (LAST)	Engine oil temperature (last)	°C	—
PRESSURE SENSOR D/STRM THRTL SIG V (LAST)	Pressure sensor downstream throttle signal voltage (last)	kPa	—
INTAKE PIPE ABSOLUTE PRESSURE 3	Intake pipe absolute pressure 3	hPa	—
CAN BUS STATUS (VGS) (LAST)	Controller area network bus status (VGS) (last)	—	—
FUEL PUMP ON/OFF RATIO (LAST)	Fuel pump on/off ratio (last)	%	—
CAN BUS STATUS [ETC (EGS)] (LAST)	Controller area network bus status [ETC (EGS)] (last)	—	—
FUEL PRESSURE IN FUNCTION MONITORING 2	FUEL PRESSURE IN FUNCTION MONITORING 2	MPa	—
FUEL TANK VENTILT N VLV CURRNT DUTY CYCLE 1	Fuel tank ventilation valve current duty cycle 1	%	—
CAN BUS STATUS [ESM (EWM), ISM] (LAST)	Controller area network bus status [ESM (EWM), ISM] (last)	—	—
AMBIENT TEMPERATURE (LAST)	Ambient temperature (last)	°C	—
IGN ANGL OUTPT: ACTUAL CRNT GIVEN ANGL 2	Ignition angle output: actual in the current liner given angle 2	°	—

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
CYL INDIVIDUAL ZW RETAR-DATN AVE BY KR 1	Cylinder individual ZW retardation average by KR 1	o	—
SPECIFIED ENGINE TORQUE (MAKV) (LAST)	Specified engine torque (MAKV) (last)	Nm	—
PRESSURE 1 IN FRONT OF THROTTLE (NOMINAL)	Pressure 1 in front of throttle (nominal)	hPa	—
PURGING SW/OVR VLV PWR CONSUMPTN (LAST)	Purging switchover valve power consumption (last)	mA	—
ENGINE START TEMPERATURE SIGNAL 3	Engine start temperature signal 3	°C	—
STOP/START SYS MALFUNCTION STATUS (LAST)	Stop/Start system malfunction status (last)	—	—
DMS INTERNAL ORDER OF ALL ENTRY HISTORY 1	DMS internal order of all entry history 1	—	—
PRESSURE 2 IN FRONT OF THROTTLE (NOMINAL)	Pressure 2 in front of throttle (nominal)	hPa	—
VEHICLE DISTANCE INFORMATION 1	Vehicle distance information 1	Km	—
ENGINE SPEED 1	Engine speed 1	1/min	—
ENGINE TEMPERATURE 1	Engine temperature 1	°C	—
ENVIRONMENTAL TEMPERATURE 1	Environmental temperature 1	°C	—
INTERFACE FOR MODE 01&02 VEHICLE SPEED 1	Interface for mode 01 and 02 vehicle speed 1	—	—
INTERFAC FOR OBD SERVICE F/ TANK FILL LEVEL 1	Interface for on-board diagnosis service fuel tank fill level 1	%	—
ELAPSED TIME FROM ENG ST/ DRIVELINE ACTIVE 1	Elapsed time from engine start/driveline active 1	s	—
MILEAGE WITH MIL ON 1	Mileage with malfunction indicator lamp on 1	Km	—
BATTERY VOLTAGE 1	Battery voltage 1	V	—
CAN BUS STATUS (BMS) (FIRST)	Controller area network bus status (BMS) (first)	—	—
FUEL TANK FILL LEVEL (FIRST)	Fuel tank fill level (first)	l	—
EGR ON/OFF RATIO (FIRST)	Exhaust gas recirculation on/off ratio (first)	%	—
RELATIVE AIR MASS (FIRST)	Relative air mass (first)	%	—
INTAKE AIR TEMPERATURE 1	Intake air temperature 1	°C	—
BDE-MODE DURING FUNCTIONAL CHECK 1	BDE-Mode during functional check 1	—	—
CAN BUS STATUS (BUS OFF) (FIRST)	Controller area network bus status (bus off) (first)	—	—
EGR ACTUATOR (FIRST)	Exhaust gas recirculation actuator (first)	%	—
EXH RELEVANT MISFIRES COUNTR OVR ALL CYL 1	Exhaust relevant misfires counter over all cylinder 1	—	—
AIR MASS (FIRST)	Air mass (first)	kg/h	—
SELF-ADJUSTMENT IN IDLE SPEED RANGE (FIRST)	Self-adjustment in idle speed range (first)	%	—

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DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
BDE OPER MODE INCLDNG DELIVERED STATES 1	BDE operating mode including delivered states 1	—	—
CAN BUS STATUS [CGW (ZGW)] (FIRST)	Controller area network bus status [CGW (ZGW)] (first)	—	—
COOLANT TEMPERATURE (RAW VALUE) (FIRST)	Coolant temperature (raw value) (first)	°C	—
EGR ACTUATOR (SPECIFIED VALUE) (FIRST)	Exhaust gas recirculation actuator (Specified value) (first)	%	—
MULTIPLICATIVE MIXTURE CORRECTION 1	Multiplicative mixture correction 1	—	—
O2-STORAGE CAPACITY OF CATH BANK (FIRST)	Oxygen-storage capacity of catalyst right bank (first)	—	—
CHARGE AIR TEMP SEN U/STRM THROTTLE (FIRST)	Charge air temperature sensor upstream throttle (first)	°C	—
THROTTLE VALVE FULLY CLOSED ANGLE 1	Throttle valve fully closed angle 1	%	—
MULTIPLICATIVE MIXTURE CORRECTION 2	Multiplicative mixture correction 2	—	—
CHARGE AIR TEMP SEN D/STRM THROTTLE (FIRST)	Charge air temperature sensor downstream throttle (first)	°C	—
MIXTURE ADAPTATION CORRECTION FACTOR (FIRST)	Mixture adaptation correction factor (first)	—	—
THROTTLE POSITION SENSOR (FIRST)	Throttle position sensor (first)	—	—
ENGINE OIL TEMPERATURE (FIRST)	Engine oil temperature (first)	°C	—
THROTTLE VALVE FULLY CLOSED ANGLE 2	Throttle valve fully closed angle 2	%	—
BDE OPER MODE INCLDNG DELIVERED STATES 2	BDE operating mode including delivered states 2	—	—
ENGINE TORQUE (FIRST)	Engine torque (first)	Nm	—
PRESSURE IN FRONT OF THROTTLE VALVE 1	Pressure in front of throttle valve 1	hPa	—
VOLTAGE DK-POTI A 1	Voltage DK-Poti A 1	V	—
VOLTAGE DK-POTI B 1	Voltage DK-Poti B 1	V	—
THROTTLE VALVE POSITION (FIRST)	Throttle valve position (first)	%	—
NUMBER OF INJECTIONS PER PWR STROKE REQ 1	Number of injections per power stroke requested 1	—	—
LAMBDA CONT U/STRM OF RH CATALYST (FIRST) 1	Lambda control upstream right catalyst (first) 1	—	—
LOW PRESSURE NOMINAL VALUE (ABSOLUTE) 1	Low pressure nominal value (absolute) 1	kPa	—
ENVIRONMENT SPEC DATA - THERMAL MANGMNT(1ST)	Environment specific data - thermal management (first)	—	—
DK-ANGLE NOMINAL VALUE IN 12 BIT 1 (FIRST)	DK-angle nominal value in 12 bit 1 (first)	%	—
CAN BUS STATUS (A/C COMP) (FIRST)	Controller area network bus status (air conditioner compressor) (first)	—	—
FAN ON/OFF RATIO (FIRST)	Fan on/off ratio (first)	%	—

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
ACCELERATOR PEDAL POSITION (FIRST)	Accelerator pedal position (first)	%	—
RELATIVE AIR CONTENT 1	Relative air content 1	%	—
THRMSTAT HEATNG ELMNT ON/OFF RATIO (1ST)	Thermostat heating element on/off ratio (first)	%	—
FUEL TEMPERATURE SENSOR (RAW VALUE) 1	Fuel temperature sensor (raw value) 1	°C	—
VOLTAGE PWG-POTI A 1	Voltage PWG-Poti A 1	V	—
CAN BUS STATUS (EZX) (FIRST)	Controller area network bus status (EZX) (first)	—	—
ADDITIVE MIXTUR CORRCTN1 - MIXTUR ADAPTATN	Additive mixture correction 1 - mixture adaptation	%	—
HDEV TEMPERATURE 1 (CALCULATED VALUE)	HDEV temperature 1 (calculated value)	°C	—
VOLTAGE PWG-POTI B 1	Voltage PWG-Poti B 1	V	—
MULTIPLICATIVE MIXTURE CORRECTION 3	Multiplicative mixture correction 3	—	—
RELATIVE AIR MASS (SPECIFIED VALUE) (FIRST)	Relative air mass (Specified value) (first)	%	—
GRILLE SHUTTER ON/OFF RATIO (FIRST)	Grille shutter on/off ratio (first)	%	—
FUEL TEMPERATURE (MODEL VALUE) 1	Fuel temperature (model value) 1	°C	—
FUEL TEMPERATURE IN RAIL (MODEL VALUE) 1	Fuel temperature in rail (model value) 1	°C	—
MULTIPLICATIVE MIXTURE CORRECTION 4	Multiplicative mixture correction 4	—	—
RELATIVE FUEL MASS (FIRST)	Relative fuel mass (first)	%	—
REQUEST FOR A/C (FIRST)	Request for air conditioning (first)	%	—
O2 SENSOR HEATER OUTPUT RH BANK (FIRST)	Oxygen sensor heater right bank (first)	%	—
CAN BUS STATUS (EFB) (FIRST)	Controller area network bus status (EFB) (first)	—	—
LOW PRESSURE NOMINAL VALUE (ABSOLUTE) 2	Low pressure nominal value (absolute) 2	kPa	—
RELATIVE FUEL MASS 1	Relative fuel mass 1	%	—
TM TEMPERATURE (NOMINAL) 1	TM temperature (nominal) 1	°C	—
CAN BUS STATUS (FPCM) (FIRST)	Controller area network bus status (fuel pump control module) (first)	—	—
VERIFIED ENVIRONMENTAL TEMP (METER) 1	Verified environmental temperature (meter) 1	°C	—
CAN BUS STATUS (AAC) (FIRST)	Controller area network bus status (AAC) (first)	—	—
FRP FILTERED NOMINAL VALUE (ABSOLUTE) 1	Fuel rail pressure filtered nominal value (absolute) 1	MPa	—
FRP UNFILTERED NOMINAL VALUE (ABSOLUTE) 1	Fuel rail pressure unfiltered nominal value (absolute) 1	MPa	—
RAIL PRESSURE REGULATION INDEX VALUE 1	Rail pressure regulation index value 1	MPa	—
DOWNTIME 1	Downtime 1	s	—

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DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
VERIFID/TEXTURD ENVIRN- MENTL TEMP (METER) 1	Verified and textured environmental temperature (meter) 1	°C	—
CAN BUS STATUS (IC) (FIRST)	Controller area network bus status (IC) (first)	—	—
MAX PERMISSIBLE ENGINE TORQUE 1	Maximum permissible engine torque 1	%	—
HDEV TEMPERATURE 2 (CALCU- LATED VALUE)	HDEV temperature 2 (calculated val- ue)	°C	—
FRP UNFILTERED NOMINAL VAL- UE (ABSOLUTE) 2	Fuel rail pressure unfiltered nominal value (absolute) 2	MPa	—
DOWNTIME 2	Downtime 2	s	—
FUEL TEMPERATURE SENSOR (RAW VALUE) 2	Fuel temperature sensor (raw value) 2	°C	—
SPECIFIED LAMBDA VALUE (FIRST)	Specified lambda value (first)	—	—
INDEXD RSLTNG NMNL MOMNT F/PATH BFR LMT 1	Indexed resulting nominal moment fuel path before limit 1	%	—
HDEV TEMPERATURE 3 (CALCU- LATED VALUE)	HDEV temperature 3 (calculated val- ue)	°C	—
LAMBDA CONT U/STRM OF RH CATALYST (FIRST) 2	Lambda control upstream right cata- lyst (first) 2	—	—
CALCULATED ALTERNATOR TORQUE (FIRST)	Calculated alternator torque (first)	Nm	—
RAIL PRESSURE REGULATOR OUTPUT VALUE 1	Rail pressure regulator output value 1	MPa	—
CAN BUS STATUS (NOX SEN- SOR) (FIRST)	Controller area network bus status (nitrogen oxide sensor) (first)	—	—
TORQUE REQUEST (FIRST)	Torque request (first)	—	—
AIR MASS FLOW RATE (FIRST)	Air mass flow rate (first)	kg/h	—
CAN BUS STATUS (AIR BAG) (FIRST)	Controller area network bus status (air bag) (first)	—	—
SPECIFIED IDLE SPEED (FIRST)	Specified idle speed (first)	1/min	—
FILL LV ACTIVATD CHARCOAL FILTR (FIRST)	Fill level activated charcoal filter (first)	—	—
SPECIFIED ENGINE TORQUE (FIRST)	Specified engine torque (first)	%	—
INDICATED ENGINE TORQUE (FIRST)	Indicated engine torque (first)	%	—
COOLANT TEMP SENSOR SIG- NAL 1 (FIRST)	Coolant temperature sensor signal 1 (first)	°C	—
ACCEL PEDAL SENSOR SUPPLY VOLTAGE 2	Accelerator pedal sensor supply volt- age 2	V	—
CAN BUS STATUS (VDC) (FIRST)	Controller area network bus status (vehicle dynamics control) (first)	—	—
AMBIENT PRESSURE (FIRST)	Ambient pressure (first)	hPa	—
ENGINE START TEMPERATURE SIGNAL 4	Engine start temperature signal 4	°C	—
IGN ANGL OUTPT: ACTUAL CRNT GIVEN ANGL 3	Ignition angle output: actual in the current liner given angle 3	°	—
INTAKE PIPE ABSOLUTE PRES- SURE 4	Intake pipe absolute pressure 4	hPa	—

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Item		Value (unit)		
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell	
COOLANT TEMP SENSOR SIGNAL 2 (FIRST)	Coolant temperature sensor signal 2 (first)	°C	—	A
ENGINE START TEMPERATURE SIGNAL 5	Engine start temperature signal 5	°C	—	EC4
EXH VALVE CLOSE ANGLE IN RELATION TO LWOT 3	Exhaust valve close angle in relation to LWOT 3	°	—	C
EXH VALVE CLOSE ANGLE IN RELATION TO LWOT 4	Exhaust valve close angle in relation to LWOT 4	°	—	D
EXHAUST CAMSHAFT CLOSES ANGLE (NOMINAL) 1	Exhaust camshaft closes angle (nominal) 1	°	—	E
ENGINE OIL TEMPERATURE SENSOR (FIRST)	Engine oil temperature sensor (first)	°C	—	E
INT VALVE OPEN ANGLE IN RELATION TO LWOT 3	Intake valve open angle in relation to LWOT 3	°	—	F
EXHAUST CAMSHAFT CLOSES ANGLE (NOMINAL) 2	Exhaust camshaft closes angle (nominal) 2	°	—	F
CAN BUS STATUS (SCCM) (FIRST)	Controller area network bus status (SCCM) (first)	—	—	G
INT VALVE OPEN ANGLE IN RELATION TO LWOT 4	Intake valve open angle in relation to LWOT 4	°	—	H
EXHAUST CAMSHAFT OPENS ANGLE (NOMINAL) 1	Exhaust camshaft opens angle (nominal) 1	°	—	H
CAN BUS STATUS (SCR) (FIRST)	Controller area network bus status (selective catalytic reduction) (first)	—	—	I
INTAKE PIPE ABSOLUTE PRESSURE 5	Intake pipe absolute pressure 5	hPa	—	J
EXHAUST CAMSHAFT OPENS ANGLE (NOMINAL) 2	Exhaust camshaft opens angle (nominal) 2	°	—	J
FUEL PRESSURE IN FUNCTION MONITORING 3	Fuel pressure in function monitoring 3	MPa	—	K
PRESSURE SENSOR D/STRM THRTL SIG V (FIRST)	Pressure sensor downstream throttle signal voltage (first)	kPa	—	L
INTAKE PIPE PRESSURE (NOMINAL)	Intake pipe pressure (nominal)	hPa	—	L
CAN BUS STATUS (VGS) (FIRST)	Controller area network bus status (VGS) (first)	—	—	M
FUEL PUMP ON/OFF RATIO (FIRST)	Fuel pump on/off ratio (first)	%	—	M
CAN BUS STATUS [ETC (EGS)] (FIRST)	Controller area network bus status [ETC (EGS)] (first)	—	—	N
FUEL PRESSURE IN FUNCTION MONITORING 4	Fuel pressure in function monitoring 4	MPa	—	O
FUEL TANK VENTILTN VLV CURRENT DUTY CYCLE 2	Fuel tank ventilation valve current duty cycle 2	%	—	O
CAN BUS STATUS [ESM (EWM), ISM] (FIRST)	Controller area network bus status [ESM (EWM), ISM] (first)	—	—	P
AMBIENT TEMPERATURE (FIRST)	Ambient temperature (first)	°C	—	
IGN ANGL OUTPT: ACTUAL CRNT GIVEN ANGL 4	Ignition angle output: actual in the current liner given angle 4	°	—	
CYL INDIVIDUAL ZW RETARDATN AVE BY KR 2	Cylinder individual ZW retardation average by KR 2	°	—	

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
ENHANCED DTC INFORMATION	Enhanced diagnosis trouble code information	—	—
SPECIFIED ENGINE TORQUE (MAKV) (FIRST)	Specified engine torque (MAKV) (first)	Nm	—
NOMINAL PRESS IN FRONT OF THROTTLE VALVE 1	Nominal pressure in front of throttle valve 1	hPa	—
PURGING SW/OVR VLV PWR CONSUMPTN (FIRST)	Purging switchover valve power consumption (first)	mA	—
ENGINE START TEMPERATURE SIGNAL 6	Engine start temperature signal 6	°C	—
STOP/START SYS MALFUNCTION STATUS (FIRST)	Stop/Start system malfunction status (first)	—	—
VEHICLE DISTANCE INFORMATION 2	Vehicle distance information 2	Km	—
NOMINAL PRESS IN FRONT OF THROTTLE VALVE 2	Nominal pressure in front of throttle valve 2	hPa	—
VEHICLE DISTANCE INFORMATION 3	Vehicle distance information 3	Km	—
ENGINE SPEED 2	Engine speed 2	1/min	—
ENGINE TEMPERATURE 2	Engine temperature 2	°C	—
ENVIRONMENTAL TEMPERATURE 2	Environmental temperature 2	°C	—
INTERFACE FOR MODE 01&02 VEHICLE SPEED 2	Interface for mode 01 and 02 vehicle speed 2	—	—
INTERFAC FOR OBD SERVICE F/ TANK FILL LEVEL 2	Interface for on-board diagnosis service fuel tank fill level 2	%	—
ELAPSED TIME FROM ENG ST/ DRIVELINE ACTIVE 2	Elapsed time from engine start/driveline active 2	s	—
MILEAGE WITH MIL ON 2	Mileage with malfunction indicator lamp on 2	Km	—
BATTERY VOLTAGE 2	Battery voltage 2	V	—
CAN BUS STATUS (BMS) (LAST)	Controller area network bus status (BMS) (last)	—	—
FUEL TANK FILL LEVEL (LAST)	Fuel tank fill level (last)	l	—
EGR ON/OFF RATIO (LAST)	Exhaust gas recirculation on/off ratio (last)	%	—
RELATIVE AIR MASS (LAST)	Relative air mass (last)	%	—
INTAKE AIR TEMPERATURE 2	Intake air temperature 2	°C	—
VEHICLE DISTANCE INFORMATION 4	Vehicle distance information 4	Km	—
BDE-MODE DURING FUNCTIONAL CHECK 2	BDE-Mode during functional check 2	—	—
CAN BUS STATUS (BUS OFF) (LAST)	Controller area network bus status (bus off) (last)	—	—
EGR ACTUATOR (LAST)	Exhaust gas recirculation actuator (last)	%	—
EXH RELEVANT MISFIRES COUNTR OVR ALL CYL 2	Exhaust relevant misfires counter over all cylinder 2	—	—
AIR MASS (LAST)	Air mass (last)	kg/h	—

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
SELF-ADJUSTMENT IN IDLE SPEED RANGE (LAST)	Self-adjustment in idle speed range (last)	%	—
BDE OPER MODE INCLDNG DELIVERED STATES 3	BDE operating mode including delivered states 3	—	—
CAN BUS STATUS [CGW (ZGW)] (LAST)	Controller area network bus status [CGW (ZGW)] (last)	—	—
COOLANT TEMPERATURE (RAW VALUE) (LAST)	Coolant temperature (raw value) (last)	°C	—
EGR ACTUATOR (SPECIFIED VALUE) (LAST)	Exhaust gas recirculation actuator (Specified value) (last)	%	—
MULTIPLICATIVE MIXTURE CORRECTION 5	Multiplicative mixture correction 5	—	—
O2-STORAGE CAPACITY OF CATH BANK (LAST)	Oxygen-storage capacity of catalyst right bank (last)	—	—
CHARGE AIR TEMP SEN U/STRM THROTTLE (LAST)	Charge air temperature sensor upstream throttle (last)	°C	—
THROTTLE VALVE FULLY CLOSED ANGLE 3	Throttle valve fully closed angle 3	%	—
MULTIPLICATIVE MIXTURE CORRECTION 6	Multiplicative mixture correction 6	—	—
CHARGE AIR TEMP SEN D/STRM THROTTLE (LAST)	Charge air temperature sensor downstream throttle (last)	°C	—
MIXTURE ADAPTATION CORRECTION FACTOR (LAST)	Mixture adaptation correction factor (last)	—	—
THROTTLE POSITION SENSOR (LAST)	Throttle position sensor (last)	—	—
THROTTLE VALVE FULLY CLOSED ANGLE 4	Throttle valve fully closed angle 4	%	—
BDE OPER MODE INCLDNG DELIVERED STATES 4	BDE operating mode including delivered states 4	—	—
ENGINE TORQUE (LAST)	Engine torque (last)	Nm	—
PRESSURE IN FRONT OF THROTTLE VALVE 2	PRESSURE IN FRONT OF THROTTLE VALVE 2	hPa	—
VOLTAGE DK-POTI A 2	Voltage DK-Poti A	V	—
VOLTAGE DK-POTI B 2	Voltage DK-Poti B 2	V	—
THROTTLE VALVE POSITION (LAST)	Throttle valve position (last)	%	—
NUMBER OF INJECTIONS PER POWER STROKE REQ 2	Number of injections per power stroke requested 2	—	—
LAMBDA CONTROL UPSTREAM OF RIGHT CATALYST (LAST) 1	Lambda control upstream right catalyst (last) 1	—	—
LOW PRESSURE NOMINAL VALUE (ABSOLUTE) 3	Low pressure nominal value (absolute) 3	kPa	—
ENVIRONMENT SPECIFIC DATA - THERMAL MANAGEMENT (LAST)	Environment specific data - thermal management (last)	—	—
DK-ANGLE NOMINAL VALUE IN 12 BIT 2 (FIRST)	DK-angle nominal value in 12 bit 2 (first)	%	—
CAN BUS STATUS (A/C COMP) (LAST)	Controller area network bus status (air conditioner compressor) (last)	—	—
FAN ON/OFF RATIO (LAST)	Fan on/off ratio (last)	%	—

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DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
ACCELERATOR PEDAL POSITION (LAST)	Accelerator pedal position (last)	%	—
RELATIVE AIR CONTENT 2	Relative air content 2	%	—
THRMSTAT HEATNG ELMNT ON/OFF RATIO (LAST)	Thermostat heating element on/off ratio (last)	%	—
FUEL TEMPERATURE SENSOR (RAW VALUE) 3	Fuel temperature sensor (raw value) 3	°C	—
VOLTAGE PWG-POTI A 2	Voltage PWG-Poti A 2	V	—
CAN BUS STATUS (EZX) (LAST)	Controller area network bus status (EZX) (last)	—	—
ADDITIVE MIXTUR CORRCTN2 - MIXTUR ADAPTATN	Additive mixture correction 2 - mixture adaptation	%	—
HDEV TEMPERATURE 4 (CALCULATED VALUE)	HDEV temperature 4 (calculated value)	°C	—
VOLTAGE PWG-POTI B 2	Voltage PWG-Poti B 2	V	—
MULTIPLICATIVE MIXTURE CORRECTION 7	Multiplicative mixture correction 7	—	—
RELATIVE AIR MASS (SPECIFIED VALUE) (LAST)	Relative air mass (Specified value) (last)	%	—
GRILLE SHUTTER ON/OFF RATIO (LAST)	Grille shutter on/off ratio (last)	%	—
FUEL TEMPERATURE (MODEL VALUE) 2	Fuel temperature (model value) 2	°C	—
FUEL TEMPERATURE IN RAIL (MODEL VALUE) 2	Fuel temperature in rail (model value) 2	°C	—
MULTIPLICATIVE MIXTURE CORRECTION 8	Multiplicative mixture correction 8	—	—
RELATIVE FUEL MASS (LAST)	Relative fuel mass (last)	%	—
REQUEST FOR A/C (LAST)	Request for air conditioning (last)	%	—
O2 SENSOR HEATER OUTPUT RH BANK (LAST)	Oxygen sensor heater right bank (last)	%	—
CAN BUS STATUS (EFB) (LAST)	Controller area network bus status (EFB) (last)	—	—
LOW PRESSURE NOMINAL VALUE (ABSOLUTE) 4	Low pressure nominal value (absolute) 4	kPa	—
RELATIVE FUEL MASS 2	Relative fuel mass 2	%	—
TM TEMPERATURE (NOMINAL) 2	TM temperature (nominal) 2	°C	—
CAN BUS STATUS (FPCM) (LAST)	Controller area network bus status (fuel pump control module) (last)	—	—
VERIFIED ENVIRONMENTAL TEMP (METER) 2	Verified environmental temperature (meter) 2	°C	—
CAN BUS STATUS (AAC) (LAST)	Controller area network bus status (AAC) (last)	—	—
FRP FILTERED NOMINAL VALUE (ABSOLUTE) 2	Fuel rail pressure filtered nominal value (absolute) 2	MPa	—
FRP UNFILTERED NOMINAL VALUE (ABSOLUTE) 3	Fuel rail pressure unfiltered nominal value (absolute) 3	MPa	—
RAIL PRESSURE REGULATION INDEX VALUE 2	Rail pressure regulation index value 2	MPa	—
DOWNTIME 3	Downtime 3	s	—

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
VERIFID/TEXTURD ENVIRN- MENTL TEMP (METER) 2	Verified and textured environmental temperature (meter) 2	°C	—
CAN BUS STATUS (IC) (LAST)	Controller area network bus status (IC) (last)	—	—
MAX PERMISSIBLE ENGINE TORQUE 2	Maximum permissible engine torque 2	%	—
HDEV TEMPERATURE 5 (CALCU- LATED VALUE)	HDEV temperature 5 (calculated val- ue)	°C	—
FRP UNFILTERED NOMINAL VAL- UE (ABSOLUTE) 4	Fuel rail pressure unfiltered nominal value (absolute) 4	MPa	—
DOWNTIME 4	Downtime 4	s	—
FUEL TEMPERATURE SENSOR (RAW VALUE) 4	Fuel temperature sensor (raw value) 4	°C	—
SPECIFIED LAMBDA VALUE (LAST)	Specified lambda value (last)	—	—
INDEXD RSLTNG NMNL MOMNT F/PATH BFR LMT 2	Indexed resulting nominal moment fuel path before limit 2	%	—
HDEV TEMPERATURE 6 (CALCU- LATED VALUE)	HDEV temperature 6 (calculated val- ue)	°C	—
DFES FREQUENCY COUNTER	DFES frequency counter	—	—
LAMBDA CONT U/STRM OF RH CATALYST (LAST) 2	Lambda control upstream right cata- lyst (last) 2	—	—
CALCULATED ALTERNATOR TORQUE (LAST)	Calculated alternator torque (last)	Nm	—
RAIL PRESSURE REGULATOR OUTPUT VALUE 2	Rail pressure regulator output value 2	MPa	—
CAN BUS STATUS (NOX SEN- SOR) (LAST)	Controller area network bus status (nitrogen oxide sensor) (last)	—	—
AIR MASS FLOW RATE (LAST)	Air mass flow rate (last)	kg/h	—
CAN BUS STATUS (AIR BAG) (LAST)	Controller area network bus status (air bag) (last)	—	—
SPECIFIED IDLE SPEED (LAST)	Specified idle speed (last)	1/min	—

DATA MONITOR MODE

NOTE:

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

Monitored Item

For reference values of the following items, refer to [EC4-124, "Reference Value"](#).

Monitor item	Unit	Remarks
SELF-ADJ IN IDLE RANGE	%	Self-adjustment in idle speed range
CANISTER SHUTOFF VALVE	Close/OPEN	Canister shutoff valve
GEAR RANGE ENGAGED	P/N/ R/ 1/2/3/4/5/6/7/ NO PWR/ FAULT	Gear range engaged
IDLE SPEED INCREASE	1/min	Idle speed increase
C/AIR TEMP/S U/STRM THRTL	°C	Charge air temperature sensor upstream throttle
C/AIR TEMP/S D/STRM THRTL	°C	Charge air temperature sensor downstream throttle

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Monitor item	Unit	Remarks
C/AIR TEMP/S U/STRM THL V	V	Charge air temperature sensor upstream throttle voltage
C/AIR TEMP/S D/STRM THL V	V	Charge air temperature sensor downstream throttle voltage
AMBIENT TEMP (CAN)	°C	Ambient temperature (controller area network)
BATTERY VOLTAGE	V	Power consumption pressure regulating valve
CHARCOAL FILTR FILL LEVEL	—	Charcoal filter fill level
STOP LAMP SWITCH	NOT ACT/ ACTIVE	Stop lamp switch
BRAKE PEDAL	NOT ACT/ ACTUAT	Brake pedal
THRMST HEAT ELMNT DUTY	%	Thermostat heating element duty
THROTTLE VALVE ACTUATOR	YET/DONE	Throttle valve actuator
BRAKE FLAP LEARN FINISHED	No/Yes	Brake flap learning finished
THRTL VALVE ACTUATOR1 V	V	Throttle valve actuator1 voltage
THRTL VALVE ACTUATOR2 V	V	Throttle valve actuator2 voltage
THROTTLE VALVE POSITION	GRAD	Throttle valve position
PRS SEN D/STRM AIR FILTR V	V	Pressure sensor downstream air filter voltage
PRESSURE D/STRM AIR FILTR	hPa	pressure downstream air filter
EXCITATION CURRENT	A	Excitation current
INJECTION TIME RIGHT	ms	Injection time right
MASS AIR FLOW CRRCTN VAL	kg/h	Mass air flow correction value
MIXTUR ADAPT IN/MANI PRES	hPa	Mixture adaptation intake manifold pressure
KNOCK CONTROL ENABLE	No/Yes	Knock control enable
SEN ROTOR ADAPT CMLPT	YES/ INVALID/ NO	Sensor rotor adaptation complete
SEN ROTOR ADAPT STATUS	NOT ACT	Sensor rotor adaptation status
PRESS D/STRM THRTL VALV	hPa	Pressure downstream throttle valve
ELECTRICAL FAULT IN ALT	No/Yes	Electrical fault in alternator
MECH FAULT IN ALTRNATR	No/Yes	Mechanical fault in alternator
ALTERNATOR ID	—	Alternator ID
O2 SENSOR HEATER STATUS	%	Oxygen sensor heater status
RAIL PRES (SPECIFIED VALU)	MPa	Rail pressure (specified value)
NORMAL MODE	NOT ACT/ ACTIVE	Normal mode
OVERHEATING PROTECTION	NOT ACT/ ACTIVE	Overheating protection
UNIFORMTY OF LAMBDA CNT	—	Uniformity of lambda control
START ENABLE CL PDL SW	Off/On	Start enable clutch pedal switch
CYL1 FUEL INJ SUPPLY PWR	mAs	Cyl1 fuel injector supply power
CYL2 FUEL INJ SUPPLY PWR	mAs	Cyl2 fuel injector supply power
CYL3 FUEL INJ SUPPLY PWR	mAs	Cyl3 fuel injector supply power
CYL4 FUEL INJ SUPPLY PWR	mAs	Cyl4 fuel injector supply power
EXH TEMP RH CAT CONVRTR	°C	Exhaust temperature right catalytic converter
KICKDOWN	NOT ACT/ ACTIVE	Kickdown
STATUS OF CIRCUIT	NOT ACT/ ACTIVE	Status of circuit

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Monitor item	Unit	Remarks
Actuation of component "Compressor"	%	Actuation of compressor
AIR CONDITIONER STATUS	NOT ACT/ ACTIVE/Reduced/ SIGNAL NOT FOUND	Air conditioner status
KNOCKING COMBUSTION	Not detected/ DETCTD	Knocking combustion
CRRCTN FACTR MAF	—	Correction factor mass air flow
GRILL SHUTTER POSI (TEST)	%	Grill shutter actuator position (test)
GRILL SHUTTER POSITION	%	Grill shutter actuator position
COOLANT TEMPERATURE	°C	Coolant temperature
CLNT PMP SWOVR VLV	%	Coolant pump switchover valve
COOLANT TEMP SENSOR V	V	Coolant temperature sensor voltage
CLUTCH PEDAL SWITCH	NOT ACT/ ACTUAT	Clutch pedal switch
ENGINE SPEED	1/min	Engine speed
PRESS U/STRM THRTL VALV	hPa	Pressure upstream throttle valve
PRS SEN U/STRM THRTL VLV	V	Pressure sensor upstream throttle valve
LAMDA CONT U/STRM CAT	—	Lambda control upstream catalyst
LAMDA CONT D/STRM CAT	—	Lambda control downstream catalyst
ENGINE LOAD	%	Engine load
SMOOTH OPR OF CYL 1	(rev/s) ²	Smooth operation of cylinder 1
SMOOTH OPR OF CYL 2	(rev/s) ²	Smooth operation of cylinder 2
SMOOTH OPR OF CYL 3	(rev/s) ²	Smooth operation of cylinder 3
SMOOTH OPR OF CYL 4	(rev/s) ²	Smooth operation of cylinder 4
IDLE RECOGNITION	Not detected/ DETCTD	Idle recognition
IDLE RPM (NOMINAL)	1/min	Idle revolutions per minute (nominal)
PURGING SWOVR VLV DUTY	%	Purging switchover valve duty
FAN SPEED REQUEST (A/C)	%	Fan speed request (air conditioner)
FAN RUN-ON	NOT ACT/ ACTIVE	Fan run-on
CRRCTN FACTR FAN OPER/T	%	Correction factor fan operation time
FAN ACTUATION DUTY	%	Fan actuation duty
AIR MASS SPECIFICATION	kg/h	Air mass specification
AIRMASS	kg/h	Air mass
QUANTY C/V TOTL ACT ANGL	deg	quantity control valve total actuation angle
CALCULATED ALT TORQ	Nm	Calculated alternator torque
OIL LEVEL	OK/Low	Oil level
ENG OIL PUMP VLV V (SHUNT)	V	Engine oil pump valve voltage (shunt)
COOLNT TEMP (ENG START)	°C	Coolant temperature (engine start)
SELF ADJ UPR P/LOAD RANGE	—	Self adjustment upper partial-load range
SELF ADJ LWR P/LOAD RANGE	—	Self-adjustment lower partial-load range
IN/MANI P F/CAPA CNVR FCTR	—	Intake manifold pressure filling capacity conversion factor
EXH TEMP D/STRM TWC	°C	Exhaust temperature downstream three way catalyst

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DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Monitor item	Unit	Remarks
EXH CMP ADAPTATION	INCMP/ COMPLET- ED	Exhaust camshaft position adaptation
INTAKE CMP ADAPTATION	INCMP/ COMPLET- ED	Intake camshaft position adaptation
RH OUT CAM ACT REDNDNCY	deg	Right outlet camshaft actuator redundancy
RH EX C/S INS/P CRCTN FCTR	deg CrS	Right exhaust camshaft installation position correction factor
RH IN C/S INS/P CRCTN FCTR	deg CrS	Right intake camshaft installation position correction factor
EXH CAMSHAFT ADAPT STAT	INITLZD/ NOT OK/ RUNNING/ ABORTD/ COMPLET- ED	Exhaust camshaft adaptation status
INTAK CAMSFT ADAPT STAT	INITLZD/ NOT OK/ RUNNING/ ABORTD/ COMPLET- ED	Intake camshaft adaptation status
RH CYL/B EX CAMSHAFT POS	deg	Right cylinder bank exhaust camshaft position
RH CYL/B IN CAMSHAFT POS	deg	Right cylinder bank intake camshaft position
T/R (O2 SEN U/STRM CAT)	No/Yes	Test readiness (oxygen sensor upstream of catalytic converter)
IN/MNFLD P CRR VL (STRTFD)	hPa	Intake manifold pressure correction value (stratified)
ACCELERATOR PEDAL SEN 1	V	Accelerator pedal sensor 1
ACCELERATOR PEDAL SEN 2	V	Accelerator pedal sensor 2
ACCEL PEDAL SENSOR	%	Accelerator pedal sensor
CYL1 F/INJECTOR CONTROL V	V	Cylinder1 fuel injector control voltage
CYL2 F/INJECTOR CONTROL V	V	Cylinder2 fuel injector control voltage
CYL3 F/INJECTOR CONTROL V	V	Cylinder3 fuel injector control voltage
CYL4 F/INJECTOR CONTROL V	V	Cylinder4 fuel injector control voltage
RAIL PRES (WITH HANDLING)	MPa	Rail pressure with handling
RAIL PRES (ACTUAL VALUE)	MPa	Rail pressure (actual value)
ALT REGULATD V (STANDRD)	V	Alternator regulated voltage (standard)
PWR CSMN (PURG SWOVR/V)	mA	Power consumption (Purging switchover valve)
CHG/A COOLR CIRCLTN PMP	Off/On	Charge air cooler circulation pump
PRES/S D/STRM THRTL VLV V	V	Pressure sensor downstream throttle valve voltage
DECEL AIR SWOVER VALVE	OPEN/Close	Deceleration air switchover valve
ACTUAL VOLTAGE CYL1	mAs	Actual voltage cylinder 1
ACTUAL VOLTAGE CYL2	mAs	Actual voltage cylinder 2
ACTUAL VOLTAGE CYL3	mAs	Actual voltage cylinder 3
ACTUAL VOLTAGE CYL4	mAs	Actual voltage cylinder 4
COOLNT TEMP (SPECFD VAL)	°C	Coolant temperature (specified value)
RH OUT CAM ANGL (NOMINL)	deg	Right outlet camshaft angle (nominal)
RH IN CAM ANGL (NOMINAL)	deg	Right inlet camshaft angle (nominal)
T/R (O2 SENSR D/STRM CAT)	No/Yes	Test readiness (oxygen sensor downstream of catalytic converter)
O2 SENS D/STRM CAT VOLT	V	Oxygen sensor downstream catalyst voltage
O2 SENS U/STRM CAT VOLT	V	Oxygen sensor upstream catalyst voltage

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Monitor item	Unit	Remarks
S/S ERR: CAN (NEUT SEN)	NOT OK/OK	Stop/Start error: controller area network communication (neutral sensor)
S/S ERR: CAN (TRANS/M)	NOT OK/OK	Stop/Start error: controller area network communication (transmission)
S/S ERR: ON-BRD ELEC SYS	NOT OK/OK	Stop/Start error: on-board electrical system
S/S ERR: DRIVER PRESENCE	NOT OK/OK	Stop/Start error: Driver presence
S/S ERR: ACCEL PEDAL	NOT OK/OK	Stop/Start error: accelerator pedal
CAN COM W/ TRANSMISSION	NOT OK/OK	CAN communication with TCM
BRAKE ASSIST SYSTEM	NOT OK/OK	Brake Assist System
ESP®*	NOT OK/OK	—
CAN COM W/ PRKNG BRK	NOT OK/OK	CAN communication with component "Electric parking brake"
S/S ERR: CAN (STEERING)	NOT OK/OK	Stop/Start error: controller area network communication (steering)
S/S ERR: CAN (SELECT LVR)	NOT OK/OK	Stop/Start error: controller area network communication (selector lever)
ECO S/S FUNC ACTVE	NOT OK/OK	Monitoring of ECO start/stop function ACTIVE
S/S ERR: ENGINE	NOT OK/OK	Stop/Start error: engine
S/S ERR: ENGINE HOOD	NOT OK/OK	Stop/Start error: engine hood
S/S ERR: STARTER	NOT OK/OK	Stop/Start error: starter
S/S ERR: OUTSIDE TEMP	NOT OK/OK	Stop/Start error: outside temperature
S/S CNL: ON-BRD ELEC SYS	NOT OK/OK	Stop/Start cancel: on-board electrical system
S/S CNL: BRAKE VACUUM	NOT OK/OK	Stop/Start cancel: brake vacuum
S/S CNL: S/S OFF SWITCH	NOT OK/OK	Stop/Start cancel: stop/start off switch
S/S CNL: DRIVER PRESENCE	NOT OK/OK	Stop/Start cancel: Driver presence
S/S CNL: SYSTEM	NOT OK/OK	Stop/Start cancel: system
S/S CNL: AIR CONDITIONER	NOT OK/OK	Stop/Start cancel: Air conditioner
S/S CNL: AIR SUSPENSION	NOT OK/OK	Stop/Start cancel: air suspension
S/S CNL: ENGINE	NOT OK/OK	Stop/Start cancel: engine
S/S CNL: ENGINE HOOD	NOT OK/OK	Stop/Start cancel: engine hood
S/S CNL: OFF-RD ENGR PK	NOT OK/OK	Stop/Start cancel: off-road engineering package
S/S CNL: EMERGENCY VHCL	Yes/No	Stop/Start cancel: emergency vehicle
S/S CNL: STARTER	NOT OK/OK	Stop/Start cancel: starter
S/S CNL: GRADIENT	NOT OK/OK	Stop/Start cancel: gradient
EGR POSTNR OPN CLAMPING	PENDNG/ Undefined/ OK/ FAULT	Exhaust gas regulation positioner open clamping
INSIDE TEMP OF CONT UNIT	°C	Inside temperature of control unit
LOW TEMP SHUTOFF VALVE 2	FALSE/True	Low temperature shutoff valve 2
S/S INH: VEHICLE SPEED	NOT OK/OK	Stop/Start inhibit: vehicle speed
S/S INH: OUTSIDE TEMP	NOT OK/OK	Stop/Start inhibit: outside temperature
S/S INH: ON-BRD ELEC SYS	NOT OK/OK	Stop/Start inhibit: on-board electrical system
S/S INH: BRAKE VACUUM	NOT OK/OK	Stop/Start inhibit: brake vacuum
S/S INH: S/S OFF SWITCH	NOT OK/OK	Stop/Start inhibit: stop/start off switch
S/S INH: DRIVER PRESENCE	NOT OK/OK	Stop/Start inhibit: Driver presence
S/S INH: ACCEL PEDAL	NOT OK/OK	Stop/Start inhibit: accelerator pedal
S/S INH: TRANSMISSION	NOT OK/OK	Stop/Start inhibit: transmission
S/S INH: AIR CONDITIONER	NOT OK/OK	Stop/Start inhibit: Air conditioner
STEERING ANGLE	NOT OK/OK	Steering angle

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DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Monitor item	Unit	Remarks
S/S INH: AIR SUSPENSION	NOT OK/OK	Stop/Start inhibit: air suspension
S/S INH: ENGINE	NOT OK/OK	Stop/Start inhibit: engine
S/S INH: ENGINE HOOD	NOT OK/OK	Stop/Start inhibit: engine hood
S/S INH: OFF-RD ENGR PK	NOT OK/OK	Stop/Start inhibit: off-road engineering package
S/S INH: EMERGENCY VHCL	No/Yes	Stop/Start inhibit: emergency vehicle
S/S INH: STARTER	NOT OK/OK	Stop/Start inhibit: starter
S/S INH: GRADIENT	NOT OK/OK	Stop/Start inhibit: gradient
S/S INH: SYSTEM	NOT OK/OK	Stop/Start inhibit: system
TANK PRESS DIFFERENTIAL	hPa	Tank pressure differential
F/TNK PRES DIFF (RAW VALU)	V	Fuel tank Pressure differential (raw value)
BOOST PRES POSITNR DUTY	%	Boost pressure positioner duty
FUEL TEMPERATURE	°C	Fuel temperature
BAROMETRIC PRESSURE	hPa	Barometric pressure
ENGINE OIL PUMP VALVE	%	Engine oil pump valve
FULL LOAD DETECTION	Not detected/ DETCTD	Full load detection
QANTY C/V T/ACT ANGL (SPC)	Grad KW	Quantity control valve total actuation angle (Specified)
RDDNT SAM CONT RLY	NOT ACT/ ACTIVE	Ignition
CYL1 MALFUNCTION COUNTR	—	Cylinder1 malfunction counter
CYL2 MALFUNCTION COUNTR	—	Cylinder2 malfunction counter
CYL3 MALFUNCTION COUNTR	—	Cylinder3 malfunction counter
CYL4 MALFUNCTION COUNTR	—	Cylinder4 malfunction counter
F/P PERMANENTLY ON	NOT ACT/ Activated	Fuel pump permanently
MIXTURE ADAPTN IN OPERTN	No/Yes	Mixture adaptation in operation
MIXTURE ADAPTATN FINISHD	No/Yes	Mixture adaptation finished
MIXTURE ADAPTATN CANCEL	No/Yes	Mixture adaptation cancel
L/CONT STAT U/STRM RH CAT	NOT ACT/ ACTIVE	Lambda control status upstream right catalyst
STRT OPRTN CNTR	—	Start operation counter
HIGH PRESSURE PUMP	—	High pressure pump
COOLNT TEMP (RAW VALUE)	°C	Coolant temperature (raw value)
ENG OIL TEMP	°C	ENG OIL TEMP

*: Both “VDC” and “ESP” are used in this manual. These indicate the same system.

WORK SUPPORT MODE

Work Item

Work item	Full spell	Usage
RESETTING OF ADAPTION VAL-UES	RESETTING OF ADAPTION VALUES	Use after a repair on the charge air system and fuel mixture generation including all affected components
ACTIVATION OF FUEL PUMP	ACTIVATION OF FUEL PUMP	Use after ECM and FPCM change

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Work item	Full spell	Usage
TEACH IN OF CAMSHART POSITION	TEACH IN OF CAMSHART POSITION	Use after one of the following components: <ul style="list-style-type: none"> • Replace the engine • Remove of timing chain • Remove intake camshaft actuator or exhaust camshaft actuator.
TEACH IN OF THROTTLE VALVE STOP	TEACH IN OF THROTTLE VALVE STOP	Use after replacing ECM or throttle valve actuator
STATUS OF TEACH IN PROCESSES	STATUS OF TEACH IN PROCESSES	Use to check status of teach-in processes
INJECTOR INJECTION QUANTITY ADJUSTMENT	INJECTOR INJECTION QUANTITY ADJUSTMENT	Use after replacing ECM or fuel injector
VIN REGISTRATION	VIN REGISTRATION	Used when registering VIN in ECM
STRT OPRTN CNTR CLEAR	STARTER OPERATION COUNTER CLEAR	Use after replacing starter motor
H/P FUEL PUMP STARTS COUNTER CLEAR	HIGH PRESSURE FUEL PUMP STARTS COUNTER CLEAR	Use after replacing high pressure fuel pump
SAVING DATA FOR REPLC CPU	SAVING DATA FOR REPLACING CPU	Use before replacing ECM
WRITING DATA FOR REPLC CPU	WRITING DATA FOR REPLACING CPU	Used when writing data stored by "SAVING DATA FOR REPLC CPU" to ECM
CAMSHAFT REFERENCE ADAPTATION	CAMSHAFT REFERENCE ADAPTATION	Use after one of the following components: <ul style="list-style-type: none"> • Replace the engine • Remove of timing chain • Remove intake camshaft actuator or exhaust camshaft actuator.
Teach in of sensor rotor adaptation	Teach in of sensor rotor adaptation	Follow the instruction of CONSULT display.
Corrcn progrmng fuel quantity	Correction programming fuel quantity	Follow the instruction of CONSULT display.
Correction programming of ignition	Correction programming of ignition	Follow the instruction of CONSULT display.

ACTIVE TEST MODE

Test Item

Test item	Full spell	Condition
CHECK DECELERATION AIR SWITCHOVER VALVE	CHECK DECELERATION AIR SWITCHOVER VALVE	<ul style="list-style-type: none"> • Combustion engine AT STANDSTILL. • Ignition ON.
CHECK ENGINE OIL PUMP VALVE	CHECK ENGINE OIL PUMP VALVE	<ul style="list-style-type: none"> • Combustion engine AT STANDSTILL. • Ignition ON.
Check boost pressure control	Check boost pressure control	Engine running at idle
CHECK PURGING SWITCHOVER VALVE	CHECK PURGING SWITCHOVER VALVE	<ul style="list-style-type: none"> • Combustion engine AT STANDSTILL • Ignition ON.
Check intake camshaft solenoid	Check intake camshaft solenoid	<ul style="list-style-type: none"> • The ignition is switched ON. • Engine running at idle • Coolant temperature > 80°C (176°F)
Check exhaust camshaft solenoid	Check exhaust camshaft solenoid	<ul style="list-style-type: none"> • The ignition is switched on. • Engine running at idle • Coolant temperature > 80°C (176°F)
CAMSHAFT POSITIONER	CAMSHAFT POSITIONER	<ul style="list-style-type: none"> • Apply parking brake. • Move selector lever to position 'P' or 'N' on vehicles with automatic transmission. • Shift the gearshift lever to neutral on vehicles with manual transmission. • During the test the engine speed must be between 2,700 and 3,500 rpm.
Check cylinder fuel injectors	Check cylinder fuel injectors	Engine running at idle

DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

Test item	Full spell	Condition
Quantity control valve	Quantity control valve	<ul style="list-style-type: none"> The fuel low pressure circuit is OK. The combustion engine is at idle. All electrical accessories must be switched OFF.
CHECK FUEL HIGH PRESSURE CIRCUIT FOR LEAKTIGHTNESS	CHECK FUEL HIGH PRESSURE CIRCUIT FOR LEAKTIGHTNESS	<ul style="list-style-type: none"> Ignition ON. Coolant temperature between 75°C and 105°C (167°F and 221°F) Fuel temperature between 40°C and 80°C (104°F and 176°F) Start combustion engine. Combustion engine IDLING Switch off all current consumers. Connect charger for battery.
CHECK FUEL HIGH PRESSURE CIRCUIT	CHECK FUEL HIGH PRESSURE CIRCUIT	<ul style="list-style-type: none"> Ignition ON. Apply parking brake.
Check fuel pressure and temperature sensor rail pressure	Check fuel pressure and temperature sensor rail pressure	<ul style="list-style-type: none"> Combustion engine IDLING. Coolant temperature between 75°C (167°F) and 105°C (221°F) All electrical accessories must be switched OFF.
CK ENG AND AC WITH INTEGRATED CONT FAN MOTOR	CHECK COMBUSTION ENGINE AND AC WITH INTEGRATED CONTROL FAN MOTOR	<ul style="list-style-type: none"> Ignition ON. Combustion engine AT STANDSTILL Vehicle AT STANDSTILL
ALTERNATOR DIAGNOSIS	ALTERNATOR DIAGNOSIS	<ul style="list-style-type: none"> DTC is not detected. Combustion engine AT STANDSTILL No charger must be connected. The charge level of the battery is OK. The battery voltage must be between 11.5 V and 15 V. Switch off air conditioning. Make sure that all current consumers are switched off.
Check coolant thermostat heating element	Check coolant thermostat heating element	<ul style="list-style-type: none"> Engine running at idle. Combustion engine AT STANDSTILL Vehicle AT STANDSTILL
CHECK THROTTLE VALVE ACTUATOR	CHECK THROTTLE VALVE ACTUATOR	<ul style="list-style-type: none"> Coolant temperature > 80°C (176°F) Ignition ON The combustion engine is at a standstill. Accelerator pedal NOT OPERATED
MIXTURE ADAPTATION	MIXTURE ADAPTATION	<ul style="list-style-type: none"> Engine speed: 400 – 800 rpm Coolant temperature between 40°C (104°F) and 80°C (176°F) Engine load: 30% or less Selector lever: P or N
AUTO STOP START	AUTO STOP START	<ul style="list-style-type: none"> Engine: After warning up, run engine at idle. Selector lever: N or P range “Start” and “Cancel” using CONSULT. <p>CAUTION: Be careful so that a hood operations in the opened state when carry out work.</p> <p>NOTE: Before performing this test, be sure to check that “OK” is displayed on “BATTERY STS” and “SUB-BATTERY STATUS” in “DATA MONITOR” of EMCM.</p>
CHECK FUEL PRESSURE AND INTERNAL LEAKTIGHTNESS OF FUEL SYSTEM	CHECK FUEL PRESSURE AND INTERNAL LEAKTIGHTNESS OF FUEL SYSTEM	<ul style="list-style-type: none"> The fuel tank must not be empty. The coolant temperature must be less than 80°C. Connect pressure gauge. The fuel level must be greater than 10 liter. Run combustion engine at idle.
CHECK COOLANT PUMP SWITCHOVER VALVE	CHECK COOLANT PUMP SWITCHOVER VALVE	Coolant temperature between 70°C (158°F) and 90°C (194°F)
Throttle valve storks load up	Throttle valve storks load up	Follow the instruction of CONSULT display.
Purging switchover valve	Purging switchover valve	Follow the instruction of CONSULT display.

DIAGNOSIS SYSTEM (ECM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Test item	Full spell	Condition
Check activated charcoal canister shutoff valve	Check activated charcoal canister shutoff valve	Follow the instruction of CONSULT display.
Check leak test of fuel tank	Check leak test of fuel tank	Follow the instruction of CONSULT display.
Check fuel tank pressure sensor	Check fuel tank pressure sensor	Follow the instruction of CONSULT display.
Check purging pressure control	Check purging pressure control	Follow the instruction of CONSULT display.
Check cylinder fuel injectors for leaks	Check cylinder fuel injectors for leaks	Follow the instruction of CONSULT display.

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DIAGNOSIS SYSTEM (FPCM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (FPCM)

CONSULT Function

INFOID:000000013289819

FUNCTION

Diagnostic test mode	Function
ECU Identification	FPCM part number can be read.
Self Diagnostic Result	Self-diagnostic results can be read and erased.
Data monitor	Input/Output data in FPCM can be read.
Active test	Diagnostic Test Mode in which CONSULT drives some actuators apart from FPCM and also shifts some parameters in a specified range.

SELF DIAGNOSTIC RESULT MODE

Self Diagnostic Item

Regarding items of DTC, refer to [EC4-159, "DTC Index"](#).

How to Erase DTC

- If ignition switch is continuously in the ON position after a DTC is detected, turn ignition switch OFF before turning ignition 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

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.

Freeze Frame Data Item List

Item		Value (unit)	
CONSULT screen terms	Full spell	CONSULT screen terms	Full spell
OCCURRENCE TRACER	Occurrence tracer	ERROR	Error
		EVENT	Event
PERIPHERAL DATA	Peripheral data	ERROR	Error
		EVENT	Event
KILOMETER READING - FIRST OCCURRENCE	Kilometer reading - first occurrence	km	—
		NOT AVLBL / DEFAULT	Not available / Default
KILOMETER READING - LAST OCCURRENCE	Kilometer reading - last occurrence	km	—
		NOT AVLBL / DEFAULT	Not available / Default
FREQUENCY COUNTER - LAST OCCURRENCE	Frequency counter - last occurrence	—	—
		NOT AVLBL / DEFAULT	Not available / Default
OPRATNG CYCL COUNTR - LST OCCURRNCE	Operating cycle counter - last occurrence	—	—
		NOT AVLBL / DEFAULT	Not available / Default

DATA MONITOR MODE

NOTE:

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

Monitored Item

For reference values of the following items, refer to [EC4-158, "Reference Value"](#).

MONITOR ITEM	Unit	Remarks
STATUS OF FUEL PUMP	V	Status of fuel pump
FUEL PRESSURE	bar	Fuel pressure
INSIDE TEMP OF CONT UNIT	°C	Inside temperature of control unit

DIAGNOSIS SYSTEM (FPCM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

MONITOR ITEM	Unit	Remarks
FUEL PUMP REQUEST	On/Off	Fuel pump request
STATUS OF CIRCUIT	On/Off	Status of circuit

ACTIVE TEST MODE

Test Item

Test item	Full spell	Condition
CK FUEL PRSS & INTRNL LKT-GHTNSS OF FL SYS	CHECK FUEL PRESSURE AND INTERNAL LEAKTIGHTNESS OF FUEL SYSTEM	<ul style="list-style-type: none">• The fuel level must be greater than 10 liter.• The coolant temperature must be less than 80°C (176°F).• Run combustion engine at idle.

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DIAGNOSIS SYSTEM (EMCM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (EMCM)

CONSULT Function

INFOID:000000013289820

FUNCTION

Diagnostic test mode	Function
ECU Identification	EMCM part number can be read.
Self Diagnostic Result	Self-diagnostic results such as DTCs can be read and erased quickly.*
Data Monitor	Input/Output data in the EMCM 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.

*: The diagnostic trouble codes is cleared when the EMCM memory is erased.

SELF DIAGNOSTIC RESULT MODE

Self Diagnostic Item

Regarding items of DTC, refer to [EC4-165. "DTC Index"](#).

How to Read DTC

DTCs related to the malfunction are displayed in "self-diag results".

- When EMCM has detected a current DTC, "0" is displayed for "TIME".
- If "TIME" is neither "0" nor "1t", the DTC occurred in the past and EMCM shows the number of times the vehicle has been driven since the last detection of the DTC.

How to Erase DTC

NOTE:

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

DATA MONITOR MODE

NOTE:

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

Monitored Item

For reference values of the following items, refer to [EC4-161. "Reference Value"](#).

Monitored item	Unit	Description	Remarks
ALT DUTY	%	The item is displayed but is not used.	
BAT TEMP SEN	V	The signal voltage from the main battery temperature sensor is displayed.	
ENG RESTART B/R STK CNT	—	Indicates a count for engine restart bypass relay function diagnosis.	
BAT CUR SEN	mV	The signal voltage of main battery current sensor is displayed.	
CML B/DCHG CRNT	—	Cumulative main battery discharge current is displayed.	
LOAD SIGNAL	On/Off	<ul style="list-style-type: none">• Indicates [ON/OFF] condition of the electrical lode signal.- ON: Rear window defogger switch is ON and/or lighting switch is 2nd position.- OFF: Both rear window defogger switch and lighting switch are OFF.	
HEATER FAN SW	On/Off	Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW2	On/Off	Indicates [ON/OFF] condition of stop lamp switch signal.	

DIAGNOSIS SYSTEM (EMCM)

[2.0L TURBO GASOLINE ENGINE]

< SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
BATTERY STS	OK/NG	Indicated [OK/NG] condition of main battery output.	EMCM judges whether stop/start system is possible according to main battery state.
AT STOP START SW	On/Off	Displays the activation status of stop/start system.	
ALT DUTY SIG	On/Off	<ul style="list-style-type: none"> • The control condition of the power generation voltage variable control (determined by EMCM according to the input signals) is indicated. - ON: Power generation voltage variable control is active. - OFF: Power generation voltage variable control is inactive. 	
BATTERY VOLT	V	Indicates power supply voltage for EMCM.	
SUB-BATTERY TEMP SENSOR	V	Indicates a signal voltage of sub battery temperature sensor.	
SUB-BATTERY VOLTAGE	V	Indicates sub battery power supply voltage.	
CMLTV S/BAT DISCHG CRNT	—	Indicates sub-battery discharge current cumulative value.	
SUB-BAT CURRENT SEN V	mV	Indicates a signal voltage of the sub battery current sensor.	
C/DYNAMOMETER MODE	On/Off	Indicates the chassis dynamometer mode status.	
BRAKE PEDAL POSITION SW	On/Off	Indicates [ON/OFF] condition from the brake pedal position switch signal.	
SUB-BATTERY STATUS	OK/NG	Indicates [OK/NG] condition of sub battery output.	EMCM judges whether stop/start system is possible according to battery state.

WORK SUPPORT MODE

Work Item

Work item	Condition	Usage
SAVING DATA FOR REPLC CPU	In this mode, save data that is in EMCM.	When EMCM is replaced.
WRITING DATA FOR REPLC CPU	In this mode, write data stored by "SAVE DATA FOR CPU REPLC" in work support mode to EMCM.	When EMCM is replaced.
CML B/DCHRG CRNT CLEAR	In this mode, cumulative main battery discharge current is cleared.	When main battery is replaced.
CUMULATIVE SUB-BATTERY DISCHG CURRENT CLEAR	In this mode, cumulative sub battery discharge current is cleared.	When sub battery is replaced.
CHASSIS DYNAMOMETER MODE	In this mode, make the vehicle possible to perform 2-wheel driving test.	when performing 2-wheel driving test.

ECU DIAGNOSIS INFORMATION

ECM

Reference Value

INFOID:000000013289821

VALUES ON THE DIAGNOSIS TOOL

NOTE:

- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.
- Numerical values in the following table are reference values.
- These values are input/output values that ECM receives/transmits and may differ from actual operations.
- For outlines of following items, refer to [EC4-101, "CONSULT Function"](#).

Monitor item	Condition	Values/Status
SELF-ADJ IN IDLE RANGE	Ignition switch: ON	1.2666%
	Engine running at idle	1.9219%
CANISTER SHUTOFF VALVE	Ignition switch: ON	Close
	EVAP purge operation	OPEN
GEAR RANGE ENGAGED	Selector lever: P or N	P/N
	Selector lever: R	R
	Selector lever: D	1 – 7
IDLE SPEED INCREASE	Ignition switch: ON	0.000 1/min
	Engine running at idle (Warm up engine condition)	0.000 1/min
C/AIR TEMP/S U/ STRM THRTL	Ignition switch: ON	Displays Charge air temperature upstream throttle.
C/AIR TEMP/S D/ STRM THRTL	Ignition switch: ON	Displays Charge air temperature downstream throttle.
C/AIR TEMP/S U/ STRM THL V	<ul style="list-style-type: none"> • Ignition switch: ON • Ambient temperature: 18.75°C 	Approx. 3.9746 V
C/AIR TEMP/S D/ STRM THL V	<ul style="list-style-type: none"> • Ignition switch: ON • Ambient temperature: 18.75°C 	Approx. 0.012150 V
AMBIENT TEMP (CAN)	Ignition switch: ON	Displays ambient temperature.
BATTERY VOLTAGE	Ignition switch: ON	Displays main battery voltage.
CHARCOAL FILTR FILL LEVEL	Ignition switch: ON	Displays charcoal filter fill level.
STOP LAMP SWITCH	<ul style="list-style-type: none"> • Ignition switch: ON • Brake pedal: Fully released 	NOT ACT
	<ul style="list-style-type: none"> • Ignition switch: ON • Brake pedal: Fully depressed 	ACTIVE
BRAKE PEDAL	<ul style="list-style-type: none"> • Ignition switch: ON • Brake pedal: Fully released 	NOT ACT
	<ul style="list-style-type: none"> • Ignition switch: ON • Brake pedal: Fully depressed 	ACTUAT
THRMST HEAT ELMNT DUTY	Ignition switch: ON	100%
	Engine running at idle (Warm up engine condition)	Approx. 70%
THROTTLE VALVE ACTUATOR	Ignition switch: ON	DONE
BRAKE FLAP LEARN FINISHED	Ignition switch: ON	YES

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Monitor item	Condition	Values/Status	
THRTL VALVE ACTUATOR1 V	• Ignition switch: ON • Accelerator pedal: Fully released	Approx. 0.7324 V	A
	• Ignition switch: ON • Accelerator pedal: Fully depressed	Approx. 4.2688 V	EC4
THRTL VALVE ACTUATOR2 V	• Ignition switch: ON • Accelerator pedal: Fully released	Approx. 4.2712 V	
	• Ignition switch: ON • Accelerator pedal: Fully depressed	Approx. 0.7373 V	C
THROTTLE VALVE POSITION	• Ignition switch: ON • Accelerator pedal: Fully released	4.300 GRAD	D
	• Ignition switch: ON • Accelerator pedal: Fully depressed	Approx. 78.800 GRAD	
PRS SEN D/STRM AIR FILTR V	Ignition switch: ON	Approx. 4.3408 V	E
	Engine running at 2,000 rpm	Approx. 4.3213 V	
PRESSURE D/STRM AIR FILTR	Ignition switch: ON	Approx. 1010 hPa	F
	Engine running at 2,000 rpm	Approx. 1005 hPa	
EXCITATION CURRENT	Ignition switch: ON	Approx. 0.000 A	
	Engine running at idle	Approx. 4.000 A	G
INJECTION TIME RIGHT	Ignition switch: ON	Approx. 0.00000 ms	
	Engine running at idle	Approx. 0.46000 ms	H
MASS AIR FLOW CR-RCTN VAL	Ignition switch: ON	Approx. 3.600 kg/h	
	Engine running at idle	Approx. 3.600 kg/h	I
MIXTUR ADAPT IN/MANI PRES	Ignition switch: ON	Approx. 0.0000 hPa	
	Engine running at idle	Approx. 0.0000 hPa	J
KNOCK CONTROL ENABLE	Ignition switch: ON	NO	
SEN ROTOR ADAPT CMLPT	Ignition switch: ON	Yes	K
	Engine running at idle	No	
SEN ROTOR ADAPT STATUS	Ignition switch: ON	NOT ACT	L
PRESS D/STRM THRTL VALV	Ignition switch: ON	Approx. 1006.4844 hPa	
	Engine running at 2,000 rpm	Approx. 279.4531 hPa	M
ELECTRICAL FAULT IN ALT	Alternator normal	NO	
	Electric fault in alternator	YES	N
MECH FAULT IN AL-TRNATR	Alternator normal	NO	
	Mechanical fault in alternator	YES	O
ALTERNATOR ID	Ignition switch: ON	3.00	
O2 SENSOR HEATER STATUS	Ignition switch: ON	0.0000 %	
	Engine running at 2,000 rpm	32.7154 %	P
	Engine running at idle	34.4122 %	
RAIL PRES (SPECIFIED VALU)	Ignition switch: ON	0.51100 MPa	
	Engine running at idle	13.00000 MPa	
NORMAL MODE	Ignition switch: ON	ACTIVE	
OVERHEATING PROTECTION	Ignition switch: ON	NOT ACT	
UNIFORMTY OF LAMBDA CNT	Ignition switch: ON	0.00000	

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Monitor item	Condition	Values/Status
START ENABLE CL PDL SW	Ignition switch: ON	Off
CYL1 FUEL INJ SUPPLY PWR	Ignition switch: ON	0.6660 mAs
	Engine running at idle	0.6940 mAs
CYL2 FUEL INJ SUPPLY PWR	Ignition switch: ON	0.6800 mAs
	Engine running at idle	0.7000 mAs
CYL3 FUEL INJ SUPPLY PWR	Ignition switch: ON	0.6600 mAs
	Engine running at idle	0.6840 mAs
CYL4 FUEL INJ SUPPLY PWR	Ignition switch: ON	0.6800 mAs
	Engine running at idle	0.7080 mAs
EXH TEMP RH CAT CONVRTR	Ignition switch: ON	18.9 °C
	Engine running at idle	498.9 °C
Kickdown	ignition switch: ON	NOT ACT
STATUS OF CIRCUIT	Ignition switch: ON	NOT ACT
Actuation of component Compressor	Ignition switch: ON	0.00 %
AIR CONDITIONER STATUS	Ignition switch: ON	NOT ACT
	Engine running at idle: A/C switch ON	ACTIVE
KNOCKING COMBUSTION	Ignition switch: ON	Not detected
CRRCTN FACTR MAF	Ignition switch: ON	1.000001
	Engine running at 2,000 rpm	0.982606
GRILL SHUTTER POSI (TEST)	Ignition switch: ON	0.0000 %
GRILL SHUTTER POSITION	Ignition switch: ON	0.0000 %
COOLANT TEMPERATURE	Ignition switch: ON	15.75 °C
	Engine running at idle: Warm-up condition	99 °C
CLNT PMP SWOVR VLV	Ignition switch: ON	0.0000 %
COOLANT TEMP SENSOR V	Ignition switch: ON	3.5693 V
	Engine running at idle: Warm-up condition	0.5420 V
CLUTCH PEDAL SWITCH	Clutch pedal: Fully released	NOT ACT
	Clutch pedal: Fully depressed	ACTUAT
ENGINE SPEED	Engine running at idle	Displays engine speed
PRESS U/STRM THRTL VALV	Ignition switch: ON	1009.4531 hPa
	Engine running at idle	1005.0000 hPa
PRS SEN U/STRM THRTL VLV	Ignition switch: ON	1.9629 V
	Engine running at idle	1.9531 V
LAMDA CONT U/STRM CAT	Ignition switch: ON	1.000001
	Engine running at idle	0.993531
LAMDA CONT D/STRM CAT	Ignition switch: ON	0.906586
	Engine running at idle	0.990388
ENGINE LOAD	Ignition switch: ON	97.4766 %
SMOOTH OPR OF CYL 1	Engine running at idle	0.3553 (rev/s) ²
	Engine running at 2,000 rpm	-0.4903 (rev/s) ²

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Monitor item	Condition		Values/Status	
SMOOTH OPR OF CYL 2	Engine running at idle		-1.1227 (rev/s) ²	A
	Engine running at 2,000 rpm		0.6537 (rev/s) ²	
SMOOTH OPR OF CYL 3	Engine running at idle		0.1421 (rev/s) ²	EC4
	Engine running at 2,000 rpm		-0.1492 (rev/s) ²	
SMOOTH OPR OF CYL 4	Engine running at idle		0.1137 (rev/s) ²	C
	Engine running at 2,000 rpm		-0.9379 (rev/s) ²	
IDLE RECOGNITION	Ignition switch: ON		DETCTD	D
	Engine running at 2,000 rpm		Not Detected	
IDLE RPM (NOMINAL)	Ignition switch: ON		0.000 1/min	E
	Engine running at idle		788.500 1/min	
PURGING SWOVER VLV DUTY	Ignition switch: ON		0.000 %	F
	Engine running at idle		24.706 %	
FAN SPEED REQUEST (A/C)	Ignition switch: ON		0.00 %	
FAN RUN-ON	Ignition switch: ON		NOT ACT	G
	Engine running at idle: Cooling fan motor operate		ACTIVE	
CRRCTN FACTR FAN OPER/T	Ignition switch: ON		0.0000 %	
FAN ACTUATION DUTY	Ignition switch: ON		9.766 %	H
	Engine running at idle: Cooling fan motor operate		10 - 100 %	
AIR MASS SPECIFICATION	Ignition switch: ON		0.000 kg/h	I
	Engine running at idle		17.300 kg/h	
AIRMASS	Ignition switch: ON		0.000 kg/h	J
	Engine running at idle		1793.400 kg/h	
QUANTY C/V TOTL ACT ANGL	Ignition switch: ON		94.000 deg	K
	Engine running at idle		32.000 deg	
CALCULATED ALT TORQ	Ignition switch: ON		-0.3125 Nm	L
	Engine running at idle		-22.9575 Nm	
OIL LEVEL	Ignition switch: ON		LOW	
ENG OIL PUMP VLV V (SHUNT)	Ignition switch: ON		0.1086 V	M
	Engine running at idle		1.6149 V	
COOLNT TEMP (ENG START)	Ignition switch: ON		15.75 °C	N
	Engine running at idle: Warm-up condition		30.75 °C	
SELF ADJ UPR P/LOAD RANGE	Ignition switch: ON		0.865906	O
	Engine running at idle		0.865906	
SELF ADJ LWR P/LOAD RANGE	Ignition switch: ON		0.877137	P
	Engine running at 2,000 rpm		0.865906	
IN/MANI P F/CAPA CNVR FCTR	Ignition switch: ON		1.000001	
EXH TEMP D/STRM TWC	Ignition switch: ON		18.9 °C	
	Engine running at idle		422.2 °C	
EXH CMP ADAPTATION	Ignition switch: ON	Adaptation is completed	COMPLETED	
		Adaptation is not completed	INCMP	
INTAKE CMP ADAPTATION	Ignition switch: ON	Adaptation is completed	COMPLETED	

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Monitor item	Condition	Values/Status
RH OUT CAM ACT REDNDNCY	Ignition switch: ON	-32.0000 deg
	Engine running at 2,000 rpm	-10.5781 deg
RH EX C/S INS/P CRCTN FCTR	Ignition switch: ON	0.1538 deg CrS
	Engine running at 2,000 rpm	0.1538 deg CrS
RH IN C/S INS/P CRCTN FCTR	Ignition switch: ON	-1.0327 deg CrS
	Engine running at 2,000 rpm	-1.0327 deg CrS
EXH CAMSHAFT ADAPT STAT	Ignition switch: ON	COMPLETED
INTAK CAMSFT ADAPT STAT	Ignition switch: ON	COMPLETED
RH CYL/B EX CAM- SHAFT POS	Ignition switch: ON	-32.0000 deg
	Engine running at 2,000 rpm	-11.1484 deg
RH CYL/B IN CAM- SHAFT POS	Ignition switch: ON	35.0000 deg
	Engine running at 2,000 rpm	34.7579 deg
T/R (O2 SEN U/STRM CAT)	Ignition switch: ON	No
	Engine running at 2,000 rpm	Yes
IN/MNFLD P CRR VL (STRTFD)	Ignition switch: ON	0.0000 hPa
ACCELERATOR PED- AL SEN 1	<ul style="list-style-type: none"> • Ignition switch: ON • Accelerator pedal: Fully released 	0.7861 V
	<ul style="list-style-type: none"> • Ignition switch: ON • Accelerator pedal: Fully depressed 	4.4824 V
ACCELERATOR PED- AL SEN 2	<ul style="list-style-type: none"> • Ignition switch: ON • Accelerator pedal: Fully released 	0.3857 V
	<ul style="list-style-type: none"> • Ignition switch: ON • Accelerator pedal: Fully depressed 	2.2168 V
ACCEL PEDAL SEN- SOR	<ul style="list-style-type: none"> • Ignition switch: ON • Accelerator pedal: Fully released 	0.00 %
	<ul style="list-style-type: none"> • Ignition switch: ON • Accelerator pedal: Fully depressed 	99.9999 %
CYL1 F/INJECTOR CONTROL V	Ignition switch: ON	143.1500 V
	Engine running at idle	147.4800 V
CYL2 F/INJECTOR CONTROL V	Ignition switch: ON	141.7400 V
	Engine running at idle	145.5800 V
CYL3 F/INJECTOR CONTROL V	Ignition switch: ON	145.5200 V
	Engine running at idle	149.6200 V
CYL4 F/INJECTOR CONTROL V	Ignition switch: ON	144.2400 V
	Engine running at idle	148.4000 V
RAIL PRES (WITH HANDLING)	Ignition switch: ON	0.51100 MPa
	Engine running at idle	13.00100 MPa
RAIL PRES (ACTUAL VALUE)	Ignition switch: ON	0.41000 MPa
	Engine running at idle	12.87300 MPa
ALT REGULATD V (STANDRD)	Ignition switch: ON	10.6000 V
	Engine running at idle	14.6000 V
PWR CSMN (PURG SWOVR/V)	Ignition switch: ON	5.5313 mA
	Engine running at idle	187.5313 mA
CHG/A COOLR CIR- CLTN PMP	Ignition switch: ON	Off

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Monitor item	Condition	Values/Status	
PRES/S D/STRM THRTL VLV V	Ignition switch: ON	1.9629 V	A
	Engine running at idle	0.8545 V	
DECEL AIR SWOVER VALVE	Ignition switch: ON	Close	EC4
ACTUAL VOLTAGE CYL1	Ignition switch: ON	0.6640 mAs	
	Engine running at idle	0.6920 mAs	C
ACTUAL VOLTAGE CYL2	Ignition switch: ON	0.6780 mAs	
	Engine running at idle	0.7060 mAs	D
ACTUAL VOLTAGE CYL3	Ignition switch: ON	0.6600 mAs	
	Engine running at idle	0.6880 mAs	E
ACTUAL VOLTAGE CYL4	Ignition switch: ON	0.6780 mAs	
	Engine running at idle	0.7080 mAs	F
COOLNT TEMP (SPECFD VAL)	Ignition switch: ON	105.000 °C	
	Engine running at idle	80.000 °C	G
RH OUT CAM ANGL (NOMINL)	Ignition switch: ON	-31.7813 deg	
	Engine running at 2,000 rpm	-11.7266 deg	H
RH IN CAM ANGL (NOMINAL)	Ignition switch: ON	36.9531 deg	
	Engine running at 2,000 rpm	35.0000 deg	I
T/R (O2 SENSR D/ STRM CAT)	Ignition switch: ON	No	
	Engine running at idle	Yes	J
O2 SENS D/STRM CAT VOLT	Ignition switch: ON	1.603 V	
	Engine running at 2,000 rpm	0.821 V	K
O2 SENS U/STRM CAT VOLT	Ignition switch: ON	1.4990 V	
	Engine running at 2,000 rpm	1.5137 V	L
S/S ERR: CAN (NEUT SEN)	Normal	OK	
	Abnormal	NOT OK	M
S/S ERR: CAN (TRANS/M)	Normal	OK	
	Abnormal	NOT OK	N
S/S ERR: ON-BRD ELEC SYS	Normal	OK	
	Abnormal	NOT OK	O
S/S ERR: DRIVER PRESENCE	Normal	OK	
	Abnormal	NOT OK	P
S/S ERR: ACCEL PEDAL	Normal	OK	
	Abnormal	NOT OK	
CAN COM W/ TRANS- MISSION	Ignition switch: ON	OK	
BRAKE ASSIST SYS- TEM	Ignition switch: ON	OK	
ESP®	Ignition switch: ON	OK	
CAN COM W/E PRKNG BRK	Ignition switch: ON	OK	
S/S ERR: CAN (STEERING)	Ignition switch: ON	OK	
S/S ERR: CAN (SE- LECT LVR)	Ignition switch: ON	OK	
ECO S/S FUNC ACTVE	Ignition switch: ON	OK	

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Monitor item	Condition		Values/Status
S/S ERR: ENGINE	Ignition switch: ON		OK
S/S ERR: ENGINE HOOD	Ignition switch: ON		OK
S/S ERR: STARTER	Ignition switch: ON		OK
S/S ERR: OUTSIDE TEMP	Ignition switch: ON		OK
S/S CNL: ON-BRD ELEC SYS	Ignition switch: ON		NOT OK
S/S CNL: BRAKE VACUUM	Ignition switch: ON		OK
S/S CNL: S/S OFF SWITCH	Ignition switch: ON	Stop/Start OFF switch: ON	OK
		Stop/Start OFF switch: OFF	NOT OK
S/S CNL: DRIVER PRESENCE	Ignition switch: ON	Driver's seat belt: Off	NOT OK
		Driver's seat belt: ON	OK
S/S CNL: SYSTEM	Ignition switch: ON		OK
S/S CNL: AIR CONDITIONER	Ignition switch: ON		OK
S/S CNL: AIR SUSPENSION	Ignition switch: ON		OK
S/S CNL: ENGINE	Ignition switch: ON		NOT OK
S/S CNL: ENGINE HOOD	Ignition switch: ON	Hood: Open	NOT OK
		Hood: Closed	OK
S/S CNL: OFF-RD ENGR PK	Ignition switch: ON		OK
S/S CNL: EMERGENCY VHCL	Ignition switch: ON		No
S/S CNL: STARTER	Ignition switch: ON		OK
S/S CNL: GRADIENT	Ignition switch: ON		OK
EGR POSTNR OPN CLAMPING	Ignition switch: ON		OK
INSIDE TEMP OF CONT UNIT	Ignition switch: ON		27.00 °C
LOW TEMP SHUT-OFF VALVE 2	Ignition switch: ON		True
S/S INH: VEHICLE SPEED	Ignition switch: ON		NOT OK
S/S INH: OUTSIDE TEMP	Ignition switch: ON		OK
S/S INH: ON-BRD ELEC SYS	Ignition switch: ON		NOT OK
S/S INH: BRAKE VACUUM	Ignition switch: ON		OK
S/S INH: S/S OFF SWITCH	Ignition switch: ON	Stop/Start OFF switch: ON	OK
		Stop/Start OFF switch: OFF	NOT OK
S/S INH: DRIVER PRESENCE	Ignition switch: ON	Driver's seat belt: Off	NOT OK
		Driver's seat belt: ON	OK
S/S INH: ACCEL PEDAL	Ignition switch: ON		OK
S/S INH: TRANSMISSION	Ignition switch: ON		OK

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Monitor item	Condition		Values/Status	
S/S INH: AIR CONDITONER	Ignition switch: ON		OK	A
STEERING ANGLE	Ignition switch: ON		OK	
S/S INH: AIR SUSPENSION	Ignition switch: ON		OK	EC4
S/S INH: ENGINE	Ignition switch: ON		NOT OK	
S/S INH: ENGINE HOOD	Ignition switch: ON	Hood: Open	NOT OK	C
		Hood: Closed	OK	
S/S INH: OFF-RD ENGR PK	Ignition switch: ON		OK	D
S/S INH: EMERGENCY VHCL	Ignition switch: ON		No	E
S/S INH: STARTER	Ignition switch: ON		OK	
S/S INH: GRADIENT	Ignition switch: ON		OK	
S/S INH: SYSTEM	Ignition switch: ON		OK	F
TANK PRESS DIFFERENTIAL	Ignition switch: ON		0.000 hPa	
F/TNK PRES DIFF (RAW VALU)	Ignition switch: ON		4.9951 V	G
BOOST PRES POSITNR DUTY	Ignition switch: ON		8.9998 %	H
FUEL TEMPERATURE	Ignition switch: ON (Cold engine condition)		19.00°C	
	Engine running at idle		25.50°C	I
BAROMETRIC PRESSURE	Ignition switch: ON		1012.1223 hPa	
	Engine running at 2,000 rpm		1007.1223 hPa	J
ENGINE OIL PUMP VALVE	Ignition switch: ON		10.196 %	
	Engine running at idle		89.904 %	K
FULL LOAD DETECTION	Ignition switch: ON		Not detected	
QANTY C/V T/ACT ANGL (SPC)	Ignition switch: ON		94.000 Grad KW	
	Engine running at idle		32.300 Grad KW	L
RDDNT SAM CONT RLY	Ignition switch: ON		ACTIVE	
	Engine running at idle		ACTIVE	M
CYL1 MALFUNCTION COUNTR	Ignition switch: ON		0.00	
CYL2 MALFUNCTION COUNTR	Ignition switch: ON		0.00	N
CYL3 MALFUNCTION COUNTR	Ignition switch: ON		0.00	
CYL4 MALFUNCTION COUNTR	Ignition switch: ON		0.00	O
F/P PERMANENTLY ON	Ignition switch: ON		Activated	P
MIXTURE ADAPTN IN OPERTN	Ignition switch: ON		No	
MIXTURE ADAPTATN FINISHD	Ignition switch: ON		No	
MIXTURE ADAPTATN CANCEL	Ignition switch: ON		No	

ECM

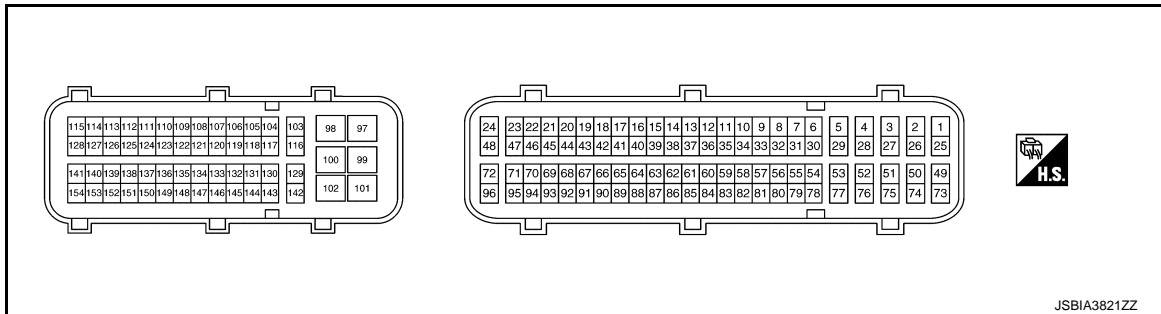
< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Monitor item	Condition	Values/Status
L/CONT STAT U/ STRM RH CAT	Ignition switch: ON	NOT ACT
STRT OPRTN CNTR	Ignition switch: ON	Displays the number of operations of starter motor.
HIGH PRESSURE PUMP	Ignition switch: ON	Displays the number of operations of high pressure pump.
COOLNT TEMP (RAW VALUE)	Ignition switch: ON	15.75 °C
	Engine running at idle: Warm-up condition	95.50 °C
ENG OIL TEMP	Ignition switch: ON	15.75 °C
	Engine running at idle	95.50 °C

*: Both "VDC" and "ESP" are used in this manual. These indicate the same system.

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

Pulse signal is measured by CONSULT.

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
1 (L)	98 (B)	Fuel injector (No.1)	Output	[Ignition switch: ON]	0.5 V
				[Engine is running] • Idle speed	
2 (R)	98 (B)	Fuel injector (No.1)	Output	[Ignition switch: ON]	0.5 V
				[Engine is running] • Idle speed	
3 (Y)	98 (B)	Partial load operation crankcase ventilation valve	Output	[Ignition switch: ON]	0 V
				[Engine is running] • Idle speed	Battery voltage

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< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
4 (L)	98 (B)	Coolant thermostat heater element	Output	[Ignition switch: ON] Coolant temperature: Approx. 24°C (75.2°F)*	3.5 V
7 (R)	98 (B)	Ignition coil (No. 2)	Output	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	<div style="text-align: center;"> <p>0.04 V★ 50mSec/div 2V/div JMBIA0035GB</p> </div>
				[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	<div style="text-align: center;"> <p>0.04 V★ 50mSec/div 2V/div JMBIA0036GB</p> </div>
10 (BG)	—	Sensor ground (Intake camshaft position sensor, exhaust camshaft position sensor)	—	—	—
11 (BG)	—	Sensor ground (Engine coolant temperature sensor, charge air temperature sensor downstream of throttle valve, charge air temperature sensor upstream of throttle valve, pressure sensor upstream of throttle valve, pressure sensor downstream of air filter)	—	—	—
12 (P)	—	Sensor ground (Crankshaft position sensor, fuel pressure and temperature sensor, pressure sensor downstream of throttle valve)	—	—	—
13 (L)	—	Sensor ground (Heated oxygen sensor)	—	—	—
14 (BR)	—	Sensor ground (Throttle valve actuator)	—	—	—
16 (W)	98 (B)	Sensor power supply (Pressure sensor upstream of throttle valve)	Output	[Ignition switch: ON]	5 V
17 (LG)	98 (B)	Sensor power supply (Throttle valve actuator)	Output	[Ignition switch: ON]	5 V
18 (R)	98 (B)	Sensor power supply (Crankshaft position sensor, fuel pressure and temperature sensor, pressure sensor downstream of throttle valve)	Output	[Ignition switch: ON]	5 V

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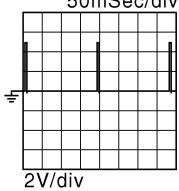
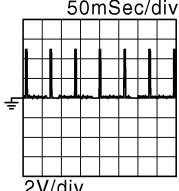

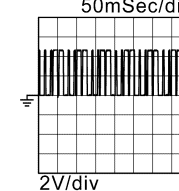
[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
23 (L)	98 (B)	Divert air switchover valve	Output	[Ignition switch: ON]	Battery voltage
				Perform "CHECK DECELERATION AIR SWITCHOVER VALVE" in "ACTIVE TEST" mode.* Touch "START" and select "OPEN".	0.5 V
24 (W)	98 (B)	Throttle valve motor (+)	Output	[Ignition switch: ON]	0 V
				• Engine stopped • Accelerator pedal: Fully depressed	2 V
				• Engine stopped • Accelerator pedal: For few seconds after depressing fully.	10 V
25 (B)	98 (B)	Fuel injector (No.4)	Output	[Ignition switch: ON]	0.5 V
				• Engine is running • Engine speed: Idle	
26 (G)	98 (B)	Fuel injector (No.4)	Output	[Ignition switch: ON]	0.5 V
				• Engine is running • Engine speed: Idle	
28 (W)	98 (B)	Engine oil pump valve	Output	[Ignition switch: ON] Cold condition	Battery voltage
				[Ignition switch: ON] Warm-up condition	1.6 V
				• Engine is running • Engine speed: Idle	
29 (SB)	98 (B)	Intake camshaft actuator	Output	[Ignition switch: ON]	Battery voltage
				• Engine is running • Engine speed: Idle	

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< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
31 (GR)	98 (B)	Ignition coil (No. 4)	Output	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	0.04 V★ 50mSec/div  2V/div JMBIA0035GB
				[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0.04 V★ 50mSec/div  2V/div JMBIA0036GB
34 (Y)	98 (B)	Exhaust camshaft position sensor	Input	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	50mSec/div  2V/div JSBIA5290GB
				[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	50mSec/div  2V/div JSBIA5291GB
36 (Y)	98 (B)	EVAP control system pressure sensor	Input	[Ignition switch: ON]	1.8 - 4.8 V
37 (W)	98 (B)	Heated oxygen sensor	Input	[Ignition switch: ON] Cold condition	4.2 V
				[Engine is running] • Warm-up condition • Idle speed	0.8 V
38 (Y)	98 (B)	Throttle position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.74 V
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	4.3 V
40 (G)	98 (B)	Charge air temperature sensor downstream of throttle valve	Input	[Ignition switch: ON] • Charge air temperature: 21°C (69.8°F)*	3.8 V
				[Ignition switch: ON] • Charge air temperature downstream of throttle valve: 27°C (80.6°F)*	3.8 V

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[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
41 (L)	98 (B)	Pressure sensor up- stream of throttle valve	Input	[Ignition switch: ON]	1.96 V
				<ul style="list-style-type: none"> • Engine is running • Engine speed: 2,000 rpm 	1.98 V
45 (L)	98 (B)	LIN	Input/ Output	[Ignition switch: ON]	Battery voltage
48 (GR)	98 (B)	Throttle valve motor (-)	Output	[Ignition switch: ON]	0 V
				<ul style="list-style-type: none"> • Engine stopped • Accelerator pedal: Fully depressed 	2 V
				<ul style="list-style-type: none"> • Engine stopped • Accelerator pedal: For few seconds after depressing fully. 	12 V
49 (R)	98 (B)	Fuel injector (No.3)	Output	[Ignition switch: ON]	0.5 V
				<ul style="list-style-type: none"> • [Engine is running] • Idle speed 	
50 (G)	98 (B)	Fuel injector (No.3)	Output	[Ignition switch: ON]	0.5 V
				<ul style="list-style-type: none"> • [Engine is running] • Idle speed 	
51 (Y)	98 (B)	Boost pressure control vacuum transducer	Output	[Ignition switch: ON]	Battery voltage
				<ul style="list-style-type: none"> • [Engine is running] • Idle speed 	<p>Battery voltage★</p>
53 (G)	98 (B)	Exhaust camshaft actua- tor	Output	[Ignition switch: ON]	Battery voltage
				<ul style="list-style-type: none"> • Engine is running • Engine speed: 2,000 rpm 	

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[2.0L TURBO GASOLINE ENGINE]

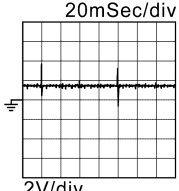
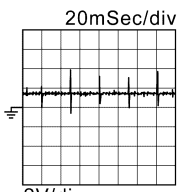
Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
54 (G)	98 (B)	Coolant pump switchover valve	Output	[Ignition switch: ON]	Battery voltage
				[Engine is running] • Coolant temperature: 85°C • Idle speed • A/C switch off	0 V
55 (L)	98 (B)	Ignition coil (No. 3)	Output	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	0.04 V★ 50mSec/div 2V/div JSBIA0035GB
				[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0.04 V★ 50mSec/div 2V/div JSBIA0036GB
58 (R)	98 (B)	Intake camshaft position sensor	Input	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	50mSec/div 2V/div JSBIA5294GB
				[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	50mSec/div 2V/div JSBIA5295GB

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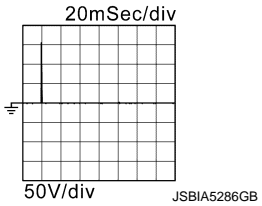
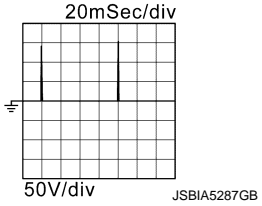
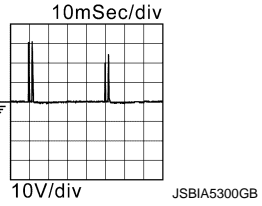
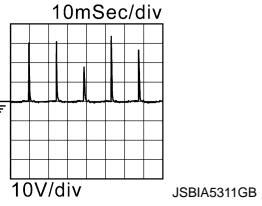
[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
59 (B)	98 (B)	Knock sensor 1	Input	[Ignition switch: ON]	1.63 V
				<ul style="list-style-type: none"> • Engine is running • Engine speed: Idle 	1.63 V★  <small>JSBIA5296GB</small>
60 (LG)	98 (B)	Knock sensor 2	Input	[Ignition switch: ON]	1.63 V
				<ul style="list-style-type: none"> • Engine is running • Engine speed: 2,000 rpm 	1.45 V★  <small>JSBIA5297GB</small>
61 (R)	98 (B)	Charge air temperature sensor upstream of throttle valve	Input	[Ignition switch: ON] • Charge air temperature upstream of throttle valve: 21°C (69.8°F)*	3.87 V
				[Ignition switch: ON] • Charge air temperature upstream of throttle valve: 22°C (71.6°F)*	3.81 V
62 (P)	98 (B)	Throttle position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.73 V
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	4.27 V
63 (L)	98 (B)	Air fuel ratio (A/F) sensor	Input	[Ignition switch: ON]	2.7 V
64 (B)	98 (B)	Air fuel ratio (A/F) sensor	Input	[Ignition switch: ON]	2.5 V

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[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
65 (BR)	98 (B)	Fuel temperature signal	Input	Fuel temperature: Approx. 24°C (75.2°F)*	3.8 V
				Fuel temperature: Approx. 46°C (114.8°F)*	2.9 V
67 (SB)	98 (B)	Fuel pressure signal	Input	[Ignition switch: ON]	3.6 V
				<ul style="list-style-type: none"> • Engine is running • Engine speed: Idle 	2.35 V
73 (BR)	98 (B)	Fuel injector (No.2)	Output	[Ignition switch: ON]	0.5 V
				<ul style="list-style-type: none"> • [Engine is running] • Idle speed 	
74 (L)	98 (B)	Fuel injector (No.2)	Output	[Ignition switch: ON]	0.5 V
				<ul style="list-style-type: none"> • [Engine is running] • Idle speed 	
75 (V)	98 (B)	Quantity control valve (LOW)	Output	[Ignition switch: ON]	0.72 V
				<ul style="list-style-type: none"> • Engine is running • Engine speed: Idle 	
				<ul style="list-style-type: none"> • Engine is running • Engine speed: 2,000 rpm 	

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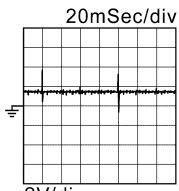
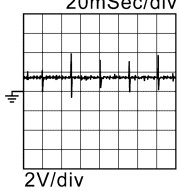
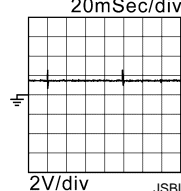
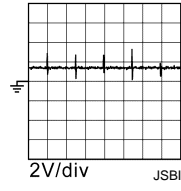
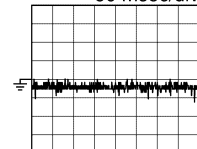
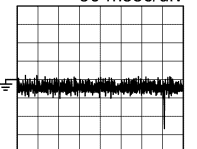
[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
76 (G)	98 (B)	Quantity control valve (HIGH)	Output	[Ignition switch: ON]	0.72 V
				<ul style="list-style-type: none"> • Engine is running • Engine speed: Idle 	
77 (BG)	98 (B)	Air fuel ratio (A/F) sensor heater	Output	<ul style="list-style-type: none"> • Engine is running • Engine speed: 2,000 rpm 	
				[Engine is running]	<ul style="list-style-type: none"> • Warm-up condition • Idle speed
78 (V)	98 (B)	Full-load operation vent line heater element	Output	[Ignition switch: ON]	Battery voltage
79 (Y)	98 (B)	Ignition coil (No. 1)	Output	<ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle</p>	<p>0.04 V★</p>
				<ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	
81 (GR)	98 (B)	Crankshaft position sen- sor	Input	[Ignition switch: ON]	5 V
				<ul style="list-style-type: none"> • Engine is running • Engine speed: Idle 	<p>4.7 V★</p>

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< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
82 (BG)	98 (B)	Engine oil level switch	Input	Engine oil level: Filled enough	0 V
83 (W)	98 (B)	Knock sensor 1	Input	[Ignition switch: ON]	1.63 V
				<ul style="list-style-type: none"> • Engine is running • Engine speed: Idle 	1.63 V★ 20mSec/div  2V/div JSBIA5296GB
				<ul style="list-style-type: none"> • Engine is running • Engine speed: 2,000 rpm 	1.45 V★ 20mSec/div  2V/div JSBIA5297GB
84 (Y)	98 (B)	Knock sensor 2	Input	[Ignition switch: ON]	1.63 V
				<ul style="list-style-type: none"> • Engine is running • Engine speed: Idle 	1.63 V★ 20mSec/div  2V/div JSBIA5298GB
				<ul style="list-style-type: none"> • Engine is running • Engine speed: 2,000 rpm 	1.45 V★ 20mSec/div  2V/div JSBIA5299GB
85 (G)	98 (B)	Blow by sensor	Input	<ul style="list-style-type: none"> • Engine is running • Engine speed: Idle 	50 msec/div  200 mV/div JSBIB0031GB
				<ul style="list-style-type: none"> • Engine is running • Engine speed: 2,000 rpm 	50 msec/div  200 mV/div JSBIB0032GB

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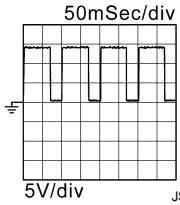
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[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
86 (V)	98 (B)	Engine coolant temperature sensor	Input	Engine coolant temperature: 22°C (71.6°F)*	3.2 V
				Engine coolant temperature: 80°C (176°F)*	0.5 V
87 (R)	98 (B)	Air fuel ratio (A/F) sensor	Input	[Ignition switch: ON]	2.9 V
88 (Y)	98 (B)	Air fuel ratio (A/F) sensor	Input	[Ignition switch: ON]	2.8 V
				[Engine is running] • Warm-up condition • Engine speed: Idle	2.1 - 2.8 V Output voltage varies with air fuel ratio.
90 (P)	98 (B)	Pressure sensor downstream of air filter	Input	[Ignition switch: ON]	4.34 V
				[Engine is running] • Warm-up condition • Engine speed: Idle	4.34 V
91 (W)	98 (B)	Pressure sensor downstream of throttle valve	Input	[Ignition switch: ON]	1.96 V
				[Engine is running] • Warm-up condition • Engine speed: Idle	0.84 V
				[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0.55 V
95 (R)	98 (B)	Heated oxygen sensor heater	Output	[Ignition switch: ON]	Battery voltage
				[Engine is running] • Warm-up condition • Engine speed: Idle	 <p style="text-align: right; font-size: small;">JSBIA5305GB</p>
97 (G)	98 (B)	Power supply (MAIN)	Input	[Ignition switch: ON]	Battery voltage
98 (B)	—	ECM ground	—	—	—
99 (G)	98 (B)	Power supply (MAIN)	Input	[Ignition switch: ON]	Battery voltage
100 (B)	—	ECM ground	—	—	—
101 (G)	98 (B)	Power supply (MAIN)	Input	[Ignition switch: ON]	Battery voltage
102 (B)	—	ECM ground	—	—	—

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< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
103 (V)	98 (B)	Cooling fan control signal (PWM)	Output	<ul style="list-style-type: none"> Ignition switch: ON Cooling fan: Not operates 	
				<ul style="list-style-type: none"> Ignition switch: ON Cooling fan: 60% operates* 	
104 (Y)	106 (W)	Sensor power supply (Accelerator pedal position sensor 1)	Output	[Ignition switch: ON]	5 V
105 (R)	119 (BR)	Sensor power supply (Accelerator pedal position sensor 2, fuel tank pressure sensor, refrigerant pressure sensor)	Output	[Ignition switch: ON]	5 V
106 (W)	—	Sensor ground (Accelerator pedal position sensor 1)	—	—	—
109 (P)	98 (B)	Engine speed signal	Output	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Engine speed: Idle NOTE: The pulse cycle changes depending on rpm at idle.	
111 (G)	98 (B)	Power supply (IGNITION)	Input	[Ignition switch: ON]	Battery voltage
116 (LG)	98 (B)	Starter relay-L	Output	Ignition switch: ON	3.45 V
				During engine cranking	3.45 V → 0 V → 3.45 V
119 (BR)	—	Sensor ground (Accelerator pedal position sensor2)	—	—	—
120 (BG)	—	Sensor ground (Refrigerant pressure sensor, fuel tank pressure sensor)	—	—	—
123 (BR)	98 (B)	Main relay control signal	Output	[Ignition switch: ON]	0.89 V
				[Ignition switch: OFF] <ul style="list-style-type: none"> After ECM self shut-off 	Battery voltage
127 (V)	98 (B)	Fuel pump on signal	Output	[Ignition switch: ON] <ul style="list-style-type: none"> Fuel pump: Not operates 	Battery voltage
				[Engine is running] <ul style="list-style-type: none"> Warm-up condition Engine speed: Idle 	0 V

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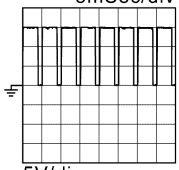
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[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
132 (G)	106 (W)	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Accelerator pedal: Fully depressed	4.56 V
				[Ignition switch: ON] • Accelerator pedal: Released	0.78 V
137 (L)	—	CAN-H	Input/ Output	—	—
138 (L)	—	Drivetrain CAN-H	Input/ Output	—	—
142 (GR)	120 (BG)	Back-up lamp relay	Output	[Ignition switch: ON] • Shift or selector lever position: R	0 V
				[Ignition switch: ON] • Shift or selector lever position: Except "R" position	Battery voltage
143 (LG)	120 (BG)	Refrigerant pressure sensor	Input	[Ignition switch: ON]	1.15 V
				• Engine is running under normal operating temperature • Both A/C switch and blower fan switch: ON (Compressor operates)	1.19 - 1.65 V
145 (L)	119 (BR)	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Accelerator pedal: Fully depressed	2.27 V
				[Ignition switch: ON] • Accelerator pedal: Released	0.381 V
146 (L)	120 (BG)	Fuel tank pressure sensor	Input	[Ignition switch: ON]	2.486 V
				[Engine is running] • Engine speed: Idle	2.492 V
148 (L)	98 (B)	Starter relay-H	Output	Ignition switch: ON	3.45 V
				During engine cranking	3.45 V → 0 V → 3.45 V
150 (P)	—	CAN-L	Input/ Output	—	—
151 (P)	—	Drivetrain CAN-L	Input/ Output	—	—
152 (B)	98 (B)	EVAP canister vent control valve	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
153 (G)	98 (B)	EVAP canister purge volume control solenoid valve	Output	[Engine is running] • Engine speed: Idle	BATTERY VOLTAGE (12 - 14 V)★ 5mSec/div  5V/div JSBIA5309GB

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

*: It can be confirmed using CONSULT.

Fail-safe (ECM)

INFOID:0000000013289822

STOP/START SYSTEM

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

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EC4

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P

DTC No.	Malfunction type	Engine operating condition in fail-safe mode
P0001	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0003	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0004	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0011	SIGNAL PLAUSIBILITY ERROR	Prohibits the stop/start operation.
P0012	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0016	SIGNAL PLAUSIBILITY ERROR	Prohibits the stop/start operation.
	SIG ABOVE ALLOWABLE RANGE	Prohibits the stop/start operation.
P0017	SIGNAL PLAUSIBILITY ERROR	Prohibits the stop/start operation.
	SIG ABOVE ALLOWABLE RANGE	Prohibits the stop/start operation.
P0087	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
	MISSING MESSAGE	Prohibits the stop/start operation.
P0088	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0106	SG BS LVL O-OF RNG/ZR AJST ERR	Prohibits the stop/start operation.
	SIGNAL STUCK IN RANGE	Prohibits the stop/start operation.
P0107	CIRCUIT SHORT TO GROUND	Prohibits the stop/start operation.
P0108	CIRCUIT SHORT TO BATTERY	Prohibits the stop/start operation.
P0115	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0116	SIGNAL COMPARE ERROR	Prohibits the stop/start operation.
	SIGNAL PLAUSIBILITY ERROR	Prohibits the stop/start operation.
	SIG BELOW ALLOWABLE RANGE	Prohibits the stop/start operation.
	SIG ABOVE ALLOWABLE RANGE	Prohibits the stop/start operation.
	SIGNAL INVALID	Prohibits the stop/start operation.
P0117	CIRCUIT SHORT TO GROUND	Prohibits the stop/start operation.
P0118	CIRCUIT SHORT TO BATTERY	Prohibits the stop/start operation.
P0119	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0119	SIG RTE OF CHNG ABV THRESHLD	Prohibits the stop/start operation.
P0190	CIRC VOLT BELOW THRESHOLD	Prohibits the stop/start operation.
	CIRC VOLT ABOVE THRESHOLD	Prohibits the stop/start operation.
P0191	CIRC VOLT BELOW THRESHOLD	Prohibits the stop/start operation.
	CIRC VOLT ABOVE THRESHOLD	Prohibits the stop/start operation.
P0192	CIRCUIT SHORT TO GROUND	Prohibits the stop/start operation.
P0193	CIRCUIT SHORT TO BATTERY	Prohibits the stop/start operation.
P0300	SIG ABOVE ALLOWABLE RANGE	Prohibits the stop/start operation.
P0335	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0339	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0341	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0342	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0343	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0366	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0367	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0368	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P0697	SYSTEM INTERNAL MALFUNCTN	Prohibits the stop/start operation.
P167B	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1CDE	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.

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< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

DTC No.	Malfunction type	Engine operating condition in fail-safe mode
P1CDF	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1CE2	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1D04	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1D05	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1D06	NO SUBTYPE INFORMATION	Prohibits the stop/start operation.
P1D07	SUPERVISION SOFTWARE ERROR	Prohibits the stop/start operation.
P2617	CIRCUIT OPEN	Prohibits the stop/start operation.

DTC Index

INFOID:000000013289823

DTC	Items (CONSULT screen terms)	Reference page
U0028	VEHICLE COMMUNICATION BUS A	EC4-239
U0037	Vehicle communication bus B	EC4-241
U0046	VEHICLE COMMUNICATION BUS C	EC4-242
U0101	COMMUNICATION ERROR (LOST)	EC4-246
U0103	COMMUNICATION ERROR (LOST)	EC4-247
U0104	COMMUNICATION ERROR (LOST)	EC4-249
U0109	COMMUNICATION ERROR (LOST)	EC4-250
U0111	COMMUNICATION ERROR (LOST)	EC4-251
U0120	COMMUNICATION ERROR (LOST)	EC4-252
U0122	COMMUNICATION ERROR (LOST)	EC4-253
U0140	COMMUNICATION ERROR (LOST)	EC4-254
U0141	COMMUNICATION ERROR (LOST)	EC4-255
U0151	COMMUNICATION ERROR (LOST)	EC4-256
U0155	COMMUNICATION ERROR (LOST)	EC4-257
U0164	COMMUNICATION ERROR (LOST)	EC4-258
U0168	COMMUNICATION ERROR (LOST)	EC4-259
U0212	COMMUNICATION ERROR (LOST)	EC4-260
U0402	COMMUNICATION ERROR (INVALID)	EC4-263
U0404	COMMUNICATION ERROR (INVALID)	EC4-264
U0405	COMMUNICATION ERROR (INVALID)	EC4-266
U040A	COMMUNICATION ERROR (INVALID)	EC4-267
U0416	COMMUNICATION ERROR (INVALID)	EC4-268
U0424	COMMUNICATION ERROR (INVALID)	EC4-269
U0427	COMMUNICATION ERROR (INVALID)	EC4-270
U0429	COMMUNICATION ERROR (INVALID)	EC4-271
U0469	COMMUNICATION ERROR (INVALID)	EC4-272
U1110	VEHICLE SPEED SIGNAL	EC4-274
U1407	ENGINE TORQUE SIGNAL	EC4-275
U3003	BATTERY VOLTAGE	EC4-276
U300E	IGNITION INPUT ON	EC4-277
U3011	Ignition input off	EC4-278
C0031	LH RR WHEEL SPEED SENSOR	EC4-287
C0034	RH RR WHEEL SPEED SENSOR	EC4-288

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< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

DTC	Items (CONSULT screen terms)	Reference page	
C0037	LH FR WHEEL SPEED SENSOR	EC4-289	A
C003A	RH FR WHEEL SPEED SENSOR	EC4-289	
P0001	FUEL VOLUME REGULATOR	EC4-291	EC4
P0003	FUEL VOLUME REGULATOR	EC4-293	
P0004	FUEL VOLUME REGULATOR	EC4-295	C
P0008	ENGINE POSITION SYSTEM	EC4-297	
P000E	FUEL VOLUME REGULATOR	EC4-300	
P0010	CAMSHAFT POSITION ACTUATR A B1	EC4-302	D
P0011	CAMSHAFT A POSITION	EC4-304	
P0012	CAMSHAFT A POSITION	EC4-305	E
P0013	CAMSHAFT B POSITION	EC4-306	
P0014	CAMSHAFT B POSITION	EC4-308	
P0015	CAMSHAFT B POSITION	EC4-309	F
P0016	CKP - CMP CORRELATION B1 SEN A	EC4-310	
P0017	CKP - CMP CORRELATION B1 SEN B	EC4-311	G
P0030	HO2S HEATER B1 SEN1		
P0031	HO2S HEATER B1 SEN1	EC4-312	H
P0032	HO2S HEATER B1 SEN1		
P0033	TC/SC BYPASS VALVE A	EC4-314	
P0034	TC/SC BYPASS VALVE A	EC4-316	I
P0035	TC/SC BYPASS VALVE A	EC4-318	
P0036	HO2S HEATER B1 SEN2		
P0037	HO2S HEATER B1 SEN2	EC4-320	J
P0038	HO2S HEATER B1 SEN2		
P0039	TC/SC BYPASS VALVE A	EC4-322	
P0068	MAP/MAF - TP CORRELATION	EC4-324	K
P0070	AMBIENT AIR TEMP SENSOR A	EC4-327	
P0071	AMBIENT AIR TEMP SENSOR A	EC4-328	L
P0072	AMBIENT AIR TEMP SENSOR A	EC4-329	
P0073	AMBIENT AIR TEMP SENSOR A	EC4-330	
P007B	CHARGE AIR COOLER TEMP SEN B1	EC4-331	M
P007C	CHARGE AIR COOLER TEMP SEN B1	EC4-334	
P007D	CHARGE AIR COOLER TEMP SEN B1	EC4-336	
P007E	CHARGE AIR COOLER TEMP SEN B1	EC4-338	N
P0087	FUEL RAIL/ SYSTEM PRESSURE	EC4-340	
P0088	FUEL RAIL/ SYSTEM PRESSURE	EC4-347	O
P0089	FUEL PRESSURE REGULATOR 1	EC4-349	
P008A	LOW PRESSURE FUEL SYSTEM	EC4-354	
P008B	LOW PRESSURE FUEL SYSTEM	EC4-355	P
P0096	INTAKE AIR TEMP SENSOR 2 B1	EC4-356	
P0097	INTAKE AIR TEMP SENSOR 2 B1	EC4-359	
P0098	INTAKE AIR TEMP SENSOR 2 B1	EC4-361	
P0099	INTAKE AIR TEMP SENSOR 2 B1	EC4-363	
P0106	MAP/BARO PRESSURE SENSOR	EC4-365	

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< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

DTC	Items (CONSULT screen terms)	Reference page
P0107	MAP/BARO PRESSURE SENSOR	EC4-366
P0108	MAP/BARO PRESSURE SENSOR	EC4-367
P0115	ENGINE COOLANT TEMP SEN 1	EC4-368
P0116	ENGINE COOLANT TEMP SEN 1	EC4-370
P0117	ENGINE COOLANT TEMP SEN 1	EC4-374
P0118	ENGINE COOLANT TEMP SEN 1	
P0119	ENGINE COOLANT TEMP SEN 1	EC4-376
P0122	THROTTLE/PEDAL POS SEN/SW A	EC4-381
P0123	THROTTLE/PEDAL POS SEN/SW A	EC4-384
P0128	COOLANT THERMOSTAT	EC4-387
P0130	O2 SENSOR B1 SENSOR 1	EC4-390
P0133	O2 SENSOR B1 SENSOR 1	EC4-392
P0135	O2 SENSOR HEATER B1 SENSOR 1	EC4-394
P0136	O2 SENSOR B1 SENSOR 2	EC4-396
P0137	O2 SENSOR B1 SENSOR 2	EC4-398
P0138	O2 SENSOR B1 SENSOR 2	EC4-400
P013A	O2 SENSOR B1 SENSOR 2	EC4-402
P013B	O2 SENSOR B1 SENSOR 2	EC4-404
P013E	O2 SENSOR B1 SENSOR 2	EC4-406
P013F	O2 SENSOR B1 SENSOR 2	EC4-408
P0140	O2 SENSOR B1 SENSOR 2	EC4-410
P0141	O2 SENSOR HEATER B1 SENSOR 2	EC4-412
P0170	FUEL TRIM B1	EC4-414
P0171	SYSTEM LEAN B1	EC4-416
P0172	SYSTEM RICH B1	EC4-418
P0181	FUEL TEMPERATURE SENSOR A	EC4-420
P0182	FUEL TEMPERATURE SENSOR A	EC4-423
P0183	FUEL TEMPERATURE SENSOR A	EC4-426
P0184	FUEL TEMPERATURE SENSOR A	EC4-429
P0190	FUEL RAIL PRESSURE SENSOR A	EC4-432
P0191	FUEL RAIL PRESSURE SENSOR A	EC4-435
P0192	FUEL RAIL PRESSURE SENSOR A	EC4-438
P0193	FUEL RAIL PRESSURE SENSOR A	EC4-441
P0201	CYLINDER 1 FUEL INJECTOR	EC4-444
P0202	CYLINDER 2 FUEL INJECTOR	EC4-447
P0203	CYLINDER 3 FUEL INJECTOR	EC4-450
P0204	CYLINDER 4 FUEL INJECTOR	EC4-453
P0217	ENG COOLNT OVER TEMPERATURE	EC4-456
P0219	ENGINE OVERSPEED	EC4-457
P0222	THROTTLE/PEDAL POS SEN/SW B	EC4-458
P0223	THROTTLE/PEDAL POS SEN/SW B	
P0234	TC/SC A	EC4-461
P0236	TC/SC BOOST SENSOR A	EC4-464

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[2.0L TURBO GASOLINE ENGINE]

DTC	Items (CONSULT screen terms)	Reference page	
P0237	TC/SC BOOST SENSOR A	EC4-465	A
P0238	TC/SC BOOST SENSOR A		
P0243	TC/SC WASTEGATE SOLENOID A	EC4-467	EC4
P0245	TC/SC WASTEGATE SOLENOID A	EC4-469	
P0246	TC/SC WASTEGATE SOLENOID A	EC4-471	C
P0262	CYLINDER 1 FUEL INJECTOR	EC4-473	
P0265	CYLINDER 2 FUEL INJECTOR	EC4-475	D
P0268	CYLINDER 3 FUEL INJECTOR	EC4-477	
P0271	CYLINDER 4 FUEL INJECTOR	EC4-479	E
P0299	TC/SC A	EC4-481	
P0300	RANDOM/MULTIPLE CYL MISFIRE	EC4-484	F
P0301	CYLINDER 1 MISFIRE		
P0302	CYLINDER 2 MISFIRE		
P0303	CYLINDER 3 MISFIRE		
P0304	CYLINDER 4 MISFIRE		G
P0324	KNOCK/COMBSTN VIBRTN CNT SYS	EC4-486	
P0327	KNOCK/COMBSTN VIBRTN SEN 1 B1	EC4-487	H
P0328	KNOCK/COMBSTN VIBRTN SEN 1 B1	EC4-489	
P032C	KNOCK/COMBSTN VIBRTN SEN 3 B1	EC4-491	I
P032D	KNOCK/COMBSTN VIBRTN SEN 3 B1	EC4-493	
P0335	CRANKSHAFT POSITION SENSOR A	EC4-495	J
P0339	CRANKSHAFT POSITION SENSOR A	EC4-498	
P0341	CAMSHAFT POSITION SENSOR A B1	EC4-501	K
P0342	CAMSHAFT POSITION SENSOR A B1	EC4-503	
P0343	CAMSHAFT POSITION SENSOR A B1	EC4-505	L
P0351	IGNITION COIL A PRIMARY CONT	EC4-507	
P0352	IGNITION COIL B PRIMARY CONT	EC4-509	M
P0353	IGNITION COIL C PRIMARY CONT	EC4-511	
P0354	IGNITION COIL D PRIMARY CONT	EC4-513	N
P0363	MISFIRE	EC4-515	
P0366	CAMSHAFT POSITION SENSOR B B1	EC4-517	O
P0367	CAMSHAFT POSITION SENSOR B B1	EC4-519	
P0368	CAMSHAFT POSITION SENSOR B B1	EC4-521	P
P0420	CATALYST SYSTEM EFFICIENCY B1	EC4-523	
P0442	Evaporation system leak	EC4-526	
P0444	EVAP system purge control valve A	EC4-527	
P0447	Evaporation system vent control	EC4-530	
P0451	EVAP system pressure sensor/sw	EC4-532	
P0452	EVAP system pressure sensor/sw	EC4-533	
P0453	EVAP system pressure sensor/sw	EC4-534	
P0455	Evaporation system leak	EC4-535	
P0456	Evaporation system leak	EC4-536	
P0457	EVAP SYSTEM LEAK	EC4-537	
P0458	EVAP SYS PURGE CONT VALVE A	EC4-538	

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[2.0L TURBO GASOLINE ENGINE]

DTC	Items (CONSULT screen terms)	Reference page
P0459	EVAP SYS PURGE CONT VALVE A	EC4-541
P0461	FUEL LEVEL SENSOR A	EC4-544
P0462	Fuel level sensor A	EC4-545
P0463	Fuel level sensor A	EC4-546
P0480	FAN 1	EC4-547
P0483	FAN RATIONALITY CHECK	EC4-549
P0485	FAN POWER SUPPLY/GROUND	EC4-551
P0496	EVAP SYSTEM	EC4-553
P0497	EVAP SYSTEM	EC4-556
P0498	Evaporation system vent valve	EC4-559
P0499	Evaporation system vent valve	EC4-561
P04DB	CRANKCASE VENTILATION SYSTEM	EC4-563
P04F0	EVAP sys high pressure purge line	EC4-564
P0500	VEHICLE SPEED SENSOR A	EC4-566
P0505	IDLE CONTROL SYSTEM	EC4-567
P0506	IDLE CONTROL SYSTEM RPM	EC4-568
P0507	DLE CONTROL SYSTEM RPM	EC4-571
P050A	COLD START IDLE CONT SYSTEM	EC4-572
P050B	COLD START IGNITION TIMING	EC4-573
P050D	COLD START ROUGH IDLE	EC4-574
P0511	IDLE AIR CONTROL CIRCUIT	EC4-575
P052A	COLD ST CAMSFT A POS TIMING B1	EC4-576
P052E	POSITV C/CASE VENTILT N REG VLV	EC4-577
P053A	POSITIVE C/CASE VENTILT N HEATER	EC4-578
P053B	POSITIVE C/CASE VENTILT N HEATER	EC4-581
P053C	POSITIVE C/CASE VENTILT N HEATER	EC4-584
P053F	COLD START FUEL PRESSURE	EC4-587
P054A	COLD ST CAMSFT B POS TIMING B1	EC4-592
P0562	SYSTEM VOLTAGE	EC4-593
P0563	SYSTEM VOLTAGE	EC4-594
P0571	BRAKE SWITCH A	EC4-595
P0575	CRUISE CONTROL INPUT CIRCUIT	EC4-596
P0597	THERMOSTAT HEATER	EC4-597
P0598	THERMOSTAT HEATER	EC4-600
P0599	THERMOSTAT HEATER	EC4-603
P0604	CONTROL MODULE	EC4-606
P0606	CONTROL MODULE	EC4-609
P0607	CONTROL MODULE	EC4-610
P060B	CONTROL MODULE	EC4-612
P060C	CONTROL MODULE	EC4-613
P060D	CONTROL MODULE	EC4-614
P0611	FUEL INJECTOR CONTROL MODULE	EC4-615
P0615	STARTER RELAY	EC4-617
P0616	STARTER RELAY	EC4-618

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[2.0L TURBO GASOLINE ENGINE]

DTC	Items (CONSULT screen terms)	Reference page	
P0617	STARTER RELAY	EC4-619	A
P061A	CONTROL MODULE	EC4-620	EC4
P061B	CONTROL MODULE	EC4-621	
P061C	CONTROL MODULE	EC4-622	
P061D	CONTROL MODULE	EC4-623	
P0627	FUEL PUMP A	EC4-624	C
P0628	FUEL PUMP A	EC4-627	D
P0629	FUEL PUMP A	EC4-630	
P062A	FUEL PUMP A	EC4-633	E
P062B	CONTROL MODULE	EC4-636	
P062C	CONTROL MODULE	EC4-637	F
P062F	CONTROL MODULE	EC4-638	
P0634	CONT MODULE INTERNAL TEMP A	EC4-639	G
P0638	THROTTLE ACTUATOR B1	EC4-640	
P063E	AUTO CONFIG THROTTLE INPUT	EC4-643	H
P0641	SENSOR REFERENCE VOLT A	EC4-646	
P0642	SENSOR REFERENCE VOLT A	EC4-647	I
P0643	SENSOR REFERENCE VOLT A	EC4-648	
P064D	CONTROL MODULE	EC4-652	J
P0651	SENSOR REFERENCE VOLT B	EC4-653	
P065B	GENERATOR CONTROL CIRCUIT	EC4-654	K
P0667	CONT MODULE INTRNL TEMP SEN A	EC4-655	
P0691	FAN 1	EC4-656	L
P0692	FAN 1	EC4-658	
P0697	SENSOR REFERENCE VOLT C	EC4-660	M
P06AF	TORQUE MANAGEMENT SYSTEM	EC4-661	
P06DA	ENG OIL PRESSURE CONT CIRC	EC4-662	N
P06DB	ENG OIL PRESSURE CONT CIRC	EC4-664	
P06DC	ENG OIL PRESSURE CONT CIRC	EC4-666	O
P0702	TRANSMISSION CONTROL SYSTEM	EC4-668	
P0715	INPUT/TURBINE SPEED SENSOR A	EC4-669	P
P0716	INPUT/TURBINE SPEED SENSOR A	EC4-670	
P0717	INPUT/TURBINE SPEED SENSOR A	EC4-671	O
P0718	INPUT/TURBINE SPEED SENSOR A	EC4-672	
P0740	TORQUE CONVERTER CLUTCH	EC4-673	P
P0743	TORQUE CONVERTER CLUTCH	EC4-674	
P0748	PRESSURE CONTROL SOLENOID A	EC4-675	P
P0753	SHIFT SOLENOID A	EC4-676	
P0758	SHIFT SOLENOID B	EC4-677	O
P0763	SHIFT SOLENOID C	EC4-678	
P0778	SHIFT SOLENOID B	EC4-679	P
P0798	SHIFT SOLENOID C	EC4-680	
P0A0F	ENGINE FAILED TO START	EC4-681	P
P0A1E	STARTR/GENERATR CONT MODUL	EC4-682	

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[2.0L TURBO GASOLINE ENGINE]

DTC	Items (CONSULT screen terms)	Reference page
P1188	NTAKE AIR PRESSURE SENSOR	EC4-685
P1189	INTAKE AIR PRESSURE SENSOR	EC4-687
P1190	INTAKE AIR PRESSURE SENSOR	EC4-689
P13B2	IGNITION COIL FUSE 1	EC4-692
P13B3	IGNITION COIL FUSE 1	EC4-693
P13C5	TORQUE LIMIT BY KNOCK CONT	EC4-694
P13C6	TORQUE LIMIT BY KNOCK CONT	EC4-694
P13EA	COLD START IGN ANGLE SETTING	EC4-695
P1522	EVAP control system check valve	EC4-696
P1523	EVAP control system check valve	EC4-697
P1525	EVAP control system check valve	EC4-698
P1614	INTERNAL CONTROL UNITRESET	EC4-746
P1616	REVERSE DRIVING LIGHT OUTPUT	EC4-747
P1644	CONFIGURATION INCORRECT	EC4-750
P1670	TORQUE CURVE CALIBRATION	EC4-757
P167B	DRIVTRN SHUTOFF DUE TO CRASH	EC4-758
P1CCF	HIGH PRESSURE SYSTEM	EC4-763
P1CDE	ECO START/STOP FUNCTION	EC4-768
P1CDF	S/S: RESTART CANCEL	EC4-769
P1CE2	ECO START/STOP FUNCTION	EC4-770
P1CE7	CRANKCASE VENTILATION SYSTEM	EC4-771
P1D01	CRANKCASE VENT VALVE	EC4-772
P1D02	CRANKCASE VENT VALVE	EC4-773
P1D03	CRANKCASE VENT VALVE	EC4-774
P1D04	ECO START/STOP FUNCTION	EC4-775
P1D05	ECO START/STOP FUNCTION	EC4-776
P1D06	ECO START/STOP FUNCTION	EC4-778
P1D07	ECO START/STOP FUNCTION	EC4-779
P1D68	CRANKCASE VENT LINE	EC4-781
P2072	THROTTLE ACTUATOR CONT SYS	EC4-782
P2088	CAMSHAFT A POSITN ACTUATR B1	EC4-785
P2089	CAMSHAFT A POSITN ACTUATR B1	EC4-787
P2090	CAMSHAFT B POSITN ACTUATR B1	EC4-789
P2091	CAMSHAFT B POSITN ACTUATR B1	EC4-791
P2096	POST CAT FUEL TRIM SYSTEM B1	EC4-793
P2097	POST CAT FUEL TRIM SYSTEM B1	EC4-795
P2101	THROTTLE ACT A CONT MOTOR	EC4-797
P2102	THROTTLE ACT A CONT MOTOR	EC4-797
P2103	THROTTLE ACT A CONT MOTOR	EC4-803
P2111	Throttle actuator A control system	EC4-806
P2122	THROTTLE/PDL POSITION SEN/SW D	EC4-809
P2123	THROTTLE/PDL POSITION SEN/SW D	EC4-812
P2127	THROTTLE/PDL POSITION SEN/SW E	EC4-815
P2128	THROTTLE/PDL POSITION SEN/SW E	EC4-818

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< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

DTC	Items (CONSULT screen terms)	Reference page	
P2135	THTL/PDL POS SEN/SW A/B CRRLTN	EC4-821	A
P2136	THTL/PDL POS SEN/SW A/C CRRLTN	EC4-824	EC4
P2137	THTL/PDL POS SEN/SW B/C CRRLTN	EC4-827	
P2138	THTL/PDL POS SEN/SW D/E CRRLTN	EC4-830	
P2176	Throttle actuator A control system	EC4-833	
P2177	SYSTEM LEAN B1	EC4-836	D
P2178	SYSTEM RICH B1	EC4-838	
P2187	SYSTEM LEAN B1	EC4-840	E
P2188	SYSTEM RICH B1	EC4-842	
P2195	O2 SENSOR B1 SENSOR 1	EC4-844	F
P2196	O2 SENSOR B1 SENSOR 1	EC4-846	
P219C	CYL1 AIR-FUEL RATIO IMBALANCE	EC4-848	G
P219D	CYL2 AIR-FUEL RATIO IMBALANCE	EC4-850	
P219E	CYL3 AIR-FUEL RATIO IMBALANCE	EC4-852	H
P219F	CYL4 AIR-FUEL RATIO IMBALANCE	EC4-854	
P2227	BAROMETRIC PRESSURE SEN A	EC4-856	I
P2228	BAROMETRIC PRESSURE SEN A	EC4-857	
P2229	BAROMETRIC PRESSURE SEN A	EC4-858	J
P2230	BAROMETRIC PRESSURE SEN A	EC4-859	
P2231	O2 SENSOR B1 SENSOR 1	EC4-860	K
P2237	O2 SENSOR B1 SENSOR 1	EC4-862	
P2243	O2 SENSOR B1 SENSOR 1	EC4-864	L
P2251	O2 SENSOR B1 SENSOR 1	EC4-866	
P2263	TC/SC BOOST SYSTEM	EC4-868	M
P2270	O2 SENSOR B1 SENSOR 2	EC4-871	
P2271	O2 SENSOR B1 SENSOR 2	EC4-873	N
P2279	INTAKE AIR SYSTEM LEAK	EC4-875	
P2280	A/FLOW RESTRICTION/AIR LEAK B1	EC4-876	O
P2282	—	EC4-877	
P2300	IGNITION COIL A PRIMARY CONT	EC4-878	P
P2301	IGNITION COIL A PRIMARY CONT	EC4-880	
P2303	IGNITION COIL B PRIMARY CONT	EC4-882	N
P2304	IGNITION COIL B PRIMARY CONT	EC4-884	
P2306	IGNITION COIL C PRIMARY CONT	EC4-886	O
P2307	IGNITION COIL C PRIMARY CONT	EC4-888	
P2309	IGNITION COIL D PRIMARY CONT	EC4-890	P
P230A	Cylinder 1 Air-Fuel Ratio Imbalance	EC4-892	
P230B	Cylinder 2 air-fuel ratio imbalance	EC4-893	O
P230C	Cylinder 3 Air-Fuel Ratio Imbalance	EC4-894	
P230D	Cylinder 4 Air-Fuel Ratio Imbalance	EC4-895	P
P2310	IGNITION COIL D PRIMARY CONT	EC4-896	
P2336	CYL1 KNOCK/CMBSTN VIBRTN SEN	EC4-898	O
P2337	CYL2 KNOCK/CMBSTN VIBRTN SEN	EC4-898	
P2338	CYL3 KNOCK/CMBSTN VIBRTN SEN	EC4-898	

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

DTC	Items (CONSULT screen terms)	Reference page
P2339	CYL4 KNOCK/CMBSTN VIBRTN SEN	EC4-898
P2414	O2 SENSOR B1 SENSOR 1	EC4-899
P2422	Evaporation system vent valve	EC4-901
P24D6	EVAP system pressure sensor/sw B	EC4-903
P24D7	EVAP system pressure sen/sw B	EC4-905
P24D8	EVAP pressure sensor/switch B	EC4-907
P2505	ECM/PCM POWER INLET SIGNAL	EC4-909
P250B	ENGINE OIL LEVEL SENSOR	EC4-910
P250E	ENGINE OIL LEVEL SENSOR	EC4-912
P252B	ENGINE OIL QUALITY SENSOR	EC4-914
P2539	LOW PRESS FUEL SYSTEM SENSOR	EC4-915
P2540	LOW PRESS FUEL SYSTEM SENSOR	EC4-918
P2541	LOW PRESS FUEL SYSTEM SENSOR	EC4-921
P2542	LOW PRESS FUEL SYSTEM SENSOR	EC4-924
P257D	ENGINE HOOD SWITCH	EC4-927
P2600	COOLANT PUMP A	EC4-929
P2602	COOLANT PUMP A	EC4-931
P2603	COOLANT PUMP A	EC4-933
P2610	ECM/PCM ENGINE OFF TIMER	EC4-935
P2617	CAMSHAFT POSITION SIGNAL	EC4-936
P2626	O2 SENSOR B1 SENSOR 1	EC4-939
P2716	PRESSURE CONTROL SOLENOID D	EC4-941
P2725	PRESSURE CONTROL SOLENOID E	EC4-942
P2734	PRESSURE CONTROL SOLENOID F	EC4-943
P2757	TORQ CONVRTR CL PRES CNT SOL	EC4-944
P2759	TORQ CONVRTR CL PRES CNT SOL	EC4-945
P2766	INPUT/TURBINE SPEED SENSOR B	EC4-946
P2767	INPUT/TURBINE SPEED SENSOR B	EC4-947
P2768	INPUT/TURBINE SPEED SENSOR B	EC4-948
P2810	PRESSURE CONTROL SOLENOID G	EC4-949

DTC Sub Type Index

INFOID:000000013289824

Malfunction Type	Items (CONSULT screen terms)	Description
00	NO SUBTYPE INFORMATION	No subtype information
01	ELECTRICAL MALFUNCTION	Electrical malfunction
02	GENERAL ELEC MALFUNCTN	General electrical malfunction
03	FM/PWM ERROR	Frequency modulated/Pulse width modulated
04	SYSTEM INTERNAL MALFUNCTN	System internal malfunction
05	SYSTEM PROGRAMMING ERROR	System programming error
06	ALGORITHM BASED ERROR	Algorithm based error
07	MECHANICAL MALFUNCTION	Mechanical malfunction
08	BUS SIGNAL/MESSAGE ERROR	Bus Signal/Message error

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Malfunction Type	Items (CONSULT screen terms)	Description	A
09	COMPONENT MALFUNCTION	Component malfunction	
11	CIRCUIT SHORT TO GROUND	Circuit short to ground	EC4
12	CIRCUIT SHORT TO BATTERY	Circuit short to battery	
13	CIRCUIT OPEN	Circuit open	
14	CIRC SHORT TO GRND OR OPEN	Circuit short to ground or open	C
15	CIRC SHORT TO BATT OR OPEN	Circuit short to battery or open	
16	CIRC VOLT BELOW THRESHOLD	Circuit voltage below threshold	
17	CIRC VOLT ABOVE THRESHOLD	Circuit voltage above threshold	D
18	CIRC CRRNT BELOW THRESHLD	Circuit current below threshold	
19	CIRC CRRNT ABOVE THRESHOLD	Circuit current above threshold	E
1A	CIRC RESIST BELOW THRESHLD	Circuit resistance below threshold	
1B	CIRC RESIST ABOVE THRESHLD	Circuit resistance above threshold	
1C	CIRC VOLTAGE OUT OF RANGE	Circuit voltage out of range	F
1D	CIRC CURRENT OUT OF RANGE	Circuit current out of range	
1E	CIRC RESISTANCE OUT OF RANGE	Circuit resistance out of range	
1F	CIRCUIT INTERMITTENT	Circuit intermittent	G
21	SIGNAL AMPLITUDE < MIN	Signal amplitude < minimum	
22	SIG AMPLITUDE > MAX	Signal amplitude > maximum	H
23	SIGNAL STUCK LOW	Signal stuck low	
24	SIGNAL STUCK HIGH	Signal stuck high	
25	SIG SHAPE/WAVEFORM FAILURE	Signal shape/waveform failure	I
26	SIG RTE OF CHNG BLW THRESHLD	Signal rate of change below threshold	
27	SIG RTE OF CHNG ABV THRESHLD	Signal rate of change above threshold	J
28	SG BS LVL O-OF RNG/ZR AJST FLR	Signal bias level out of range/zero adjustment failure	
29	SIGNAL INVALID	Signal invalid	
2A	SIGNAL STUCK IN RANGE	Signal stuck in range	K
2B	SIGNAL CROSS COUPLED	Signal cross coupled	
2F	SIGNAL ERRATIC	Signal erratic	L
31	NO SIGNAL	No signal	
32	SIGNAL LOW TIME < MIN	Signal low time < minimum	
33	SIGNAL LOW TIME > MAX	Signal low time > maximum	M
34	SIGNAL HIGH TIME < MIN	Signal high time < minimum	
35	SIGNAL HIGH TIME > MAX	Signal high time > maximum	
36	SIGNAL FREQUENCY TOO LOW	Signal frequency too low	N
37	SIGNAL FREQUENCY TOO HIGH	Signal frequency too high	
38	SIGNAL FREQUENCY INCORRECT	Signal frequency incorrect	O
39	SIGNAL HAS TOO FEW PULSES	Signal has too few pulses	
3A	SIGNAL HAS TOO MANY PULSES	Signal has too many pulses	P
41	GENERAL CHECKSUM ERROR	General checksum error	
42	MEMORY ERROR	Memory error	
43	SPECIAL MEMORY ERROR	Special memory error	
44	DATA MEMORY ERROR	Data memory error	
45	PROGRAM MEMORY ERROR	Program memory error	
46	CALIB/PRMTER MEMORY ERROR	Calibration/parameter memory error	

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Malfunction Type	Items (CONSULT screen terms)	Description
47	WATCHDOG/SAFETY μ C ERROR	Watchdog/safety μ C error
48	SUPERVISION SOFTWARE ERROR	Supervision software error
49	INTERNAL ELECTRONIC ERROR	Internal electronic error
4A	INCRRCT COMPNT INSTALLED	Incorrect component installed
4B	OVER TEMPERATURE	Overtemperature
51	NOT PROGRAMMED	Not programmed
52	NOT ACTIVATED	Not activated
53	DEACTIVATED	Deactivated
54	MISSING CALIBRATION	Missing calibration
55	NOT CONFIGURED	Not configured
61	SIGNAL CALCULATION ERROR	Signal calculation error
62	SIGNAL COMPARE ERROR	Signal compare error
63	CIRC/COMP PROTECTN TIMEOUT	Circuit/component protection timeout
64	SIGNAL PLAUSIBILITY ERROR	Signal plausibility error
65	SIG HAS TOO FEW TRNSIT/EVNTS	Signal has too few transitions/events
66	SIG HAS TOO MANY TRNSIT/EVNTS	Signal has too many transitions/events
67	SIGNAL INCORRECT AFTER EVENT	Signal incorrect after event
68	EVENT INFORMATION	Event information
71	ACTUATOR STUCK	Actuator stuck
72	ACTUATOR STUCK OPEN	Actuator stuck open
73	ACTUATOR STUCK CLOSED	Actuator stuck closed
74	ACTUATOR SLIPPING	Actuator slipping
75	EMRGNCY POSI NOT REACHABLE	Emergency position not reachable
76	WRONG MOUNTING POSITION	Wrong mounting position
77	COMMAND POSI NOT REACHABLE	Commanded position not reachable
78	ALGNMNT OR ADJSTMNT INCRRCT	Alignment or adjustment incorrect
79	MECHANCL LINKAGE MALFNCTN	Mechanical linkage malfunction
7A	FLUID LEAK OR SEAL FAILURE	Fluid leak or seal failure
7B	LOW FLUID LEVEL	Low fluid level
81	INVALID SERIAL DATA RECEIVED	Invalid serial data received
82	SEQUENCE COUNTER INCORRECT	Sequence counter incorrect
83	PROTECT CALCULATION ERROR	Protection calculation error
84	SIG BELOW ALLOWABLE RANGE	Signal below allowable range
85	SIG ABOVE ALLOWABLE RANGE	Signal above allowable range
86	SIGNAL INVALID	Signal invalid
87	MISSING MESSAGE	Missing message
88	BUS OFF	Bus off
8F	ERRATIC	Erratic
91	PARAMETRIC	Parametric
92	PFM/INCORRECT OPERATN	Performance/Incorrect operation
93	NO OPERATION	No operation
94	UNEXPECTED OPERATION	Unexpected operation
95	INCORRECT ASSEMBLY	Incorrect assembly
96	CMPNENT INTERNAL MLFNCTN	Component internal malfunction

ECM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Malfunction Type	Items (CONSULT screen terms)	Description	
97	CMP/SYS OPR OBST OR BLKD	Component or system operation obstructed or blocked	A
98	COMPONENT/SYS OVER TEMP	Component/System overtemperature	EC4
9A	OPERATING CONDITIONS	Operating conditions	
F0	TIME OUT	Time out	
F1	OVERLOAD	Overload	C
F2	NOT READABLE	Not readable	

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FUEL PUMP CONTROL MODULE (FPCM)

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

FUEL PUMP CONTROL MODULE (FPCM)

Reference Value

INFOID:000000013289825

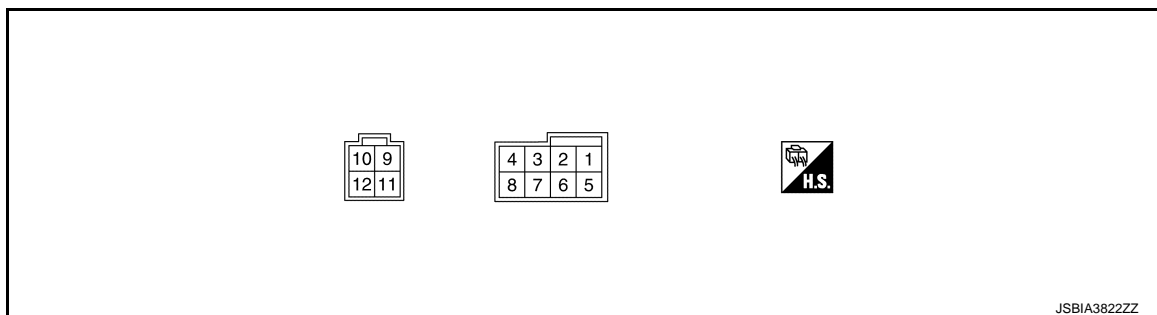
VALUES ON THE DIAGNOSIS TOOL

NOTE:

- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.
- Numerical values in the following table are reference values.
- These values are input/output values that FPCM receives/transmits and may differ from actual operations. For outlines of following items, refer to [EC4-120. "CONSULT Function"](#).

Monitor item	Condition	Values/Status (Approx.)
STATUS OF FUEL PUMP	<ul style="list-style-type: none"> • Ignition switch: ON • Engine: Stopped • Fuel pump: Not operates 	0.0 V
	<ul style="list-style-type: none"> • Engine: running (at idle) 	8.6 – 9.5 V
FUEL PRESSURE	<ul style="list-style-type: none"> • Engine: running (at idle) 	4.0 – 6.7 bar
INSIDE TEMP OF CONT UNIT	Indicates inside temperature of FPCM.	
FUEL PUMP REQUEST	<ul style="list-style-type: none"> • Ignition switch: ON • Engine: Stopped • Fuel pump: Not operates 	Off
	<ul style="list-style-type: none"> • Engine: running (at idle) 	On
STATUS OF CIRCUIT	Ignition switch: ON	On

TERMINAL LAYOUT



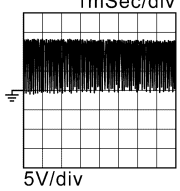
PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
2 (R)	9 (B)	Fuel pump activation request signal	Input	Ignition switch: ON	12 V
				Engine is running	0 V
3 (L)	—	Drivetrain CAN-H	Input/Output	—	—
4 (V)	—	Drivetrain CAN-L	Input/Output	—	—
5 (SB)	9 (B)	Ignition power supply	Input	Ignition switch: ON	Battery voltage
6 (Y)	—	Sensor ground (Fuel pressure sensor)	—	—	—

FUEL PUMP CONTROL MODULE (FPCM)

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
7 (R)	9 (B)	Fuel pressure sensor signal	Input	Ignition switch: ON	1.5 V
				Engine is running	1.9 V
8 (LG)	6 (Y)	Sensor power supply (Fuel pressure sensor)	Output	Ignition switch: ON	5 V
9 (B)	—	Ground	—	—	—
10 (L)	9 (B)	Ignition power supply (MAIN RELAY)	Input	Always	Battery voltage
11 (G)	—	Fuel pump ground	—	—	—
12 (O)	9 (B)	Fuel pump control signal (PWM)	Output	Ignition switch: ON	0 V
				Engine is running (at idle)	<div style="text-align: center;"> <p>7 V★</p> <p>1mSec/div</p>  <p>5V/div JSBIA5310GB</p> </div>

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

*: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Fail-safe (FPCM)

INFOID:000000013289826

DTC No.	Operating condition in fail-safe mode
U0100	pressure control on substitute value
P2539 P2540 P2541 P2542	open loop pressure control

DTC Index

INFOID:000000013289827

DTC*	Items (CONSULT screen terms)	Reference page
U0100	COMMUNICATION ERROR (LOST)	EC4-244
U0401	COMMUNICATION ERROR (INVALID)	EC4-261
B210D	POWER SUPPLY OF KL30	EC4-286
B210E	POWER SUPPLY OF KL30	EC4-286
P0087	FUEL RAIL/SYSTEM PRESSURE	EC4-344
P0627	FUEL PUMP A CONTROL	EC4-624
P0628	FUEL PUMP A CONTROL	EC4-627
P0629	FUEL PUMP A CONTROL	EC4-630
P062A	FUEL PUMP A CONTROL	EC4-633
P0A7C	MOTOR ELECTRONICS OVER TEMP	EC4-683
P1240	CAN BUS	EC4-691

FUEL PUMP CONTROL MODULE (FPCM)

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

DTC*	Items (CONSULT screen terms)	Reference page
P1611	FUEL PUMP	EC4-745
P162A	CONTROL UNIT "FUEL PUMP"	EC4-749
P2539	LOW PRESS FUEL SYSTEM SENSOR	EC4-915
P2540	LOW PRESS FUEL SYSTEM SENSOR	EC4-918
P2541	LOW PRESS FUEL SYSTEM SENSOR	EC4-921
P2542	LOW PRESS FUEL SYSTEM SENSOR	EC4-924

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

EMCM

Reference Value

INFOID:000000013289828

VALUES ON THE DIAGNOSIS TOOL

NOTE:

- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.
- Numerical values in the following table are reference values.
- These values are input/output values that EMCM receives/transmits and may differ from actual operations. For outlines of following items, refer to [EC4-122. "CONSULT Function"](#).

Monitor item	Condition		Values/Status (Approx.)
ALT DUTY	The item is displayed but is not used.		
BAT TEMP SEN	<ul style="list-style-type: none"> • Engine: After warming up • Selector lever position: Neutral • A/C switch: OFF • No load 		Indicated temperature around the main battery.
ENG RESTART B/R STK CNT	Ignition switch: ON		0
BAT CUR SEN	<ul style="list-style-type: none"> • Engine speed: Idle • Main battery: Full charged*1 • Selector lever position: Neutral • A/C switch: OFF • No load 		2,600 - 2,730 mV
CML B/DCHG CRNT	Ignition switch: ON		Indicated cumulative main battery discharge current.
LOAD SIGNAL	Ignition switch: ON	Rear window defogger switch: ON and/or Lighting switch: 2nd position	On
		Rear window defogger switch and lighting switch: OFF	Off
HEATER FAN SW	<ul style="list-style-type: none"> • Engine: After warming up • Engine speed: Idle 	Heater fan switch: ON	On
		Heater fan switch: OFF	Off
BRAKE SW2	Ignition switch: ON	Brake pedal: Fully released	Off
		Brake pedal: Slightly depressed	On
BATTERY STS	Engine: Running	Main battery output is normal	OK
		Main battery output is abnormal	NG
AT STOP START SW	Ignition switch: ON	Stop/Start system: Activated	On
		Stop/Start system: Not activated	Off
ALT DUTY SIG	Engine on energy management function: Operating		On
	Engine on energy management function: Not operating		Off
BATTERY VOLT	Ignition switch: ON		Main battery voltage
SUB-BATTERY TEMP SENSOR	<ul style="list-style-type: none"> • Engine: After warming up • Selector lever position: Neutral • A/C switch: OFF • No load 		Indicated temperature around the sub battery.
SUB-BATTERY VOLTAGE	Ignition switch: ON		Sub battery voltage
CMLTV S/BAT DIS-CHG CRNT	Ignition switch: ON		Indicated cumulative sub battery discharge current.

EMCM

< ECU DIAGNOSIS INFORMATION >

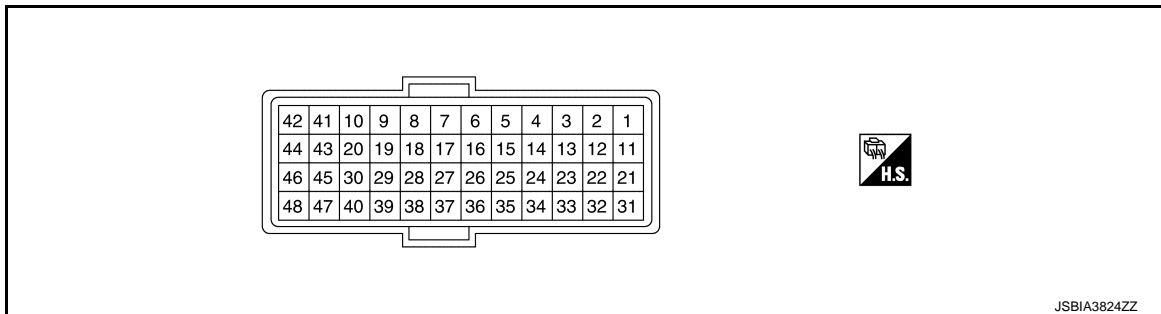
[2.0L TURBO GASOLINE ENGINE]

Monitor item	Condition		Values/Status (Approx.)
SUB-BAT CURRENT SEN V	<ul style="list-style-type: none"> • Engine speed: Idle • Sub battery: Full charged*1 • Selector lever position: Neutral • A/C switch: OFF • No load 		2,790 - 2,830 mV
C/DYNAMOMETER MODE	Engine speed: idle	CASSIS DYNAMOMETER MODE*2 is ON.	On
		CASSIS DYNAMOMETER MODE*2 is OFF.	Off
BRAKE PEDAL POSITION SW	Ignition switch: ON	Brake pedal: Fully released	On
		Brake pedal: Slightly depressed	Off
SUB-BATTERY STATUS	Engine: Running	Sub battery output is normal	OK
		Sub battery output is abnormal	NG

*1: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

*2: CASSIS DYNAMOMETER MODE is WORK SUPPORT function. For details, refer to [EC4-221, "Description"](#).

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

Pulse signal is measured by CONSULT.

Terminal No. (Wire color)		Description	Condition	Value (Approx.)	
+	-	Signal name			Input/Output
1 (Y)	48 (B)	EMCM relay control (Self shut-off)	Output	[Ignition switch: ON]	0 - 1.0 V
				[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	Battery voltage (11 - 14 V)
5 (L)	48 (B)	Ignition switch	Input	[Ignition switch: OFF]	0 V
				[Ignition switch: ON]	Battery voltage (11 - 14 V)
6 (LG)	48 (B)	Stop lamp switch	Input	[Ignition switch: ON] • Brake pedal: Fully released	0 V
				[Ignition switch: ON] • Brake pedal: Fully depressed	Battery voltage (11 - 14 V)
9 (L)	—	CAN-H	Input/Output	—	—
10 (P)	—	CAN-L	Input/Output	—	—

EMCM

< ECU DIAGNOSIS INFORMATION >

[2.0L TURBO GASOLINE ENGINE]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
13 (W)	48 (B)	Stop/start OFF switch	Input	[Ignition switch: ON] • Stop/start OFF switch: OFF	Battery voltage (11 - 14 V)
				[Ignition switch: ON] • Stop/start OFF switch: Hold pressed	0 V
15 (Y)	35 (SB)	Sensor power supply (Main battery current sensor, main battery temperature sensor)	Output	[Ignition switch: ON]	5.0 V
16 (W)	36 (G)	Sensor power supply (Sub battery current sensor, sub battery temperature sensor)	Output	[Ignition switch: ON]	5.0 V
21 (V)	48 (B)	Sub battery relay control	Output	[Stop/start system operates] • Engine speed: Idle	0 V
				[Ignition switch: ON]	Battery voltage (11 - 14 V)
22 (G)	48 (B)	Engine restart bypass control re- lay control	Output	[Stop/start system operates] • While cranking of restart	0 V (While operating the starter motor)
				[Engine is running] • Warm-up condition • Engine speed: Idle	Battery voltage (11 - 14 V)
23 (BR)	48 (B)	Brake pedal position switch	Input	[Ignition switch: ON] • Brake pedal: Fully released	Battery voltage (11 - 14 V)
				[Ignition switch: ON] • Brake pedal: Fully depressed	0 V
24 (GR)	35 (SB)	Main battery current sensor	Input	[Engine is running] • Main battery: Fully charged* • Engine speed: Idle	2.6 - 3.5 V Output voltage varies with main battery current.
25 (BG)	35 (SB)	Main battery temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with main battery temperature.
26 (R)	36 (G)	Sub battery current sensor	Input	[Engine is running] • Sub battery: Fully charged* • Engine speed: Idle	2.6 - 3.5 V Output voltage varies with sub bat- tery current.
27 (BR)	36 (G)	Sub battery temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with sub bat- tery temperature.
35 (SB)	—	Sensor ground (Main battery current sensor, main battery temperature sensor)	—	—	—
36 (G)	—	Sensor ground (Sub battery current sensor, sub battery temperature sensor)	—	—	—
42 (G)	48 (B)	Power supply for EMCM	Input	[Ignition switch: ON]	Battery voltage (11 - 14 V)
45 (R)		Sub battery voltage monitor	Input	Always	Sub battery voltage
47 (B)	—	EMCM ground	—	—	—
48 (B)	—	EMCM ground	—	—	—

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*: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-248. "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Fail-safe (EMCM)

INFOID:000000013289829

STOP/START SYSTEM

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)
B1910 B1911	Sub battery relay	Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time
P0120	Sensor power supply	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P0605 P0607	EMCM	Prohibit the stop/start system operation	Restart the engine —	Prohibit the stop/start system operation from the next time
P0643	Sensor power supply	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1540 P1543 P1544 P1541 P1542	Sub battery current sensor	Prohibit the stop/start system operation	— Restart the engine	Prohibit the stop/start system operation from the next time
P1546 P1547	Sub battery temperature sensor	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1550 P1553 P1554 P1551 P1552	Main battery current sensor	Prohibit the stop/start system operation	— Restart the engine	Prohibit the stop/start system operation from the next time
P1556 P1557	Main battery temperature sensor	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1575	Brake switch	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1576 P1577	Brake pedal position switch	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
P1655	Engine restart bypass relay	Prohibit the stop/start system operation	Prohibit the stop/start system operation	Prohibit the stop/start system operation from the next time
P1656	Engine restart bypass relay	Prohibit the stop/start system operation	Prohibit the stop/start system operation	Prohibit the stop/start system operation from the next time

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)
P1805	Brake switch	Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time
U1000	CAN communication line	Prohibit the stop/start system operation	Restart the engine NOTE: Does not start the engine by the CAN communication abnormal status	Prohibit the stop/start system operation from the next time

DTC Index

INFOID:000000013289830

DTC*	Items (CONSULT screen terms)	Reference page
U1000	CAN COMM CIRCUIT	EC4-273
B1910	SUB BATTERY RELAY	EC4-279
B1911	SUB BATTERY RELAY	EC4-282
P0120	THRTL POS SEN/CIRC	EC4-378
P0605	ECM	EC4-607
P0607	ECM	EC4-610
P0643	SENSOR POWER/CIRC	EC4-648
P1540	BATTERY CURRENT SENSOR B	EC4-699
P1541	BATTERY CURRENT SENSOR B	EC4-703
P1542	BATTERY CURRENT SENSOR B	EC4-703
P1543	BATTERY CURRENT SENSOR B	EC4-707
P1544	BATTERY CURRENT SENSOR B	EC4-711
P1546	BATTERY TEMPERATURE SENSOR B	EC4-715
P1547	BATTERY TEMPERATURE SENSOR B	EC4-715
P1550	BAT CURRENT SENSOR	EC4-718
P1551	BAT CURRENT SENSOR	EC4-722
P1552	BAT CURRENT SENSOR	EC4-722
P1553	BAT CURRENT SENSOR	EC4-726
P1554	BAT CURRENT SENSOR	EC4-730
P1556	BATTMPSEN/CIRC	EC4-734
P1557	BATTMPSEN/CIRC	EC4-734
P1575	BRAKE SW	EC4-737
P1576	ASCD BRAKE SW	EC4-740
P1577	ASCD BRAKE SW	EC4-743
P1655	ENGINE RESTART BYPASS RELAY	EC4-751
P1656	ENGINE RESTART BYPASS RELAY	EC4-754
P1805	BRAKE SW/CIRCUIT	EC4-759

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

ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

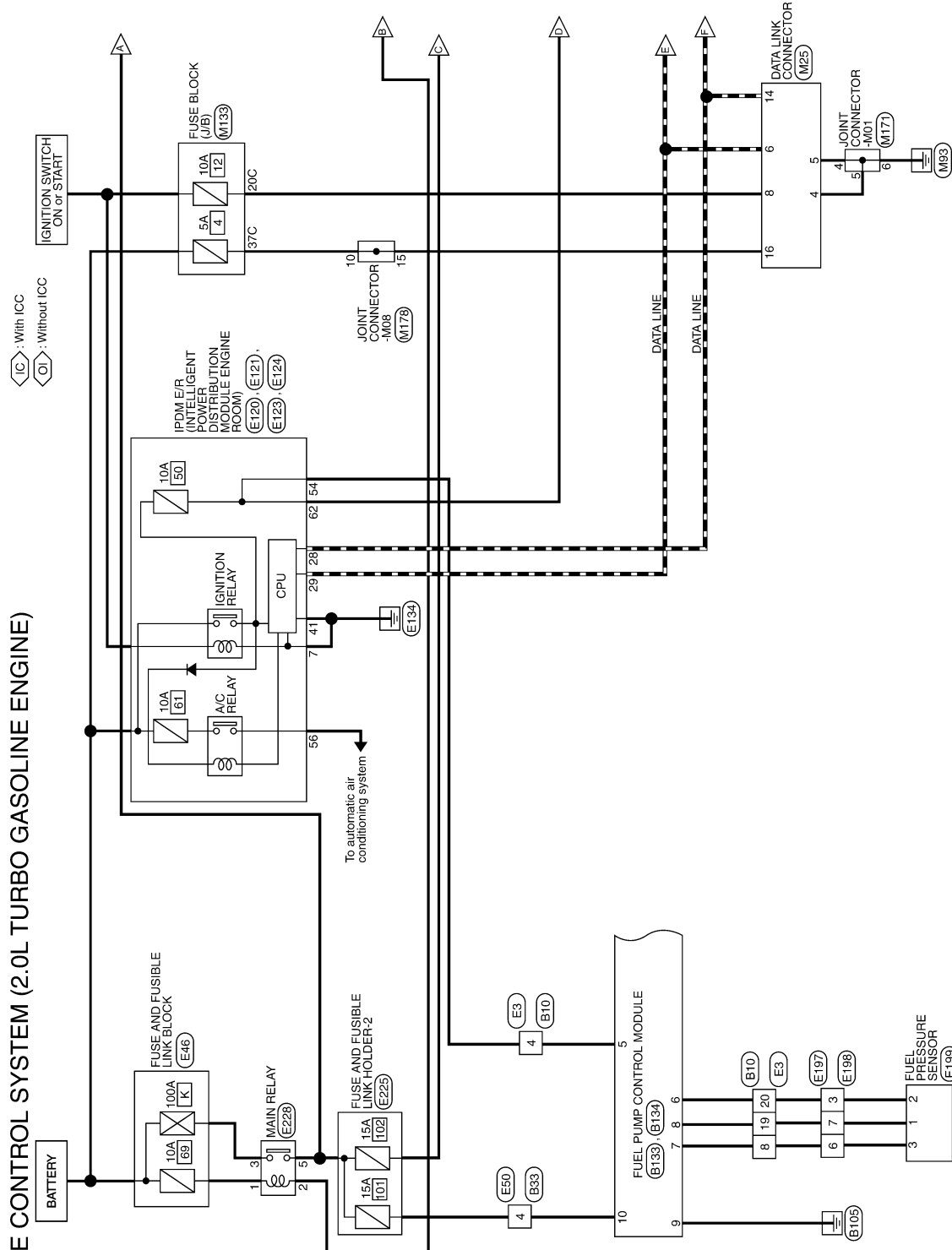
< WIRING DIAGRAM >

WIRING DIAGRAM

ENGINE CONTROL SYSTEM

Wiring Diagram

INFOID:0000000013289831



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

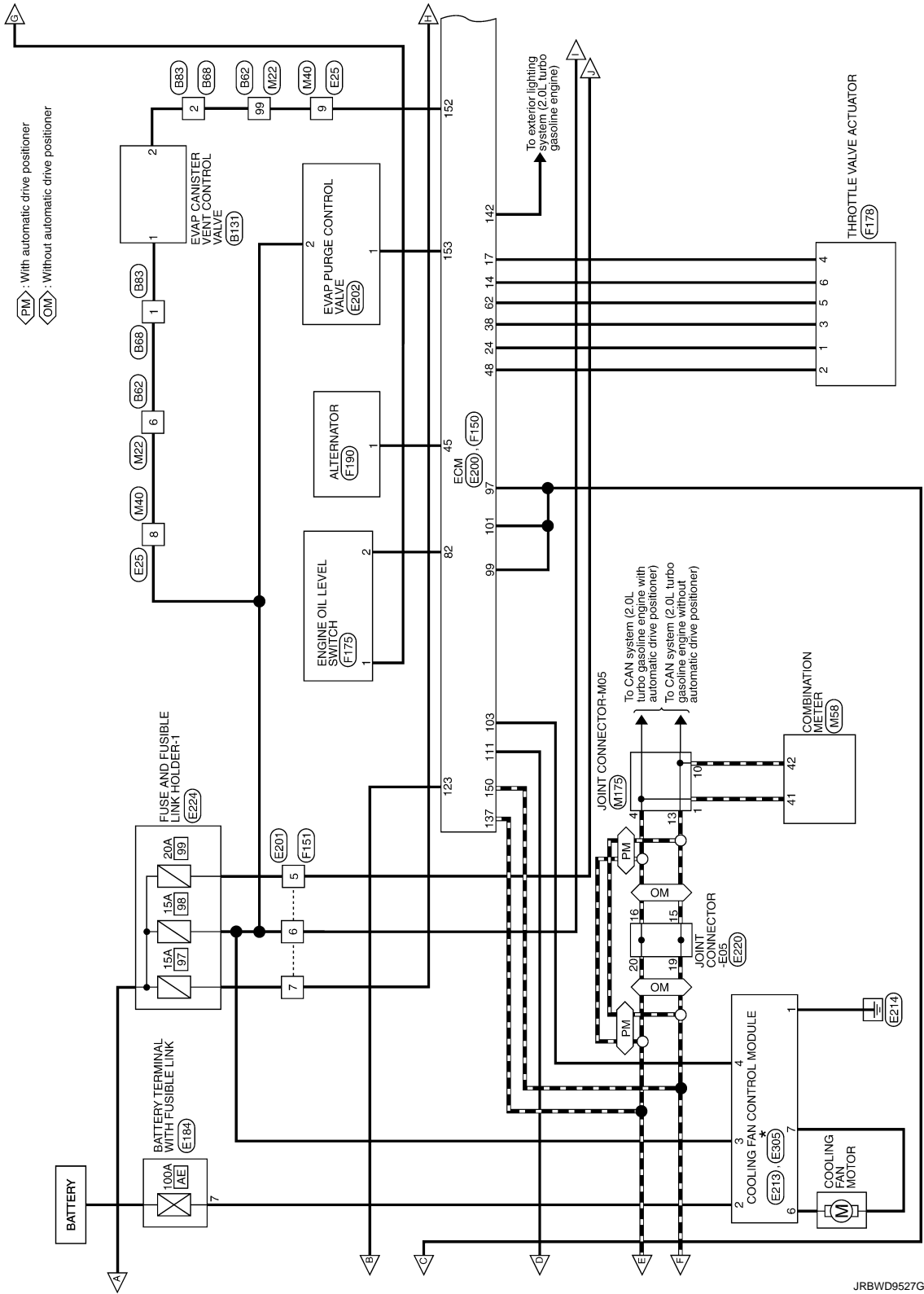
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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >



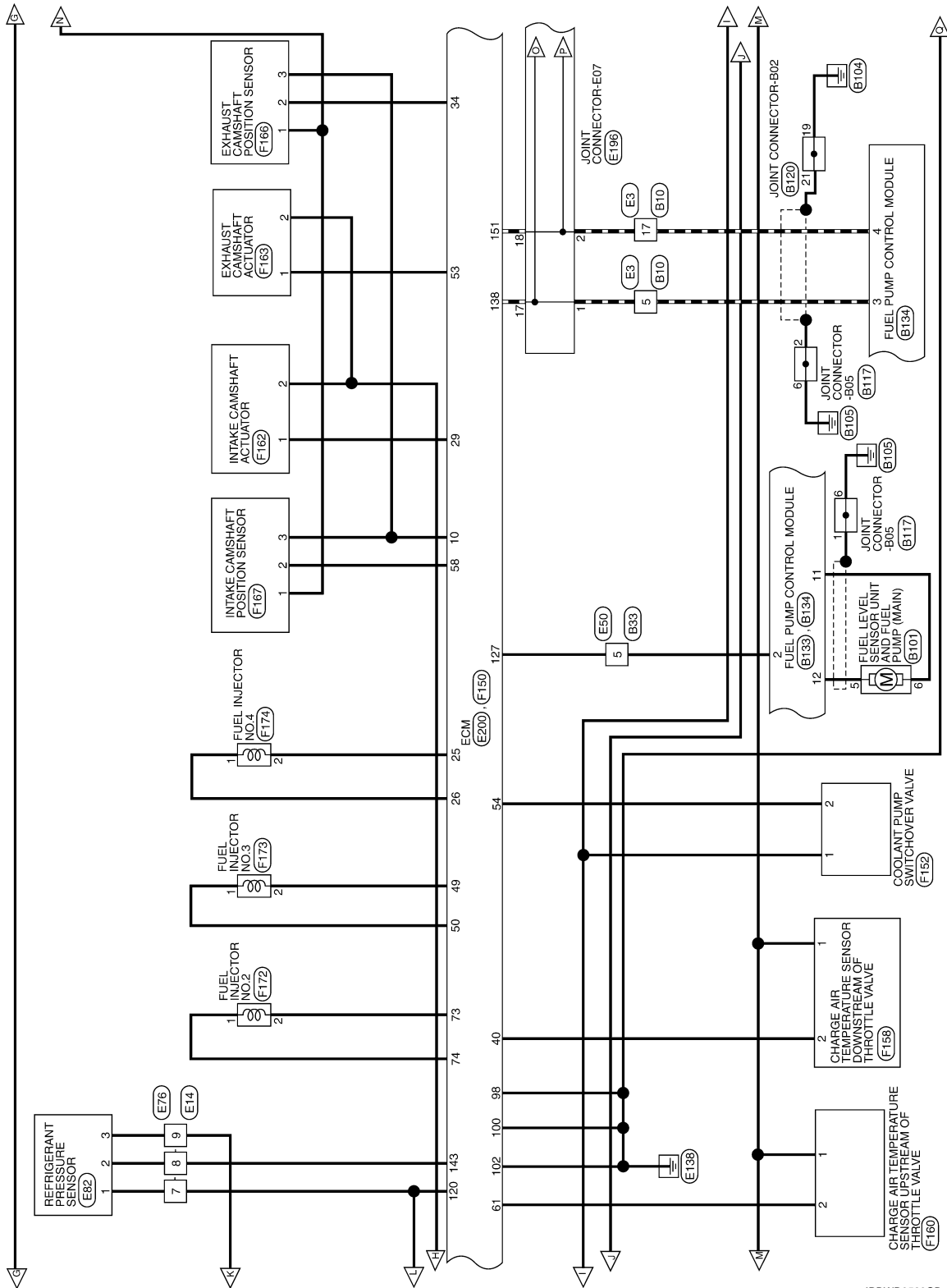
JRBWD9527GB

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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >



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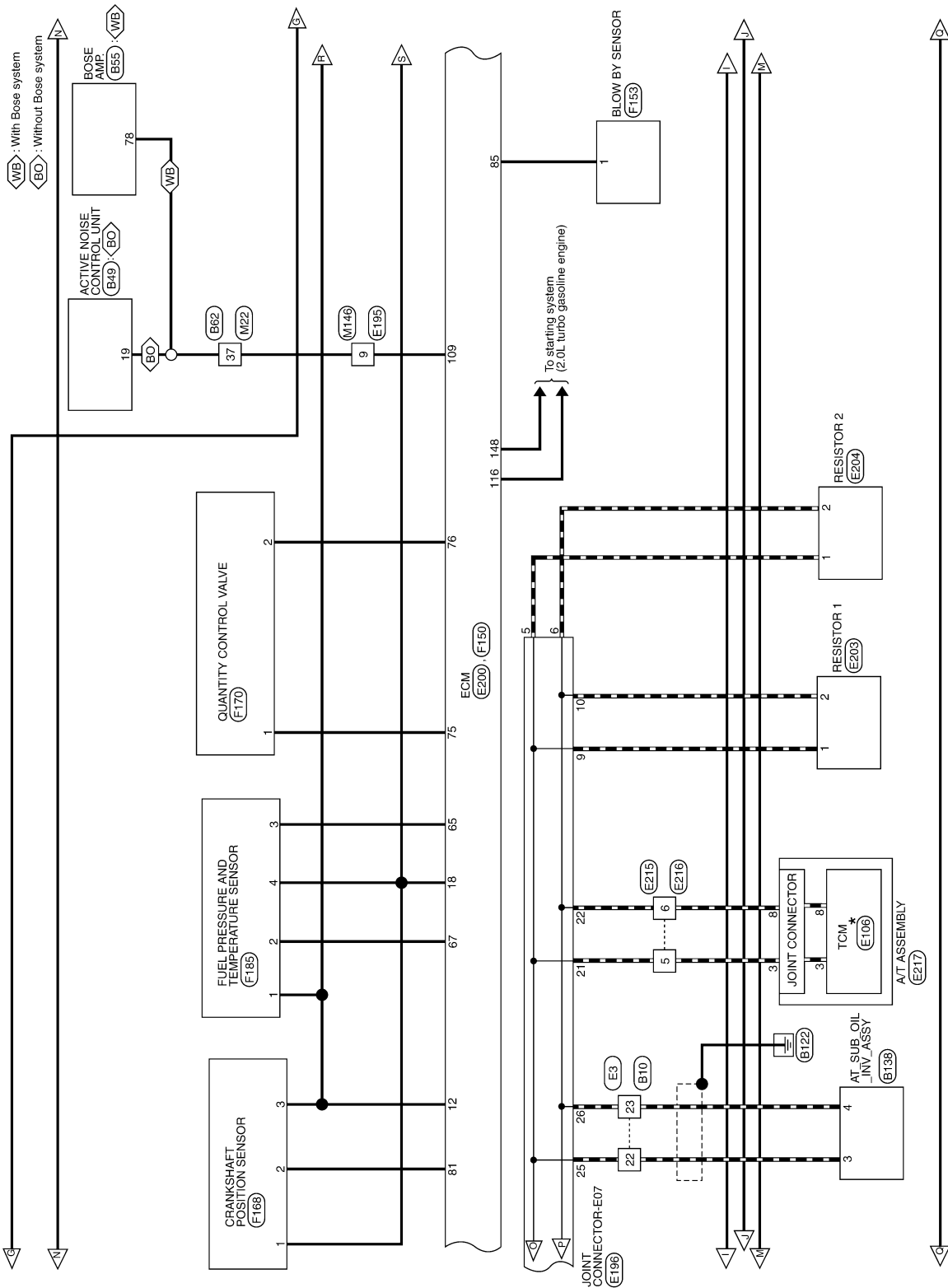
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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

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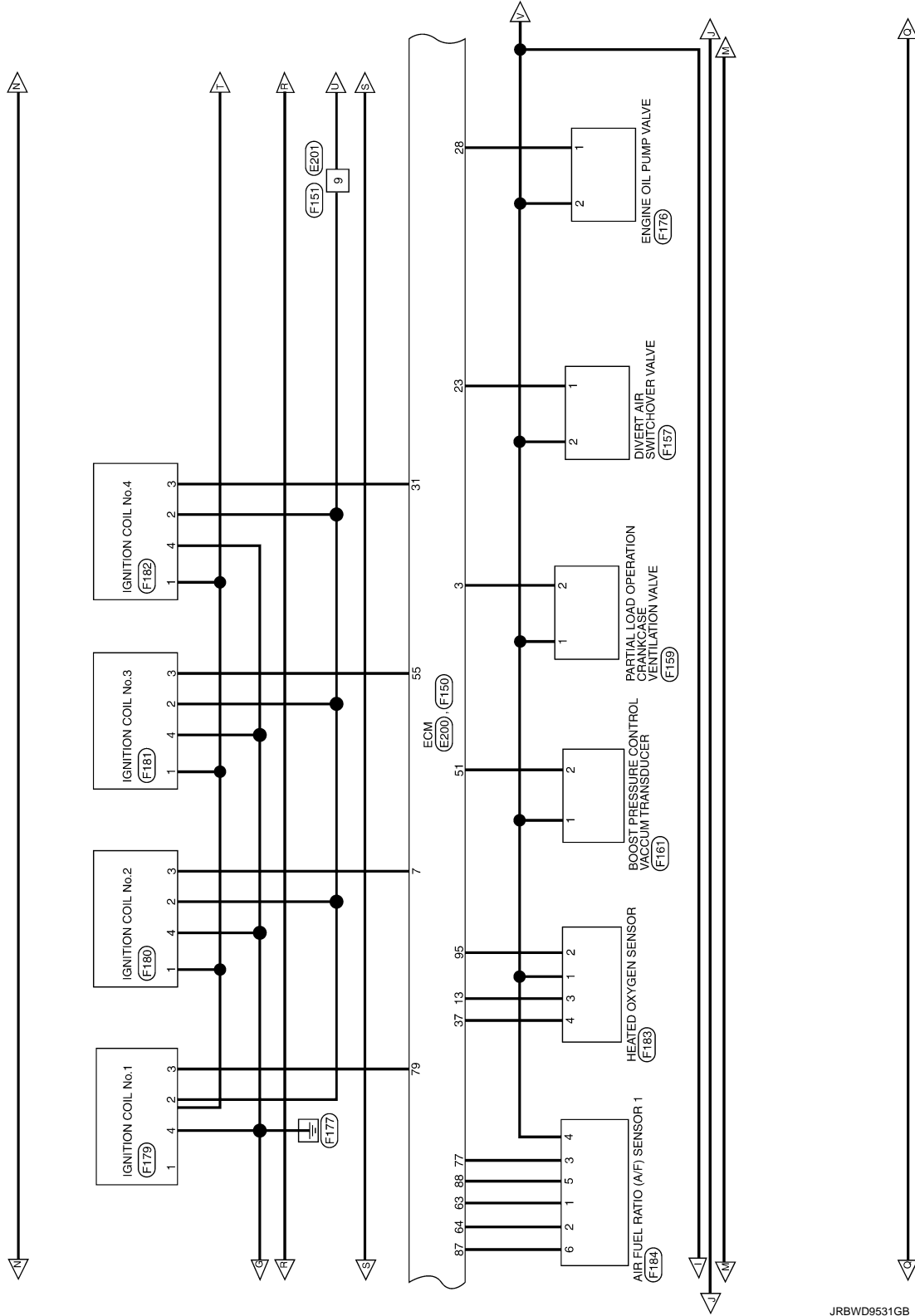


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ENGINE CONTROL SYSTEM

< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]



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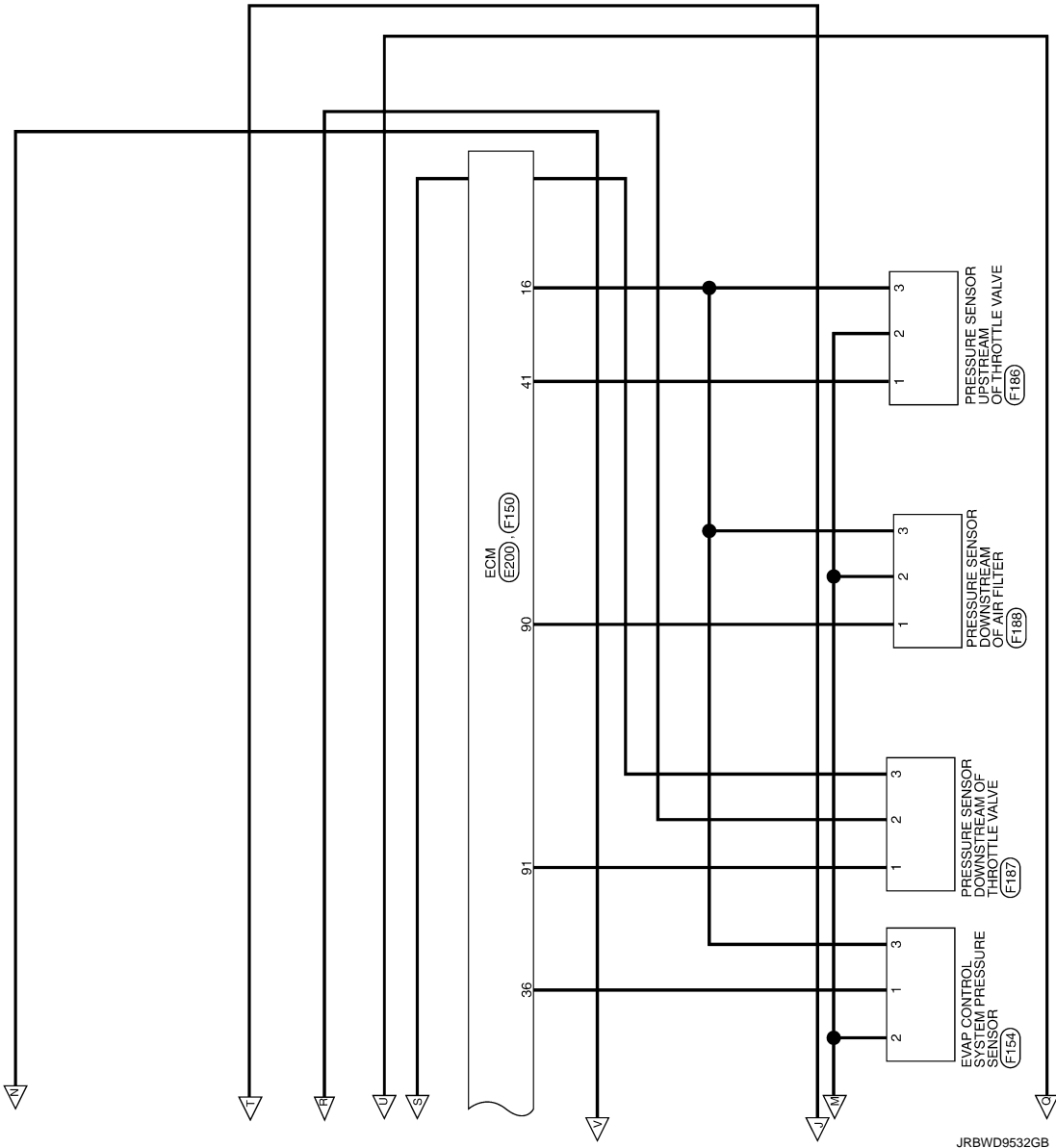
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ENGINE CONTROL SYSTEM

< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]



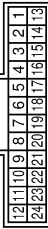
ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	B10
Connector Name	WIRE TO WIRE
Connector Type	TH24FW-NH



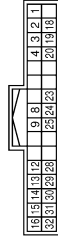
Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	- [With 2.0L turbo gasoline engine]
1	Y	- [With VR30 engine]
2	W	-
3	LG	-
4	P	- [With VR30 engine]
4	SB	- [With 2.0L turbo gasoline engine]
5	L	-
6	V	-
7	LG	-
8	R	-
9	W	-
10	B	-
11	G	-
12	R	-
13	GR	-
14	BG	-
15	BR	-
16	LG	-
17	V	-
18	BR	-
19	LG	- [With 2.0L turbo gasoline engine]
19	Y	- [With VR30 engine]
20	Y	-
21	R	- [With 2.0L turbo gasoline engine]
21	V	- [With VR30 engine]
22	L	-
23	V	-
24	B	- [With VR30 engine]
24	R	- [With 2.0L turbo gasoline engine]

Connector No.	B33
Connector Name	WIRE TO WIRE
Connector Type	M06FW-4C



Terminal No.	Color Of Wire	Signal Name [Specification]
2	BR	-
4	L	-
5	R	-

Connector No.	B49
Connector Name	ACTIVE NOISE CONTROL UNIT
Connector Type	TH32FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	SHIELD	GND
2	R	CAN-L [For 2.0L turbo gasoline engine]
3	B	CAN-H [For VR30 engine]
4	B	ENGINE TYPE SIGNAL 1
4	B	ENGINE TYPE SIGNAL 2
8	G	FRONT MICROPHONE SIGNAL (+)
9	BG	REAR MICROPHONE SIGNAL (+)
12	G	SOUND SIGNAL FRONT LH (+)
13	R	SOUND SIGNAL FRONT RH (+)
14	LG	SOUND SIGNAL REAR LH (+)
15	B	SOUND SIGNAL REAR RH (+)
16	V	ACC
18	L	CAN-H
19	P	ENGINE SPEED SIGNAL
20	W	IGN
23	B	GND

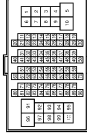
24	R	FRONT MICROPHONE SIGNAL (+)
25	W	REAR MICROPHONE SIGNAL (+)
28	L	SOUND SIGNAL FRONT LH (+)
29	L	SOUND SIGNAL FRONT RH (+)
30	P	SOUND SIGNAL REAR LH (+)
31	W	SOUND SIGNAL REAR RH (+)
32	Y	BAT

Connector No.	B55
Connector Name	BOSE AMP.
Connector Type	TH40FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
43	W	REAR MICROPHONE GND
44	R	VOICE GUIDANCE SIGNAL (+)
45	R	SOUND SIGNAL LH (+)
46	B	SOUND SIGNAL RH (+)
52	R	FRONT MICROPHONE GND
54	LG	AV COMM (L)
56	V	ACC
58	B	ENGINE TYPE SIGNAL 1
63	BG	REAR MICROPHONE SIGNAL
64	G	VOICE GUIDANCE SIGNAL (+)
65	L	SOUND SIGNAL LH (+)
66	W	SOUND SIGNAL RH (+)
72	G	FRONT MICROPHONE SIGNAL
74	P	AV COMM (H)
78	W	ENGINE SPEED SIGNAL
79	SHIELD	SHIELD

Connector No.	B62
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	- [With 2.0L turbo gasoline engine and without BOSE system]
1	LG	- [With VR30 engine]
1	W	- [With 2.0L turbo gasoline engine and with BOSE system]
2	L	- [With VR30 engine]
2	SHIELD	- [With 2.0L turbo gasoline engine]
3	BR	- [With VR30 engine]
3	R	- [With 2.0L turbo gasoline engine]
3	W	- [With VR30 engine and with BOSE system]
3	W	- [With VR30 engine and without BOSE system]
4	SHIELD	- [With VR30 engine]
4	Y	- [With 2.0L turbo gasoline engine]
5	G	- [With VR30 engine]
5	V	- [With 2.0L turbo gasoline engine]
6	BG	- [With VR30 engine]
6	BR	- [With 2.0L turbo gasoline engine]
7	B	- [With 2.0L turbo gasoline engine and with BOSE system]
7	BR	- [With VR30 engine and without BOSE system]
7	W	- [With VR30 engine and with BOSE system]
7	Y	- [With 2.0L turbo gasoline engine and without BOSE system]
8	B	- [With VR30 engine and with BOSE system]
8	G	- [With 2.0L turbo gasoline engine]
8	Y	- [With VR30 engine and without BOSE system]
9	LG	- [With 2.0L turbo gasoline engine]
10	SHIELD	- [With VR30 engine]
11	GR	-
12	Y	-
13	R	-
14	BG	-
15	BG	- [With 2.0L turbo gasoline engine]
15	GR	- [With VR30 engine]
16	V	-
17	P	-
18	L	-
19	R	-
20	GR	-

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EC4

ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	B117
Connector Name	JOINT CONNECTOR-B05
Connector Type	24342_4GAZA



6	5	4	3	2	1
12	11	10	9	8	7
18	17	16	15	14	13
24	23	22	21	20	19

Connector No.	B120
Connector Name	JOINT CONNECTOR-B02
Connector Type	24342_4GAZA



6	5	4	3	2	1
12	11	10	9	8	7
18	17	16	15	14	13
24	23	22	21	20	19

Connector No.	B131
Connector Name	EVAP CANISTER VENT CONTROL VALVE
Connector Type	EDZFB4S



1	2
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Connector No.	B133
Connector Name	FUEL PUMP CONTROL MODULE
Connector Type	HIRSCHMANN_772-717-5101



10	9
12	11

Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	- [With 2.0L turbo gasoline engine]
2	SHIELD	- [With VR30 engine]
3	B	- [With VR30 engine]
4	B	- [With 2.0L turbo gasoline engine]
5	B	- [With VR30 engine]
6	B	- [With VR30 engine]
7	Y	- [With VR30 engine]
8	Y	- [With VR30 engine]
9	Y	- [With 2.0L turbo gasoline engine]
10	P	- [With VR30 engine]
11	P	- [With 2.0L turbo gasoline engine]
12	P	- [With VR30 engine]
13	L	- [With VR30 engine]
14	L	- [With VR30 engine]
15	L	- [With VR30 engine]
16	L	- [With VR30 engine]
17	L	- [With VR30 engine]
18	L	- [With VR30 engine]
19	B	- [With VR30 engine]
20	B	- [With VR30 engine]
21	SHIELD	- [With 2.0L turbo gasoline engine]
22	B	- [With VR30 engine]
23	SHIELD	- [With VR30 engine]
24	SHIELD	- [With VR30 engine]

Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	- [With VR30 engine]
2	R	- [With VR30 engine]
3	L	- [With 2.0L turbo gasoline engine]
4	L	- [With VR30 engine]
5	L	- [With 2.0L turbo gasoline engine]
6	L	- [With VR30 engine]
7	L	- [With VR30 engine]
8	L	- [With 2.0L turbo gasoline engine]
9	R	- [With VR30 engine]
10	L	- [With 2.0L turbo gasoline engine]
11	R	- [With VR30 engine]
12	R	- [With VR30 engine]
13	W	- [With VR30 engine]
14	W	- [With VR30 engine]
15	W	- [With VR30 engine]
17	SHIELD	- [With VR30 engine]
18	B	- [With VR30 engine]
19	B	- [With 2.0L turbo gasoline engine]
20	GR	- [With VR30 engine]
20	SHIELD	- [With 2.0L turbo gasoline engine]
21	B	- [With 2.0L turbo gasoline engine]
21	GR	- [With VR30 engine]
22	W	- [With VR30 engine]
23	W	- [With VR30 engine]
24	W	- [With VR30 engine]

Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	POWER
2	P	SIG

Connector No.	B132
Connector Name	FUEL TANK PRESSURE SENSOR
Connector Type	SCC03FL



3	2	1
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Terminal No.	Color Of Wire	Signal Name [Specification]
9	B	GROUND
10	L	BATTERY POWER SUPPLY
11	G	FUEL PUMP GROUND
12	O	FUEL PUMP CONTROL SIGNAL (PMM)

Connector No.	B134
Connector Name	FUEL PUMP CONTROL MODULE
Connector Type	Tyco_1_969474-1



4	3	2	
8	7	6	5

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	GND
2	L	SIG
3	R	VCC

Terminal No.	Color Of Wire	Signal Name [Specification]
2	R	FUEL PUMP ACTIVATION REQUEST SIGNAL
3	L	DRIVETRAIN CAN-H
4	V	DRIVETRAIN CAN-L
5	SB	IGNITION POWER SUPPLY
6	W	SENSOR GROUND (FUEL PRESSURE SENSOR)
7	R	FUEL PRESSURE SENSOR SIGNAL
8	LG	SENSOR POWER SUPPLY (FUEL PRESSURE SENSOR)

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EC4

ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	B138
Connector Name	SUB ELECTRIC OIL PUMP INVERTER
Connector Type	A06FW



Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	IGN
2	L	A/T RELAY
3	L	CAN-H
4	V	CAN-L
5	LG	E-OP RELAY

Connector No.	E3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	- [With 2.0L turbo gasoline engine]
2	W	- [With VR30 engine]
3	LG	-
4	P	- [With VR30 engine]
4	SB	- [With 2.0L turbo gasoline engine]
5	L	-
6	V	-
7	LG	-
8	BG	-
9	W	-
10	B	-
11	G	-
12	R	-

14	G	-
15	LG	- [With 2.0L turbo gasoline engine]
15	V	- [With VR30 engine]
16	Y	-
17	P	-
18	BR	- [With 2.0L turbo gasoline engine]
19	LG	- [With VR30 engine]
19	Y	-
20	GR	- [With 2.0L turbo gasoline engine]
21	R	- [With VR30 engine]
21	V	-
22	L	-
23	P	- [With VR30 engine]
24	B	-
24	BR	- [With 2.0L turbo gasoline engine]

Connector No.	E14
Connector Name	WIRE TO WIRE
Connector Type	SAA18MB-RS10-SJ22



Terminal No.	Color Of Wire	Signal Name [Specification]
4	Y	-
5	L	-
6	B	-
7	BG	- [With VR30 engine]
8	LG	- [With 2.0L turbo gasoline engine]
9	R	-
11	GR	- [With VR30 engine]
12	R	-
13	B	-
14	G	-
15	V	- [With VR30 engine]
16	Y	-
17	B	-
18	G	-
19	Y	-
21	W	- [With 2.0L turbo gasoline engine]
31	Y	- [With VR30 engine]
18	SB	-
21	B	-
22	SHIELD	-
23	P	-
24	L	-
25	V	-

26	B	-
28	B	-

Connector No.	E25
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	BG	-
6	V	-
7	L	-
8	BG	- [With VR30 engine]
8	BR	- [With 2.0L turbo gasoline engine]
9	B	- [With 2.0L turbo gasoline engine]
9	GR	- [With VR30 engine] [Color of wire differs depending on production]
9	LG	- [With VR30 engine] [Color of wire differs depending on production]
10	BR	-
11	L	-
12	GR	- [With VR30 engine]
12	P	- [With 2.0L turbo gasoline engine]
13	SHIELD	- [With 2.0L turbo gasoline engine]
13	W	- [With VR30 engine]
14	B	-
15	GR	- [With 2.0L turbo gasoline engine]
15	SB	- [With VR30 engine]
16	BR	- [With 2.0L turbo gasoline engine]
16	V	- [With VR30 engine]
17	BR	- [With VR30 engine]
17	GR	- [With 2.0L turbo gasoline engine]
18	G	- [With 2.0L turbo gasoline engine]
18	Y	- [With VR30 engine]
19	Y	-
31	W	- [With 2.0L turbo gasoline engine]
31	Y	- [With VR30 engine]
32	G	- [With 2.0L turbo gasoline engine]
32	GR	- [With VR30 engine]
33	L	- [With VR30 engine]
33	Y	- [With 2.0L turbo gasoline engine]
34	P	-
35	GR	-

36	R	-
37	L	- [With 2.0L turbo gasoline engine]
37	V	- [With VR30 engine]
38	L	- [With VR30 engine]
38	P	- [With 2.0L turbo gasoline engine and without gateway]
38	R	- [With 2.0L turbo gasoline engine and without gateway]
39	BR	- [With 2.0L turbo gasoline engine]
39	Y	- [With VR30 engine]
40	SB	-
41	LG	-
44	Y	-
45	L	- [With 2.0L turbo gasoline engine]
45	W	- [With VR30 engine]
46	B	- [With VR30 engine]
47	Y	- [With 2.0L turbo gasoline engine]
47	G	-
48	SHIELD	-
49	R	-
50	GR	- [With VR30 engine]
50	BR	- [With 2.0L turbo gasoline engine]
51	L	-
52	W	-
53	V	- [With VR30 engine]
54	P	- [With 2.0L turbo gasoline engine]
54	W	- [With 2.0L turbo gasoline engine]
55	B	- [With 2.0L turbo gasoline engine]
55	W	- [With VR30 engine]
56	BG	- [With 2.0L turbo gasoline engine]
56	SB	- [With VR30 engine]
57	BG	- [With 2.0L turbo gasoline engine]
57	W	- [Color of wire differs depending on production]
58	B	- [Color of wire differs depending on production]
58	6/W	- [Color of wire differs depending on production]
59	W	-
61	R	-
64	Y	-
65	BR	- [Color of wire differs depending on production]
65	GR	- [Color of wire differs depending on production]
66	GR	-
67	LG	-
68	BG	-
69	L	-
70	R	-
71	G	- [With 2.0L turbo gasoline engine]
71	LG	- [With VR30 engine]
72	L	- [With 2.0L turbo gasoline engine]
72	V	- [With VR30 engine]
73	G	- [With VR30 engine]
73	W	- [With 2.0L turbo gasoline engine]
74	BR	- [With VR30 engine]

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ENGINE CONTROL SYSTEM

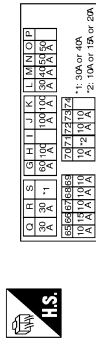
[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

74	L	- [With 2.0L turbo gasoline engine]
75	P	- [With 2.0L turbo gasoline engine and without gateway]
75	R	- [With 2.0L turbo gasoline engine and with gateway]
75	V	- [With VR30 engine]
76	G	-
77	Y	-
78	LG	- [With 2.0L turbo gasoline engine and with ADAS]
78	P	- [With VR30 engine]
78	V	- [With VR30 engine]
79	SB	- [With 2.0L turbo gasoline engine and without ADAS]
80	G	-
81	R	-
82	V	-
83	BR	- [With 2.0L turbo gasoline engine]
83	R	- [With VR30 engine]
84	LG	-
86	BG	-
87	G	-
89	LG	-
90	G	- [With VR30 engine]
90	GR	- [With 2.0L turbo gasoline engine]
91	G	-
93	BG	-
94	GR	- [With VR30 engine]
94	L	- [With 2.0L turbo gasoline engine]
95	BG	- [With VR30 engine]
95	P	- [With 2.0L turbo gasoline engine and without gateway]
95	R	- [With 2.0L turbo gasoline engine and with gateway]
96	W	-
97	LG	-
98	L	-
99	LG	- [With 2.0L turbo gasoline engine]
99	P	- [With VR30 engine]
100	SHIELD	-

Connector No.	E46
Connector Name	FUSE AND FUSIBLE LINK BLOCK
Connector Type	24384-4GA0A



Connector No.	E50
Connector Name	WIRE TO WIRE
Connector Type	M06MW-1C



Terminal No.	24	L
Terminal No.	25	V
Terminal No.	26	B
Terminal No.	28	B

Connector No.	E82
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB



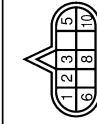
Terminal No.	1	BR
Terminal No.	2	L
Terminal No.	4	L
Terminal No.	5	V

Terminal No.	E76
Connector Name	WIRE TO WIRE
Connector Type	SAA18FB-RS10-S1Z2

Terminal No.	Color Of Wire	Signal Name [Specification]
65	GR	-
66	SB	-
67	BG	-
68	LG	- [With VR30 engine]
68	Y	- [With 2.0L turbo gasoline engine]
69	V	- [With VR30 engine]
69	W	- [With 2.0L turbo gasoline engine]
70	GR	- [With VR30 engine]
70	LG	- [With 2.0L turbo gasoline engine]
71	BG	- [With VR30 engine]
71	GR	- [With 2.0L turbo gasoline engine]
72	G	-
73	P	-
G	L	- [With VR30 engine]
G	R	- [With 2.0L turbo gasoline engine]
H	G	- [With VR30 engine]
H	R	- [With VR30 engine]
J	BR	- [With EPS] [With 2.0L turbo gasoline engine]
J	R	- [Without EPS]
J	W	- [With EPS] [With VR30 engine]
K	L	-
L	G	- [With VR30 engine]
L	P	- [With 2.0L turbo gasoline engine]
M	W	-
N	Y	-
O	L	-
Q	BG	- [With 2.0L turbo gasoline engine]
Q	G	- [With VR30 engine]
R	GR	-
S	BG	- [With 2.0L turbo gasoline engine]
S	BR	- [With VR30 engine]

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

Connector No.	E106
Connector Name	TCM
Connector Type	SP10FG



Terminal No.	Color Of Wire	Signal Name [Specification]
4	Y	-
5	L	-
6	B	-
7	BR	-
8	LG	-
9	GR	-
11	LG	-
12	BG	-
13	B	-
14	R	-
15	G	-
16	V	-
17	B	-
18	P	-
21	B	-
22	SHIELD	-
23	P	-

Terminal No.	Color Of Wire	Signal Name [Specification]
65	GR	-
66	SB	-
67	BG	-
68	LG	- [With VR30 engine]
68	Y	- [With 2.0L turbo gasoline engine]
69	V	- [With VR30 engine]
69	W	- [With 2.0L turbo gasoline engine]
70	GR	- [With VR30 engine]
70	LG	- [With 2.0L turbo gasoline engine]
71	BG	- [With VR30 engine]
71	GR	- [With 2.0L turbo gasoline engine]
72	G	-
73	P	-
G	L	- [With VR30 engine]
G	R	- [With 2.0L turbo gasoline engine]
H	G	- [With VR30 engine]
H	R	- [With VR30 engine]
J	BR	- [With EPS] [With 2.0L turbo gasoline engine]
J	R	- [Without EPS]
J	W	- [With EPS] [With VR30 engine]
K	L	-
L	G	- [With VR30 engine]
L	P	- [With 2.0L turbo gasoline engine]
M	W	-
N	Y	-
O	L	-
Q	BG	- [With 2.0L turbo gasoline engine]
Q	G	- [With VR30 engine]
R	GR	-
S	BG	- [With 2.0L turbo gasoline engine]
S	BR	- [With VR30 engine]

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EC4

ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	E120
Connector Name	IPM (FOR INTELLIGENT POWER DISTRIBUTION) MODULE ENGINE ROOM
Connector Type	NS12FW-CS



7	9	10	11
13	14	15	17
18			

Terminal No.	Color of Wire	Signal Name [Specification]
7	B/W	-
9	P	-
10	LG	-
11	V	-
13	BG	-
14	SB	-
15	BR	-
17	GR	-
18	L	-

Connector No.	E121
Connector Name	IPM (FOR INTELLIGENT POWER DISTRIBUTION) MODULE ENGINE ROOM
Connector Type	TH32FW-NH



19	22	23	41	45	27	28	29	31	32	33	34
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Terminal No.	Color of Wire	Signal Name [Specification]
19	L	- [With 2.0L turbo gasoline engine]
22	P	- [With VRS30 engine]
23	BG	-
27	GR	- [With VRS30 engine]
28	LG	- [With 2.0L turbo gasoline engine and without Aeri (best class)]
29	P	- [With 2.0L turbo gasoline engine and with Aeri (best class)]
31	L	-
32	SB	-

Terminal No.	Color of Wire	Signal Name [Specification]
33	SB	-
34	Y	-
35	G	-
36	SB	- [With VRS30 engine]
64	W	- [With 2.0L turbo gasoline engine]
37	GR	-
38	BR	-
41	GR	-
43	V	-

Connector No.	E123
Connector Name	IPM (FOR INTELLIGENT POWER DISTRIBUTION) MODULE ENGINE ROOM
Connector Type	MS10FW-CS



52	54	55
56	57	58
59	61	

Terminal No.	Color of Wire	Signal Name [Specification]
52	Y	-
54	SB	-
55	W	-
56	L	-
57	LG	-
58	P	-
59	R	-
61	GR	-

Connector No.	E124
Connector Name	IPM (FOR INTELLIGENT POWER DISTRIBUTION) MODULE ENGINE ROOM
Connector Type	TH12FW-NH



62	64	65
69	71	72

Terminal No.	Color of Wire	Signal Name [Specification]
62	G	-
64	SB	-
65	V	-
69	G	-
71	W	-
72	Y	-

Connector No.	E184
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	LD1FB-MC



Terminal No.	Color of Wire	Signal Name [Specification]
7	BR	- [With 2.0L turbo gasoline engine]
	W	- [With VRS30 engine]

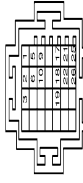
Connector No.	E195
Connector Name	WIRE TO WIRE
Connector Type	TK36FW-NS10



Terminal No.	Color of Wire	Signal Name [Specification]
5	BR	-
8	GR	-
9	P	-
10	R	-
11	L	-
12	P	-
13	GR	-
14	Y	-

15	G	-
16	W	-
17	L	-
18	R	-
19	BR	-
20	SHIELD	-
21	BR	-
22	V	-
23	W	-
24	L	-
26	G	-
30	G	-
31	GR	-
32	SB	-
33	W	-
34	W	-
35	B	-
36	G	-
37	SHIELD	-
38	R	-
39	L	-
40	GR	-
41	W	-
42	B	-
43	BR	-
44	P	-
45	SB	-
46	Y	-

Connector No.	E196
Connector Name	JOINT CONNECTOR-E07
Connector Type	SGA28FDGV-I



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	P	-
3	B	-
5	L	-
6	P	-

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ENGINE CONTROL SYSTEM

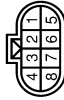
[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Terminal No.	Color Of Wire	Signal Name [Specification]
9	L	-
10	P	-
17	L	-
18	P	-
19	SHIELD	-
21	L	-
22	P	-
25	L	-
26	P	-

Connector No.	E197
Connector Name	WIRE TO WIRE
Connector Type	RS05FB-PR



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	R	-
3	GR	-
4	BR	-
5	Y	-
6	BG	-
7	LG	-
8	GR	-

Connector No.	E198
Connector Name	WIRE TO WIRE
Connector Type	RS05MB-PR



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	R	-
3	Y	-
4	BR	-
5	Y	-
6	R	-
7	LG	-
8	GR	-

Connector No.	E199
Connector Name	FUEL PRESSURE SENSOR
Connector Type	RH03FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	FUEL_PRESSURE_SENSOR_SUPPLY
2	Y	FUEL_PRESSURE_SENSOR_GND
3	R	FUEL_PRESSURE_SIGNAL

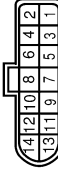
Connector No.	E200
Connector Name	ECM
Connector Type	AD452FB-AH26



Terminal No.	Color Of Wire	Signal Name [Specification]
97	G	POWER_SUPPLY (MAIN)
98	B	ECM_GROUND
99	G	POWER_SUPPLY (MAIN)
100	B	ECM_GROUND
101	G	POWER_SUPPLY (MAIN)

Terminal No.	Color Of Wire	Signal Name [Specification]
102	B	ECM_GROUND
103	V	COOLING_FAN_CONTROL_SIGNAL (PWM)
104	Y	SENSOR_POWER_SUPPLY
105	R	SENSOR_POWER_SUPPLY
106	W	SENSOR_GROUND
109	P	ENGINE_SPEED_SIGNAL
111	G	POWER_SUPPLY
116	LG	STARTER_RELAY
119	BR	SENSOR_GROUND
120	BG	SENSOR_GROUND
123	BR	MAIN_RELAY_CONTROL_SIGNAL
127	V	FUEL_PUMP_ON_SIGNAL
132	G	ACCELERATOR_PEDAL_POSITION_SENSOR_1
137	L	CAN-H
138	L	DRIVETRAIN_CAN-H
142	GR	BACK-UP_LAMP_SWITCH
143	LG	REFRIGERANT_PRESSURE_SENSOR
145	L	ACCELERATOR_PEDAL_POSITION_SENSOR_2
146	L	FUEL_TANK_PRESSURE_SENSOR
148	L	STARTER_RELAY-H
150	P	CAN-L
151	P	DRIVETRAIN_CAN-L
152	B	EVAP_CANISTER_VENT_CONTROL_VALVE
153	G	EVAP_PURGE_CONTROL_VALVE

Connector No.	E201
Connector Name	WIRE TO WIRE
Connector Type	Deiphi_33104047



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	R	-
5	G	-
6	L	-
7	R	-
8	W	-
9	B	-
13	L	-

Connector No.	E202
Connector Name	EVAP_PURGE_CONTROL_VALVE
Connector Type	EC_54200205



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	SIG
2	BR	POWER

Connector No.	E203
Connector Name	RESISTOR_1
Connector Type	MDZFL



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

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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

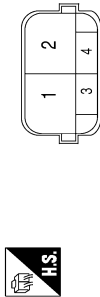
ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	E204
Connector Name	RESISTOR 2
Connector Type	MDZFL



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

Connector No.	E213
Connector Name	COOLING FAN CONTROL MODULE
Connector Type	Kostal_09442401



Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	1PIN_GND
2	BR	T30
3	R	187_2
4	V	PWM_SIG

Connector No.	E215
Connector Name	WIRE TO WIRE
Connector Type	RH08FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	-
3	GR	-
5	L	-
6	P	-
7	B	-
8	B	-

Connector No.	E21G
Connector Name	WIRE TO WIRE
Connector Type	RH08MB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	-
3	GR	-
5	L	-
6	B	-
7	B	-
8	B	-

Connector No.	E217
Connector Name	A/T ASSEMBLY
Connector Type	RK10FG-DGY



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	IGNITION POWER SUPPLY
2	P	BATTERY POWER SUPPLY (MEMORY BACK-UP)
3	L	CAN-H
5	B	GROUND
6	GR	IGNITION POWER SUPPLY
8	P	CAN-L
10	B	GROUND

Connector No.	E220
Connector Name	JOINT CONNECTOR-E05
Connector Type	NH24FB-J



Terminal No.	Color Of Wire	Signal Name [Specification]
3	W	-
4	L	-
7	W	-
8	L	-
11	W	-
12	L	-
15	P	- [Without Gateway]
15	R	- [With Gateway]
16	L	-
19	P	- [Without Gateway]
19	R	- [With Gateway]
20	L	-
23	P	- [Without Gateway]

23	R	- [With Gateway]
24	L	-

Connector No.	E224
Connector Name	FUSE AND FUSIBLE LINK HOLDER-1
Connector Type	24380_1AT0A



Terminal No.	Color Of Wire	Signal Name [Specification]
97	R	-
98	L	-
99	G	-

Connector No.	E225
Connector Name	FUSE AND FUSIBLE LINK HOLDER-2
Connector Type	24380_1AT0A



Terminal No.	Color Of Wire	Signal Name [Specification]
101	L	-
102	G	-

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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	E228
Connector Name	MAIN RELAY
Connector Type	24347-9F500



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

Connector No.	E305
Connector Name	COOLING FAN CONTROL MODULE
Connector Type	6188-0259



Terminal No.	Color Of Wire	Signal Name [Specification]
6	-	-
7	-	-

Connector No.	F150
Connector Name	ECM
Connector Type	Kostal_09409602



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	FUEL INJECTOR (No. 1)
2	R	FUEL INJECTOR (No. 1)
3	Y	PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE
4	L	COOLANT THERMOSTAT HEATER ELEMENT
7	R	IGNITION COIL (No. 2)
10	BG	SENSOR GROUND
11	BG	SENSOR GROUND
12	P	SENSOR GROUND
13	L	SENSOR GROUND
14	BR	SENSOR GROUND
16	W	SENSOR POWER SUPPLY
17	LG	SENSOR POWER SUPPLY
18	R	SENSOR POWER SUPPLY
23	L	DIVERT AIR SWITCHOVER VALVE
24	W	THROTTLE VALVE MOTOR (+)
25	B	FUEL INJECTOR (No. 4)
26	G	FUEL INJECTOR (No. 4)
28	W	ENGINE OIL PUMP VALVE
29	SB	INTAKE CAMSHAFT ACTUATOR
31	GR	IGNITION COIL (No. 4)
34	Y	EXHAUST CAMSHAFT POSITION SENSOR
36	Y	EVAP CONTROL SYSTEM PRESSURE SENSOR
37	W	HEATED OXYGEN SENSOR 1
38	Y	THROTTLE POSITION SENSOR 1
40	G	HEATED OXYGEN SENSOR 2
41	L	PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE
45	L	UN
48	GR	THROTTLE VALVE MOTOR (-)
49	R	FUEL INJECTOR (No. 3)
50	G	FUEL INJECTOR (No. 3)
51	Y	BOOST PRESSURE CONTROL VACUUM TRANSDUCER
53	G	EXHAUST CAMSHAFT ACTUATOR
54	G	COOLANT PUMP SWITCHOVER VALVE
55	L	IGNITION COIL (No. 3)
58	R	INTAKE CAMSHAFT POSITION SENSOR
59	B	KNOCK SENSOR 1

60	LG	KNOCK SENSOR 2
61	R	DOWNSTREAM AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE
62	P	THROTTLE POSITION SENSOR 2
63	L	AIR FUEL RATIO (A/F) SENSOR
64	B	AIR FUEL RATIO (A/F) SENSOR
65	BR	FUEL TEMPERATURE SIGNAL
67	SA	FUEL PRESSURE SIGNAL
73	BR	FUEL INJECTOR (No. 2)
74	W	FUEL INJECTOR (No. 2)
75	V	QUANTITY CONTROL VALVE (LOW)
76	G	QUANTITY CONTROL VALVE (HIGH)
77	BG	AIR FUEL RATIO (A/F) SENSOR HEATER
78	V	FULL LOAD OPERATION VENT LINE HEATER ELEMENT
79	Y	IGNITION COIL (No. 1)
81	GR	CRANKSHAFT POSITION SENSOR
82	BG	ENGINE OIL LEVEL SWITCH
83	W	KNOCK SENSOR 1
84	Y	KNOCK SENSOR 2
85	G	BLOW BY SENSOR
86	V	ENGINE COOLANT TEMPERATURE SENSOR
87	R	AIR FUEL RATIO (A/F) SENSOR
88	Y	AIR FUEL RATIO (A/F) SENSOR
90	P	PRESSURE SENSOR DOWNSTREAM OF AIR FILTER
91	W	PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE
95	R	HEATED OXYGEN SENSOR HEATER

Connector No.	F151
Connector Name	WIRE TO WIRE
Connector Type	Delphi_13833238



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	R	-
3	W	-
5	W	-
6	BR	-
7	P	-
8	W	-
9	B	-
13	L	-

Connector No.	F152
Connector Name	COOLANT PUMP SWITCHOVER VALVE
Connector Type	Teco_1-1418463-9



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

Connector No.	F153
Connector Name	BLOW BY SENSOR
Connector Type	HIRSCHMANN_805-120-508



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

Connector No.	F154
Connector Name	EVAP CONTROL SYSTEM PRESSURE SENSOR
Connector Type	HIRSCHMANN_805-121-504



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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	SIG
2	R	GND
3	P	VCC

Connector No.	Signal Name [Specification]
F155	KNOCK SENSOR1
Connector Type	Kostal_09443201



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

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

Connector No.	Signal Name [Specification]
F156	FULL LOAD OPERATION VENT LINE MASTER ELEMENT
Connector Type	HIRSCHMANN_805-1398-501



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

Connector No.	Signal Name [Specification]
F157	DIVERT AIR SWITCHOVER VALVE
Connector Type	Kostal_10026841



Connector No.	Signal Name [Specification]
F159	PARTIAL LOAD OPERATION COMMONS VENTILATION VALVE
Connector Type	HIRSCHMANN_805-120-507



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

Connector No.	Signal Name [Specification]
F160	CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE
Connector Type	HIRSCHMANN_805-120-502



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

Connector No.	Signal Name [Specification]
F161	BOOST PRESSURE CONTROL VACUUM TRANSDUCER
Connector Type	Kostal_10026841



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

Connector No.	Signal Name [Specification]
F162	INTAKE CAMSHAFT ACTUATOR
Connector Type	Kostal_10026841



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

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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	F163
Connector Name	EXHAUST CAMSHAFT ACTUATOR
Connector Type	Kostal_10026841



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

Connector No.	F164
Connector Name	KNOCK SENSOR2
Connector Type	HIRSCHMANN_805-120-501



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

Connector No.	F165
Connector Name	ENGINE COOLANT TEMPERATURE SENSOR
Connector Type	Tyco_1-1418463-9



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

Connector No.	F166
Connector Name	EXHAUST CAMSHAFT POSITION SENSOR
Connector Type	HIRSCHMANN_805-121-501



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

Connector No.	F167
Connector Name	INTAKE CAMSHAFT POSITION SENSOR
Connector Type	HIRSCHMANN_805-121-501



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

Connector No.	F168
Connector Name	CRANKSHAFT POSITION SENSOR
Connector Type	HIRSCHMANN_805-299-501



Terminal No.	Color Of Wire	Signal Name [Specification]
1	V	GND
2	GR	SIG
3	P	POWER

Connector No.	F169
Connector Name	COOLANT THERMOSTAT HEATER ELEMENT
Connector Type	HIRSCHMANN_805-120-507



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

Connector No.	F170
Connector Name	QUANTITY CONTROL VALVE
Connector Type	Delphi_F986410



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

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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	F171	F173	F175	F178
Connector Name	FUEL INJECTOR No.1	FUEL INJECTOR No.3	ENGINE OIL LEVEL SWITCH	THROTTLE VALVE ACTUATOR
Connector Type	HIRSCHMANN_805-120-501	HIRSCHMANN_805-120-501	HIRSCHMANN_805-120-501	HIRSCHMANN_805-124-521
Terminal No.	1 2	1 2	1 2	1 2 3 4 5 6
Color Of Wire	L R	G R	B BG	W GR Y LG P BR
Signal Name [Specification]	- -	- -	- -	- -
Connector No.	F172	F174	F176	F179
Connector Name	FUEL INJECTOR No.2	FUEL INJECTOR No.4	ENGINE OIL PUMP VALVE	IGNITION COIL No.1
Connector Type	HIRSCHMANN_805-120-501	HIRSCHMANN_805-120-501	HIRSCHMANN_805-120-501	HIRSCHMANN_805-200-501
Terminal No.	1 2	1 2	1 2	1 2 3 4
Color Of Wire	L BR	G B	W Y	W G GR Y L
Signal Name [Specification]	- -	- -	- -	- -

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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	F180
Connector Name	IGNITION COIL No.2
Connector Type	HIRSCHMANN_805-200-501



Terminal No.	Color Of Wire	Signal Name [Specification]
1	V	-
2	P	-
3	R	-
4	Y	-

Connector No.	F181
Connector Name	IGNITION COIL No.3
Connector Type	HIRSCHMANN_805-200-501



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

Connector No.	F182
Connector Name	IGNITION COIL No.4
Connector Type	HIRSCHMANN_805-200-501



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

Connector No.	F183
Connector Name	HEATED OXYGEN SENSOR
Connector Type	TYCO_184-355-2



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

Connector No.	F184
Connector Name	AIR FUEL RATIO (A/F) SENSOR 1
Connector Type	Kostal_09442111



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

Connector No.	F185
Connector Name	FUEL PRESSURE AND TEMPERATURE SENSOR
Connector Type	HIRSCHMANN_805-122-522



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

Connector No.	F186
Connector Name	PRESURE SENSOR UPSTREAM OF THROTTLE VALVE
Connector Type	HIRSCHMANN_805-121-501



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

Connector No.	F187
Connector Name	PRESURE SENSOR DOWNSTREAM OF THROTTLE VALVE
Connector Type	HIRSCHMANN_805-121-501



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

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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

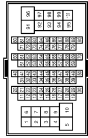
< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	F188
Connector Name	PRESURE SENSOR DOWNSTREAM OF AIR FILTER
Connector Type	HIRSCHMANN_805-121-502



Connector No.	M22
Connector Name	WIRE TO WIRE
Connector Type	THROMW-CS16-TM4



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

Connector No.	F150
Connector Name	ALTERNATOR
Connector Type	HIRSCHMANN_805-198-506



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

25	S8	- [With VR30 engine]
26	G	- [With VR30 engine]
27	W	- [With 2.0L turbo gasoline engine]
29	R	-
30	LG	- [With VR30 engine]
30	SR	- [With 2.0L turbo gasoline engine]
31	W	- [With 2.0L turbo gasoline engine]
32	SHIELD	-
33	L	-
33	B	- [With VR30 engine]
33	LG	- [With 2.0L turbo gasoline engine]
34	SHIELD	-
35	LG	- [With VR30 engine]
35	W	- [With 2.0L turbo gasoline engine]
36	R	- [With VR30 engine]
36	V	- [With 2.0L turbo gasoline engine]
37	R	- [With VR30 engine]
37	V	- [With 2.0L turbo gasoline engine]
38	W	-
39	P	- [With VR30 engine and without BOSE system]
39	R	- [With 2.0L turbo gasoline engine]
39	V	- [With VR30 engine and with BOSE system]
40	G	-
41	L	-
42	R	-
43	SHIELD	-
44	P	-
45	B	- [With 2.0L turbo gasoline engine]
45	G	- [With VR30 engine]
46	SHIELD	-
47	G	-
48	BG	- [Except with VR30 engine and with BOSE system]
48	BR	- [With VR30 engine and with BOSE system]
49	G	-
50	V	-
51	V	-
52	L	- [With 2.0L turbo gasoline engine]
52	Y	- [With VR30 engine]
53	R	-
54	GR	-
55	L	-
56	P	-
57	R	-
58	LG	-
59	S8	-
61	L	-
62	P	- [With 2.0L turbo gasoline engine]
62	V	- [With VR30 engine]
63	L	-
64	W	-

65	R	-
68	L	-
69	P	-
71	GR	- [With 2.0L turbo gasoline engine]
71	R	- [With VR30 engine]
72	G	- [With 2.0L turbo gasoline engine]
73	LG	- [With 2.0L turbo gasoline engine]
73	SHIELD	- [With VR30 engine]
74	L	- [With VR30 engine]
74	LG	- [With 2.0L turbo gasoline engine]
75	P	-
76	S8	- [With 2.0L turbo gasoline engine]
76	V	- [With VR30 engine]
77	Y	-
78	L	-
79	G	-
80	GR	- [With 2.0L turbo gasoline engine]
80	W	- [With VR30 engine]
81	B	-
81	R	- [With 2.0L turbo gasoline engine]
82	G	- [With 2.0L turbo gasoline engine]
82	SHIELD	- [With VR30 engine]
83	R	- [With 2.0L turbo gasoline engine]
83	W	- [With VR30 engine]
84	BR	- [With VR30 engine]
84	SHIELD	- [With 2.0L turbo gasoline engine]
85	BR	- [With VR30 engine]
85	G	- [With 2.0L turbo gasoline engine]
86	R	- [With 2.0L turbo gasoline engine]
86	V	- [With VR30 engine]
87	LG	- [With 2.0L turbo gasoline engine]
87	SHIELD	- [With VR30 engine]
89	BR	- [With VR30 engine]
89	LG	- [With 2.0L turbo gasoline engine]
90	S8	- [With 2.0L turbo gasoline engine]
90	V	- [With VR30 engine]
92	L	- [With 2.0L turbo gasoline engine]
92	W	- [With VR30 engine]
93	R	- [With VR30 engine]
93	SHIELD	- [With 2.0L turbo gasoline engine]
94	R	-
95	L	- [With 2.0L turbo gasoline engine]
95	Y	- [With VR30 engine]
96	R	- [With 2.0L turbo gasoline engine]
96	W	- [With VR30 engine]
97	L	- [With 2.0L turbo gasoline engine]
97	R	- [With VR30 engine]
98	BR	-
99	BR	- [With VR30 engine and with BOSE system]

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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Terminal No.	Color Of Wire	Signal Name [Specification]
99	P	- [With 2.0L turbo gasoline engine]
99	Y	- [With VR30 engine and without BOSE system]
100	BR	- [With VR30 engine]
100	W	- [With 2.0L turbo gasoline engine]

Connector No.	M25
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color Of Wire	Signal Name [Specification]
3	LG	M. CAN. L
4	B	EARTH
5	B	EARTH
6	L	CAN-H
7	V	KLIVE [With 2.0L turbo gasoline engine]
8	W	IGN_SW
11	SB	M. CAN. H
12	R	CAN-L
13	L	CAN-H
14	P	CAN-L
16	W	POWER

Connector No.	M40
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CSI6-TM4

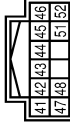


Terminal No.	Color Of Wire	Signal Name [Specification]
1	BG	- [With VR30 engine]
6	W/B	- [With VR30 engine]
7	V	- [With VR30 engine]
8	BG	- [With VR30 engine]
8	BR	- [With 2.0L turbo gasoline engine]
9	LG	- [With VR30 engine]
9	P	- [With 2.0L turbo gasoline engine]
10	W	- [With VR30 engine]
11	W	- [With VR30 engine]
11	Y	- [With 2.0L turbo gasoline engine]
12	B	- [With VR30 engine]
12	BR	- [With 2.0L turbo gasoline engine]
13	GR	- [With VR30 engine]
13	GR	- [With 2.0L turbo gasoline engine]
13	SHIELD	- [With 2.0L turbo gasoline engine]
14	B	- [With 2.0L turbo gasoline engine]
15	BG	- [With 2.0L turbo gasoline engine]
15	SB	- [With VR30 engine]
16	B	- [With VR30 engine]
16	BR	- [With 2.0L turbo gasoline engine]
17	LG	- [With VR30 engine]
18	B	- [With VR30 engine]
18	W/B	- [With 2.0L turbo gasoline engine]
19	Y	- [With VR30 engine]
31	W	- [With VR30 engine]
32	G	- [With 2.0L turbo gasoline engine]
32	V	- [With VR30 engine]
33	L	- [With VR30 engine]
33	Y	- [With 2.0L turbo gasoline engine]
34	P	- [With VR30 engine]
35	BG	- [With VR30 engine]
36	G	- [With VR30 engine]
37	B	- [With 2.0L turbo gasoline engine]
37	L	- [With VR30 engine]
38	P	- [With VR30 engine]
38	R	- [With 2.0L turbo gasoline engine and without gateway]
38	R	- [With 2.0L turbo gasoline engine and with gateway]
39	R	- [With 2.0L turbo gasoline engine]
40	GR	- [With VR30 engine]
41	L	- [With VR30 engine]
44	BR	- [With 2.0L turbo gasoline engine]
45	L	- [With 2.0L turbo gasoline engine]
45	W	- [With VR30 engine]
46	G	- [With 2.0L turbo gasoline engine]
46	Y	- [With VR30 engine]
47	BG	- [With 2.0L turbo gasoline engine]
47	R	- [With VR30 engine]
48	SHIELD	- [With VR30 engine]

Terminal No.	Color Of Wire	Signal Name [Specification]
49	B	- [With VR30 engine]
49	G	- [With 2.0L turbo gasoline engine]
50	B	- [With 2.0L turbo gasoline engine]
50	BR	- [With VR30 engine]
51	L	- [With VR30 engine]
52	W	- [With VR30 engine]
53	G	- [With 2.0L turbo gasoline engine]
54	SB	- [With VR30 engine]
54	V	- [With 2.0L turbo gasoline engine]
55	B	- [With 2.0L turbo gasoline engine]
55	P	- [With VR30 engine]
56	BG	- [With VR30 engine]
56	GR	- [With 2.0L turbo gasoline engine]
57	P	- [With VR30 engine]
57	P	- [With 2.0L turbo gasoline engine]
58	B	- [With VR30 engine]
59	SB	- [With VR30 engine]
61	W/B	- [With 2.0L turbo gasoline engine]
64	Y	- [With VR30 engine]
65	R	- [With VR30 engine]
66	P	- [Color of wire differs depending on production]
66	P	- [Color of wire differs depending on production]
67	LG	- [With VR30 engine]
68	BG	- [With VR30 engine]
69	L	- [With VR30 engine]
70	R	- [With VR30 engine]
71	V	- [With VR30 engine]
71	W	- [With 2.0L turbo gasoline engine]
72	L	- [With 2.0L turbo gasoline engine]
72	LG	- [With VR30 engine]
73	R	- [With VR30 engine]
73	W	- [With 2.0L turbo gasoline engine]
74	BR	- [With VR30 engine]
74	L	- [With 2.0L turbo gasoline engine]
75	B	- [With VR30 engine]
75	P	- [With 2.0L turbo gasoline engine and without gateway]
75	P	- [With 2.0L turbo gasoline engine and with gateway]
76	B	- [With VR30 engine]
76	W/B	- [With 2.0L turbo gasoline engine]
77	SB	- [With VR30 engine]
78	G	- [With VR30 engine]
78	LG	- [With 2.0L turbo gasoline engine]
79	R	- [With VR30 engine]
80	G	- [With VR30 engine]
81	R	- [With VR30 engine]
82	LG	- [With 2.0L turbo gasoline engine]
83	BR	- [With VR30 engine]
83	R	- [With 2.0L turbo gasoline engine]
84	V	- [With VR30 engine]
86	V	- [With VR30 engine]
87	G	- [With VR30 engine]

Terminal No.	Color Of Wire	Signal Name [Specification]
89	V	- [With VR30 engine]
90	G	- [With 2.0L turbo gasoline engine]
90	V	- [With 2.0L turbo gasoline engine]
91	W	- [With VR30 engine]
92	G	- [With VR30 engine]
93	BR	- [With VR30 engine]
94	GR	- [With 2.0L turbo gasoline engine]
94	L	- [With 2.0L turbo gasoline engine]
95	BR	- [With VR30 engine]
95	P	- [With 2.0L turbo gasoline engine and without gateway]
95	P	- [With 2.0L turbo gasoline engine and with gateway]
96	W	- [With VR30 engine]
97	LG	- [With VR30 engine]
98	Y	- [With VR30 engine]
99	BR	- [With VR30 engine]
99	LG	- [With 2.0L turbo gasoline engine]
100	SHIELD	- [With VR30 engine]

Connector No.	M55
Connector Name	COMBINATION METER
Connector Type	TH12FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
41	L	CAN-H
42	P	CAN-L
43	B	ILLUMINATION CONTROL SIGNAL
44	V	FUEL LEVEL SENSOR GROUND
45	W	BATTERY POWER SUPPLY
46	BG	CANTON SIGNAL [For with 2.0L engine and without ES]
46	R	CANTON SIGNAL [With VR30 engine and without ES]
47	SB	AV COMMUNICATION SIGNAL [H]
48	LG	AV COMMUNICATION SIGNAL [L]
51	BR	FUEL LEVEL SENSOR SIGNAL
52	B	GROUND

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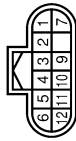
ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

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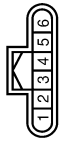
ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	M124
Connector Name	ACCELERATOR PEDAL ACTUATOR/ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RH12FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	BATTERY
2	G	IGNITION
3	L	ITS COMM-H
4	W	-
5	G	-
6	Y	-
7	B	GROUND
9	Y	ITS COMM-L
10	L	-
11	R	-
12	BR	-

Connector No.	M126
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RH06FB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	APS2_OUT
2	R	APS2_GND
3	Y	APS1_OUT
4	G	APS1_GND
5	W	APS1_IN
6	L	APS2_IN

Connector No.	M133
Connector Name	FUSE BLOCK (I/B)
Connector Type	TH40FW-AH



Terminal No.	Color Of Wire	Signal Name [Specification]
10C	V	-
12C	L	-
13C	L	-
14C	Y	-
15C	R	-
16C	R	-
17C	L	-
18C	BG	- [Without DRPO] - [With DRPO]
18C	P	-
19C	B	-
1C	R	-
20C	W	-
21C	L	-
22C	L	-
23C	L	-
25C	LG	-
26C	SB	-
27C	P	-
28C	W	-
29C	W	-
2C	R	-
30C	R	-
31C	W	-
32C	R	-
33C	B	-
34C	B	- [With VR30 engine] - [With 2.0L turbo gasoline engine]
35C	W/B	-
36C	SB	-
36C	R	-
37C	W	-
38C	SB	-
39C	V	-
3C	P	-
40C	G	-
4C	P	-
5C	P	-

6C	G	-
7C	G	-
8C	G	-
9C	V	-

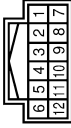
Connector No.	M146
Connector Name	WIRE TO WIRE
Connector Type	TK356MW-AS10



Terminal No.	Color Of Wire	Signal Name [Specification]
5	R	-
8	GR	-
9	V	-
10	BG	-
11	L	-
12	P	-
13	SB	-
14	Y	-
15	G	-
16	BR	-
17	W	-
18	R	-
19	L	-
20	SHIELD	-
21	BR	-
22	B	-
23	G	-
24	L	-
25	R	-
26	C	-
30	Y	-
31	GR	-
32	SB	-
33	BG	-
34	W	-
35	G	-
36	R	-
37	SHIELD	-
38	B	-
39	W	-

40	B	-
41	GR	-
42	B	-
43	LG	-
44	B	-
45	SB	-
46	B	-

Connector No.	M157
Connector Name	WIRE TO WIRE
Connector Type	TH12FW-AH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	-
2	G	- [With VR30 engine] - [With 2.0L turbo gasoline engine]
3	L	-
4	Y	- [With VR30 engine] - [With 2.0L turbo gasoline engine]
5	BR	- [With 2.0L turbo gasoline engine] - [With VR30 engine]
6	G	- [With 2.0L turbo gasoline engine] - [With VR30 engine]
7	B	-
8	Y	-
9	L	- [With VR30 engine] - [With 2.0L turbo gasoline engine]
10	R	- [With 2.0L turbo gasoline engine] - [With VR30 engine]
11	R	- [With VR30 engine] - [With 2.0L turbo gasoline engine]
12	BR	- [With VR30 engine] - [With 2.0L turbo gasoline engine]
12	W	-

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ENGINE CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

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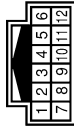
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ENGINE CONTROL SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	M158
Connector Name	WIRE TO WIRE
Connector Type	TH12MW-AH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	-
2	G	-
3	L	-
4	W	-
5	G	-
6	Y	-
7	B	-
8	B	-
9	Y	-
10	L	-
11	R	-
12	BR	-

Connector No.	M171
Connector Name	JOINT CONNECTOR-M01
Connector Type	24342_4GAZA



Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	-
2	G	-
3	L	-
4	W	-
5	G	-
6	Y	-
7	B	-
8	B	-
9	Y	-
10	L	-
11	R	-
12	BR	-
13	B	-
14	W	-
15	L	-
16	B	-
17	R	-
18	L	-
19	B	-

10	G	-
11	G	-
14	B	-
15	B	-
16	SB	- [With VR30 engine]
16	Y	- [With 2.0L turbo gasoline engine]
17	SB	- [With VR30 engine]
17	Y	- [With 2.0L turbo gasoline engine]
18	SB	- [With VR30 engine]
18	Y	- [With 2.0L turbo gasoline engine]
19	G	-
20	G	-
22	LG	- [With VR30 engine]
23	LG	- [With 2.0L turbo gasoline engine]
23	SB	- [With VR30 engine]
24	LG	- [With VR30 engine]
24	SB	- [With 2.0L turbo gasoline engine]

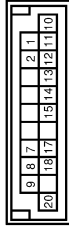
Connector No.	M175
Connector Name	JOINT CONNECTOR-M05
Connector Type	NH30FL-DC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
2	L	-
3	L	-
4	L	-
5	L	-
6	L	-
7	L	-
8	L	-
10	P	-
11	P	-
12	P	-
13	P	-
14	P	-
15	P	-
16	P	- [With VR30 engine]
16	R	- [With 2.0L turbo gasoline engine]

17	P	- [With VR30 engine]
17	R	- [With 2.0L turbo gasoline engine]
19	R	- [With VR30 engine and with SS]
19	W	- [Except with VR30 engine and with SS]
20	R	- [With VR30 engine and with SS]
20	W	- [Except with VR30 engine and with SS]

Connector No.	M178
Connector Name	JOINT CONNECTOR-M08
Connector Type	NH20FW-DC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-
2	R	-
7	B	-
8	B	-
9	B	-
10	B	- [With VR30 engine]
10	W	- [With 2.0L turbo gasoline engine]
11	B	- [With VR30 engine]
11	W	- [With 2.0L turbo gasoline engine]
12	B	- [With VR30 engine]
12	W	- [With 2.0L turbo gasoline engine]
13	B	- [With VR30 engine]
13	W	- [With 2.0L turbo gasoline engine]
14	B	- [With 2.0L turbo gasoline engine]
15	B	- [With VR30 engine]
15	W	- [With 2.0L turbo gasoline engine]
17	BR	-
18	BR	-
20	BR	-

STOP/START SYSTEM

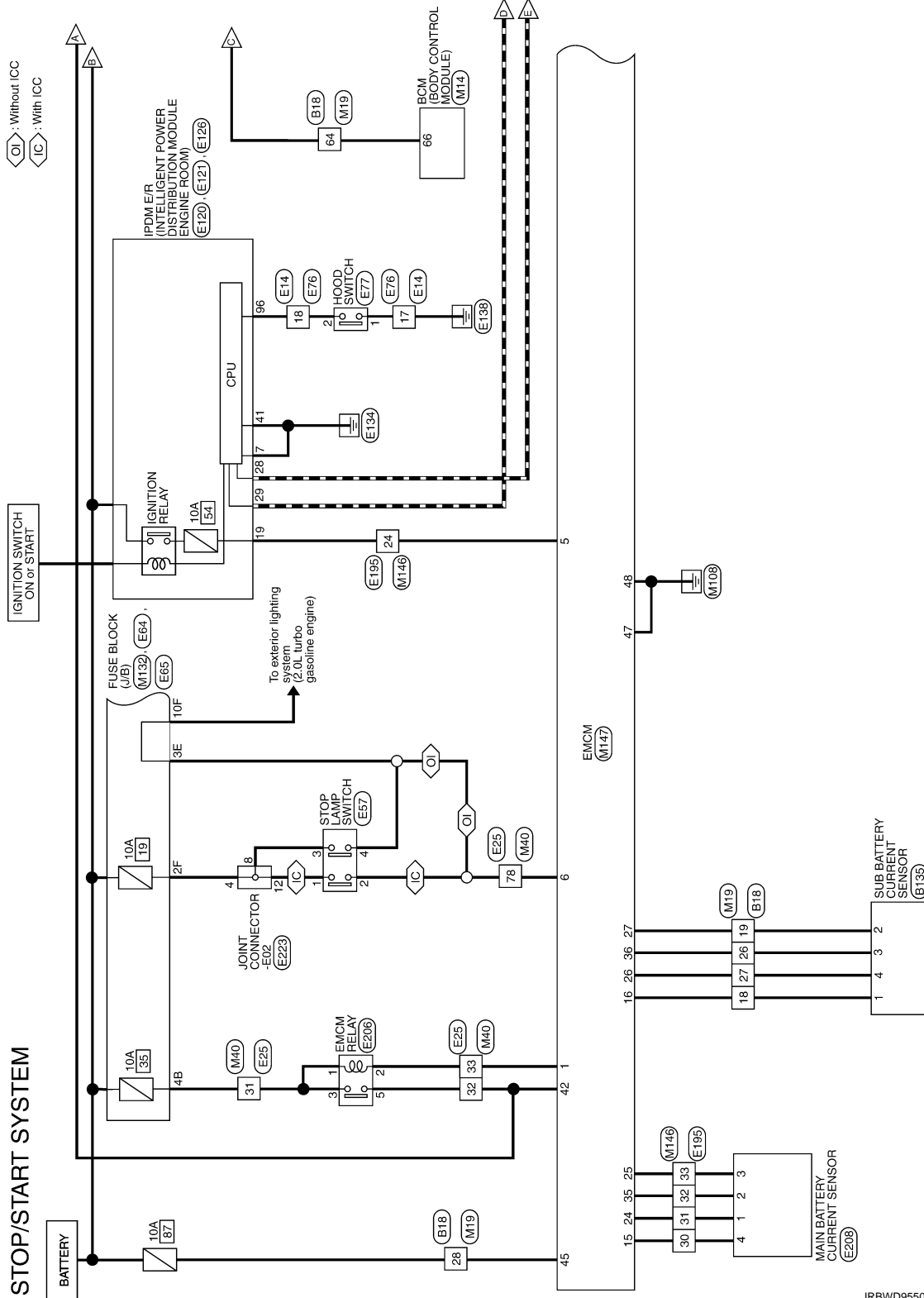
[2.0L TURBO GASOLINE ENGINE]

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STOP/START SYSTEM

Wiring Diagram

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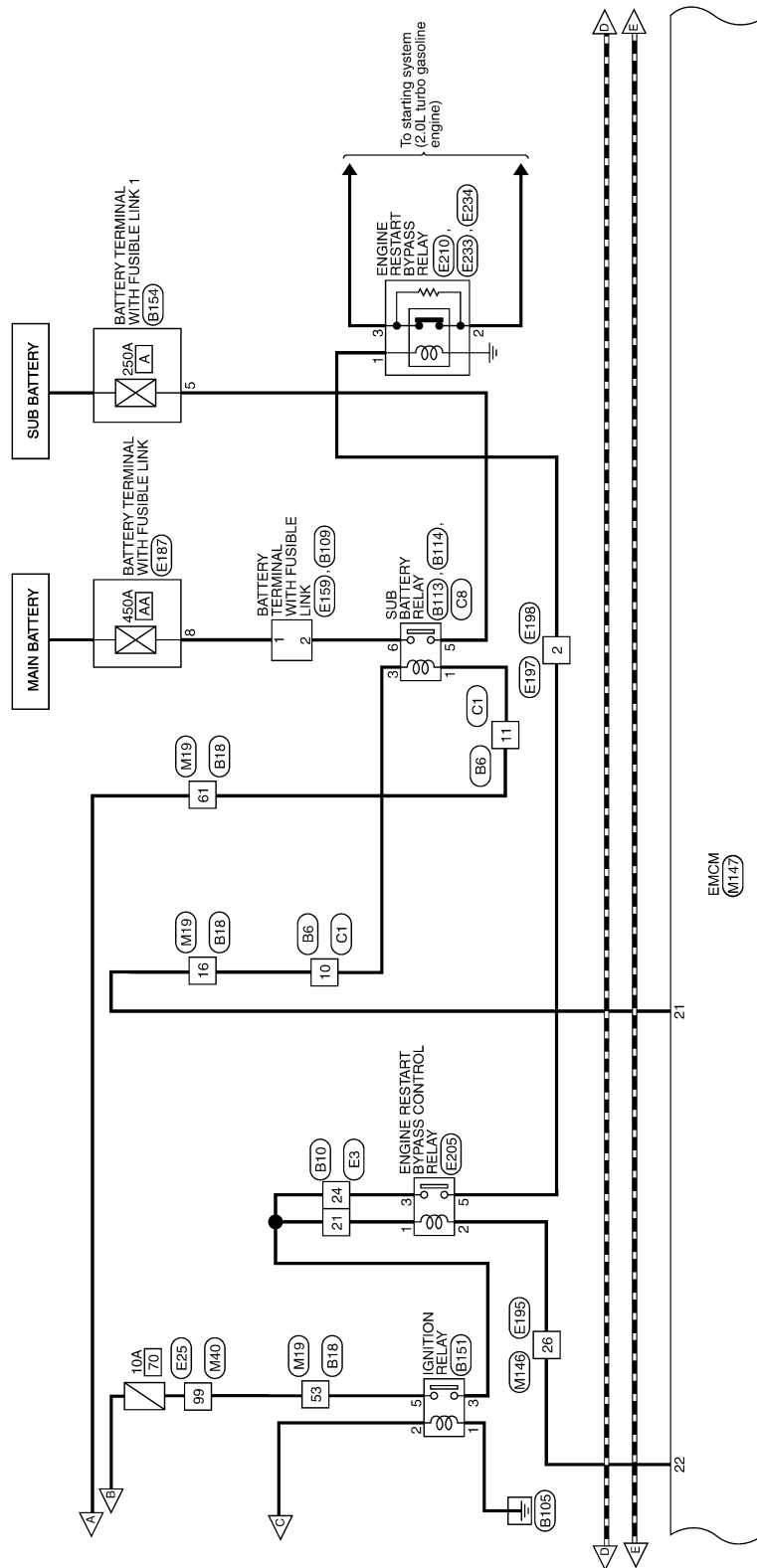
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STOP/START SYSTEM

[2.0L TURBO GASOLINE ENGINE]

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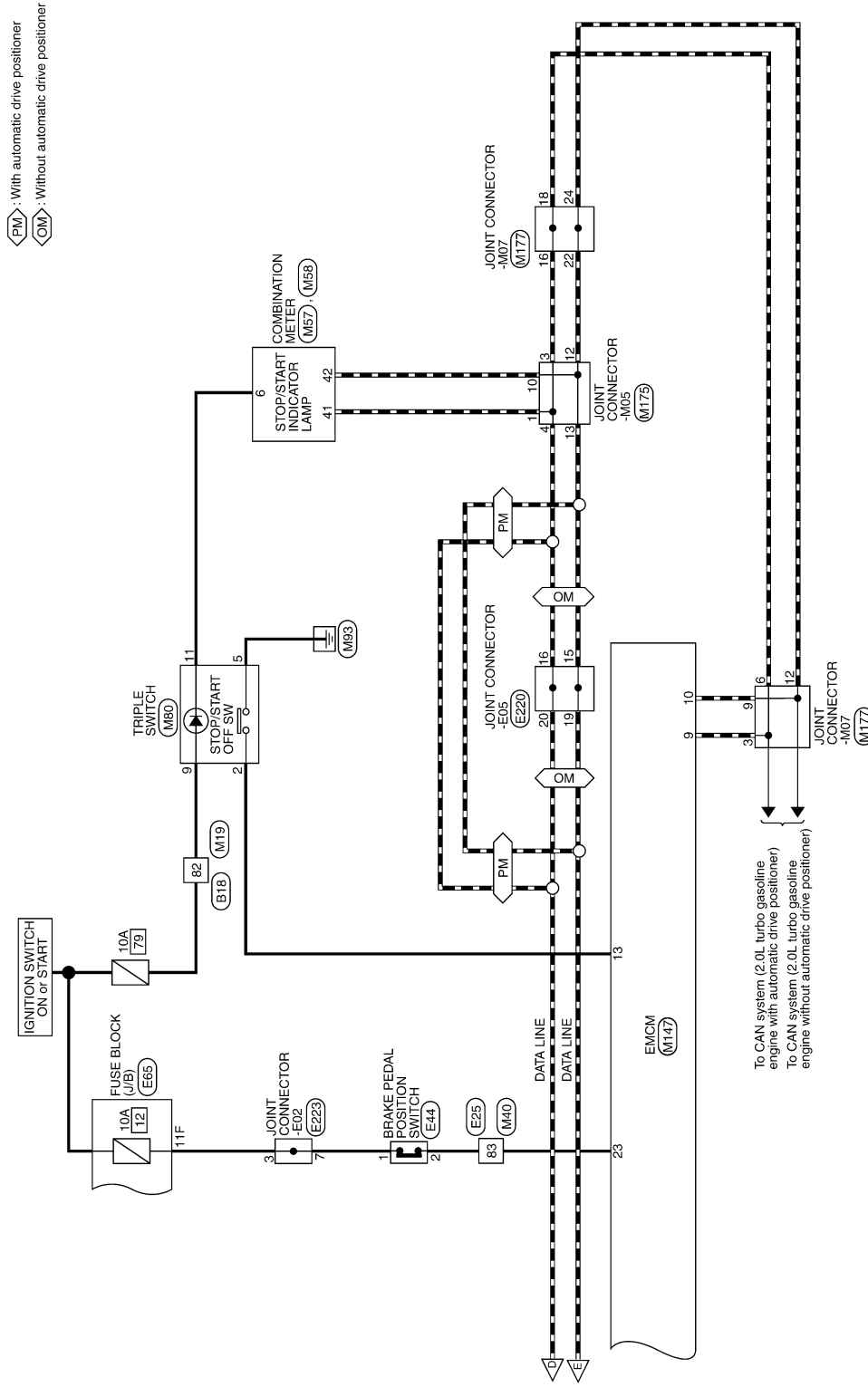
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STOP/START SYSTEM

[2.0L TURBO GASOLINE ENGINE]

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STOP/START SYSTEM

[2.0L TURBO GASOLINE ENGINE]

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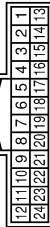
STOP/START SYSTEM

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Type	TH16MW-AH



Terminal No.	Color Of Wire	Signal Name (Specification)
7	LG	-
8	GR	-
9	SHIELD	-
10	L	- [With VR30 engine]
10	V	- [With 2.0L turbo gasoline engine]
11	G	- [With 2.0L turbo gasoline engine]
11	V	- [With VR30 engine]
12	GR	-
13	BG	-
14	LG	-
15	V	-
16	BG	-

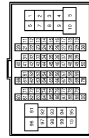
Connector No.	B10
Connector Name	WIRE TO WIRE
Connector Type	TH24FW-AH



Terminal No.	Color Of Wire	Signal Name (Specification)
1	LG	- [With 2.0L turbo gasoline engine]
1	Y	- [With VR30 engine]
2	W	-
3	LG	-
4	P	- [With VR30 engine]
4	SB	- [With 2.0L turbo gasoline engine]
5	L	-

6	V	-
7	LG	-
8	R	-
9	W	-
10	B	-
11	G	-
12	R	-
13	GR	-
14	BG	-
15	LG	-
16	V	-
17	V	-
18	BR	- [With 2.0L turbo gasoline engine]
19	LG	- [With VR30 engine]
19	Y	- [With VR30 engine]
20	Y	-
21	R	- [With 2.0L turbo gasoline engine]
21	V	- [With VR30 engine]
22	L	-
23	V	-
24	B	- [With VR30 engine]
24	R	- [With 2.0L turbo gasoline engine]

Connector No.	B18
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-316-TM4



Terminal No.	Color Of Wire	Signal Name (Specification)
1	Y	-
2	G	-
3	L	-
4	LG	-
5	Y	-
6	R	-
7	V	-
8	LG	-
10	BG	-
11	BG	-
12	LG	-

13	GR	-
14	R	-
15	L	-
16	W	- [Without paddle shift]
16	V	- [With paddle shift]
18	W	-
19	BR	-
20	W	-
21	B	-
22	R	-
23	V	- [With VR30 engine]
24	Y	- [With 2.0L turbo gasoline engine]
24	R	- [With VR30 engine]
25	P	- [With 2.0L turbo gasoline engine and without gateway]
25	V	- [With 2.0L turbo gasoline engine and with gateway]
25	W	- [With VR30 engine]
26	G	-
27	R	-
28	R	-
31	B	-
31	BR	- [With 2.0L turbo gasoline engine]
32	B	-
33	B	-
34	LG	-
35	P	-
36	W	-
37	SB	-
38	LG	-
40	P	-
41	SB	-
42	BR	-
43	BG	-
44	BG	-
46	R	-
50	W	-
51	SA	-
52	V	-
53	LG	-
54	R	-
55	R	-
57	W	-
58	V	-
59	GR	-
60	G	-
61	G	-
62	BG	-
63	BR	-
64	Y	-
66	R	-
70	R	-
71	W	-

72	B	-
73	W	-
74	L	-
75	R	- [Without paddle shift]
75	V	- [With paddle shift]
76	BR	-
77	B	-
78	SB	-
79	V	- [With VR30 engine]
79	W	- [With 2.0L turbo gasoline engine]
81	B	-
82	R	-
83	BG	-
84	L	-
85	R	- [Without paddle shift]
85	V	- [With paddle shift]
86	B	-
88	G	-
89	V	- [With 2.0L turbo gasoline engine]
89	W	- [With VR30 engine]
91	GR	-
94	GR	-
96	Y	-
97	V	-
98	BR	- [With VR30 engine and with BOSE system]
98	Y	- [Except with VR30 engine and with BOSE system]

Connector No.	B109
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	24340_15U00



Terminal No.	Color Of Wire	Signal Name (Specification)
2	BY	-

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EC4

STOP/START SYSTEM

< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]

STOP/START SYSTEM

Connector No.	B113
Connector Name	SUB BATTERY RELAY
Connector Type	24340_JATOC



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

Connector No.	B114
Connector Name	SUB BATTERY RELAY
Connector Type	E-BA8



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

Connector No.	B135
Connector Name	SUB BATTERY CURRENT SENSOR
Connector Type	SAZ04EGY



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

Connector No.	B151
Connector Name	IGNITION RELAY
Connector Type	RS22FL_MZLC



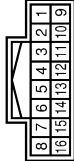
Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	-
2	B	-
3	R	-
5	LG	-

Connector No.	B154
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK 1
Connector Type	24340_JA04D



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

Connector No.	C1
Connector Name	WIRE TO WIRE
Connector Type	TH1GFV-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
7	LG	-
8	GR	-
9	SHIELD	-
10	L	- [With VR30 engine]
10	V	- [With 2.0L turbo gasoline engine]
11	G	-
12	GR	-
13	BG	-
14	LG	-
15	BR	-
16	BG	-

Connector No.	C8
Connector Name	SUB BATTERY RELAY
Connector Type	TH04FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	- [With 2.0L turbo gasoline engine]
1	R	- [With VR30 engine]
3	V	-

Connector No.	E3
Connector Name	WIRE TO WIRE
Connector Type	TH24MW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	- [With 2.0L turbo gasoline engine]
1	Y	- [With VR30 engine]
2	W	-
3	LG	-
4	P	- [With VR30 engine]
4	SB	- [With 2.0L turbo gasoline engine]
5	L	-
6	Y	-
7	LG	-
8	BG	-
9	W	-
10	B	-
11	G	-
12	R	-
13	GR	-
14	G	-
15	LG	- [With 2.0L turbo gasoline engine]
15	V	- [With VR30 engine]
16	Y	-
17	P	-
18	BR	-
19	LG	- [With 2.0L turbo gasoline engine]
19	Y	- [With VR30 engine]
20	GR	-
21	R	- [With 2.0L turbo gasoline engine]
21	V	- [With VR30 engine]
22	L	-
23	P	-
24	B	- [With VR30 engine]
24	BR	- [With 2.0L turbo gasoline engine]

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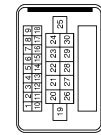
STOP/START SYSTEM

< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]

STOP/START SYSTEM

Connector No.	E14
Connector Name	WIRE TO WIRE
Connector Type	SA418MB-4S13-S1Z2



Connector No.	E25
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-4S16-TM4



Terminal No.	Color Of Wire	Signal Name (Specification)
4	Y	-
5	L	-
6	B	-
7	BG	-
8	LG	- [With VR30 engine]
9	R	- [With 2.0L turbo gasoline engine]
11	GR	- [With VR30 engine] (Color of wire differs depending on production)
12	R	-
13	B	-
14	B	-
21	B	-
22	SHIELD	-
23	P	- [With VR30 engine]
24	L	-
25	V	-
26	B	-
28	B	-

Terminal No.	Color Of Wire	Signal Name (Specification)
1	BG	-
6	V	-
7	L	-
8	BG	-
9	BR	- [With 2.0L turbo gasoline engine]
10	BR	- [With 2.0L turbo gasoline engine]
11	L	-
12	GR	- [With VR30 engine]
13	SHIELD	- [With 2.0L turbo gasoline engine]
14	B	- [With VR30 engine]
15	GR	- [With 2.0L turbo gasoline engine]
16	BR	- [With VR30 engine]
17	GR	- [With VR30 engine]
18	G	- [With 2.0L turbo gasoline engine]
19	V	- [With VR30 engine]
31	W	- [With 2.0L turbo gasoline engine]
32	G	- [With VR30 engine]
33	L	- [With 2.0L turbo gasoline engine]
34	Y	- [With VR30 engine]
35	GR	-
36	R	-
37	L	- [With 2.0L turbo gasoline engine]
38	L	- [With VR30 engine]

38	P	- [With 2.0L turbo gasoline engine and without gateway]
39	BR	- [With 2.0L turbo gasoline engine and with gateway]
40	Y	- [With VR30 engine]
41	LG	-
44	V	-
45	L	- [With 2.0L turbo gasoline engine]
46	W	- [With VR30 engine]
47	Y	- [With VR30 engine]
48	SHIELD	-
49	R	-
50	BR	- [With VR30 engine]
51	L	-
52	W	-
53	V	-
54	P	- [With VR30 engine]
54	W	- [With 2.0L turbo gasoline engine]
55	B	- [With VR30 engine]
55	W	- [With 2.0L turbo gasoline engine]
56	BG	- [With 2.0L turbo gasoline engine]
56	SB	- [With VR30 engine]
57	BG	- [With VR30 engine]
57	W	- [With 2.0L turbo gasoline engine]
58	B	- [Color of wire differs depending on production]
58	B/W	- [Color of wire differs depending on production]
59	W	-
61	R	-
64	Y	-
65	BR	- [Color of wire differs depending on production]
65	GR	- [Color of wire differs depending on production]
66	GR	-
67	LG	-
68	BG	-
69	L	-
70	R	-
71	G	- [With 2.0L turbo gasoline engine]
71	LG	- [With VR30 engine]
72	L	- [With 2.0L turbo gasoline engine]
72	V	- [With VR30 engine]
73	G	- [With VR30 engine]
73	W	- [With 2.0L turbo gasoline engine]
74	BR	- [With VR30 engine]
74	L	- [With 2.0L turbo gasoline engine]
75	P	- [With 2.0L turbo gasoline engine and without gateway]
75	R	- [With 2.0L turbo gasoline engine and with gateway]
75	V	- [With VR30 engine]

76	G	-
77	Y	-
78	LG	- [With 2.0L turbo gasoline engine and with ADAS]
78	P	- [With VR30 engine]
78	V	- [With 2.0L turbo gasoline engine and without ADAS]
79	SR	-
80	LG	-
81	R	-
82	V	-
83	BR	- [With 2.0L turbo gasoline engine]
83	R	- [With VR30 engine]
84	LG	-
86	BG	-
87	G	-
89	LG	-
90	G	- [With VR30 engine]
90	GR	- [With 2.0L turbo gasoline engine]
91	G	-
93	BG	-
94	GR	- [With VR30 engine]
94	L	- [With 2.0L turbo gasoline engine]
95	BG	- [With VR30 engine]
95	P	- [With 2.0L turbo gasoline engine and without gateway]
95	R	- [With 2.0L turbo gasoline engine and with gateway]
96	W	-
97	LG	-
98	L	-
99	LG	- [With 2.0L turbo gasoline engine]
99	P	- [With VR30 engine]
100	SHIELD	-

Connector No.	E44
Connector Name	BRAKE PEDAL POSITION SWITCH
Connector Type	S02FL



Terminal No.	Color Of Wire	Signal Name (Specification)
1	G	- [Color of wire differs depending on production]
1	V	- [Color of wire differs depending on production]
2	BG	- [With VR30 engine]
2	BR	- [With 2.0L turbo gasoline engine]

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EC4

STOP/START SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

STOP/START SYSTEM

Connector No.	E57
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	- [With ASCD]
1	L	- [With ADAS]
2	GR	- [With ASCD]
2	LG	- [With ADAS]
3	BR	-
4	V	-

Connector No.	E64
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS08FW-CS



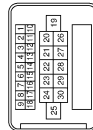
Terminal No.	Color Of Wire	Signal Name [Specification]
1E	G	-
2E	P	-
3E	V	-
4E	GR	-
6E	L	-
7E	BG	-

Connector No.	E65
Connector Name	FUSE BLOCK (J/B)
Connector Type	TH12FW-AH



Terminal No.	Color Of Wire	Signal Name [Specification]
10F	W	-
11F	G	- [Color of wire differs depending on production]
11F	R	- [Color of wire differs depending on production]
12F	W	- [With VR30 engine]
12F	Y	- [With 2.0L turbo gasoline engine]
1F	R	-
2F	BR	-
3F	P	-
5F	P	-
6F	L	-
7F	R	-
8F	L	-
9F	L	-

Connector No.	E76
Connector Name	WIRE TO WIRE
Connector Type	SAA18FB-BS-LS-51Z



Terminal No.	Color Of Wire	Signal Name [Specification]
4	Y	-
5	L	-
6	B	-
7	BR	-
8	LG	-
9	GR	-
11	LG	-

12	BG	-
13	B	-
14	R	-
15	G	-
16	V	-
17	B	-
18	P	-
21	B	-
22	SHIELD	-
23	P	-
24	L	-
25	V	-
26	B	-
28	B	-

Connector No.	E77
Connector Name	HOOD SWITCH
Connector Type	RH02FB



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

Connector No.	E120
Connector Name	RELAY (INTELLIGENT POWER DISTRIBUTION) MOBILE ENGINE ROOM
Connector Type	NS12FW-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
7	B/W	-
9	P	-
10	LG	-
11	V	-
13	BG	-
14	SR	-
15	BR	-
17	GR	-
18	L	-

Connector No.	E121
Connector Name	RELAY (INTELLIGENT POWER DISTRIBUTION) MOBILE ENGINE ROOM
Connector Type	TH02FW-AH



Terminal No.	Color Of Wire	Signal Name [Specification]
19	L	- [With 2.0L turbo gasoline engine]
19	P	- [With VR30 engine]
22	BG	-
23	GR	- [With VR30 engine]
23	LG	- [With 2.0L turbo gasoline engine and without air pre-heater]
23	P	- [With 2.0L turbo gasoline engine and with air pre-heater]
27	GR	-
28	P	-
29	L	-
31	G	-
32	SR	-
33	SR	-
34	V	-
34	Y	-
35	G	-
36	SR	- [With VR30 engine]
37	GR	- [With 2.0L turbo gasoline engine]
38	BR	-
41	GR	-
43	V	-

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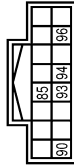
STOP/START SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

STOP/START SYSTEM

Connector No.	E126
Connector Name	IPWM FOR INTELLIGENT POWER DISTRIBUTION/MODULE ENGINE (R00A)
Connector Type	TH16FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
85	L	-
90	BR	-
93	V	-
94	Y	-
96	P	- [With VR3D engine]
96	SB	- [With 2.0L turbo gasoline engine]

Connector No.	E159
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	24340_J5U00



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

Connector No.	E187
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	24340_JA04D



Terminal No.	Color Of Wire	Signal Name [Specification]
8	B/Y	-

Connector No.	E195
Connector Name	WIRE TO WIRE
Connector Type	TK36FW-NS1D



Terminal No.	Color Of Wire	Signal Name [Specification]
5	BR	-
8	GR	-
9	P	-
10	R	-
11	L	-
12	P	-
13	GR	-
14	Y	-
15	G	-
16	W	-
17	L	-
18	R	-
19	BR	-
20	SHIELD	-
21	BR	-
22	V	-
23	W	-
24	L	-
25	G	-

26	G	-
30	Y	-
31	GR	-
32	SB	-
33	W	-
34	W	-
35	B	-
36	G	-
37	SHIELD	-
38	R	-
39	L	-
40	GR	-
41	W	-
42	B	-
43	BR	-
44	P	-
45	SB	-
46	Y	-

Connector No.	E197
Connector Name	WIRE TO WIRE
Connector Type	RS08FB-PR



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	R	-
3	GR	-
4	BR	-
5	W	-
6	BG	-
7	LG	-
8	GR	-

Connector No.	E198
Connector Name	WIRE TO WIRE
Connector Type	RS08MB-PR



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	-
2	R	-
3	Y	-
4	BR	-
5	Y	-
6	R	-
7	LG	-
8	GR	-

Connector No.	E205
Connector Name	DRIVING LAMP RELAY
Connector Type	MS02FL-M2-LC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-
2	G	-
3	BR	-
5	R	-

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STOP/START SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

STOP/START SYSTEM

Connector No.	E206
Connector Name	EMCM RELAY
Connector Type	MS02FL-M2-4C



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

Connector No.	E208
Connector Name	MAIN BATTERY CURRENT SENSOR
Connector Type	RH04FB



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

Connector No.	E210
Connector Name	ENGINE RESTART BYPASS RELAY
Connector Type	X01EG7



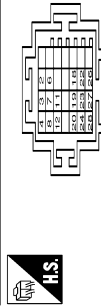
Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-

Connector No.	E220
Connector Name	JOINT CONNECTOR-E05
Connector Type	NH24FBJ



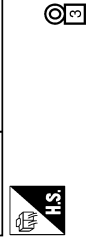
Terminal No.	Color Of Wire	Signal Name [Specification]
3	W	-
4	L	-
7	W	-
8	L	-
11	W	-
12	L	-
15	P	- [Without Gateway]
16	R	- [With Gateway]
18	L	-
19	P	- [Without Gateway]
19	R	- [With Gateway]
20	L	-
23	P	- [Without Gateway]
23	R	- [With Gateway]
24	L	-

Connector No.	E223
Connector Name	JOINT CONNECTOR-E06
Connector Type	SGA28FBJ



Terminal No.	Color Of Wire	Signal Name [Specification]
2	GR	-
3	G	-
4	BR	-
6	BG	-
7	G	-
8	BR	-
11	G	-
12	L	-
18	V	-
19	W	-
20	BG	-
22	GR	-
23	P	-
24	BR	-
26	V	-
27	W	-
28	BG	-

Connector No.	E233
Connector Name	ENGINE RESTART BYPASS RELAY
Connector Type	E-BA608



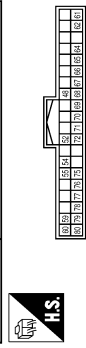
Terminal No.	Color Of Wire	Signal Name [Specification]
3	BRH	-

Connector No.	E234
Connector Name	ENGINE RESTART BYPASS RELAY
Connector Type	E-BA608



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

Connector No.	IM14
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
48	R	PUSH-BTN IGN SW ILL-PWR
52	G	DONGLE LINK
54	V	COMM LINE
55	R	RAIN SENSOR
59	P	CAN-L
60	L	CAN-H
61	G	REAR WINDOW DEF RLY CONT
62	R	STARTER RLY CONT
64	V	1-KEY WGR BUZZER
65	B	OUTS HD LAMP CONT
66	Y	BLOWER FAN RLY CONT [With V6B0 engine]
66	Y	BLOWER FAN RLY CONT [With V6B0 engine]
67	W/B	IGN RLY (I7/B) CONT
68	R	DIMMER
69	GR	A/T SHIFT SELECT PWR SPLY
70	B	IGN RLY (IPDM E/R) CONT
71	G	DR DOOR REQ SW
72	SB	PASS DOOR REQ SW
75	BR	COMBI SW INPUT 5

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STOP/START SYSTEM

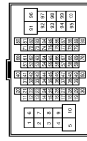
< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]

STOP/START SYSTEM

76	BG	COMBI SW INPUT 4
77	V	COMBI SW INPUT 3
78	Y	COMBI SW INPUT 2
79	LG	COMBI SW INPUT 1
80	L	TR LID OPNS SW

Connector No.	M19
Connector Name	WIRE TO WIRE
Connector Type	TH80M/M-CS16-TM4

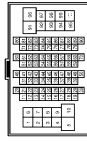


Terminal No.	Color Of Wire	Signal Name (Specification)
1	Y	-
2	G	-
3	SB	-
4	BR	-
5	Y	-
6	R	-
7	W	-
8	V	-
10	BG	-
11	BR	-
12	LG	-
13	GR	-
14	R	-
15	L	-
16	V	-
18	W	-
19	BR	-
20	W	-
22	SB	-
23	R	-
24	Y	-
24	R	- [With 2.0L turbo gasoline engine]
25	P	- [With VR30 engine]
25	W	- [With VR30 engine]
26	G	-
27	R	-
28	R	-
31	BR	-
32	B	-

33	B	-
34	V	-
35	P	-
36	W	-
37	SB	-
38	LG	-
40	P	-
41	G	-
42	BR	-
43	BR	-
44	BR	-
46	BG	-
50	W	-
51	Y	-
52	V	-
53	LG	-
54	R	-
55	R	-
57	W	-
58	V	-
59	BG	-
60	G	-
61	G	-
62	BG	-
63	BR	-
64	Y	-
66	R	-
70	LG	-
71	W	-
72	B	-
73	W	-
74	L	-
75	W	-
76	BR	-
77	B	-
78	SB	-
79	P	- [With VR30 engine]
79	W	- [With 2.0L turbo gasoline engine]
81	B	-
82	R	-
83	BG	-
84	L	-
85	W	-
86	B	-
88	G	-
89	V	-
89	W	- [With 2.0L turbo gasoline engine]
91	GR	- [With VR30 engine]
94	GR	-
96	W	-

97	V	-
98	BR	- [With VR30 engine and with BOSE system]
98	Y	- [Except with VR30 engine and with BOSE system]

Connector No.	M40
Connector Name	WIRE TO WIRE
Connector Type	TH80M/M-CS16-TM4



Terminal No.	Color Of Wire	Signal Name (Specification)
1	BG	-
6	W/B	-
7	V	-
8	BG	- [With VR30 engine]
8	BR	- [With 2.0L turbo gasoline engine]
9	LG	- [With VR30 engine]
9	P	- [With 2.0L turbo gasoline engine]
10	W	-
11	Y	- [With VR30 engine]
11	W	- [With 2.0L turbo gasoline engine]
12	B	- [With VR30 engine]
12	BR	- [With 2.0L turbo gasoline engine]
13	GR	- [With VR30 engine]
13	SHIELD	- [With 2.0L turbo gasoline engine]
14	B	-
15	BG	- [With 2.0L turbo gasoline engine]
15	SB	- [With VR30 engine]
16	B	-
16	BR	- [With 2.0L turbo gasoline engine]
17	LG	-
18	B	-
18	W/B	- [With VR30 engine]
19	Y	-
31	W	-
32	G	- [With 2.0L turbo gasoline engine]
32	V	- [With VR30 engine]
33	L	- [With VR30 engine]
33	Y	- [With 2.0L turbo gasoline engine]
34	P	-
35	BG	-
36	G	-

37	B	- [With VR30 engine]
37	L	- [With 2.0L turbo gasoline engine]
38	L	- [With VR30 engine]
38	P	- [With 2.0L turbo gasoline engine and without gateway]
38	R	- [With 2.0L turbo gasoline engine and with gateway]
39	R	- [With 2.0L turbo gasoline engine]
39	Y	- [With VR30 engine]
40	GR	-
51	L	-
54	BR	-
54	L	- [With 2.0L turbo gasoline engine]
45	W	- [With VR30 engine]
46	G	-
46	Y	- [With 2.0L turbo gasoline engine]
47	BG	- [With 2.0L turbo gasoline engine]
47	R	- [With VR30 engine]
48	SHIELD	-
49	B	- [With VR30 engine]
49	G	- [With 2.0L turbo gasoline engine]
50	B	- [With 2.0L turbo gasoline engine]
50	BR	- [With VR30 engine]
51	L	-
52	W	-
53	G	-
54	SB	- [With 2.0L turbo gasoline engine]
54	Y	- [With VR30 engine]
55	B	- [With 2.0L turbo gasoline engine]
55	P	- [With VR30 engine]
56	BG	- [With VR30 engine]
56	GR	- [With 2.0L turbo gasoline engine]
57	GR	- [With VR30 engine]
57	P	- [With 2.0L turbo gasoline engine]
58	B	-
59	SB	-
61	W/B	-
64	Y	-
65	R	-
66	P	- [Color of wire differs depending on production]
66	V	- [Color of wire differs depending on production]
67	LG	-
68	BG	-
69	L	-
70	R	-
71	V	- [With VR30 engine]
71	W	- [With 2.0L turbo gasoline engine]
72	L	- [With 2.0L turbo gasoline engine]
72	LG	- [With VR30 engine]
73	R	- [With VR30 engine]
73	W	- [With 2.0L turbo gasoline engine]
74	BR	- [With VR30 engine]

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STOP/START SYSTEM

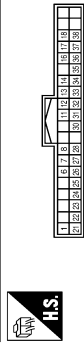
< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]

STOP/START SYSTEM

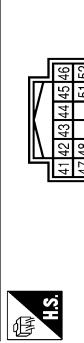
74	L	- [With 2.0L turbo gasoline engine]
75	B	- [With VR30 engine]
75	P	- [With 2.0L turbo gasoline engine and without gateway]
75	R	- [With 2.0L turbo gasoline engine and with gateway]
76	W/B	-
77	SB	-
78	G	- [With VR30 engine]
78	LG	- [With 2.0L turbo gasoline engine]
79	R	-
80	G	-
81	R	-
82	LG	-
83	BR	- [With 2.0L turbo gasoline engine]
83	R	- [With VR30 engine]
84	V	-
85	V	-
87	G	-
89	V	-
90	V	- [With VR30 engine]
91	W	-
92	G	-
93	BR	-
94	GR	- [With VR30 engine]
94	L	- [With 2.0L turbo gasoline engine]
95	BR	- [With VR30 engine]
95	P	- [With 2.0L turbo gasoline engine and without gateway]
95	R	- [With 2.0L turbo gasoline engine and with gateway]
96	W	-
97	LG	-
98	Y	-
99	BR	- [With VR30 engine]
99	LG	- [With 2.0L turbo gasoline engine]
100	SHIELD	-

Connector No.	M57
Connector Name	COMBINATION METER
Connector Type	TH40FW-AH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	GROUND
6	GR	STOP/START OFF SWITCH INDICATOR SIGNAL
7	G	SECURITY SIGNAL
8	B	-
11	W	ALTERNATOR SIGNAL
12	G	LED HEADLAMP (RH) WARNING SIGNAL
13	BR	LED HEADLAMP (LH) WARNING SIGNAL
14	V	ACC POWER SUPPLY
16	V	AIR BAG SIGNAL
17	BR	METER CONTROL SWITCH GROUND
18	SB	TRIP/RESET SIGNAL
21	B	STEERING SWITCH SIGNAL GROUND
22	P	STEERING SWITCH SIGNAL A
23	W/B	STEERING SWITCH SIGNAL B
24	L	WASHER LEVEL SWITCH SIGNAL
25	LG	BRAKE FLUID LEVEL SWITCH SIGNAL
26	V	PARKING BRAKE SWITCH SIGNAL
27	G	PASSENGER SEAT BELT WARNING SIGNAL
28	W	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)
30	G	MANUAL MODE SIGNAL [With 2.0L turbo gasoline engine]
30	SB	MANUAL MODE SIGNAL [With VR30 engine]
31	G	NON-MANUAL MODE SIGNAL [With 2.0L turbo gasoline engine]
31	L	NON-MANUAL MODE SIGNAL [With VR30 engine]
32	BG	MANUAL MODE SHIFT UP SIGNAL
33	GR	MANUAL MODE SHIFT DOWN SIGNAL [With VR30 engine]
33	D	MANUAL MODE SHIFT DOWN SIGNAL [With 2.0L turbo gasoline engine]
34	BG	PADDLE SHIFTER UP SWITCH SIGNAL
35	G	PADDLE SHIFTER DOWN SWITCH SIGNAL
36	V	ILLUMINATION CONTROL SWITCH SIGNAL (+)
37	GR	ILLUMINATION CONTROL SWITCH SIGNAL (-)
38	R	VEHICLE SPEED SIGNAL (8-PULSE)

Connector No.	M58
Connector Name	COMBINATION METER
Connector Type	TH12FW-AH



Terminal No.	Color Of Wire	Signal Name [Specification]
41	L	CAN-H
42	P	CAN-L
43	B	ILLUMINATION CONTROL SIGNAL
44	Y	FUEL LEVEL SENSOR GROUND
45	W	BATTERY POWER SUPPLY
46	BG	Ignitions signal. (Except with VR30 engine and without IS)
46	R	IGNITION SIGNAL [With VR30 engine and without IS]
47	SB	AV COMMUNICATION SIGNAL (H)
48	LG	AV COMMUNICATION SIGNAL (L)
51	BR	FUEL LEVEL SENSOR SIGNAL
52	B	GROUND

Connector No.	M80
Connector Name	TRIPLE SWITCH
Connector Type	TH12FB-AH



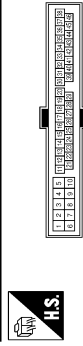
Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
2	W	-
3	R	-
5	B	-
6	R	-
7	B	-
9	R	INDICATOR+
11	GR	INDICATOR-

Connector No.	M132
Connector Name	FUSE BLOCK (I/B)
Connector Type	NS16FW-C5



Terminal No.	Color Of Wire	Signal Name [Specification]
11B	LG	-
13B	P	-
14B	G	-
15B	Y	-
16B	Y	-
2B	B	-
4B	W	-
5B	R	-
9B	Y	-

Connector No.	M146
Connector Name	WIRE TO WIRE
Connector Type	TK36MW-NS10



Terminal No.	Color Of Wire	Signal Name [Specification]
5	B	-
8	GR	-
9	V	-
10	BG	-
11	L	-
12	P	-
13	SB	-
14	Y	-
15	G	-
16	BR	-
17	W	-

STOP/START SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

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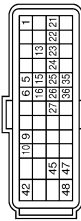
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STOP/START SYSTEM

18	R	-	-
19	L	-	-
20	SHIELD	-	-
21	BR	-	-
22	B	-	-
23	G	-	-
24	L	-	-
25	R	-	-
26	G	-	-
27	GR	-	-
28	SB	-	-
29	B5	-	-
30	W	-	-
31	G	-	-
32	Y	-	-
33	GR	-	-
34	SB	-	-
35	B5	-	-
36	W	-	-
37	SHIELD	-	-
38	B	-	-
39	W	-	-
40	B	-	-
41	GR	-	-
42	B	-	-
43	LG	-	-
44	B	-	-
45	SB	-	-
46	B	-	-

Connector No.	M1147
Connector Name	EMCM
Connector Type	RH401FB-R28-R4LH-Z



Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	EMCM RELAY CONTROL (S/OFF)
5	L	IGNITION SWITCH
6	LG	STOP LAMP SWITCH
9	L	CAN-L
10	P	CAN-L
13	W	STOP/START OFF SWITCH
15	Y	SENSOR POWER SUPPLY (MAIN BATTERY CURRENT/Temperature Sensor)
16	W	SENSOR POWER SUPPLY (SUB BATTERY CURRENT/Temperature Sensor)

21	V	SUB BATTERY RELAY CONTROL
22	G	ENGINE RESTART BYPASS CONTROL RELAY
23	BR	BRAKE PEDAL POSITION SWITCH
24	GR	MAIN BATTERY CURRENT SENSOR
25	BG	MAIN BATTERY TEMPERATURE SENSOR
26	R	SUB BATTERY CURRENT SENSOR
27	BR	SUB BATTERY TEMPERATURE SENSOR
28	SB	SENSOR GROUND (SUB BATTERY CURRENT/Temperature Sensor)
29	G	SENSOR GROUND (SUB BATTERY CURRENT/Temperature Sensor)
42	G	EMCM POWER SUPPLY
45	R	SUB BATTERY VOLTAGE MONITOR
47	B	EMCM GROUND
48	B	EMCM GROUND

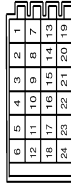
Connector No.	M175
Connector Name	JOINT CONNECTOR-M05
Connector Type	NH20FL-DC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
2	L	-
3	L	-
4	L	-
5	L	-
6	L	-
7	L	-
8	L	-
10	P	-
11	P	-
12	P	-
13	P	-
14	P	-
15	P	-
16	R	- [With V630 engine]
17	P	- [With V630 engine]
19	R	- [With 2.0L turbo gasoline engine]
19	R	- [With V630 engine and with ISS]
19	W	- [Except with V630 engine and with ISS]
20	R	- [With V630 engine and with ISS]

20	W	- [Except with V630 engine and with ISS]
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Connector No.	M177
Connector Name	JOINT CONNECTOR-M07
Connector Type	2434Z-4G32A



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
2	L	-
3	L	-
4	L	-
5	L	-
6	L	-
7	P	-
8	P	-
9	P	-
10	P	-
11	P	-
12	P	-
13	L	-
14	L	-
15	L	-
16	L	-
17	L	-
18	L	-
19	W	-
20	W	-
21	W	-
22	P	-
23	P	-
24	P	-

DRIVETRAIN CAN COMMUNICATION

[2.0L TURBO GASOLINE ENGINE]

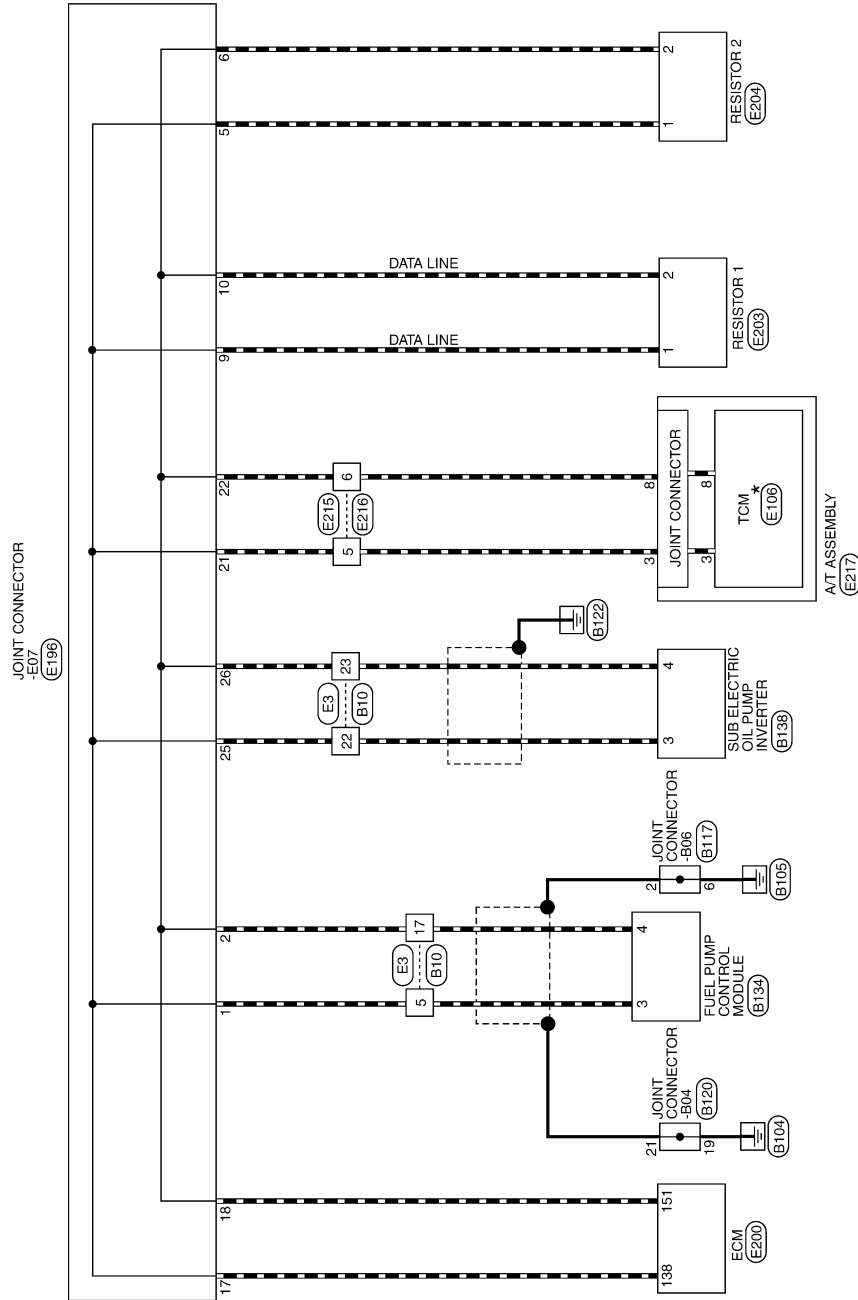
< WIRING DIAGRAM >

DRIVETRAIN CAN COMMUNICATION

Wiring Diagram

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DRIVETRAIN CAN SYSTEM



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

2015/11/27

JRBWD8771GB

DRIVETRAIN CAN COMMUNICATION

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

DRIVETRAIN CAN SYSTEM

Connector No.	B10
Connector Name	WIRE TO WIRE
Connector Type	TH24FW-NH



12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Connector No.	B117
Connector Name	JOINT CONNECTOR-B05
Connector Type	24342_4GA2A



6	5	4	3	2	1
12	11	10	9	8	7
18	17	16	15	14	13
24	23	22	21	20	19

Connector No.	B120
Connector Name	JOINT CONNECTOR-B02
Connector Type	24342_4GA2A



16	15	14	13	12	11
12	11	10	9	8	7
18	17	16	15	14	13
24	23	22	21	20	19

Connector No.	B134
Connector Name	FUEL PUMP CONTROL MODULE
Connector Type	Two_1-569474-1



4	3	2	
8	7	6	5

Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	- [With 2.0L turbo gasoline engine]
1	Y	- [With VR30 engine]
2	W	-
3	LG	-
4	P	- [With VR30 engine]
4	SB	- [With 2.0L turbo gasoline engine]
5	L	-
6	V	-
7	LG	-
8	R	-
9	W	-
10	B	-
11	G	-
12	R	-
13	GR	-
14	BG	-
15	BR	-
16	LG	-
17	V	-
18	BR	-
19	LG	- [With 2.0L turbo gasoline engine]
19	Y	- [With VR30 engine]
20	R	-
21	V	- [With 2.0L turbo gasoline engine]
22	L	- [With VR30 engine]
23	V	-
24	B	- [With VR30 engine]
24	R	- [With 2.0L turbo gasoline engine]

Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	- [With 2.0L turbo gasoline engine]
1	SHIELD	- [With VR30 engine]
2	B	-
3	B	- [With VR30 engine]
3	SHIELD	- [With 2.0L turbo gasoline engine]
4	B	-
5	B	-
6	B	-
7	Y	-
8	Y	-
9	P	- [With VR30 engine]
9	Y	- [With 2.0L turbo gasoline engine]
10	P	- [With VR30 engine]
10	Y	- [With 2.0L turbo gasoline engine]
11	P	-
12	P	-
13	L	-
14	L	-
15	L	-
16	L	-
17	L	-
18	L	-
19	B	-
20	B	-
20	GR	- [With VR30 engine]
21	B	- [With 2.0L turbo gasoline engine]
21	SHIELD	- [With VR30 engine]
22	B	- [With 2.0L turbo gasoline engine]
22	SHIELD	- [With VR30 engine]
23	SHIELD	-
24	SHIELD	-

Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-
2	R	-
3	L	- [With VR30 engine]
3	R	- [With 2.0L turbo gasoline engine]
4	L	- [With VR30 engine]
4	R	- [With 2.0L turbo gasoline engine]
5	L	-
6	L	-
7	L	-
8	L	-
9	L	- [With 2.0L turbo gasoline engine]
9	R	- [With VR30 engine]
10	L	- [With 2.0L turbo gasoline engine]
10	R	- [With VR30 engine]
11	R	-
12	R	-
13	W	-
14	W	-
15	W	-
17	SHIELD	-
18	B	-
19	B	- [With 2.0L turbo gasoline engine]
19	GR	- [With VR30 engine]
20	GR	- [With VR30 engine]
20	SHIELD	- [With 2.0L turbo gasoline engine]
21	B	- [With 2.0L turbo gasoline engine]
21	GR	- [With 2.0L turbo gasoline engine]
22	W	-
23	W	-
24	W	-

Terminal No.	Color Of Wire	Signal Name [Specification]
2	R	FUEL PUMP ACTIVATION REQUEST SIGNAL
3	L	DRIVETRAIN CAN-H
4	V	DRIVETRAIN CAN-L
5	SB	IGNITION POWER SUPPLY
6	Y	SENSOR GROUND (FUEL PRESSURE SENSOR)
7	R	FUEL PRESSURE SENSOR SIGNAL
8	LG	SENSOR POWER SUPPLY (FUEL PRESSURE SENSOR)

Connector No.	B138
Connector Name	SUB ELECTRIC OIL PUMP INVERTER
Connector Type	A06FW



1	2	3	4	5
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Terminal No.	Color Of Wire	Signal Name [Specification]
2	R	IGN
3	L	A/T RELAY
4	V	CAN-L
5	LG	EOP RELAY

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DRIVETRAIN CAN COMMUNICATION

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >


DRIVETRAIN CAN SYSTEM

Connector No.	E3
Connector Name	WIRE TO WIRE
Connector Type	TH24M/W-AH



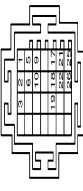
Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	- [With 2.0L turbo gasoline engine]
1	Y	- [With VR30 engine]
2	W	-
3	LG	-
4	P	- [With VR30 engine]
4	SB	- [With 2.0L turbo gasoline engine]
5	L	-
6	Y	-
7	LG	-
8	BG	-
9	W	-
10	B	-
11	G	-
12	R	-
13	GR	-
14	G	-
15	LG	- [With 2.0L turbo gasoline engine]
15	V	- [With VR30 engine]
16	Y	-
17	P	-
18	BR	-
19	LG	- [With 2.0L turbo gasoline engine]
19	Y	- [With VR30 engine]
20	GR	-
21	R	- [With 2.0L turbo gasoline engine]
21	V	- [With VR30 engine]
22	L	-
23	B	-
24	B	- [With VR30 engine]
24	BR	- [With 2.0L turbo gasoline engine]

Connector No.	E106
Connector Name	TCM
Connector Type	SPI10FG




Terminal No.	Color Of Wire	Signal Name [Specification]
1	-	-
2	-	-
3	-	-
5	-	-
6	-	-
8	-	-
10	-	-

Connector No.	E196
Connector Name	JOINT CONNECTOR-E07
Connector Type	SGA28FDG-J




Terminal No.	Color Of Wire	Signal Name [Specification]
1	-	-
2	P	-
3	B	-
5	L	-
6	P	-
9	L	-
10	P	-
17	L	-
18	P	-
19	SHIELD	-
21	L	-
22	P	-
25	L	-

Connector No.	E200
Connector Name	ECM
Connector Type	ADA52FB-AH26




Terminal No.	Color Of Wire	Signal Name [Specification]
97	G	POWER SUPPLY (MAIN)
98	B	ECM GROUND
99	G	POWER SUPPLY (MAIN)
100	B	ECM GROUND
101	G	POWER SUPPLY (MAIN)
102	B	ECM GROUND
103	V	COOLING FAN CONTROL SIGNAL (PWM)
104	Y	SENSOR POWER SUPPLY
105	R	SENSOR POWER SUPPLY
106	W	SENSOR GROUND
109	P	ENGINE SPEED SIGNAL
111	G	POWER SUPPLY
116	LG	STARTER RELAY-L
119	BR	SENSOR GROUND
120	BG	SENSOR GROUND
123	BR	MAIN RELAY CONTROL SIGNAL
127	V	FUEL PUMP ON SIGNAL
132	G	ACCELERATOR PEDAL POSITION SENSOR 1
137	L	CAN-H
138	L	DRIVETRAIN CAN-H
142	GR	BACK-UP LAMP SWITCH
143	LG	REFRIGERANT PRESSURE SENSOR
145	L	ACCELERATOR PEDAL POSITION SENSOR 2
146	L	FUEL TANK PRESSURE SENSOR
148	L	STARTER RELAY-H
150	P	CAN-L
151	P	DRIVETRAIN CAN-L
152	B	EVAP CANISTER VENT CONTROL VALVE
153	G	EVAP PURGE CONTROL VALVE

Connector No.	E203
Connector Name	RESISTOR 1
Connector Type	MD2FL



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

Connector No.	E204
Connector Name	RESISTOR 2
Connector Type	MD2FL



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

JRBWD9563GB

DRIVETRAIN CAN COMMUNICATION

[2.0L TURBO GASOLINE ENGINE]

< WIRING DIAGRAM >

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DRIVETRAIN CAN SYSTEM

Connector No.	E215
Connector Name	WIRE TO WIRE
Connector Type	RH08FB



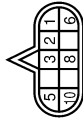
Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	-
3	GR	-
5	L	-
6	P	-
7	B	-
8	B	-

Connector No.	E216
Connector Name	WIRE TO WIRE
Connector Type	RH08MB



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	-
3	GR	-
5	L	-
6	B	-
7	B	-
8	B	-

Connector No.	E217
Connector Name	A/T ASSEMBLY
Connector Type	RK10FG-DG7



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	IGNITION POWER SUPPLY
2	P	BATTERY POWER SUPPLY (MEMORY BACKUP)
3	L	CAN-H
5	B	GROUND
6	GR	IGNITION POWER SUPPLY
8	P	CAN-L
10	B	GROUND

JRBWD9564GB

SERVICE AFTER REPLACING OR REMOVING ENGINE PARTS

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

BASIC INSPECTION

SERVICE AFTER REPLACING OR REMOVING ENGINE PARTS

Special Repair Requirement List

INFOID:0000000013289834

×:Applicable

	Repair or replace part	Service performed		CONSULT function	Reference
		Replacement	Removal		
ECU	ECM	×	—	• ECM programming	See CONSULT Operation Manual.
				• SAVING DATA FOR REPLAC CPU* ¹ • ACTIVATION OF FUEL PUMP • Key ID registration • VIN REGISTRATION • WRITING DATA FOR REPLAC CPU* ¹ • Configuration* ¹ • INJECTOR INJECTION QUANTITY ADJUSTMENT • TEACH IN OF THROTTLE VALVE STOP	EC4-207
	EMCM	×	—	• SAVING DATA FOR REPLAC CPU* ² • WRITING DATA FOR REPLAC CPU* ²	—
	FPCM	×	—	• Configuration* ³ • ACTIVATION OF FUEL PUMP	EC4-209
Fuel	High pressure fuel pump	×	—	H/P FUEL PUMP TOTAL STARTS COUNTER CLEAR	EC4-219
	Fuel injector	×	—	INJECTOR INJECTION QUANTITY ADJUSTMENT	EC4-210
Intake air	Throttle valve actuator	×	—	TEACH IN OF THROTTLE VALVE STOP	EC4-213
Timing control	Intake camshaft actuator	×	×	• TEACH IN OF CAMSHAFT POSITION • CAMSHAFT REFERENCE ADAPTATION	EC4-215 , EC4-214
	Exhaust camshaft actuator				
	Crankshaft position sensor	×	—	—	EC4-211
	Timing chain	×	×	• TEACH IN OF CAMSHAFT POSITION • CAMSHAFT REFERENCE ADAPTATION	EC4-215 , EC4-214
Others	Starter motor	×	—	STRT OPRTN CNTR CLEAR	EC4-218
	Engine	×	—	• TEACH IN OF CAMSHAFT POSITION • CAMSHAFT REFERENCE ADAPTATION	EC4-215 , EC4-214
	All sensors and all actuators	×	—	RESETTING OF ADAPTION VALUES	EC4-216

*1: Function of ECM

*2: Function of EMCM

*3: Function of FPCM

ADDITIONAL SERVICE WHEN REPLACING ECM

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

ADDITIONAL SERVICE WHEN REPLACING ECM

Description

INFOID:0000000013289835

When replacing ECM, this procedure must be performed. (For details, refer to [EC4-207, "Work Procedure"](#).)

A

EC4

Work Procedure

INFOID:0000000013289836

1. SAVE ECM DATA

With CONSULT

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. Select "SAVING DATA FOR REPLAC CPU" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.
5. Follow the instruction of CONSULT display.

NOTE:

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

>> GO TO 2.

2. REPLACE ECM

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

>> GO TO 3.

3. PERFORM PROGRAMMING

Perform the ECM programming. Refer to "CONSULT Operation Manual".

>> GO TO 4.

4. PERFORM "ACTIVATION OF FUEL PUMP"

With CONSULT

Perform ACTIVATION OF FUEL PUMP. Refer to [EC4-212, "Description"](#).

>> GO TO 5.

5. PERFORM INITIALIZATION OF IVIS (NATS) SYSTEM AND REGISTRATION OF ALL IVIS (NATS) IGNITION KEY IDS

Refer to [SEC-95, "Description"](#).

>> GO TO 6.

6. WRITE ECM DATA

With CONSULT

1. Select "WRITING DATA FOR REPLAC CPU" in "WORK SUPPORT" mode of "ENGINE".
2. Follow the instruction of CONSULT display.

NOTE:

The data saved by "SAVING DATA FOR REPLAC CPU" is written to ECM.

>> GO TO 7.

7. PERFORM VIN REGISTRATION

With CONSULT

If necessary, perform "VIN REGISTRATION". Refer to [EC4-217, "Description"](#).

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ADDITIONAL SERVICE WHEN REPLACING ECM

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

>> GO TO 8.

8. PERFORM CONFIGURATION

 **With CONSULT**

Select "Configuration" and select specification of the vehicle. Refer to [EC4-225, "Description"](#).

>> GO TO 9.

9. PERFORM INJECTOR INJECTION QUANTITY ADJUSTMENT VALUE REGISTRATION

 **With CONSULT**

Perform INJECTOR INJECTION QUANTITY ADJUSTMENT. Refer to [EC4-210, "Description"](#).

>> GO TO 10.

10. PERFORM TEACH IN OF THROTTLE VALVE STOP

 **With CONSULT**

1. Select "ENGINE" >> "WORK SUPPORT" >> "TEACH IN OF THROTTLE VALVE STOP". Refer to [EC4-215, "Description"](#).
2. Follow the instruction of CONSULT display.

>> GO TO 11.

11. CHECK DTC

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Turn ignition switch ON.
3. Check DTC. If DTC is displayed, erase it.

>> END

ADDITIONAL SERVICE WHEN REPLACING FPCM

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

ADDITIONAL SERVICE WHEN REPLACING FPCM

Description

INFOID:000000013525172

When replacing FPCM, this procedure must be performed. (For details, refer to [EC4-209, "Work Procedure"](#).)

EC4

Work Procedure

INFOID:000000013525174

1. PERFORM CONFIGURATION (WRITING VEHICLE SPECIFICATION)

With CONSULT

Perform configuration. Refer to [EC4-225, "Description"](#).

NOTE:

Log in to the network, according to the CONSULT screen.

>> GO TO 2.

2. PERFORM ACTIVATION OF FUEL PUMP

With CONSULT

Perform Activation of Fuel Pump. Refer to [EC4-212, "Description"](#).

>> END

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INJECTOR INJECTION QUANTITY ADJUSTMENT

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

INJECTOR INJECTION QUANTITY ADJUSTMENT

Description

INFOID:000000013289837

Injector Injection Quantity Adjustment allows to perform registration of the individual characteristics code of the fuel injector. (For details, refer to [EC4-210. "Work Procedure".](#))

Injector Injection Quantity Adjustment must be performed after the following cases.

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

Work Procedure

INFOID:000000013289838

1. START

NOTE:

Before performing this procedure, record injector characteristics code printed on a fuel injector.

1. Turn ignition switch ON and engine stopped.
2. On the CONSULT screen, select "ENGINE" >> "WORK SUPPORT" >> "INJECTOR INJECTION QUANTITY ADJUSTMENT".
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 Injection Quantity Adjustment.
5. Input injector adjustment value (A).

CAUTION:

Input four digits from the left with CONSULT, although the stamped number is five digits.

NOTE:

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

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

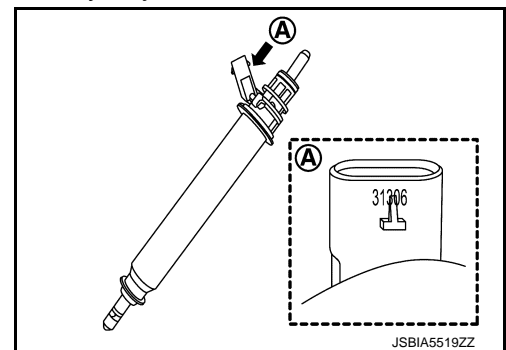
NOTE:

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

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

NOTE:

- In this step, CONSULT reads injector characteristics codes stored in ECM and displays the values on the CONSULT screen. This is for checking if injector characteristics codes are written onto ECM memory correctly.
8. Turn ignition switch OFF and wait at least 30 seconds.



>> END

TEACH IN PROCESS SENSOR ROTOR ADAPTATION

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

TEACH IN PROCESS SENSOR ROTOR ADAPTATION

Description

INFOID:000000013289839

TEACH-IN PROCESS SENSOR ROTOR ADAPTATION allows to learn the position of the sensor rotor for crankshaft position sensor. (For details, refer to [EC4-211. "Work Procedure"](#).)

EC4

Work Procedure

INFOID:000000013289840

1. PRECONDITION-1

Ⓜ With CONSULT

1. Turn ignition switch ON.
2. On the CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "SEN ROTOR ADAPT CMPLT".
3. Start the engine.
4. Push stop/start OFF switch to deactivate stop/start system.
5. Shift selector lever to manual mode (1st gear).

>> GO TO 2.

2. START

Ⓜ With CONSULT

1. Accelerate to 20 km/h (13 MPH), and then release the accelerator pedal to decelerate for 4 seconds or more (in the fuel cut status).

CAUTION:

Never rev up the engine speed to 4,000 rpm or more.

2. Check "SEN ROTOR ADAPT CMPLT" display.

Is "YES" displayed on CONSULT screen?

- YES >> END
NO >> GO TO 1.

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ACTIVATION OF FUEL PUMP

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

ACTIVATION OF FUEL PUMP

Description

INFOID:000000013289841

ACTIVATION OF FUEL PUMP must be performed when ECM or FPCM is replaced. (For details, refer to [EC4-212](#), "Work Procedure".)

Work Procedure

INFOID:000000013289842

1.START

Ⓟ With CONSULT

1. Turn ignition switch ON and engine stopped.
2. On the CONSULT screen, select "ENGINE" >> "WORK SUPPORT" >> "ACTIVATION OF FUEL PUMP".
3. Touch "Start".

>> END

TEACH IN OF THROTTLE VALVE STOP

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

TEACH IN OF THROTTLE VALVE STOP

Description

INFOID:000000013289843

TEACH-IN OF THROTTLE VALVE STOP must be performed when ECM or throttle valve actuator is replaced. (For details, refer to [EC4-213, "Work Procedure"](#).)

EC4

Work Procedure

INFOID:000000013289844

1. PRECONDITION-1

④ With CONSULT

1. Turn ignition switch ON.
2. On the CONSULT screen, select "ENGINE" >> "WORK SUPPORT" >> "TEACH IN OF THROTTLE VALVE STOP".
3. Touch "Start".

>> GO TO 2.

2. PRECONDITION-2

④ With CONSULT

Check the following conditions.

ENGINE SPEED	≤ 10 1/min
COOLANT TEMPERATURE	5°C (41°F) ≤ temperature ≤ 100°C (212°F)
C/AIR TENP/S U/STRM THRTL	≤ 40°C (104°F)
ACCEL PEDAL SENSOR	≤ 5%

Is the condition satisfied?

YES >> GO TO 3.

NO >> Satisfy the condition, and GO TO 3.

3. START

④ With CONSULT

Touch "Start" and wait a few seconds.

Is "Test Finished" displayed on CONSULT screen?

YES >> END

NO >> Follow the instruction of CONSULT display.

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CAMSHAFT REFERENCE ADAPTATION

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

CAMSHAFT REFERENCE ADAPTATION

Description

INFOID:000000013289845

CAMSHAFT REFERENCE ADAPTATION must be performed when the component related to camshaft control (e.g. timing chain, camshaft actuator, etc.) is replaced. (For details, refer to [EC4-214. "Work Procedure"](#).)

Work Procedure

INFOID:000000013289846

1. PRECONDITION-1

Ⓟ With CONSULT

1. Turn ignition switch ON.
2. On the CONSULT screen, select "ENGINE" >> "WORK SUPPORT" >> "CAMSHAFT REFERENCE ADAPTATION".
3. Touch "Start".

>> GO TO 2.

2. PRECONDITION-2

Ⓟ With CONSULT

1. Start the engine and let it idle.
2. Check the following conditions.

BATTERY VOLTAGE	> 10 V
ENGINE SPEED	> 2,520 1/min
COOLANT TEMP (RAW VALUE)	80°C (176°F) ≤ temperature ≤ 90°C (194°F)
ENG OIL TEMP	≤ 110°C (230°F)

Is the condition satisfied?

- YES >> GO TO 3.
NO >> Satisfy the condition, and GO TO 3.

3. START

Ⓟ With CONSULT

1. Touch "Start" and wait a few seconds.
2. Touch "Continue" and wait a few seconds.

Is "COMPLETED" displayed on CONSULT screen?

- YES >> END
NO >> Follow the instruction of CONSULT display.

TEACH IN OF CAMSHAFT POSITION

[2.0L TURBO GASOLINE ENGINE]

< BASIC INSPECTION >

TEACH IN OF CAMSHAFT POSITION

Description

INFOID:000000013289847

TEACH-IN OF CAMSHAFT POSITON allows to learn the position of the camshafts. (For details, refer to [EC4-215](#). "Work Procedure".)

A

EC4

Work Procedure

INFOID:000000013289848

1. PRECONDITION-1

④ With CONSULT

1. Turn ignition switch ON.
2. On the consult screen, select "ENGINE" >> "WORK SUPPORT" >> "TEACH IN OF CAMSHAFT POSITION".
3. Touch "Start".

>> GO TO 2.

2. PRECONDITION-2

④ With CONSULT

1. Start the engine and let it idle.
2. Check the following conditions.

ENGINE SPEED	500 1/min ≤ engine speed ≤ 1,000 1/min
COOLANT TEMPERATURE	60°C (140°F) ≤ temperature ≤ 90°C (194°F)

Is the condition satisfied?

YES >> GO TO 3.

NO >> Satisfy the condition, and GO TO 3.

3. START

④ With CONSULT

1. Touch "Start" and wait a few seconds.
2. Touch "Continue" and wait a few seconds.

Is "COMPLETED" displayed on CONSULT screen?

YES >> END

NO >> Follow the instruction of consult display.

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RESETTING OF ADAPTATION VALUES

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

RESETTING OF ADAPTATION VALUES

Description

INFOID:000000013289849

RESETTING OF ADAPTATION VALUES must be performed when any sensors and actuators are replaced. (For details, refer to [EC4-216. "Work Procedure"](#).)

Work Procedure

INFOID:000000013289850

1. PRECONDITION-1

④ With CONSULT

1. Turn ignition switch ON.
2. On the CONSULT screen, select "ENGINE" >> "WORK SUPPORT" >> "RESETTING OF ADAPTION VALUES".
3. Touch "Start".

>> GO TO 2.

2. PRECONDITION-2

④ With CONSULT

Check the following conditions.

ENGINE SPEED	≤ 10 1/min
COOLANT TEMPERATURE	5°C (41°F) ≤ temperature ≤ 100°C (212°F)
ACCEL PEDAL SENSOR	≤ 5%

Is the condition satisfied?

- YES >> GO TO 3.
NO >> Satisfy the condition, and GO TO 3.

3. START

④ With CONSULT

Touch "Start" and wait a few seconds.

Is "COMPLETED" displayed on CONSULT screen?

- YES >> END
NO >> Follow the instruction of CONSULT display.

VIN REGISTRATION**Description**

INFOID:000000013289851

VIN Registration is an operation to registering VIN in ECM. It must be performed each time ECM is replaced. (For details, refer to [EC4-217. "Work Procedure"](#).)

EC4**Work Procedure**

INFOID:000000013289852

1. CHECK VIN

Check the VIN of the vehicle and note it. Refer to [GI-36. "Information About Identification or Model Code"](#).

>> GO TO 2.

2. PERFORM VIN REGISTRATION

Ⓜ With CONSULT

1. Turn ignition switch ON and engine stopped.
2. On the CONSULT screen, select "ENGINE" >> "WORK SUPPORT" >> "VIN REGISTRATION".
3. Follow the instruction of CONSULT display.

>> END

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STARTER OPERATION COUNTER CLEAR

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

STARTER OPERATION COUNTER CLEAR

Description

INFOID:000000013289853

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. (For details, refer to [EC4-218. "Work Procedure"](#).)

CAUTION:

Never Perform Starter Operation Counter Clear when starter motor is not replaced as new one.

Work Procedure

INFOID:000000013289854

1. ERASE STARTER OPERATION COUNTER

Ⓢ With CONSULT

1. Turn ignition switch ON.
2. On the CONSULT screen, select "ENGINE" >> "WORK SUPPORT" >> "STRT OPRTN CNTR CLEAR".
3. Touch "CLEAR" and erase starter operation counter.

>> END

HIGH PRESSURE FUEL PUMP TOTAL STARTS COUNTER RESET

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

HIGH PRESSURE FUEL PUMP TOTAL STARTS COUNTER RESET

Description

INFOID:0000000013289855

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. (For details, refer to [EC4-219, "Work Procedure"](#).)

CAUTION:

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

Work Procedure

INFOID:0000000013289856

1. START

④ 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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FUEL PRESSURE

Work Procedure

INFOID:000000013289857

LOW FUEL PRESSURE CHECK

1. INSPECTION START

With CONSULT

1. Turn ignition switch OFF.
2. Start the engine and let it idle.
3. On CONSULT screen, select "FPCM" >> "DATA MONITOR" >> "FUEL PRESSURE".
4. Check that the indicated value is between 400 kPa (4 bar, 4.08 kg/cm², 58 psi) and 670 kPa (6.7 bar, 6.834 kg/cm², 97.15 psi).

>> INSPECTION END

CHASSIS DYNAMOMETER MODE

Description

INFOID:000000013289858

This function must be used when performing the 2-wheel drive test (e.g. with 2-wheel chassis dynamometer, speedometer tester). (For details, refer to [EC4-221. "Work Procedure".](#))

The use of this mode is essential to avoid torque control and to perform a proper test with the 2-wheel chassis dynamometer. Charge warning lamp indicates this mode is set by blinking.

CAUTION:

- **Chassis Dynamometer Mode must be set when performing test with 2-wheel chassis dynamometer.**
- **At the end of test, always cancel Chassis Dynamometer Mode and check that the charge warning lamp turns OFF.**

Work Procedure

INFOID:000000013289859

1. PRECONDITIONING

Check the following before performing test.

- No DTC is detected in all ECU.
- Stop lamp switch and brake pedal position switch operate normally.
- Stop/Start OFF switch operates normally.
- Battery voltage is 10 V or more at ignition switch ON.

>> GO TO 2.

2. SET THE VEHICLE TO CHASSIS DYNAMOMETER MODE

 **With CONSULT**

1. Start the engine.
2. Check that the charging system does not have a malfunction. (Charge warning lamp is OFF.)
3. On CONSULT screen, select "EMCM" >> "WORK SUPPORT" >> "CHASSIS DYNAMOMETER MODE".
4. Touch "ON".
5. Check that the charge warning lamp is blinking in a few seconds.

 **Without CONSULT**

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. With the stop/start OFF switch pushed, repeat depress and release the brake 5 times within 6 seconds.
4. Release the stop/start OFF switch and repeat depress and release the brake 5 times within 6 seconds.
5. With the brake pedal released, press the stop/start OFF switch within 2 seconds.

CAUTION:

Never push stop/start OFF switch more than once.

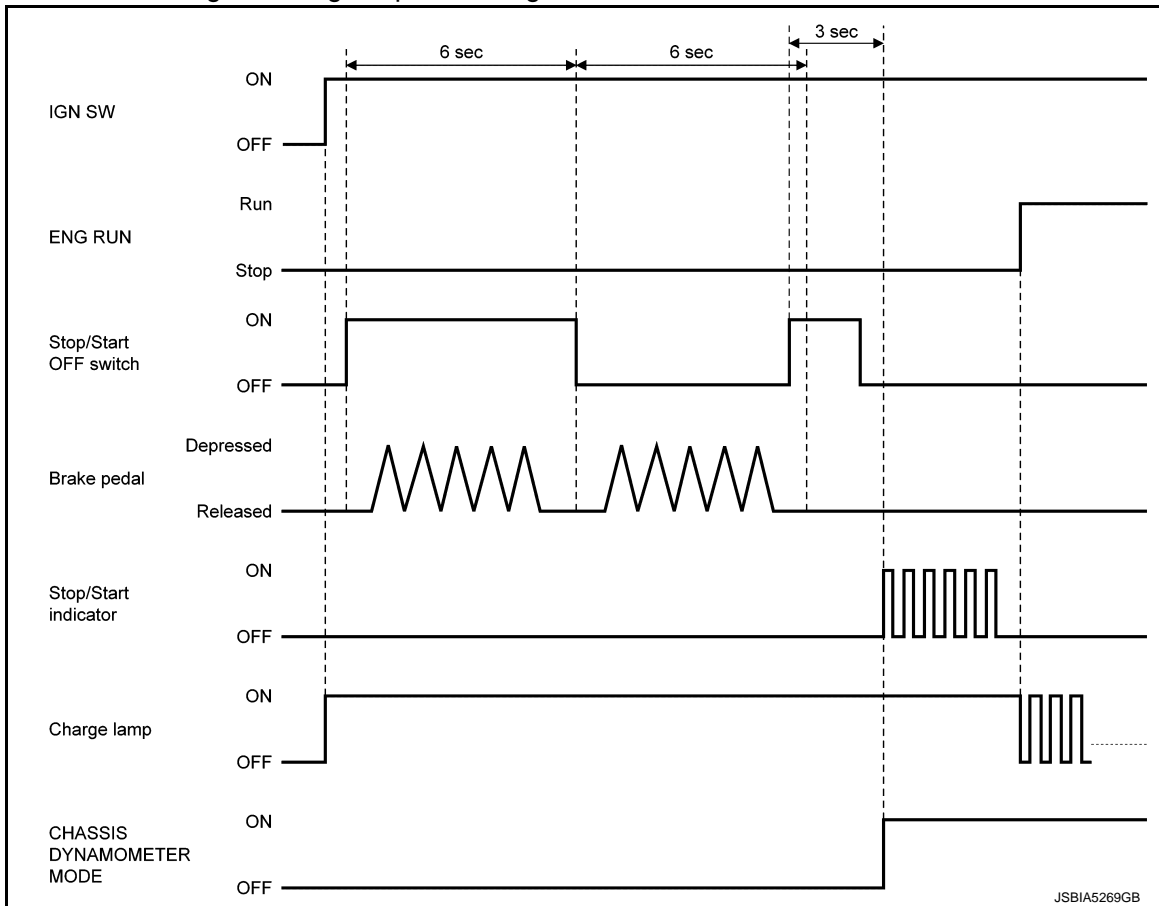
6. Check that the stop/start status indicator is blinking in a few seconds. (Stop/Start status indicator repeats ON ⇔ OFF up to 6 times.)
7. Start the engine and let it idle under the following conditions:
 - Vehicle stopped.
 - Selector lever: P or N
 - Parking brake: applied

CHASSIS DYNAMOMETER MODE

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

8. Check that the charge warning lamp is blinking in a few seconds.



Is the charge warning lamp blinking?

YES >> GO TO 3.

NO >> Repeat work procedure 2.

3. PERFORM 2-WHEEL DRIVE TEST

1. Turn ESP OFF switch is ON. (Check that the ESP OFF indicator lamp is ON)
2. Perform the test using the chassis dynamometer.

>> GO TO 4.

4. CANCEL CHASSIS DYNAMOMETER MODE - 1

CAUTION:

Always cancel Chassis Dynamometer Mode after the test.

1. Move the vehicle from the tester.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start the engine.
4. Drive the vehicle at 20 km/h (13 MPH) or more at least 10 seconds.
5. Stop the vehicle.
6. Check that the charge warning lamp is not blinking.

Is the charge warning lamp blinking?

YES >> GO TO 5.

NO >> GO TO 6.

5. CANCEL CHASSIS DYNAMOMETER MODE - 2

CAUTION:

- Always cancel Chassis Dynamometer Mode after the test.
- Erase DTC after this procedure otherwise MIL may turn ON.

Ⓟ With CONSULT

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

CHASSIS DYNAMOMETER MODE

[2.0L TURBO GASOLINE ENGINE]

< BASIC INSPECTION >

2. Start the engine.
3. On CONSULT screen, select "EMCM" >> "WORK SUPPORT" >> "CHASSIS DYNAMOMETER MODE".
4. Touch "OFF".
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Turn ignition switch ON and check that the charge warning lamp turns ON.
7. Start the engine and check that the charge warning lamp turns OFF.

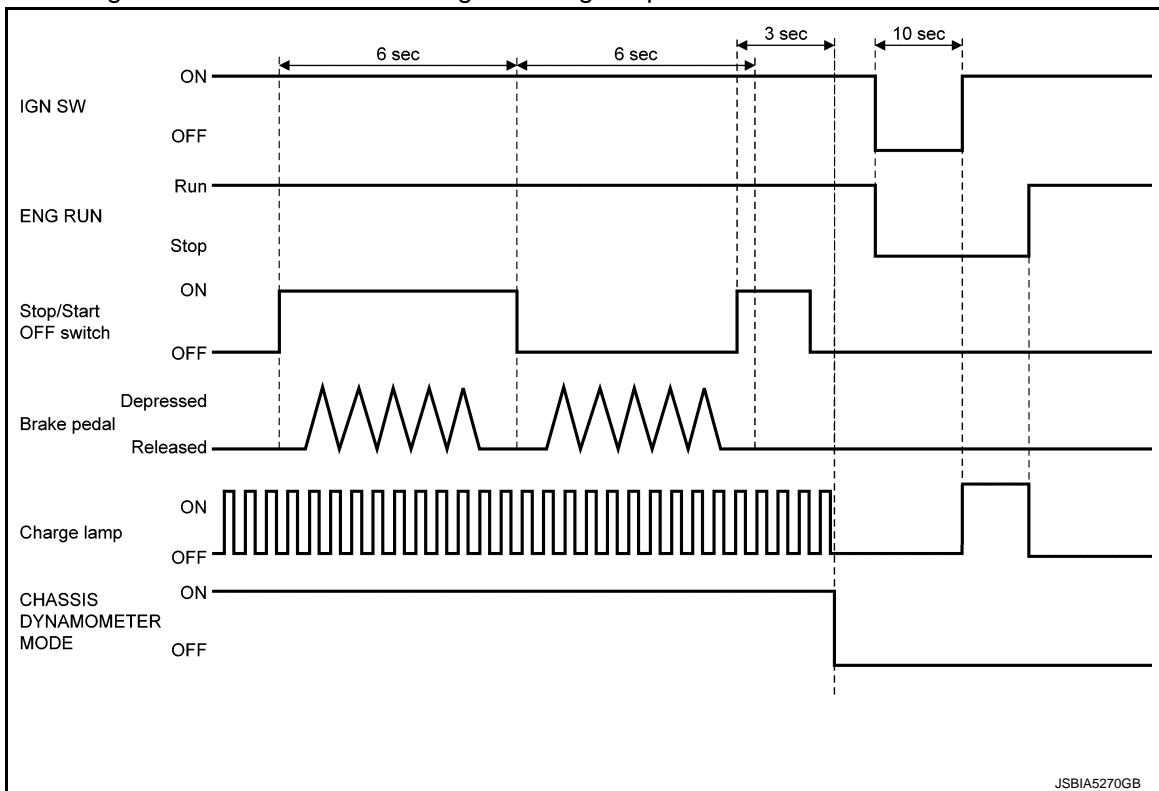
⊗ Without CONSULT

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start the engine.
3. Set the vehicle under the following conditions:
 - Engine is running
 - Vehicle stopped.
 - Selector lever: P or N
 - Parking brake: applied
4. Check that the charging system does not have a malfunction. (Charge warning lamp is blinking.)
5. With the stop/start OFF switch pushed, repeat depress and release the brake 5 times within 6 seconds.
6. Release the stop/start OFF switch and repeat depress and release the brake 5 times within 6 seconds.
7. With the brake pedal released, press the stop/start OFF switch within 2 seconds.

CAUTION:

Never push stop/start OFF switch more than once.

8. Check that the charge warning lamp turns OFF in a few seconds.
9. Turn ignition switch OFF and wait at least 10 seconds.
10. Turn ignition switch ON and check that the charge warning lamp turns ON.
11. Start the engine and check that the charge warning lamp turns OFF.



Does the charge warning lamp turn OFF?

YES >> GO TO 6.

NO >> Check that DTC is not detected in all ECU. And then repeat work procedure 5.

6. CHECK DTC

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Turn ignition switch ON.
3. Check that DTC is not detected in all ECU.

Is inspection result normal?

YES >> END

CHASSIS DYNAMOMETER MODE

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

NO >> Erase DTC.

CONFIGURATION

Description

INFOID:000000013522922

If vehicle specifications are not yet written in a new ECM and FPCM, it is necessary to write them with CONSULT. For work procedure, refer to [EC4-225. "Work Procedure"](#).

EC4

Work Procedure

INFOID:000000013522923

ECM

1.PERFORM CONFIGURATION

With CONSULT

1. Turn ignition switch ON.
2. Select the "Re/programming, Configuration" of CONSULT.
3. Perform configuration according to the CONSULT display.
4. Select the "Manual Configuration". (If necessary)
5. Perform configuration according to the CONSULT display.

>> GO TO 2.

2.CHECK DTC

With CONSULT

1. Turn ignition switch OFF and wait for 10 seconds or more.
2. Turn ignition switch ON.
3. Perform self-diagnosis.
4. Check that no DTC is detected.

>> WORK END

FPCM

1.PERFORM CONFIGURATION

With CONSULT

1. Turn ignition switch ON.
2. Select the "Re/programming, Configuration" of CONSULT.
3. Perform configuration according to the CONSULT display.

>> GO TO 2.

2.WRITING MODE SELECTION

CONSULT Configuration

Select "CONFIGURATION" of FPCM.

When writing saved data>>GO TO 3.

3.PERFORM "BEFORE ECU REPLACEMENT"

CONSULT Configuration

Select "Before ECU Replacement". (If necessary)

>> GO TO 4.

4.PERFORM "BEFORE ECU REPLACEMENT"

CONSULT Configuration

Perform "Before ECU Replacement" according to the CONSULT display. (If necessary)

>> GO TO 5.

5. PERFORM CONFIGURATION

④ With CONSULT

1. Turn ignition switch ON.
2. Select the "Re/programming, Configuration" of CONSULT.
3. Select the "After ECU Replacement".
4. Select the "Manual Configuration". (If necessary)
5. Confirm and/or change setting value for each item.
6. Perform configuration according to the CONSULT display.

>> GO TO 6.

6. CHECK DTC

④ With CONSULT

1. Turn ignition switch OFF and wait for 10 seconds or more.
2. Turn ignition switch ON.
3. Perform self-diagnosis.
4. Check that no DTC is detected.

>> WORK END

HOW TO SET SRT CODE

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

HOW TO SET SRT CODE

Description

INFOID:000000013522878

OUTLINE

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

SRT ITEM

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

SRT item (CONSULT indication)	Required self-diagnostic items to set the SRT to "CMPLT"
EGR/VVT SYSTEM	Exhaust gas recirculation
HO2S HTR	Oxygen sensor heater
HO2S	Oxygen sensor or oxygen sensors
S-AIR SYSTEM	Secondary air system
EVAP SYSTEM	Ventilation of fuel tank
HEATED CAT	Catalytic converter heating
CATALYST	Catalytic converter

SRT SERVICE PROCEDURE

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

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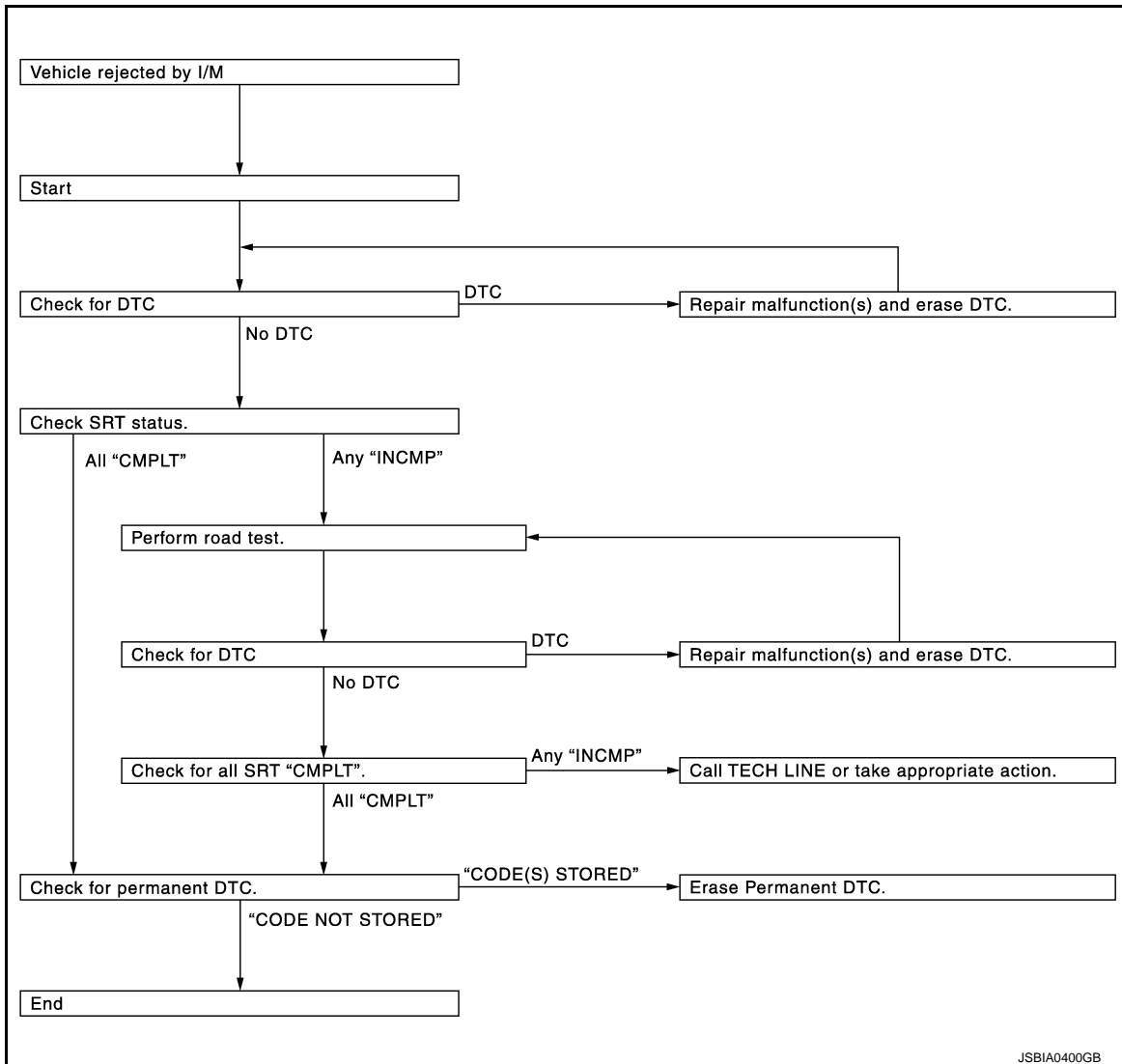
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HOW TO SET SRT CODE

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]



SRT Set Driving Pattern

INFOID:000000013522879

CAUTION:

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

Exhaust gas recirculation

Run engine at idle for approximately 1 minute.

The test drive must last for at least 5 minutes.

The following systems are combined under test readiness code Exhaust gas recirculation:

- Exhaust gas recirculation
- Camshaft adjustment

Oxygen sensor heater

Perform cold start.

The engine must have been switched off for a duration of at least 2 minutes.

The ignition must have been on for a duration of at least 1 minute.

Engine idling.

Wait until readiness reaches status.

Oxygen sensor or oxygen sensors

The engine must have been switched off for a duration of at least 2 minutes.

The ignition must have been on for a duration of at least 1 minute.

NOTE:

Drive the vehicle consistently for a duration of 5 minutes.

HOW TO SET SRT CODE

[2.0L TURBO GASOLINE ENGINE]

< BASIC INSPECTION >

During the trip at least 5 deceleration phases from a speed more than 80km/h must be performed.
Each deceleration phase must last for at least 10 seconds.
During the deceleration phase, the engine rpm should not fall below 1,500 rpm.

Secondary air system

Perform cold start.
Engine idling
Vehicle at standstill
The air conditioning is switched off.
Enabling of lambda control

Ventilation of fuel tank

The battery voltage must be higher than 12V.
Charger NOT CONNECTED
The coolant temperature must be between 1.5 – 60°C (34.7 – 140°F).
The ambient temperature must range between 1.5 – 38°C (34.7 – 100°F).
Fuel temperature more than 30°C (86°F).
Fill level in fuel tank between 30% and 90%.
The tank cap is locked.
The vehicle must not be refueled shortly before the test.
The test drive must last for at least 10 minutes.
Switch off ignition and wait for 8 minutes run-on time of control unit to end.

Catalytic converter heating

Follow the instruction of CONSULT display.

Catalytic converter

The engine must have been switched off for a duration of at least 2 minutes.
The ignition must have been on for a duration of at least 1 minute.
For a duration of at least 10 minutes, drive constantly in top gear at a speed of 80 – 110km/h (49 – 68 MPH).

Work Procedure

INFOID:000000013522880

1.CHECK DTC

Check DTC.

Is any DTC detected?

YES >> Repair malfunction(s) and erase DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 2.

2.CHECK SRT STATUS

WITH CONSULT

Select "SRT Status" of "SRT & P-DTC" with CONSULT.

Is SRT code(s) set?

YES >> GO TO 6.
NO >> GO TO 3.

3.PERFORM ROAD TEST

WITH CONSULT

- Perform the most efficient SRT set driving pattern to set the SRT properly. Refer to [EC4-228, "SRT Set Driving Pattern"](#).
In order to set all SRTs, the SRT set driving pattern must be performed at least once.

>> GO TO 4.

4.CHECK DTC

Check DTC.

Is any DTC detected?

YES >> Repair malfunction(s) and erase DTC. Refer to [EC4-146, "DTC Index"](#). and GO TO 3.
NO >> GO TO 5.

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HOW TO SET SRT CODE

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

5.CHECK SRT STATUS

④ WITH CONSULT

Select "SRT STATUS" with CONSULT.

Is SRT(s) set?

YES >> GO TO 6.

NO >> Call TECH LINE or take appropriate action.

6.CHECK PERMANENT DTC

NOTE:

Permanent DTC cannot be checked with a tool other than CONSULT.

④ WITH CONSULT

Select "Permanent DTC Status" of "SRT & P-DTC" with CONSULT.

Is permanent DTC(s) detected?

YES >> Go to [EC4-231. "Description"](#).

NO >> END

HOW TO ERASE PERMANENT DTC

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

HOW TO ERASE PERMANENT DTC

Description

INFOID:000000013522881

When a DTC is stored in ECM

the DTCs must first be erased by the CONSULT from the normal malfunction memory. After that perform the driving condition to reach the test prerequisites for the DTCs so the OBD-System can confirm that the malfunction is no longer present. Only then it will delete the malfunction from the permanent DTC memory

Work Procedure

INFOID:000000013522882

CAUTION:

Permanent DTC can only be erased by a legally stipulated driving cycle.


1. CHECK DTC

Check DTC.

Is any DTC detected?

- YES >> Repair malfunction(s) and erase DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> GO TO 2.

2. CHECK PERMANENT DTC


 With CONSULT

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "Permanent DTC Status" of "SRT & P-DTC" mode with CONSULT.

Is any permanent DTC detected?

- YES >> GO TO 3.
- NO >> END

3. SET SRT

 With CONSULT

Set SRT. Refer to [EC4-227, "Description"](#).


If a vehicle has one or more SRT items indicating "INCMP", perform the most efficient SRT set driving pattern to set the SRT properly.

>> GO TO 4.

4. DRIVE DRIVING PATTERN

CAUTION:


Always drive at a safe speed.

 With CONSULT

1. Start engine and warm it up to normal operating temperature.
2. Use "Permanent DTC Status" of "SRT & P-DTC" mode with CONSULT.
3. Drive the vehicle according to driving cycle.
 - The driving cycle must be performed under the following conditions:
 - The state of driving at 40 km/h (25 MPH) reaches 300 seconds or more in total.
 - Idle speed lasts 15 seconds or more.
 - A lapse of 600 seconds or more after engine start.

>> GO TO 5.

5. CHECK PERMANENT DTC

 With CONSULT

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

HOW TO ERASE PERMANENT DTC

[2.0L TURBO GASOLINE ENGINE]

< BASIC INSPECTION >

4. Turn ignition switch ON.
5. Select "Permanent DTC Status" of "SRT & P-DTC" mode with CONSULT.

Is any permanent DTC detected?

YES >> GO TO 4.
NO >> END

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

DTC/CIRCUIT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT ECM

ECM : Diagnosis Procedure

INFOID:0000000013289860

A

EC4

1. CHECK FUSE AND FUSIBLE LINK

1. Turn ignition switch OFF.
2. Pull out the fuse and fusible link.
3. Check that the fuse and fusible link are not fusing.

Power supply	Fuse No.
Ignition power supply	#50
	#102

Are the fuse and fusible link fusing?

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

2. CHECK ECM GROUND CIRCUIT

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

+		-	Continuity
ECM			
Connector	Terminal		
E200	98	Ground	Existed
	100		
	102		

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3. CHECK IGNITION POWER SUPPLY

1. Insert the fuse which pulled out.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

+		-	Voltage
ECM			
Connector	Terminal		
E200	97	Ground	Battery voltage
	99		
	101		
	111		

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 4.

4. CHECK MAIN RELAY

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

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POWER SUPPLY AND GROUND CIRCUIT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- Check the continuity between MAIN relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace MAIN relay.

5.CHECK MAIN RELAY DRIVE CIRCUIT

- Check the continuity between ECM harness connector and MAIN relay harness connector.

+		-		Continuity
ECM		MAIN relay		
Connector	Terminal	Connector	Terminal	
E200	123	E228	2	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 IGNITION POWER SUPPLY CIRCUIT-1

- Check the continuity between ECM harness connector and MAIN relay harness connector.

+		-		Continuity
ECM		MAIN relay		
Connector	Terminal	Connector	Terminal	
E200	97	E228	5	Existed
	99			
	101			

- Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK IGNITION POWER SUPPLY CIRCUIT-2

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

+		-		Continuity
ECM		IPDM E/R		
Connector	Terminal	Connector	Terminal	
E200	111	E124	62	Existed

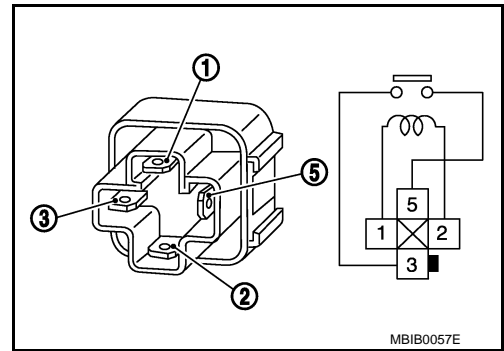
- Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

EMCM



MBIB0057E

POWER SUPPLY AND GROUND CIRCUIT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000013289861

EMCM : Diagnosis Procedure

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out the fuse.
3. Check that the fuse are not fusing.

Power supply	Fuse No.
Ignition power supply	#35
	#54

Is the fuse fusing?

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

NO >> GO TO 2.

2.CHECK IGNITION POWER SUPPLY-1

1. Insert the fuse which pulled out.
2. Turn ignition switch ON.
3. Check the voltage between EMCM harness connector and ground.

+		-	Voltage
EMCM			
Connector	Terminal		
M147	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK IGNITION POWER SUPPLY CIRCUIT

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

+		-		Continuity
EMCM		IPDM E/R		
Connector	Terminal	Connector	Terminal	
M147	5	E121	19	Existed

5. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check IPDM E/R power supply circuit. Refer to [PCS-43, "Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4.CHECK IGNITION POWER SUPPLY-2

Check the voltage between EMCM harness connector and ground.

+		-	Voltage
EMCM			
Connector	Terminal		
M147	42	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 5.

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POWER SUPPLY AND GROUND CIRCUIT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

5. CHECK EMCM RELAY

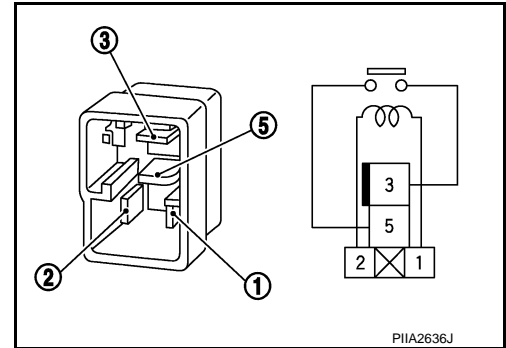
1. Turn ignition switch OFF.
2. Disconnect EMCM relay.
3. Check the continuity between EMCM relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace EMCM relay. Refer to [EC4-968, "Removal and Installation"](#).



6. CHECK EMCM RELAY DRIVE CIRCUIT

1. Check the continuity between EMCM harness connector and EMCM relay harness connector.

+		-		Continuity
EMCM		EMCM relay		
Connector	Terminal	Connector	Terminal	
M147	1	E206	2	Existed

2. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK IGNITION POWER SUPPLY CIRCUIT

1. Check the continuity between ECM harness connector and EMCM relay harness connector.

+		-		Continuity
EMCM		EMCM relay		
Connector	Terminal	Connector	Terminal	
M147	42	E206	5	Existed

2. Also check harness for short to ground.

Is the inspection result normal?

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

NO >> Repair or replace error-detected parts.

8. CHECK EMCM GROUND CIRCUIT

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

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

INFOID:000000013289862

1. CHECK FUSE AND FUSIBLE LINK

1. Turn ignition switch OFF.
2. Pull out the fuse and fusible link.
3. Check that the fuse and fusible link are not fusing.

Power supply	Fuse No.
Ignition power supply	#50
	#101

Are the fuse and fusible link fusing?

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

2. CHECK FPCM GROUND CIRCUIT

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

+		-	Continuity
FPCM			
Connector	Terminal		
B133	9	Ground	Existed

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3. CHECK IGNITION POWER SUPPLY-1

1. Insert the fuse which pulled out.
2. Check the voltage between FPCM harness connector and ground.

+		-	Voltage
FPCM			
Connector	Terminal		
B134	5	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK IGNITION POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R harness connector.
2. Check the continuity between FPCM harness connector and IPDM E/R harness connector.

+		-		Continuity
FPCM		IPDM E/R		
Connector	Terminal	Connector	Terminal	
B134	5	E123	54	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check IPDM E/R power supply circuit. Refer to [PCS-43. "Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

5. CHECK IGNITION POWER SUPPLY-2

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

+		-	Voltage
FPCM			
Connector	Terminal		
B133	10	Ground	Battery voltage

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 6.

6. CHECK IGNITION POWER SUPPLY CIRCUIT

1. Disconnect MAIN relay.
2. Check the continuity between FPCM harness connector and MAIN relay harness connector.

+		-		Continuity
FPCM		MAIN relay		
Connector	Terminal	Connector	Terminal	
B133	10	E228	5	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check ECM power supply and ground circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

U0028 DRIVETRAIN CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0028 DRIVETRAIN CAN COMMUNICATION

DTC Description

INFOID:000000013289863

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0028	COMMUNICATION ERROR (LOST) (Vehicle communication bus A)	SIGNAL INVALID	Communication with the drivetrain CAN bus has a malfunction. There is an incorrect signal.
		MISSING MESSAGE	Communication with the drivetrain CAN bus has a malfunction. The message is missing.

POSSIBLE CAUSE

- CAN communication

Diagnosis Procedure

INFOID:000000013289864

1. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

1. Perform "ALL DTC Reading".
2. Check DTC of "TRANSMISSION" and "FPCM".

Is the DTC related to the communication error with ECM detected?

YES >> GO TO 2.

NO >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

2. CHECK RESISTOR

Check resistors. Refer to [EC4-240, "Component Inspection \(Resistor 1 and 2\)"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace the malfunctioning resistor.

3. CHECK HARNESS AND CONNECTORS FOR CAN COMMUNICATION

1. Disconnect harness connector of the following items.
 - ECM
 - FPCM
 - Sub electric oil pump inverter
 - A/T shift selector
 - Automatic transmission (TCM)
2. Check the continuity between ECM harness connector and the other ECU harness connector.

U0028 DRIVETRAIN CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-			Continuity
ECM		Other ECU			
Connector	Terminal	Name	Connector	Terminal	
E200	138	FPCM	B134	3	Existed
	151			4	
	138	Sub electric oil pump inverter	B138	3	
	151			2	
	138	Automatic transmission	E217	1	
	151			2	
	138	Resistor 1	E203	1	
	151			2	
	138	Resistor 2	E204	1	
	151			2	

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. REPLACE ECM

Ⓢ With CONSULT

1. Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

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

3. Check "Self-diagnostic result" of "ENGINE".

Is DTC "U0028" detected again?

YES >> Replace ECU which detects DTC related to communication error with ECM.

NO >> INSPECTION END

Component Inspection (Resistor 1 and 2)

INFOID:000000013289865

1. CHECK RESISTOR 1 AND 2

1. Turn ignition switch OFF.

2. Disconnect resistor harness connectors. (For parts location, refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).)

3. Check resistance between resistor terminals.

Resistor	Terminals	Resistance
1	1 and 2	120 Ω
2		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the malfunctioning resistor.

U0037 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0037 CAN COMMUNICATION

DTC Description

INFOID:000000013841824

DTC DETECTION LOGIC

DTC No.		CONSULT screen terms		DTC detecting condition
		(Trouble diagnosis content)	Malfunction type	
U0037	88	Vehicle communication bus B (Vehicle Communication Bus B)	BUS OFF	Communication with the vehicle CAN bus has a malfunction. Bus OFF

POSSIBLE CAUSE

- CAN communication

Diagnosis Procedure

INFOID:000000013841825

1. CHECK DTC

With CONSULT

Check that the DTC related to CAN communication is not detected.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> Perform trouble diagnosis for CAN communication system. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

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EC4

U0046 DRIVETRAIN CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0046 DRIVETRAIN CAN COMMUNICATION

DTC Description

INFOID:000000013289866

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0046	VEHICLE COMMUNICATION BUS C (Vehicle communication bus C)	BUS OFF	Communication with the drive train sensor CAN bus has a malfunction. Bus OFF

POSSIBLE CAUSE

Drivetrain CAN bus OFF

Diagnosis Procedure

INFOID:000000013289867

1. CHECK RESISTOR

Check resistors. Refer to [EC4-265, "Component Inspection \(Resistor 1 and 2\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the malfunctioning resistor.

2. CHECK HARNESS AND CONNECTORS FOR CAN COMMUNICATION

1. Disconnect harness connector of the following items.

- ECM
- FPCM
- Sub electric oil pump inverter
- A/T shift selector
- Automatic transmission (TCM)

2. Check the continuity between ECM harness connector and the other ECU harness connector.

+		-			Continuity
ECM		Other ECU			
Connector	Terminal	Name	Connector	Terminal	
E200	138	FPCM	B134	3	Existed
	151			4	
	138	Sub electric oil pump inverter	B138	3	
	151			2	
	138	Automatic transmission	E217	1	
	151			2	
	138	Resistor 1	E203	1	
	151			2	
	138	Resistor 2	E204	1	
	151			2	

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

Is the inspection result normal?

YES >> Erase DTC.

NO >> Repair or replace error-detected parts.

U0046 DRIVETRAIN CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Component Inspection (Resistor 1 and 2)

INFOID:000000013289868

1. CHECK RESISTOR 1 AND 2

1. Turn ignition switch OFF.
2. Disconnect resistor harness connectors. (For parts location, refer to [EC4-25. "ENGINE CONTROL SYS-TEM : Component Parts Location".](#))
3. Check resistance between resistor terminals.

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Resistor	Terminals	Resistance
1	1 and 2	120 Ω
2		

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace the malfunctioning resistor.

U0100 DRIVETRAIN CAN COMMUNICATION (ECM)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0100 DRIVETRAIN CAN COMMUNICATION (ECM)

DTC Description

INFOID:000000013289869

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0100	COMMUNICATION ERROR (LOST) (Lost communication with ECM/PCM "A")	NO SUBTYPE INFORMATION	FPCM cannot receive the drivetrain CAN communication signal sent from ECM for Approx. 1 second or more.

POSSIBLE CAUSE

- Drivetrain CAN harness or connectors
- ECM

FAIL-SAFE

Pressure control on substitute value

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

Ⓟ With CONSULT

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check "Self Diagnostic Result" of "FPCM".

Is DTC "U0100" detected?

- YES >> Proceed to [EC4-244, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013289870

1. CHECK DRIVETRAIN CAN COMMUNICATION HARNESS AND CONNECTORS

1. Turn ignition switch OFF.
2. Check installation condition of ECM and FPCM.
3. Disconnect ECM harness connector and FPCM harness connector.
4. Check the continuity between ECM harness connector and FPCM harness connector.

+		-		Continuity
ECM		FPCM		
Connector	Terminal	Connector	Terminal	
E200	138	B134	3	Existed
	151		4	

5. 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. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

Ⓟ With CONSULT

1. Reconnect all harness connector disconnected.
2. Turn ignition switch ON.
3. Erase "Self Diagnostic Result" of "FPCM".
4. Perform DTC confirmation procedure again. Refer to [EC4-244, "DTC Description"](#).

Is DTC "U0100" detected again?

U0100 DRIVETRAIN CAN COMMUNICATION (ECM)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 3.

NO >> GO TO 4.

3. REPLACE FPCM

1. Replace FPCM. Refer to [EC4-969, "Removal and Installation"](#).

2. Perform DTC confirmation procedure again. Refer to [EC4-244, "DTC Description"](#).

Is DTC "U0100" detected again?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> INSPECTION END

4. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

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U0101 DRIVETRAIN CAN COMMUNICATION (TCM)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0101 DRIVETRAIN CAN COMMUNICATION (TCM)

DTC Description

INFOID:000000013289871

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0101	COMMUNICATION ERROR (LOST) (Lost Communication with TCM)	MISSING MESSAGE	Communication with TCM has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors
(Drivetrain CAN circuit)
- TCM

Diagnosis Procedure

INFOID:000000013289872

1. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

1. Perform "All DTC reading".
2. Check DTC of "TRANSMISSION".

Is the DTC related to "communication error with ECM" detected?

YES >> GO TO 2.

NO >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

2. CHECK HARNESS AND CONNECTORS FOR CAN COMMUNICATION

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

+		-		Continuity
ECM		TCM		
Connector	Terminal	Connector	Terminal	
E200	138	E217	1	Existed
	151		2	

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. REPLACE ECM

With CONSULT

1. Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
2. Turn ignition switch ON and wait at least 5 seconds.
3. Check "Self-diagnostic result" of "ENGINE".

Is DTC "U0101" detected again?

YES >> Replace TCM. Refer to [TM-295, "Exploded View"](#).

NO >> INSPECTION END

U0103 DRIVETRAIN CAN COMMUNICATION (SELECTOR LEVER MODULE)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0103 DRIVETRAIN CAN COMMUNICATION (SELECTOR LEVER MODULE)

DTC Description

INFOID:0000000013289873

EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0103	COMMUNICATION ERROR (LOST) (Lost communication with gear shift control module "A")	MISSING MESSAGE	Communication with the electronic selector lever module has a malfunction. The message is missing.

POSSIBLE CAUSE

Drivetrain CAN communication with A/T shift selector

Diagnosis Procedure

INFOID:0000000013289874

1. CHECK RESISTOR

Check resistors. Refer to [EC4-265, "Component Inspection \(Resistor 1 and 2\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the malfunctioning resistor.

2. CHECK HARNESS AND CONNECTORS FOR CAN COMMUNICATION

- Disconnect harness connector of the following items.
 - ECM
 - FPCM
 - Sub electric oil pump inverter
 - A/T shift selector
 - Automatic transmission (TCM)
- Check the continuity between ECM harness connector and the other ECU harness connector.

+		-			Continuity
ECM		Other ECU			
Connector	Terminal	Name	Connector	Terminal	
E200	138	FPCM	B134	3	Existed
	151			4	
	138	Sub electric oil pump inverter	B138	3	
	151			2	
	138	Automatic transmission	E217	1	
	151			2	
	138	Resistor 1	E203	1	
	151			2	
138	Resistor 2	E204	1		
151			2		

- Also check harness for short to battery and short to ground.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

U0103 DRIVETRAIN CAN COMMUNICATION (SELECTOR LEVER MODULE)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. REPLACE A/T SHIFT SELECTOR

With CONSULT

1. Replace A/T shift selector. Refer to [TM-289, "Removal and Installation"](#).
2. Turn ignition switch ON and wait at least 5 seconds.
3. Check "Self-diagnostic result" of "ENGINE".

Is DTC "U0103" detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
NO >> INSPECTION END

Component Inspection (Resistor 1 and 2)

INFOID:000000013289875

1. CHECK RESISTOR 1 AND 2

1. Turn ignition switch OFF.
2. Disconnect resistor harness connectors. (For parts location, refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).)
3. Check resistance between resistor terminals.

Resistor	Terminals	Resistance
1	1 and 2	120 Ω
2		

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace the malfunctioning resistor.

U0104 CAN COMMUNICATION (ADAS CONTROL UNIT)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0104 CAN COMMUNICATION (ADAS CONTROL UNIT)

DTC Description

INFOID:000000013289876

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0104	CAN COMMUNICATION (LOST) (Lost communication with cruise control module)	BUS SIGNAL/MESSAGE ERROR	Communication with ADAS control unit has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	Communication with ADAS control unit has a malfunction. The message is missing.

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POSSIBLE CAUSE

- Harness and connectors (CAN communication circuit)
- ADAS control unit
- ECM

E

F

Diagnosis Procedure

INFOID:000000013289877

1. PERFORM CAN DIAGNOSIS

With CONSULT

Perform "CAN Diagnosis" using CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

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2. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with ECM detected in other ECUs?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> Replace ADAS control unit. Refer to [DAS-214, "Removal and Installation"](#).

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U0109 DRIVETRAIN CAN COMMUNICATION (FPCM)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0109 DRIVETRAIN CAN COMMUNICATION (FPCM)

DTC Description

INFOID:000000013289878

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0109	COMMUNICATION ERROR (LOST) (Lost Communication with fuel pump control module "A")	MISSING MESSAGE	Communication with FPCM has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors
(Drivetrain CAN circuit)
- FPCM (Fuel Pump Control Module)

Diagnosis Procedure

INFOID:000000013289879

1. CHECK SELF-DIAGNOSTIC RESULT IN FPCM

With CONSULT

1. Perform "All DTC reading".
2. Check DTC of "FPCM".

Is the DTC related to "communication error with ECM" detected?

YES >> GO TO 2.

NO >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

2. CHECK HARNESS AND CONNECTORS FOR CAN COMMUNICATION

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

+		-		Continuity
ECM		FPCM		
Connector	Terminal	Connector	Terminal	
E200	138	B134	3	Existed
	151		4	

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. REPLACE FPCM

With CONSULT

1. Replace FPCM. Refer to [EC4-969, "Removal and Installation"](#).
2. Turn ignition switch ON and wait at least 5 seconds.
3. Check "Self-diagnostic result" of "ENGINE".

Is DTC "U0109" detected again?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> INSPECTION END

U0111 CAN COMMUNICATION (EMCM)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

U0111 CAN COMMUNICATION (EMCM)

DTC Description

INFOID:000000013289880

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0111	COMMUNICATION ERROR (LOST) (Lost communication with battery energy control module "A")	BUS SIGNAL/MESSAGE ERROR	Communication with EMCM has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	Communication with EMCM has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors (CAN communication circuit)
- EMCM
- ECM

Diagnosis Procedure

INFOID:000000013289881

1. PERFORM CAN DIAGNOSIS

With CONSULT

Perform "CAN Diagnosis" using CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

2. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with ECM detected in other ECUs?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

U0120 LIN COMMUNICATION (ALTERNATOR)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0120 LIN COMMUNICATION (ALTERNATOR)

DTC Description

INFOID:000000013289882

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0120	COMMUNICATION ERROR (LOST) (Lost communication with starter/generator control module)	BUS SIGNAL/MESSAGE ERROR	Communication with the starter or alternator has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	Communication with the starter or alternator has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors
(LIN circuit is open or shorted.)
- Alternator
- ECM

Diagnosis Procedure

INFOID:000000013289883

1. CHECK CHARGING SYSTEM

Check charging system. Refer to [CHG-14, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#), or [CHG-18, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

Is the inspection result normal?

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

2. CHECK LIN CIRCUIT

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

+		-		Continuity
Alternator		ECM		
Connector	Terminal	Connector	Terminal	
F190	1	F150	45	Existed

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

Is the inspection result normal?

- YES >> Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

U0122 CAN COMMUNICATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0122 CAN COMMUNICATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

DTC Description

INFOID:000000013289884

EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0122	COMMUNICATION ERROR (LOST) (Lost communication with vehicle dynamics control module)	BUS SIGNAL/MESSAGE ERROR	Communication with ABS actuator and electric unit (control unit) has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	Communication with ABS actuator and electric unit (control unit) has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors (CAN communication circuit)
- ABS actuator and electric unit (control unit)
- ECM

Diagnosis Procedure

INFOID:000000013289885

1. PERFORM CAN DIAGNOSIS

With CONSULT

Perform "CAN Diagnosis" using CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

2. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with ECM detected in other ECUs?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-195, "Removal and Installation"](#).

U0140 CAN COMMUNICATION (BCM)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0140 CAN COMMUNICATION (BCM)

DTC Description

INFOID:000000013289886

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0140	COMMUNICATION ERROR (LOST) (Lost communication with body control module)	BUS SIGNAL/MESSAGE ERROR	Communication with BCM has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	Communication with BCM has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors
(CAN communication circuit)
- BCM
- ECM

Diagnosis Procedure

INFOID:000000013289887

1. PERFORM CAN DIAGNOSIS

With CONSULT

Perform "CAN Diagnosis" using CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

2. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with ECM detected in other ECUs?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> Replace BCM. Refer to [BCS-99, "Removal and Installation"](#).

U0141 CAN COMMUNICATION (IPDM E/R)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0141 CAN COMMUNICATION (IPDM E/R)

DTC Description

INFOID:000000013289888

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0141	COMMUNICATION ERROR (LOST) (Lost communication with body control module "A")	BUS SIGNAL/MESSAGE ERROR	Communication with IPDM E/R has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	Communication with IPDM E/R has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors (CAN communication circuit)
- IPDM E/R
- ECM

Diagnosis Procedure

INFOID:000000013289889

1. PERFORM CAN DIAGNOSIS

With CONSULT

Perform "CAN Diagnosis" using CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

2. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with ECM detected in other ECUs?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> Replace IPDM E/R. Refer to [PCS-44, "Removal and Installation"](#).

U0151 CAN COMMUNICATION (AIR BAG DIAGNOSIS SENSOR UNIT)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0151 CAN COMMUNICATION (AIR BAG DIAGNOSIS SENSOR UNIT)

DTC Description

INFOID:000000013289890

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0151	COMMUNICATION ERROR (LOST) (Lost communication with restraints control module)	BUS SIGNAL/MESSAGE ERROR	Communication with air bag diagnosis sensor unit has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	Communication with air bag diagnosis sensor unit has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors
(CAN communication circuit)
- Air bag diagnosis sensor unit
- ECM

Diagnosis Procedure

INFOID:000000013289891

1. PERFORM CAN DIAGNOSIS

With CONSULT

Perform "CAN Diagnosis" using CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

2. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with ECM detected in other ECUs?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> Replace air bag diagnosis sensor unit. Refer to [SR-37, "Removal and Installation"](#).

U0155 CAN COMMUNICATION (COMBINATION METER)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0155 CAN COMMUNICATION (COMBINATION METER)

DTC Description

INFOID:000000013289892

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0155	COMMUNICATION ERROR (LOST) [Lost communication with instrument panel cluster (IPC) control module]	BUS SIGNAL/MESSAGE ERROR	Communication with combination meter has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	Communication with combination meter has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors (CAN communication circuit)
- Combination meter
- ECM

Diagnosis Procedure

INFOID:000000013289893

1. PERFORM CAN DIAGNOSIS

With CONSULT

Perform "CAN Diagnosis" using CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

2. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with ECM detected in other ECUs?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> Replace combination meter. Refer to [MWI-141, "Removal and Installation"](#).

U0164 CAN COMMUNICATION (A/C AUTO AMP.)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0164 CAN COMMUNICATION (A/C AUTO AMP.)

DTC Description

INFOID:000000013289894

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0164	COMMUNICATION ERROR (LOST) (Lost communication with HVAC control module)	BUS SIGNAL/MESSAGE ERROR	<ul style="list-style-type: none">Communication with A/C auto amp. has a malfunction. There is a signal error or the message error.Communication with chassis control module has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	<ul style="list-style-type: none">Communication with A/C auto amp. has a malfunction. The message is missing.Communication with chassis control module has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors
(CAN communication circuit is open or shorted.)
- Chassis control module
- ECM

Diagnosis Procedure

INFOID:000000013289895

1. PERFORM CAN DIAGNOSIS

With CONSULT

Perform "CAN Diagnosis" using CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

2. CHECK SELF-DIAGNOSTIC RESULT-1

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with A/C auto amp. detected in other ECUs?

YES >> Replace A/C auto amp. Refer to [HAC-137, "Removal and Installation"](#).

NO >> GO TO 3.

3. CHECK SELF-DIAGNOSTIC RESULT-2

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with chassis control module detected in other ECUs?

YES-2 >> Replace chassis control module. Refer to [DAS-713, "Removal and Installation"](#).

NO >> GO TO 4.

4. CHECK SELF-DIAGNOSTIC RESULT-3

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with ECM detected?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> INSPECTION END

U0168 CAN COMMUNICATION (BCM)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0168 CAN COMMUNICATION (BCM)

DTC Description

INFOID:000000013289896

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0168	COMMUNICATION ERROR (LOST) (Lost communication with vehicle security control module)	MISSING MESSAGE	Communication with BCM has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors (CAN communication circuit is open or shorted.)
- BCM
- ECM

Diagnosis Procedure

INFOID:000000013289897

1. CHECK HARNESS AND CONNECTORS FOR CAN COMMUNICATION

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

+		-		Continuity
ECM		BCM		
Connector	Terminal	Connector	Terminal	
E200	137	M14	60	Existed
	150		59	

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

Is the inspection result normal?

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

2. REPLACE BCM

With CONSULT

1. Replace BCM. Refer to [BCS-99, "Removal and Installation"](#).
2. Turn ignition switch ON and wait at least 5 seconds.
3. Check "Self-diagnostic result" of "ENGINE".

Is DTC "U0168" detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
NO >> INSPECTION END

U0212 CAN COMMUNICATION (STEERING CONTROL MODULE)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0212 CAN COMMUNICATION (STEERING CONTROL MODULE)

DTC Description

INFOID:000000013289898

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0212	COMMUNICATION ERROR (LOST) (Lost communication with steering column control module)	BUS SIGNAL/MESSAGE ERROR	Communication with power steering control module has a malfunction. There is a signal error or the message error.
		MISSING MESSAGE	Communication with power steering control module has a malfunction. The message is missing.

POSSIBLE CAUSE

- Harness and connectors
(CAN communication circuit is open or shorted.)
- Power steering control module
- ECM

Diagnosis Procedure

INFOID:000000013289899

1. PERFORM CAN DIAGNOSIS

With CONSULT

Perform "CAN Diagnosis" using CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform the trouble diagnosis for CAN communication. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

2. CHECK SELF-DIAGNOSTIC RESULT-1

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with power steering control module detected in other ECUs?

YES >> Replace power steering control module. Refer to [STC-61, "Removal and Installation"](#).

NO >> GO TO 3.

3. CHECK SELF-DIAGNOSTIC RESULT-2

With CONSULT

Perform "All DTC reading".

Is the DTC related to communication error with ECM detected?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> INSPECTION END

U0401 DRIVETRAIN CAN COMMUNICATION (ECM)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0401 DRIVETRAIN CAN COMMUNICATION (ECM)

DTC Description

INFOID:000000013289900

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0401	COMMUNICATION ERROR (INVALID) (Invalid data received from ECM/PCM "A")	NO SUBTYPE INFORMATION	Fuel pump ON signals sent from ECM are different between drivetrain CAN signal and voltage signal.

POSSIBLE CAUSE

- Drivetrain CAN harness or connectors
- ECM
- Fuel pump ON voltage signal circuit

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check "Self Diagnostic Result" of "FPCM".

Is DTC "U0401" detected?

- YES >> Proceed to [EC4-261, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013289901

1. CHECK FUEL PUMP ON SIGNAL CIRCUIT

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

+		-		Continuity
ECM		FPCM		
Connector	Terminal	Connector	Terminal	
E200	127	B134	2	Existed

4. 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. CHECK DRIVETRAIN CAN COMMUNICATION HARNESS AND CONNECTORS

1. Check the continuity between ECM harness connector and FPCM harness connector.

+		-		Continuity
ECM		FPCM		
Connector	Terminal	Connector	Terminal	
E200	138	B134	3	Existed
	151		4	

2. Also check harness for short.

U0401 DRIVETRAIN CAN COMMUNICATION (ECM)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

ⓅWith CONSULT

1. Reconnect all harness connector disconnected.

2. Turn ignition switch ON.

3. Erase "Self Diagnostic Result" of "FPCM".

4. Perform DTC confirmation procedure again. Refer to [EC4-261, "DTC Description"](#).

Is DTC "U0401" detected again?

YES >> GO TO 4.

NO >> GO TO 5.

4.REPLACE FPCM

1. Replace FPCM. Refer to [EC4-969, "Removal and Installation"](#).

2. Perform DTC confirmation procedure again. Refer to [EC4-261, "DTC Description"](#).

Is DTC "U0401" detected again?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> INSPECTION END

5.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

U0402 DRIVETRAIN CAN COMMUNICATION (TCM)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0402 DRIVETRAIN CAN COMMUNICATION (TCM)

DTC Description

INFOID:000000013289902

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0402	COMMUNICATION ERROR (INVALID) (Invalid data received from TCM)	NO SUBTYPE INFORMATION	Implausible data were received from TCM.
		BUS SIGNAL/MESSAGE ERROR	Implausible data were received from TCM. There is a signal error or the message is abnormal.

C

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POSSIBLE CAUSE

- Harness and connectors (Drivetrain CAN circuit)
- TCM

E

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Diagnosis Procedure

INFOID:000000013289903

1. CHECK SELF-DIAGNOSTIC RESULT

G

With CONSULT

1. Perform "All DTC reading".
2. Check DTC of "TRANSMISSION".

H

Is the DTC related to "communication error with ECM" detected?

YES >> GO TO 2.

NO >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

I

2. CHECK HARNESS AND CONNECTORS FOR CAN COMMUNICATION

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect A/T assembly harness connector.
4. Check the continuity between ECM harness connector and A/T assembly harness connector.

J

K

+		-		Continuity
ECM		A/T assembly		
Connector	Terminal	Connector	Terminal	
E200	138	E217	1	Existed
	151		2	

L

M

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

N

3. REPLACE ECM

O

With CONSULT

1. Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
2. Turn ignition switch ON and wait at least 5 seconds.
3. Check "Self-diagnostic result" of "ENGINE".

P

Is DTC "U0402" detected again?

YES >> Replace TCM. Refer to [TM-295, "Exploded View"](#).

NO >> INSPECTION END

U0404 CAN COMMUNICATION (A/T SHIFT SELECTOR)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0404 CAN COMMUNICATION (A/T SHIFT SELECTOR)

DTC Description

INFOID:000000013289904

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0404	COMMUNICATION ERROR (INVALID) (Invalid data from gear shift control module "A")	BUS SIGNAL/MESSAGE ERROR	Implausible data were received from the electronic selector lever module. There is a signal error or the message error.

POSSIBLE CAUSE

Drivetrain CAN communication with A/T shift selector

Diagnosis Procedure

INFOID:000000013289905

1. CHECK RESISTOR

Check resistors. Refer to [EC4-265, "Component Inspection \(Resistor 1 and 2\)"](#).

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace the malfunctioning resistor.

2. CHECK HARNESS AND CONNECTORS FOR CAN COMMUNICATION

1. Disconnect harness connector of the following items.
 - ECM
 - FPCM
 - Sub electric oil pump inverter
 - A/T shift selector
 - Automatic transmission (TCM)
2. Check the continuity between ECM harness connector and the other ECU harness connector.


+		-			Continuity
ECM		Other ECU			
Connector	Terminal	Name	Connector	Terminal	
E200	138	FPCM	B134	3	Existed
	151			4	
	138	Sub electric oil pump inverter	B138	3	
	151			2	
	138	Automatic transmission	E217	1	
	151			2	
	138	Resistor 1	E203	1	
	151			2	
	138	Resistor 2	E204	1	
	151			2	

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

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace error-detected parts.

3. REPLACE A/T SHIFT SELECTOR

 With CONSULT

U0404 CAN COMMUNICATION (A/T SHIFT SELECTOR)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

1. Replace A/T shift selector. Refer to [TM-289, "Removal and Installation"](#).
2. Turn ignition switch ON and wait at least 5 seconds.
3. Check "Self-diagnostic result" of "ENGINE".

Is DTC "U0404" detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
NO >> INSPECTION END

Component Inspection (Resistor 1 and 2)

INFOID:000000013289906

1. CHECK RESISTOR 1 AND 2

1. Turn ignition switch OFF.
2. Disconnect resistor harness connectors. (For parts location, refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).)
3. Check resistance between resistor terminals.

Resistor	Terminals	Resistance
1	1 and 2	120 Ω
2		

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace the malfunctioning resistor.

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EC4
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U0405 CAN COMMUNICATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0405 CAN COMMUNICATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

DTC Description

INFOID:000000013289907

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0405	COMMUNICATION ERROR (INVALID) (Invalid data received from cruise control module)	NO SUBTYPE INFORMATION	Implausible data were received from ABS actuator and electric unit (control unit).

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

Diagnosis Procedure

INFOID:000000013289908

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "ABS"

With CONSULT

Check "Self-diagnostic result" of "ABS".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-195, "Removal and Installation"](#).

U040A CAN COMMUNICATION (A/C AUTO AMP.)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U040A CAN COMMUNICATION (A/C AUTO AMP.)

DTC Description

INFOID:0000000013289909

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U040A	COMMUNICATION ERROR (INVALID) (Invalid data received from air conditioning control module)	NO SUBTYPE INFORMATION	Implausible data were received from A/C auto amp.

C

D

POSSIBLE CAUSE

A/C auto amp.

E

Diagnosis Procedure

INFOID:0000000013289910

F

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "HVAC"

With CONSULT

Check "Self-diagnostic result" of "HVAC".

G

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> Replace A/C auto amp. Refer to [HAC-137, "Removal and Installation"](#).

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U0416 CAN COMMUNICATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0416 CAN COMMUNICATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

DTC Description

INFOID:0000000013289911

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0416	COMMUNICATION ERROR (INVALID) (Invalid data received from vehicle dynamics control module)	NO SUBTYPE INFORMATION	Implausible data were received from ABS actuator and electric unit (control unit).
		BUS SIGNAL/MESSAGE ERROR	Implausible data were received from ABS actuator and electric unit (control unit). There is a signal error or the message is abnormal.
		INVALID SERIAL DATA RECEIVED	Implausible data were received from ABS actuator and electric unit (control unit). Incorrect data were received.

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

Diagnosis Procedure

INFOID:0000000013289912

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "ABS"

With CONSULT

Check "Self-diagnostic result" of "ABS".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-146. "DTC Index"](#).
- NO >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-195. "Removal and Installation"](#).

U0424 CAN COMMUNICATION (A/C AUTO AMP.)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0424 CAN COMMUNICATION (A/C AUTO AMP.)

DTC Description

INFOID:000000013289913

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0424	COMMUNICATION ERROR (INVALID) (Invalid data received from HVAC control module)	NO SUBTYPE INFORMATION	Implausible data were received from A/C auto amp.
		BUS SIGNAL/MESSAGE ERROR	Implausible data were received from A/C auto amp. There is a signal error or the message is abnormal.
		4A	Implausible data were received from A/C auto amp. The wrong component is installed.
		SIGNAL INVALID	Implausible data were received from A/C auto amp. There is an incorrect signal.

POSSIBLE CAUSE

A/C auto amp.

Diagnosis Procedure

INFOID:000000013289914

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "HVAC"

With CONSULT

Check "Self-diagnostic result" of "HVAC".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> Replace A/C auto amp. Refer to [HAC-137, "Removal and Installation"](#).

U0427 CAN COMMUNICATION (BCM)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0427 CAN COMMUNICATION (BCM)

DTC Description

INFOID:000000013289915

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0427	COMMUNICATION ERROR (INVALID) (Invalid data received from vehicle security control module)	BUS SIGNAL/MESSAGE ERROR	Implausible data were received from BCM. There is a signal error or the message is abnormal.

POSSIBLE CAUSE

BCM

Diagnosis Procedure

INFOID:000000013289916

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "BCM"

With CONSULT

Check "Self-diagnostic result" of "BCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> Replace BCM. Refer to [BCS-99, "Removal and Installation"](#).

U0429 CAN COMMUNICATION (STEERING CONTROL MODULE)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0429 CAN COMMUNICATION (STEERING CONTROL MODULE)

DTC Description

INFOID:0000000013289917

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0429	COMMUNICATION ERROR (INVALID) (Invalid data received from steering column control module)	BUS SIGNAL/MESSAGE ERROR	Implausible data were received from power steering control module.

POSSIBLE CAUSE

Power steering control module

Diagnosis Procedure

INFOID:0000000013289918

1. CHECK "SELF-DIAGNOSTIC RESULT" OF POWER STEERING CONTROL MODULE

With CONSULT

Check "Self-diagnostic result" of "EPS/DAST 3".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> Replace power steering control module. Refer to [STC-61, "Removal and Installation"](#).

U0469 LIN COMMUNICATION (ALTERNATOR)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U0469 LIN COMMUNICATION (ALTERNATOR)

DTC Description

INFOID:000000013289919

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U0469	COMMUNICATION ERROR (INVALID) (Invalid data received from starter/generator control module)	BUS SIGNAL/MESSAGE ERROR	Implausible data were received from the alternator. There is a signal error or the message is abnormal.

POSSIBLE CAUSE

Alternator

Diagnosis Procedure

INFOID:000000013289920

1. CHECK CHARGING SYSTEM

Check charging system. Refer to [CHG-14, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#), [CHG-18, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

Is the inspection result normal?

YES >> Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

U1000 CAN COMMUNICATION CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U1000 CAN COMMUNICATION CIRCUIT

DTC Description

INFOID:000000013289921

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U1000	CAN COMM CIRCUIT (Manufacturer controlled DTC)	NO SUBTYPE INFORMATION	When EMCM is not transmitting or receiving CAN communication signal of OBD (emission related diagnosis) for 2 seconds or more.

C

D

POSSIBLE CAUSE

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

E

FAIL-SAFE

Stop/Start System

F

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine NOTE: Does not start the engine by the CAN communication abnormal status	Prohibit the stop/start system operation from the next time

G

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DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

Turn ignition switch OFF and wait at least 10 seconds.

J

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

K

With CONSULT

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check "Self Diagnostic Result" of "EMCM".

L

Is DTC "U1000" detected?

M

- YES >> Proceed to [EC4-273, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013289922

Perform the trouble diagnosis for CAN communication system. Refer to [LAN-41, "Trouble Diagnosis Flow Chart"](#).

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U1110 VEHICLE SPEED SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U1110 VEHICLE SPEED SIGNAL

DTC Description

INFOID:000000013289923

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U1110	VEHICLE SPEED SIGNAL (Vehicle speed signal)	SIGNAL INVALID	The vehicle speed signal was not received. There is an invalid signal.

POSSIBLE CAUSE

Vehicle speed signal sent from ABS actuator and electric unit (control unit)

Diagnosis Procedure

INFOID:000000013289924

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "ABS"

With CONSULT

Check "Self-diagnostic result" of "ABS".

Is any DTC detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-146. "DTC Index"](#).
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check "Self-diagnostic result" of "ENGINE".

Is any DTC related to CAN communication detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-146. "DTC Index"](#).
NO >> INSPECTION END

U1407 CAN COMMUNICATION (TCM)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U1407 CAN COMMUNICATION (TCM)

DTC Description

INFOID:0000000013289925

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U1407	ENGINE TORQUE SIGNAL (Engine torque signal)	INVALID SERIAL DATA RECEIVED	Implausible signal "Engine torque" is received. Incorrect data were received.
		SIGNAL INVALID	Implausible signal "Engine torque" is received. There is an incorrect signal.
		MISSING MESSAGE	Implausible signal "Engine torque" is received. The message is missing.

POSSIBLE CAUSE

CAN message signal

Diagnosis Procedure

INFOID:0000000013289926

1. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

Perform "All DTC reading".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC.
- NO >> INSPECTION END

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U3003 BATTERY VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U3003 BATTERY VOLTAGE

DTC Description

INFOID:000000013289927

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U3003	BATTERY VOLTAGE (Battery voltage)	CIRC VOLT BELOW THRESHOLD	The ECM power supply voltage is too low. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	The power supply voltage is too high. The limit value for electrical voltage has been exceeded.

POSSIBLE CAUSE

- Harness or connectors
(ECM power supply circuit)

Diagnosis Procedure

INFOID:000000013289928

1. CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

Is the inspection result normal?

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

U300E IGNITION POWER SUPPLY VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U300E IGNITION POWER SUPPLY VOLTAGE

DTC Description

INFOID:000000013289929

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U300E	IGNITION INPUT ON (Ignition input ON)	NO SUBTYPE INFORMATION	Ignition input signal is implausible.

C

D

POSSIBLE CAUSE

- Harness or connectors (ECM power supply circuit)

E

Diagnosis Procedure

INFOID:000000013289930

1. CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

F

Check ECM power supply and ground circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

Is the inspection result normal?

G

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

H

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U3011 IGNITION POWER SUPPLY VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

U3011 IGNITION POWER SUPPLY VOLTAGE

DTC Description

INFOID:00000001328931

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
U3011	IGNITION INPUT OFF (Ignition input OFF)	NO SUBTYPE INFORMATION	Ignition input signal is implausible.

POSSIBLE CAUSE

- Harness or connectors
(ECM power supply circuit)

Diagnosis Procedure

INFOID:00000001328932

1. CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

Is the inspection result normal?

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

B1910 SUB BATTERY RELAY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

B1910 SUB BATTERY RELAY

DTC Description

INFOID:000000013289933

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
B1910	SUB BATTERY RELAY (Sub battery relay)	NO SUBTYPE INFORMATION	Sub battery relay is stuck ON

C

D

POSSIBLE CAUSE

- Harness or connectors
(between sub battery relay harness connector and EMCM harness connector is shorted to ground)
(Sub battery harness is shorted to main battery harness)
- Sub battery relay

E

FAIL-SAFE

Stop/Start System

F

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

G

H

I

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

Turn ignition switch OFF and wait at least 10 seconds.

J

>> GO TO 2.

K

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start engine and warm it up to normal operating temperature.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "AUTO START STOP".
3. Touch "START" and operate stop/start system (engine stop.)
4. Check "Self Diagnostic Result" of "EMCM".

L

M

Is DTC "B1910" detected?

- YES >> Proceed to [EC4-279, "Diagnosis Procedure"](#).
NO >> INSPECTION END

N

Diagnosis Procedure

INFOID:000000013289934

1. CHECK SUB BATTERY RELAY POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect sub battery relay harness connector.
3. Check the voltage between sub battery relay harness connector and ground.

O

P

+		-	Voltage (Approx.)
Sub battery relay			
Connector	Terminal		
C8	1	Ground	0 V

B1910 SUB BATTERY RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> GO TO 2.

2.CHECK EMCM POWER SUPPLY CIRCUIT

Check EMCM power supply circuit. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace error-detected parts.

3.CHECK SUB BATTERY RELAY POWER SUPPLY CIRCUIT

Check harness for short to power, between EMCM relay and sub battery relay.

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Repair or replace error-detected parts.

4.CHECK SUB BATTERY RELAY CONTROL CIRCUIT VOLTAGE-1

1. Reconnect sub battery relay harness connector.
2. Turn ignition switch ON.
3. Check the voltage between sub battery relay and ground.

+		-	Voltage (Approx.)
Sub battery relay			
Connector	Terminal		
C8	3	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 5.

5.CHECK SUB BATTERY RELAY CONTROL CIRCUIT VOLTAGE-2

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Turn ignition switch ON.
4. Check the voltage between sub battery relay and ground.

+		-	Voltage (Approx.)
Sub battery relay			
Connector	Terminal		
C8	3	Ground	Battery voltage

Is the inspection result normal?

- YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).
- NO >> GO TO 6.

6.CHECK SUB BATTERY RELAY CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect sub battery relay harness connector.
3. Check harness for short to ground, between sub battery relay harness connector and EMCM harness connector.

+		-	Continuity
Sub battery relay			
Connector	Terminal		
C8	3	Ground	Not existed

Is the inspection result normal?

B1910 SUB BATTERY RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 9.
- NO >> Repair or replace error-detected parts.

7.CHECK SUB BATTERY RELAY

Check sub battery relay. Refer to [EC4-281. "Component Inspection \(Sub Battery Relay\)".](#)

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace sub battery relay. Refer to [EC4-970. "Removal and Installation".](#)

8.CHECK SUB BATTERY VOLTAGE MONITOR CIRCUIT

Check the voltage between EMCM harness connector and ground.

+		-	Voltage
EMCM			
Connector	Terminal		
M147	45	Ground	Sub battery voltage*

*: If the voltage is equal to MAIN battery voltage, this circuit may be short-circuited to main battery power supply circuit.

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Repair or replace error-detected parts.

9.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident".](#)

>> INSPECTION END

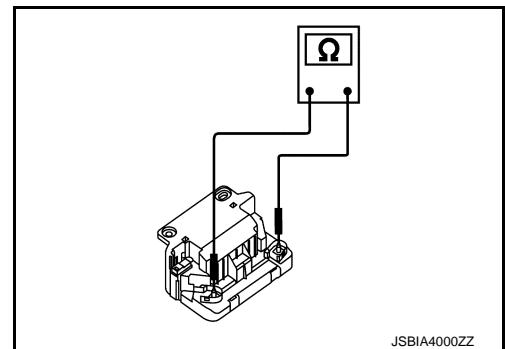
Component Inspection (Sub Battery Relay)

INFOID:0000000013289935

1.CHECK SUB BATTERY RELAY

1. Turn ignition switch OFF.
2. Remove sub battery relay.
3. Check the continuity between sub battery terminals under the following conditions.

Sub battery relay		Condition	Continuity
+	-		
Terminal			
5	6	12 V direct current supply between terminals 1 and 3	Existed
		No current supply	Not existed



JSBIA4000ZZ

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace sub battery relay. Refer to [EC4-970. "Removal and Installation".](#)

B1911 SUB BATTERY RELAY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

B1911 SUB BATTERY RELAY

DTC Description

INFOID:000000013289936

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
B1911	SUB BATTERY RELAY (Sub battery relay)	NO SUBTYPE INFORMATION	EMCM detects the sub battery relay remains OFF even though EMCM controls the relay to ON.

POSSIBLE CAUSE

- Harness or connectors
(between sub battery relay harness connector and EMCM harness connector is open)
(Sub battery voltage monitor circuit is open or shorted)
- Sub battery relay
- Sub battery current sensor

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start engine and wait at least 30 seconds.
2. Stop engine.
3. Start engine again and wait at least 30 seconds.
4. Check "Self Diagnostic Result" of "EMCM".

Is DTC "B1911" detected?

- YES >> Proceed to [EC4-282, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013289937

1. CHECK SUB BATTERY CURRENT SENSOR

Perform DTC confirmation procedure related to sub battery current sensor.

- DTC P1540 (Refer to [EC4-699, "DTC Description"](#).)
- DTC P1541 and 1542 (Refer to [EC4-703, "DTC Description"](#).)
- DTC P1543 (Refer to [EC4-707, "DTC Description"](#).)
- DTC P1544 (Refer to [EC4-711, "DTC Description"](#).)

Is the inspection result normal?

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

B1911 SUB BATTERY RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. CHECK SUB BATTERY VOLTAGE MONITOR CIRCUIT-1

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "SUB-BATTERY VOLTAGE".
3. Check that the "SUB-BATTERY VOLTAGE" indicated value is equally to the sub battery positive terminal voltage.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 3.

3. CHECK SUB BATTERY VOLTAGE MONITOR CIRCUIT-2

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the voltage between EMCM harness connector terminals.

EMCM			Voltage
Connector	+	-	
	Terminal		
M147	45	48	Sub battery voltage

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 4.

4. CHECK SUB BATTERY VOLTAGE MONITOR CIRCUIT-3

1. Check that the #87 fuse is not fusing.
2. Check the continuity between #87 fuse terminal and EMCM harness connector.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	45	#87 fuse terminal	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5. CHECK BATTERY POWER SUPPLY CIRCUIT

Perform trouble diagnosis for battery power supply circuit.

>> INSPECTION END

6. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

Is the inspection result normal?

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

7. CHECK SUB BATTERY RELAY POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect sub battery relay harness connector.
3. Check the voltage between sub battery relay harness connector and ground.

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B1911 SUB BATTERY RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
Sub battery relay			
Connector	Terminal		
C8	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 8.

8. CHECK EMCM POWER SUPPLY CIRCUIT

Check EMCM power supply circuit. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9. CHECK SUB BATTERY RELAY POWER SUPPLY CIRCUIT

1. Disconnect EMCM relay.
2. Check the continuity between EMCM relay harness connector and sub battery relay harness connector.

+		-		Continuity
EMCM relay		Sub battery relay		
Connector	Terminal	Connector	Terminal	
E206	5	C8	1	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10. CHECK SUB BATTERY RELAY CONTROL CIRCUIT

1. Disconnect EMCM harness connector.
2. Check the continuity between sub battery relay harness connector and EMCM harness connector.

+		-		Continuity
Sub battery relay		EMCM		
Connector	Terminal	Connector	Terminal	
C8	3	M147	21	Existed

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

11. CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace error-detected parts.

B1911 SUB BATTERY RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

12.CHECK SUB BATTERY RELAY

Check sub battery relay. Refer to [EC4-285. "Component Inspection \(Sub Battery Relay\)"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace sub battery relay. Refer to [EC4-970. "Removal and Installation"](#).

13.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace EMCM. Refer to [EC4-968. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

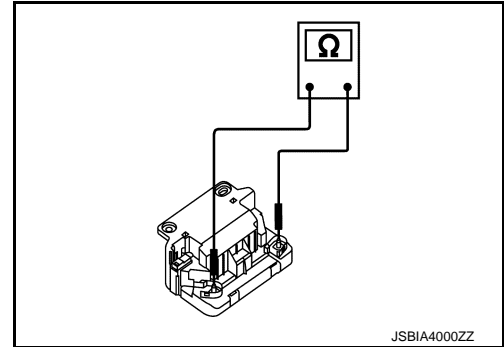
Component Inspection (Sub Battery Relay)

INFOID:000000013289938

1.CHECK SUB BATTERY RELAY

1. Turn ignition switch OFF.
2. Remove sub battery relay.
3. Check the continuity between sub battery terminals under the following conditions.

Sub battery relay		Condition	Continuity
+	-		
Terminal			
5	6	12 V direct current supply between terminals 1 and 3	Existed
		No current supply	Not existed



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace sub battery relay. Refer to [EC4-970. "Removal and Installation"](#).

B210D, B210E FPCM POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

B210D, B210E FPCM POWER SUPPLY

DTC Description

INFOID:000000013289939

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
B210D	POWER SUPPLY OF KL30 (Power supply of circuit KL30)	NO SUBTYPE INFORMATION	FPCM power supply voltage is less than 9.5 V.
B210E	POWER SUPPLY OF KL30 (Power supply of circuit KL30)	NO SUBTYPE INFORMATION	FPCM power supply voltage is more than 16.5 V.

POSSIBLE CAUSE

- Harness and connectors (FPCM power supply circuit)
- Battery
- Charging system

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check "Self Diagnostic Result" of "FPCM".

Is DTC "B210D" or "B210E" detected?

- YES >> Proceed to [EC4-286, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013289940

1. CHECK FPCM POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector.
3. Turn ignition switch ON.
4. Check the voltage between FPCM harness connector terminals.

Connector	FPCM		voltage
	+	-	
	Terminal		
B133	10	9	11 – 15 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK FPCM POWER SUPPLY CIRCUIT

Check FPCM power supply circuit. Refer to [EC4-237, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

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

C0031 WHEEL SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

C0031 WHEEL SPEED SENSOR

DTC Description

INFOID:000000013448294

DTC DETECTION LOGIC

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EC4

DTC	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	[Malfunction type]	
C0031	LH RR WHEEL SPEED SENSOR (Left Front Wheel Speed Sensor)	NO SUBTYPE INFORMATION	The left front wheel speed sensor has a malfunction.

C

D

POSSIBLE CAUSE

Vehicle speed signal

E

Diagnosis Procedure

INFOID:000000013448295

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

F

With CONSULT

Check "Self-diagnostic result" in "ABS".

G

Is the inspection result normal?

YES >> INSPECTION END

NO >> Perform trouble diagnosis for detected DTC. Refer to [BRC-72. "DTC Index"](#).

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C0034 WHEEL SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

C0034 WHEEL SPEED SENSOR

DTC Description

INFOID:000000013448296

DTC DETECTION LOGIC

DTC	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	[Malfunction type]	
C0034	RH RR WHEEL SPEED SENSOR (Right Front Wheel Speed Sensor)	NO SUBTYPE INFORMATION	The right front wheel speed sensor has a malfunction.

POSSIBLE CAUSE

Vehicle speed signal

Diagnosis Procedure

INFOID:000000013466578

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

With CONSULT

Check "Self-diagnostic result" in "ABS".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Perform trouble diagnosis for detected DTC. Refer to [BRC-72, "DTC Index"](#).

C0037 WHEEL SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

C0037 WHEEL SPEED SENSOR

DTC Description

INFOID:000000013448322

DTC DETECTION LOGIC

A

EC4

DTC	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	[Malfunction type]	
C0037	LH FR WHEEL SPEED SENSOR Left Rear Wheel Speed Sensor)	NO SUBTYPE INFORMATION	The left rear wheel speed sensor has a malfunction.

C

D

POSSIBLE CAUSE

Vehicle speed signal

E

Diagnosis Procedure

INFOID:000000013466579

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

F

With CONSULT

Check "Self-diagnostic result" in "ABS".

Is the inspection result normal?

G

YES >> INSPECTION END

NO >> Perform trouble diagnosis for detected DTC. Refer to [BRC-72, "DTC Index"](#).

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C003A WHEEL SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

C003A WHEEL SPEED SENSOR

DTC Description

INFOID:000000013448324

DTC DETECTION LOGIC

DTC	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	[Malfunction type]	
C003A	RH FR WHEEL SPEED SENSOR (Right Rear Wheel Speed Sensor)	NO SUBTYPE INFORMATION	The right rear wheel speed sensor has a malfunction.

POSSIBLE CAUSE

Vehicle speed signal

Diagnosis Procedure

INFOID:000000013466580

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

With CONSULT

Check "Self-diagnostic result" in "ABS".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Perform trouble diagnosis for detected DTC. Refer to [BRC-72. "DTC Index"](#).

P0001 QUANTITY CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0001 QUANTITY CONTROL VALVE

DTC Description

INFOID:000000013289941

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0001	FUEL VOLUME REGULATOR (Fuel volume regulator control circuit/open)	NO SUBTYPE INFORMATION	The quantity control valve has an electrical malfunction or an open circuit.

POSSIBLE CAUSE

- Harness or connectors (Quantity control valve circuit)
- Quantity control valve

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013466512

1.COMPONENT FUNCTION CHECK

With CONSULT

1. Check that the low fuel pressure system does not have malfunction.
2. Start the engine and let it idle.
3. Turn OFF all auxiliaries. (Electrical load: OFF)
4. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
5. Set the vehicle as the following conditions:

Item	Condition
ENGINE SPEED	50 rpm or more
COOLANT TEMPERATURE	75 – 105°C (167 – 221°F)
FUEL TEMPERATURE	40 – 80°C (104 – 176°F)
AIR CONDITIONER STATUS	NOT ACT

6. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Quantity control valve".
7. Perform Active Test.

Is the fuel rail pressure increase to approximately 20 MPa (200 bar, 204 kg/cm², 2900 psi)?

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

2.CHECK DTC

With CONSULT

Check that the ECM does not detect other DTC.

NOTE:

- If the actuation angle of the quantity control valve matches the specified value exactly, synchronization between the camshaft and crankshaft must be checked.
- If the DTC related to camshaft is detected, perform Diagnosis Procedure for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
- If the DTC related to crankshaft is detected, perform Diagnosis Procedure for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

>> INSPECTION END

3.CHECK QUANTITY CONTROL VALVE

P0001 QUANTITY CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Check quantity control valve. Refer to [EC4-296. "Component Inspection \(Quantity Control Valve\)".](#)

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace high pressure fuel pump. Refer to [EM-47. "Removal and Installation".](#)

4.CHECK QUANTITY CONTROL VALVE CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and quantity control valve harness connector.

+		-		Continuity
ECM		Quantity control valve		
Connector	Terminal	Connector	Terminal	
F150	75	F170	1	Existed
	76		2	

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

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-45. "Intermittent Incident".](#)

>> INSPECTION END

Component Inspection (Quantity Control Valve)

INFOID:0000000013466513

1.CHECK QUANTITY CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect quantity control valve harness connector.
3. Check the resistance between quantity control valve terminals.

Terminal	Resistance
1 and 2	0.3 – 1.1 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace high pressure fuel pump. Refer to [EM-47. "Removal and Installation".](#)

P0003 QUANTITY CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0003 QUANTITY CONTROL VALVE

DTC Description

INFOID:000000013289944

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0003	FUEL VOLUME REGULATOR (Fuel volume regulator control circuit low)	NO SUBTYPE INFORMATION	The quantity control valve has a short circuit to ground.

C

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POSSIBLE CAUSE

- Harness or connectors (Quantity control valve circuit)
- Quantity control valve

E

FAIL-SAFE

Prohibits the stop/start operation.

F

Diagnosis Procedure

INFOID:000000013466514

G

1.COMPONENT FUNCTION CHECK

With CONSULT

1. Check that the low fuel pressure system does not have malfunction.
2. Start the engine and let it idle.
3. Turn OFF all auxiliaries. (Electrical load: OFF)
4. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
5. Set the vehicle as the following conditions:

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Item	Condition
ENGINE SPEED	50 rpm or more
COOLANT TEMPERATURE	75 – 105°C (167 – 221°F)
FUEL TEMPERATURE	40 – 80°C (104 – 176°F)
AIR CONDITIONER STATUS	NOT ACT

J

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6. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Quantity control valve".
7. Perform Active Test.

L

Is the fuel rail pressure increase to approximately 20 MPa (200 bar, 204 kg/cm², 2900 psi)?

M

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

2.CHECK DTC

N

With CONSULT

Check that the ECM does not detect other DTC.

NOTE:

- If the actuation angle of the quantity control valve matches the specified value exactly, synchronization between the camshaft and crankshaft must be checked.
- If the DTC related to camshaft is detected, perform Diagnosis Procedure for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
- If the DTC related to crankshaft is detected, perform Diagnosis Procedure for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

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>> INSPECTION END

3.CHECK QUANTITY CONTROL VALVE

P0003 QUANTITY CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Check quantity control valve. Refer to [EC4-296. "Component Inspection \(Quantity Control Valve\)".](#)

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace high pressure fuel pump. Refer to [EM-47. "Removal and Installation".](#)

4.CHECK QUANTITY CONTROL VALVE CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and quantity control valve harness connector.

+		-		Continuity
ECM		Quantity control valve		
Connector	Terminal	Connector	Terminal	
F150	75	F170	1	Existed
	76		2	

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

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-45. "Intermittent Incident".](#)

>> INSPECTION END

Component Inspection (Quantity Control Valve)

INFOID:0000000013466515

1.CHECK QUANTITY CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect quantity control valve harness connector.
3. Check the resistance between quantity control valve terminals.

Terminal	Resistance
1 and 2	0.3 – 1.1 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace high pressure fuel pump. Refer to [EM-47. "Removal and Installation".](#)

P0004 QUANTITY CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0004 QUANTITY CONTROL VALVE

DTC Description

INFOID:000000013289947

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0004	FUEL VOLUME REGULATOR (Fuel volume regulator control circuit high)	NO SUBTYPE INFORMATION	The quantity control valve has a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Quantity control valve circuit)
- Quantity control valve

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013466516

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Check that the low fuel pressure system does not have malfunction.
2. Start the engine and let it idle.
3. Turn OFF all auxiliaries. (Electrical load: OFF)
4. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
5. Set the vehicle as the following conditions:

Item	Condition
ENGINE SPEED	50 rpm or more
COOLANT TEMPERATURE	75 – 105°C (167 – 221°F)
FUEL TEMPERATURE	40 – 80°C (104 – 176°F)
AIR CONDITIONER STATUS	NOT ACT

6. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Quantity control valve".
7. Perform Active Test.

Is the fuel rail pressure increase to approximately 20 MPa (200 bar, 204 kg/cm², 2900 psi)?

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

2. CHECK DTC

With CONSULT

Check that the ECM does not detect other DTC.

NOTE:

- If the actuation angle of the quantity control valve matches the specified value exactly, synchronization between the camshaft and crankshaft must be checked.
- If the DTC related to camshaft is detected, perform Diagnosis Procedure for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
- If the DTC related to crankshaft is detected, perform Diagnosis Procedure for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

>> INSPECTION END

3. CHECK QUANTITY CONTROL VALVE

P0004 QUANTITY CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Check quantity control valve. Refer to [EC4-296. "Component Inspection \(Quantity Control Valve\)".](#)

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace high pressure fuel pump. Refer to [EM-47. "Removal and Installation".](#)

4.CHECK QUANTITY CONTROL VALVE CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and quantity control valve harness connector.

+		-		Continuity
ECM		Quantity control valve		
Connector	Terminal	Connector	Terminal	
F150	75	F170	1	Existed
	76		2	

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

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-45. "Intermittent Incident".](#)

>> INSPECTION END

Component Inspection (Quantity Control Valve)

INFOID:000000013466517

1.CHECK QUANTITY CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect quantity control valve harness connector.
3. Check the resistance between quantity control valve terminals.

Terminal	Resistance
1 and 2	0.3 – 1.1 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace high pressure fuel pump. Refer to [EM-47. "Removal and Installation".](#)

P0008 CRANKSHAFT POSITION CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0008 CRANKSHAFT POSITION CONTROL

DTC Description

INFOID:0000000013289950

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0008	ENGINE POSITION SYSTEM (Engine position system performance)	ELECTRICAL MALFUNCTION	The position of the crankshaft (cylinder bank 1) is implausible. There is a general electrical malfunction.

POSSIBLE CAUSE

- Harness or connectors (Crankshaft position sensor circuit)
- Crankshaft position sensor

Diagnosis Procedure

INFOID:0000000013476200

1. COMPONENT FUNCTION CHECK

1. Start the engine and let it idle.
2. Check signal between ECM harness connector terminals.

Connector	ECM		Reference value
	+	-	
Terminal			
F150	81	12	

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect crankshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between crankshaft position sensor harness connector terminals.

Connector	Crankshaft position sensor		Voltage
	+	-	
Terminal			
F168	1	3	4.8 – 5.3 V

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 3.

3. CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY-2

Check the voltage between crankshaft position sensor harness connector and ground.

P0008 CRANKSHAFT POSITION CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
Crankshaft position sensor			
Connector	Terminal		
F168	1	Ground	4.8 – 5.3 V

Is the inspection result normal?

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

4. CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	18	F168	1	Existed

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

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair or replace error-detected parts.

5. CHECK CRANKSHAFT POSITION SENSOR GROUND CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F168	3	Existed

4. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair or replace error-detected parts.

6. CHECK CRANKSHAFT POSITION SENSOR CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	81	F168	2	Existed

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

Is the inspection result normal?

- YES >> Replace crankshaft position sensor. Refer to [EM-86, "Removal and Installation"](#).
- NO >> Repair or replace error-detected parts.

7. CHECK INTERMITTENT INCIDENT

P0008 CRANKSHAFT POSITION CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

>> INSPECTION END

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P000E QUANTITY CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P000E QUANTITY CONTROL VALVE

DTC Description

INFOID:0000000013289952

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P000E	FUEL VOLUME REGULATOR (Fuel volume regulator control exceeded learning limit)	NO SUBTYPE INFORMATION	The adaptation values of the quantity control valve are outside the valid range.

POSSIBLE CAUSE

- Harness or connectors (Quantity control valve circuit)
- Quantity control valve

Diagnosis Procedure

INFOID:0000000013289953

1. COMPONENT FUNCTION CHECK

④ With CONSULT

1. Check that the low fuel pressure system does not have malfunction.
2. Start the engine and let it idle.
3. Turn OFF all auxiliaries. (Electrical load: OFF)
4. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
5. Set the vehicle as the following conditions:

Item	Condition
ENGINE SPEED	50 rpm or more
COOLANT TEMPERATURE	75 – 105°C (167 – 221°F)
FUEL TEMPERATURE	40 – 80°C (104 – 176°F)
AIR CONDITIONER STATUS	NOT ACT

6. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Quantity control valve".
7. Perform Active Test.

Is the fuel rail pressure increase to approximately 20 MPa (200 bar, 204 kg/cm², 2900 psi)?

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

2. CHECK DTC

④ With CONSULT

Check that the ECM does not detect other DTC.

NOTE:

- If the actuation angle of the quantity control valve matches the specified value exactly, synchronization between the camshaft and crankshaft must be checked.
- If the DTC related to camshaft is detected, perform Diagnosis Procedure for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
- If the DTC related to crankshaft is detected, perform Diagnosis Procedure for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

>> INSPECTION END

3. CHECK QUANTITY CONTROL VALVE

Check quantity control valve. Refer to [EC4-301, "Component Inspection \(Quantity Control Valve\)"](#).

Is the inspection result normal?

P000E QUANTITY CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 4.

NO >> Replace high pressure fuel pump. Refer to [EM-47, "Removal and Installation"](#).

4.CHECK QUANTITY CONTROL VALVE CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and quantity control valve harness connector.

+		-		Continuity
ECM		Quantity control valve		
Connector	Terminal	Connector	Terminal	
F150	75	F170	1	Existed
	76		2	

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

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-45, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Quantity Control Valve)

INFOID:000000013289954

1.CHECK QUANTITY CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect quantity control valve harness connector.
3. Check the resistance between quantity control valve terminals.

Terminal	Resistance
1 and 2	0.3 – 1.1 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace high pressure fuel pump. Refer to [EM-47, "Removal and Installation"](#).

P0010 INTAKE CAMSHAFT ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0010 INTAKE CAMSHAFT ACTUATOR

DTC Description

INFOID:000000013289955

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0010	CAMSHAFT POSITION ACTUATOR A B1 ("A" camshaft position actuator circuit/open bank 1)	NO SUBTYPE INFORMATION	The Intake camshaft actuator (cylinder bank 1) has an electrical malfunction or an open circuit.

POSSIBLE CAUSE

- Harness or connectors (Intake camshaft actuator circuit)
- Intake camshaft actuator

Diagnosis Procedure

INFOID:000000013476201

1. COMPONENT FUNCTION CHECK

Ⓟ With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
3. Set the vehicle as the following conditions:

Item	Condition
ENGINE SPEED	500 rpm or more
COOLANT TEMPERATURE	80°C (176°F)

4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check intake camshaft solenoid".
5. Perform Active Test.

NOTE:

After performing Active Test, erase DTC if necessary.

Is the actuator actuated?

- YES >> INSPECTION END
 NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 97 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK INTAKE CAMSHAFT ACTUATOR POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect intake camshaft actuator harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake camshaft actuator harness connector and ground.

+		-	Voltage
Connector	Terminal		
F162	2	Ground	Battery voltage

P0010 INTAKE CAMSHAFT ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for intake camshaft actuator power supply circuit.

4.CHECK INTAKE CAMSHAFT ACTUATOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Intake camshaft actuator		
Connector	Terminal	Connector	Terminal	
F150	29	F162	1	Existed

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

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-45. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace intake camshaft actuator. Refer to [EM-93. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

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P0011 INTAKE CAMSHAFT CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0011 INTAKE CAMSHAFT CONTROL

DTC Description

INFOID:000000013289957

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0011	CAMSHAFT A POSITION ("A" Camshaft position - timing over-advanced or system performance bank 1)	SIGNAL PLAUSIBILITY ERROR	The position of the intake camshaft (cylinder bank 1) deviates from the specified value. There is an implausible signal.
		COMMAND POSI NOT REACHABLE	The position of the intake camshaft (cylinder bank 1) deviates from the specified value. The commanded position cannot be reached.

POSSIBLE CAUSE

- Intake camshaft
- Exhaust camshaft

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013466518

1. COMPONENT FUNCTION CHECK

④ With CONSULT

1. Apply parking brake.
2. Shift the selector lever to P or N position.
3. Start the engine and let it idle.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CAMSHAFT POSITIONER".
5. Keep the engine speed between 2,700 – 3,500 rpm.
6. Perform Active Test.

NOTE:

Start the Active Test immediately after that engine speed reaches to specified range.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the malfunctioning camshaft. Refer to [EM-70, "Exploded View"](#).

P0012 INTAKE CAMSHAFT CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0012 INTAKE CAMSHAFT CONTROL

DTC Description

INFOID:0000000013289959

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0012	CAMSHAFT A POSITION ("A" Camshaft position - timing over-retarded bank 1)	NO SUBTYPE INFORMATION	Adjustment of the intake camshaft (cylinder bank 1) is performed late.

POSSIBLE CAUSE

- Intake camshaft
- Exhaust camshaft

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:0000000013466519

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Apply parking brake.
2. Shift the selector lever to P or N position.
3. Start the engine and let it idle.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CAMSHAFT POSITIONER".
5. Keep the engine speed between 2,700 – 3,500 rpm.
6. Perform Active Test.

NOTE:

Start the Active Test immediately after that engine speed reaches to specified range.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the malfunctioning camshaft. Refer to [EM-70, "Exploded View"](#).

P0013 EXHAUST CAMSHAFT ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0013 EXHAUST CAMSHAFT ACTUATOR

DTC Description

INFOID:0000000013289961

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0013	CAMSHAFT B POSITION ("B" camshaft position - actuator circuit/open bank 1)	NO SUBTYPE INFORMATION	The exhaust camshaft actuator (cylinder bank 1) has an electrical malfunction or an open circuit.

POSSIBLE CAUSE

- Harness or connectors (Exhaust camshaft actuator circuit)
- Exhaust camshaft actuator

Diagnosis Procedure

INFOID:0000000013476202

1. COMPONENT FUNCTION CHECK

Ⓟ With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
3. Set the vehicle as the following conditions:

Item	Condition
ENGINE SPEED	500 rpm or more
COOLANT TEMPERATURE	80°C (176°F)

4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check exhaust camshaft solenoid".
5. Perform Active Test.

NOTE:

After performing Active Test, erase DTC if necessary.

Is the actuator actuated?

- YES >> INSPECTION END
 NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 97 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK EXHAUST CAMSHAFT ACTUATOR POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect exhaust camshaft actuator harness connector.
3. Turn ignition switch ON.
4. Check the voltage between exhaust camshaft actuator harness connector and ground.

+		-	Voltage
Connector	Terminal		
F163	2	Ground	Battery voltage

Is the inspection result normal?

P0013 EXHAUST CAMSHAFT ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 4.

NO >> Perform trouble diagnosis for exhaust camshaft actuator power supply circuit.

4.CHECK EXHAUST CAMSHAFT ACTUATOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Exhaust camshaft actuator		
Connector	Terminal	Connector	Terminal	
F150	53	F163	1	Existed

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

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-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace exhaust camshaft actuator. Refer to [EM-93, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

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P0014 EXHAUST CAMSHAFT CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0014 EXHAUST CAMSHAFT CONTROL

DTC Description

INFOID:000000013289963

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0014	CAMSHAFT B POSITION ("B" Camshaft position - timing over-advanced or system performance bank 1)	SIGNAL PLAUSIBILITY ERROR	The position of the exhaust camshaft (cylinder bank 1) deviates from the specified value. There is an implausible signal.
		COMMAND POSI NOT REACHABLE	The position of the exhaust camshaft (cylinder bank 1) deviates from the specified value. The commanded position cannot be reached.

POSSIBLE CAUSE

- Intake camshaft
- Exhaust camshaft

Diagnosis Procedure

INFOID:000000013289964

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Apply parking brake.
2. Shift the selector lever to P or N position.
3. Start the engine and let it idle.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CAMSHAFT POSITIONER".
5. Keep the engine speed between 2,700 – 3,500 rpm.
6. Perform Active Test.

NOTE:

Start the Active Test immediately after that engine speed reaches to specified range.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the malfunctioning camshaft. Refer to [EM-70. "Exploded View"](#).

P0015 EXHAUST CAMSHAFT CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0015 EXHAUST CAMSHAFT CONTROL

DTC Description

INFOID:000000013289965

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0015	CAMSHAFT B POSITION ("A" Camshaft position - timing over-retarded bank 1)	NO SUBTYPE INFORMATION	Adjustment of the exhaust camshaft (cylinder bank 1) is performed late.

POSSIBLE CAUSE

- Intake camshaft
- Exhaust camshaft

Diagnosis Procedure

INFOID:000000013466520

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Apply parking brake.
2. Shift the selector lever to P or N position.
3. Start the engine and let it idle.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CAMSHAFT POSITIONER".
5. Keep the engine speed between 2,700 – 3,500 rpm.
6. Perform Active Test.

NOTE:

Start the Active Test immediately after that engine speed reaches to specified range.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the malfunctioning camshaft. Refer to [EM-70. "Exploded View"](#).

P0016 CKP - CMP CORRELATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0016 CKP - CMP CORRELATION

DTC Description

INFOID:000000013289967

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0016	CKP - CMP CORRELATION B1 SEN A (Crankshaft position - camshaft position correlation bank 1 sensor A)	SIGNAL PLAUSIBILITY ERROR	The position of the intake camshaft (bank 1) is implausible relative to the position of the crankshaft. There is an implausible signal.
		SIG ABOVE ALLOWABLE RANGE	The position of the intake camshaft (bank 1) is implausible relative to the position of the crankshaft. There is a signal above the permissible limit value.

POSSIBLE CAUSE

- Improper installation of timing chain
- Timing chain tensioner
- Camshaft signal plate
- Camshaft actuator

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013289968

1.CHECK DTC PRIORITY

Check that the DTC related to the following parts is not detected.

- Intake camshaft position sensor
- Intake camshaft actuator
- Exhaust camshaft position sensor
- Exhaust camshaft actuator
- Crank shaft position sensor

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).
NO >> GO TO 2.

2.CHECK COMPONENT PARTS

Check the following items:

- Wear of timing chain or timing chain stretch.
- Check signal plate of camshafts for deformation.
- Intake camshaft actuator and exhaust camshaft actuator.
- Improper installation of timing chain
- Improper installation of chain tensioner

>> INSPECTION END

P0017 CKP-CMP CORRELATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0017 CKP-CMP CORRELATION

DTC Description

INFOID:000000013289969

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0017	CKP - CMP CORRELATION B1 SEN A (Crankshaft position - camshaft position correlation bank 1 sensor B)	SIGNAL PLAUSIBILITY ERROR	The position of the exhaust camshaft (bank 1) is implausible relative to the position of the crankshaft. There is an implausible signal.
		SIG ABOVE ALLOWABLE RANGE	The position of the exhaust camshaft (bank 1) is implausible relative to the position of the crankshaft. There is a signal above the permissible limit value.

POSSIBLE CAUSE

- Improper installation of timing chain
- Timing chain tensioner
- Camshaft signal plate
- Camshaft actuator

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013466521

1.CHECK DTC PRIORITY

Check that the DTC related to the following parts is not detected.

- Intake camshaft position sensor
- Intake camshaft actuator
- Exhaust camshaft position sensor
- Exhaust camshaft actuator
- Crank shaft position sensor

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).
NO >> GO TO 2.

2.CHECK COMPONENT PARTS

Check the following items:

- Wear of timing chain or timing chain stretch.
- Check signal plate of camshafts for deformation.
- Intake camshaft actuator and exhaust camshaft actuator.
- Improper installation of timing chain
- Improper installation of chain tensioner

>> INSPECTION END

P0030, P0031, P0032 A/F SENSOR HEATER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0030, P0031, P0032 A/F SENSOR HEATER

DTC Description

INFOID:00000001328971

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0030	HO2S HEATER B1 SEN1 (HO2S heater control circuit bank 1 sensor 1)	NO SUBTYPE INFORMATION	The output for the heater of A/F sensor (cylinder bank 1) has an electrical malfunction or open circuit.
P0031	HO2S HEATER B1 SEN1 (HO2S heater control circuit low bank 1 sensor 1)	NO SUBTYPE INFORMATION	The output for the heater of A/F sensor (cylinder bank 1) has a short circuit to ground.
P0032	HO2S HEATER B1 SEN1 (HO2S heater control circuit high bank 1 sensor 1)	NO SUBTYPE INFORMATION	The output for the heater of A/F sensor (cylinder bank 1) has a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors
(A/F sensor heater circuit is open or shorted.)
- A/F sensor heater

Diagnosis Procedure

INFOID:000000013466522

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

P0030, P0031, P0032 A/F SENSOR HEATER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace A/F sensor. Refer to [EM-39, "Exploded View"](#).
NO >> Repair or replace error-detected parts.

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P0033 DIVERT AIR SWITCHOVER VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0033 DIVERT AIR SWITCHOVER VALVE

DTC Description

INFOID:0000000013289973

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0033	TC/SC BYPASS VALVE A (Turbocharger/Supercharger bypass valve "A" control circuit)	NO SUBTYPE INFORMATION	The output for the divert air switchover valve has an electrical malfunction.

POSSIBLE CAUSE

- Harness or connectors
(Divert air switchover valve circuit)
- Divert air switchover valve

Diagnosis Procedure

INFOID:0000000013466523

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

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

2.DIVERT AIR SWITCHOVER VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect divert air switchover valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between divert air switchover valve harness connector and ground.

+		-	Voltage
Divert air switchover valve			
Connector	Terminal		
F157	2	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Perform trouble diagnosis for divert air switchover valve power supply circuit.

3.CHECK DIVERT AIR SWITCHOVER VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and divert air switchover valve harness connector.

+		-		Continuity
ECM		Divert air switchover valve		
Connector	Terminal	Connector	Terminal	
F150	23	F157	1	Existed

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

Is the inspection result normal?

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

P0033 DIVERT AIR SWITCHOVER VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace divert air switchover valve. Refer to [EM-42. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0034 DIVERT AIR SWITCHOVER VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0034 DIVERT AIR SWITCHOVER VALVE

DTC Description

INFOID:000000013289975

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0034	TC/SC BYPASS VALVE A (Turbocharger/Supercharger bypass valve "A" control circuit low)	NO SUBTYPE INFORMATION	The output for the divert air switchover valve has a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors (Divert air switchover valve circuit)
- Divert air switchover valve

Diagnosis Procedure

INFOID:000000013466524

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

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

2.DIVERT AIR SWITCHOVER VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect divert air switchover valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between divert air switchover valve harness connector and ground.

+		-	Voltage
Divert air switchover valve			
Connector	Terminal		
F157	2	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Perform trouble diagnosis for divert air switchover valve power supply circuit.

3.CHECK DIVERT AIR SWITCHOVER VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and divert air switchover valve harness connector.

+		-		Continuity
ECM		Divert air switchover valve		
Connector	Terminal	Connector	Terminal	
F150	23	F157	1	Existed

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

Is the inspection result normal?

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

P0034 DIVERT AIR SWITCHOVER VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace divert air switchover valve. Refer to [EM-42. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0035 DIVERT AIR SWITCHOVER VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0035 DIVERT AIR SWITCHOVER VALVE

DTC Description

INFOID:00000001328977

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0035	TC/SC BYPASS VALVE A (Turbocharger/Supercharger bypass valve "A" control circuit high)	NO SUBTYPE INFORMATION	The output for the divert air switchover valve has a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors
(Divert air switchover valve circuit)
- Divert air switchover valve

Diagnosis Procedure

INFOID:00000001328978

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the fuse after repairing the applicable circuit.

2.DIVERT AIR SWITCHOVER VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect divert air switchover valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between divert air switchover valve harness connector and ground.

+		-	Voltage
Divert air switchover valve			
Connector	Terminal		
F157	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for divert air switchover valve power supply circuit.

3.CHECK DIVERT AIR SWITCHOVER VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and divert air switchover valve harness connector.

+		-		Continuity
ECM		Divert air switchover valve		
Connector	Terminal	Connector	Terminal	
F150	23	F157	1	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

P0035 DIVERT AIR SWITCHOVER VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace divert air switchover valve. Refer to [EM-42. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0036, P0037, P0038 O2 SENSOR HEATER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0036, P0037, P0038 O2 SENSOR HEATER

DTC Description

INFOID:000000013289979

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0036	HO2S HEATER B1 SEN2 (HO2S heater control circuit bank 1 sensor 2)	CIRCUIT OPEN	The output for the heater of oxygen sensor (cylinder bank 1) has an electrical malfunction or open circuit. There is an open circuit.
P0037	HO2S HEATER B1 SEN2 (HO2S heater control circuit low bank 1 sensor 2)	CIRCUIT SHORT TO GROUND	The output for the heater of oxygen sensor (cylinder bank 1) has a short circuit to ground. There is a short circuit to ground.
P0038	HO2S HEATER B1 SEN2 (HO2S heater control circuit high bank 1 sensor 2)	CIRCUIT SHORT TO BATTERY	The output for the heater of oxygen sensor (cylinder bank 1) has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors
(O2 sensor heater circuit is open or shorted.)
- O2 sensor heater

Diagnosis Procedure

INFOID:000000013466525

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal	Ground	Battery voltage
F183	1		

Is the inspection result normal?

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

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal	#98 fuse terminal	Existed
F183	1		

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

P0036, P0037, P0038 O2 SENSOR HEATER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39. "Exploded View"](#).
NO >> Repair or replace error-detected parts.

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P0039 DIVERT AIR SWITCH OVER VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0039 DIVERT AIR SWITCH OVER VALVE

DTC Description

INFOID:000000013289981

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0039	TC/SC BYPASS VALVE A (Turbocharger/Supercharger bypass valve "A" control circuit range/performance)	ACTUATOR STUCK CLOSED	The output for the divert air switchover valve has an electrical malfunction. The actuator does not open.

POSSIBLE CAUSE

- Harness or connectors (Divert air switchover valve circuit)
- Divert air switchover valve

Diagnosis Procedure

INFOID:000000013466526

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

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

2.DIVERT AIR SWITCHOVER VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect divert air switchover valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between divert air switchover valve harness connector and ground.

+		-	Voltage
Divert air switchover valve			
Connector	Terminal		
F157	2	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Perform trouble diagnosis for divert air switchover valve power supply circuit.

3.CHECK DIVERT AIR SWITCHOVER VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and divert air switchover valve harness connector.

+		-		Continuity
ECM		Divert air switchover valve		
Connector	Terminal	Connector	Terminal	
F150	23	F157	1	Existed

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

Is the inspection result normal?

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

P0039 DIVERT AIR SWITCH OVER VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace divert air switchover valve. Refer to [EM-42. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0068 MANIFOLD PRESSURE - THROTTLE POSITION CORRELATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0068 MANIFOLD PRESSURE - THROTTLE POSITION CORRELATION

Diagnosis Description

INFOID:000000013289983

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0068	MAP/MAF - TP CORRELATION (MAP/MAF - throttle position correlation)	SIGNAL PLAUSIBILITY ERROR	The position of the throttle valve is implausible relative to the mass air flow or intake manifold pressure.

POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
(Pressure sensor downstream of throttle valve circuit is open or shorted.)
- Throttle valve actuator
- Pressure sensor downstream of throttle valve

Diagnosis Procedure

INFOID:000000013476203

1. CHECK THROTTLE VALVE POSITION

Ⓟ With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-325. "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace throttle valve actuator. Refer to [EM-28. "Exploded View"](#).

P0068 MANIFOLD PRESSURE - THROTTLE POSITION CORRELATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	4	F150	17	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	3	F150	38	Existed
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:0000000013476204

1. CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

P0068 MANIFOLD PRESSURE - THROTTLE POSITION CORRELATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

P0070 AMBIENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0070 AMBIENT SENSOR

DTC Description

INFOID:0000000013289986

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0070	AMBIENT AIR TEMP SENSOR A (Ambient air temperature sensor circuit "A")	SIGNAL COMPARE ERROR	The ambient sensor has an electrical malfunction. The signal comparison has a malfunction.
		SIGNAL PLAUSIBILITY ERROR	The ambient sensor has an electrical malfunction. There is an implausible signal.

POSSIBLE CAUSE

Ambient sensor

Diagnosis Procedure

INFOID:0000000013289987

1. CHECK DTC IN ECM

With CONSULT

1. Check DTC in "ENGINE".
2. Check that the DTC related to the following components is not detected.
 - Engine coolant temperature sensor.
 - Charge air temperature sensor upstream of throttle valve

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

2. CHECK DTC OF A/C AUTO AMP.

With CONSULT

Check "Self-diagnostic result" of "HVAC".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [HAC-48, "DTC Index"](#).

NO >> GO TO 3.

3. ERASE DTC

With CONSULT

1. Erase DTC in all ECU.
2. Turn ignition switch OFF and wait at least 6.5 hour.
3. Start the engine and let it idle at least 60 seconds.
4. Check DTC in "ENGINE".

Is the DTC detected again?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> INSPECTION END

P0071 AMBIENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0071 AMBIENT SENSOR

DTC Description

INFOID:000000013289988

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0071	AMBIENT AIR TEMP SENSOR A (Ambient air temperature sensor circuit "A" range/performance)	SIG RTE OF CHNG BLW THRESHLD	The ambient sensor has a malfunction. The signal change rate is below the permissible limit value.
		SIG RTE OF CHNG ABV THRESHLD	The ambient sensor has a malfunction. The signal change rate is above the permissible limit value.

POSSIBLE CAUSE

Ambient sensor

Diagnosis Procedure

INFOID:000000013466527

1. CHECK DTC IN ECM

Ⓟ With CONSULT

1. Check DTC in "ENGINE".
2. Check that the DTC related to the following components is not detected.
 - Engine coolant temperature sensor.
 - Charge air temperature sensor upstream of throttle valve

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

2. CHECK DTC OF A/C AUTO AMP.

Ⓟ With CONSULT

Check "Self-diagnostic result" of "HVAC".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [HAC-48, "DTC Index"](#).

NO >> GO TO 3.

3. ERASE DTC

Ⓟ With CONSULT

1. Erase DTC in all ECU.
2. Turn ignition switch OFF and wait at least 6.5 hour.
3. Start the engine and let it idle at least 60 seconds.
4. Check DTC in "ENGINE".

Is the DTC detected again?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> INSPECTION END

P0072 AMBIENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0072 AMBIENT SENSOR

DTC Description

INFOID:000000013289990

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0072	AMBIENT AIR TEMP SENSOR A (Ambient air temperature sensor circuit "A" low)	NO SUBTYPE INFORMATION	The ambient sensor has a short circuit to ground.

POSSIBLE CAUSE

Ambient sensor

Diagnosis Procedure

INFOID:000000013466528

1. CHECK DTC IN ECM

With CONSULT

1. Check DTC in "ENGINE".
2. Check that the DTC related to the following components is not detected.
 - Engine coolant temperature sensor.
 - Charge air temperature sensor upstream of throttle valve

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

2. CHECK DTC OF A/C AUTO AMP.

With CONSULT

Check "Self-diagnostic result" of "HVAC".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [HAC-48, "DTC Index"](#).

NO >> GO TO 3.

3. ERASE DTC

With CONSULT

1. Erase DTC in all ECU.
2. Turn ignition switch OFF and wait at least 6.5 hour.
3. Start the engine and let it idle at least 60 seconds.
4. Check DTC in "ENGINE".

Is the DTC detected again?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> INSPECTION END

P0073 AMBIENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0073 AMBIENT SENSOR

DTC Description

INFOID:00000001328992

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0073	AMBIENT AIR TEMP SENSOR A (Ambient air temperature sensor circuit "A" high)	NO SUBTYPE INFORMATION	The ambient sensor has a short circuit to positive.

POSSIBLE CAUSE

Ambient sensor

Diagnosis Procedure

INFOID:000000013466529

1. CHECK DTC IN ECM

With CONSULT

1. Check DTC in "ENGINE".
2. Check that the DTC related to the following components is not detected.
 - Engine coolant temperature sensor.
 - Charge air temperature sensor upstream of throttle valve

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

2. CHECK DTC OF A/C AUTO AMP.

With CONSULT

Check "Self-diagnostic result" of "HVAC".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [HAC-48, "DTC Index"](#).

NO >> GO TO 3.

3. ERASE DTC

With CONSULT

1. Erase DTC in all ECU.
2. Turn ignition switch OFF and wait at least 6.5 hour.
3. Start the engine and let it idle at least 60 seconds.
4. Check DTC in "ENGINE".

Is the DTC detected again?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> INSPECTION END

P007B CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P007B CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

DTC Description

INFOID:0000000013289994

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EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P007B	CHARGE AIR COOLER TEMP SEN B1 [Charge air cooler temperature sensor circuit range/performance (bank 1)]	SG BS LVL O-OF RNG/ZR AJST ERR	The charge air temperature sensor upstream of throttle valve (cylinder bank 1) has a malfunction. The signal offset is outside the permissible range.
		SIGNAL PLAUSIBILITY ERROR	The charge air temperature sensor upstream of throttle valve (cylinder bank 1) has a malfunction. There is an implausible signal.
		SIG BELOW ALLOWABLE RANGE	The charge air temperature sensor upstream of throttle valve (cylinder bank 1) has a malfunction. There is a signal below the permissible limit value.

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POSSIBLE CAUSE

- Harness or connectors
(charge air temperature sensor upstream of throttle valve circuit is open or shorted.)
- Charge air temperature sensor upstream of throttle valve

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Diagnosis Procedure

INFOID:0000000013289995

1. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE SIGNAL-1

④ With CONSULT

1. Turn ignition switch OFF and leave the vehicle in a cool place. (soak the vehicle).
NOTE:
To perform this test correctly, the engine must be cooled until ambient temperature.
2. Turn ignition switch ON.
3. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "C/AIR TEMP/S U/STRM THRTL", "COOLANT TEMPERATURE" and "AMBIENT TEMP (CAN)".
4. Check that the displayed value of "C/AIR TEMP/S U/STRM THRTL" is between -5°C (23°F) and +15°C (59°F) of "AMBIENT TEMP (CAN)".
NOTE:
When the charge air temperature sensor upstream of throttle valve harness connector is disconnected, -30°C (22°F) is displayed.

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Is the inspection result normal?

M

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK POWER SUPPLY OF CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor upstream of throttle valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between charge air temperature sensor upstream of throttle valve harness connector and ground.

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P007B CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Charge air temperature sensor upstream of throttle valve			Voltage
Connector	+	-	
	Terminal		
F160	2	1	4.75 – 5.25 V

Is the measured value OK?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE POWER SUPPLY AND GROUND CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between ECM harness connector and charge air temperature sensor upstream of throttle valve harness connector.

+		-		Continuity
ECM		Charge air temperature sensor upstream of throttle valve		
Connector	Terminal	Connector	Terminal	Existed
F150	11	F160	1	
	61		2	

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

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

4. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

Check charge air temperature sensor upstream of throttle valve. Refer to [EC4-332, "Component Inspection \(Charge Air Temperature Sensor Upstream of Throttle Valve\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Replace charge air temperature sensor upstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

Component Inspection (Charge Air Temperature Sensor Upstream of Throttle Valve)

INFOID:000000013289996

1. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

- Turn ignition switch OFF.
- Disconnect charge air temperature sensor upstream of throttle valve harness connector.
- Check the resistance between charge air temperature sensor upstream of throttle valve harness connector terminals.

P007B CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Charge air temperature sensor upstream of throttle valve		Temperature [°C (°F)]	Resistance (kΩ)
+	-		
Terminal			
1	2	0 (32)	31.00 – 34.00
		10 (50)	18.90 – 20.89
		20 (68)	11.87 – 13.11
		30 (86)	7.66 – 8.46
		40 (104)	5.06 – 5.59
		50 (122)	3.43 – 3.78
		60 (140)	2.37 – 2.61

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace charge air temperature sensor upstream of throttle valve. Refer to [EM-29, "Removal and Installation"](#).

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P007C CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P007C CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

DTC Description

INFOID:000000013289997

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P007C	CHARGE AIR COOLER TEMP SEN B1 (Charge air cooler temperature sensor circuit low bank 1)	CIRCUIT SHORT TO GROUND	The charge air temperature sensor upstream of throttle valve (cylinder bank 1) has a short circuit to ground. There is a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors
(charge air temperature sensor upstream of throttle valve circuit is open or shorted.)
- Charge air temperature sensor upstream of throttle valve

Diagnosis Procedure

INFOID:000000013466530

1. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE SIGNAL-1

Ⓟ With CONSULT

1. Turn ignition switch OFF and leave the vehicle in a cool place. (soak the vehicle).
NOTE:
To perform this test correctly, the engine must be cooled until ambient temperature.
2. Turn ignition switch ON.
3. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "C/AIR TEMP/S U/STRM THRTL", "COOLANT TEMPERATURE" and "AMBIENT TEMP (CAN)".
4. Check that the displayed value of "C/AIR TEMP/S U/STRM THRTL" is between -5°C (23°F) and $+15^{\circ}\text{C}$ (59°F) of "AMBIENT TEMP (CAN)".

NOTE:

When the charge air temperature sensor upstream of throttle valve harness connector is disconnected, -30°C (22°F) is displayed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK POWER SUPPLY OF CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor upstream of throttle valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between charge air temperature sensor upstream of throttle valve harness connector and ground.

Charge air temperature sensor upstream of throttle valve			Voltage
Connector	+	-	
	Terminal		
F160	2	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE POWER SUPPLY

P007C CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and charge air temperature sensor upstream of throttle valve harness connector.

+		-		Continuity
ECM		Charge air temperature sensor upstream of throttle valve		
Connector	Terminal	Connector	Terminal	
F150	11	F160	1	Existed
	61		2	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4.CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

Check charge air temperature sensor upstream of throttle valve. Refer to [EC4-339, "Component Inspection \(Charge Air Temperature Sensor Upstream of Throttle Valve\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Replace charge air temperature sensor upstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

Component Inspection (Charge Air Temperature Sensor Upstream of Throttle Valve)

INFOID:000000013466531

1.CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor upstream of throttle valve harness connector.
3. Check the resistance between charge air temperature sensor upstream of throttle valve harness connector terminals.

Charge air temperature sensor upstream of throttle valve		Temperature [°C (°F)]	Resistance (kΩ)
+	-		
Terminal			
1	2	0 (32)	31.00 – 34.00
		10 (50)	18.90 – 20.89
		20 (68)	11.87 – 13.11
		30 (86)	7.66 – 8.46
		40 (104)	5.06 – 5.59
		50 (122)	3.43 – 3.78
		60 (140)	2.37 – 2.61

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace charge air temperature sensor upstream of throttle valve. Refer to [EM-29, "Removal and Installation"](#).

P007D CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P007D CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

DTC Description

INFOID:000000013290000

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P007D	CHARGE AIR COOLER TEMP SEN B1 (Charge air cooler temperature sensor circuit high bank 1)	CIRCUIT SHORT TO BATTERY	The charge air temperature sensor upstream of throttle valve (cylinder bank 1) has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors
(charge air temperature sensor upstream of throttle valve circuit is open or shorted.)
- Charge air temperature sensor upstream of throttle valve

Diagnosis Procedure

INFOID:000000013466532

1. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE SIGNAL-1

Ⓟ With CONSULT

1. Turn ignition switch OFF and leave the vehicle in a cool place. (soak the vehicle).
NOTE:
To perform this test correctly, the engine must be cooled until ambient temperature.
2. Turn ignition switch ON.
3. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "C/AIR TEMP/S U/STRM THRTL", "COOLANT TEMPERATURE" and "AMBIENT TEMP (CAN)".
4. Check that the displayed value of "C/AIR TEMP/S U/STRM THRTL" is between -5°C (23°F) and $+15^{\circ}\text{C}$ (59°F) of "AMBIENT TEMP (CAN)".

NOTE:

When the charge air temperature sensor upstream of throttle valve harness connector is disconnected, -30°C (22°F) is displayed.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK POWER SUPPLY OF CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor upstream of throttle valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between charge air temperature sensor upstream of throttle valve harness connector and ground.

Charge air temperature sensor upstream of throttle valve			Voltage
Connector	+	-	
	Terminal		
F160	2	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE POWER SUPPLY

P007D CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and charge air temperature sensor upstream of throttle valve harness connector.

+		-		Continuity
ECM		Charge air temperature sensor upstream of throttle valve		
Connector	Terminal	Connector	Terminal	Existed
F150	11	F160	1	
	61		2	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4.CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

Check charge air temperature sensor upstream of throttle valve. Refer to [EC4-339, "Component Inspection \(Charge Air Temperature Sensor Upstream of Throttle Valve\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Replace charge air temperature sensor upstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

Component Inspection (Charge Air Temperature Sensor Upstream of Throttle Valve)

INFOID:000000013466533

1.CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor upstream of throttle valve harness connector.
3. Check the resistance between charge air temperature sensor upstream of throttle valve harness connector terminals.

Charge air temperature sensor upstream of throttle valve		Temperature [°C (°F)]	Resistance (kΩ)
+	-		
Terminal			
1	2	0 (32)	31.00 – 34.00
		10 (50)	18.90 – 20.89
		20 (68)	11.87 – 13.11
		30 (86)	7.66 – 8.46
		40 (104)	5.06 – 5.59
		50 (122)	3.43 – 3.78
		60 (140)	2.37 – 2.61

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace charge air temperature sensor upstream of throttle valve. Refer to [EM-29, "Removal and Installation"](#).

P007E CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P007E CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

DTC Description

INFOID:00000001329003

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P007E	CHARGE AIR COOLER TEMP SEN B1 (Charge air cooler temperature sensor circuit intermittent/erratic bank 1)	SIG RTE OF CHNG ABV THRESHLD	The charge air temperature sensor upstream of throttle valve (cylinder bank 1) has a sporadic malfunction. The signal change rate is above the permissible limit value.
		SIGNAL STUCK IN RANGE	The charge air temperature sensor upstream of throttle valve (cylinder bank 1) has a sporadic malfunction. There is no signal change.

POSSIBLE CAUSE

- Harness or connectors
(charge air temperature sensor upstream of throttle valve circuit is open or shorted.)
- Charge air temperature sensor upstream of throttle valve

Diagnosis Procedure

INFOID:000000013466534

1. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE SIGNAL-1

With CONSULT

1. Turn ignition switch OFF and leave the vehicle in a cool place. (soak the vehicle).
NOTE:
To perform this test correctly, the engine must be cooled until ambient temperature.
2. Turn ignition switch ON.
3. On CONSULT screen, select “ENGINE” >> “DATA MONITOR” >> “C/AIR TEMP/S U/STRM THRTL”, “COOLANT TEMPERATURE” and “AMBIENT TEMP (CAN)”.
4. Check that the displayed value of “C/AIR TEMP/S U/STRM THRTL” is between -5°C (23°F) and $+15^{\circ}\text{C}$ (59°F) of “AMBIENT TEMP (CAN)”.
NOTE:
When the charge air temperature sensor upstream of throttle valve harness connector is disconnected, -30°C (22°F) is displayed.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK POWER SUPPLY OF CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor upstream of throttle valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between charge air temperature sensor upstream of throttle valve harness connector and ground.

Charge air temperature sensor upstream of throttle valve			Voltage
Connector	+	-	
	Terminal		
F160	2	1	4.75 – 5.25 V

Is the measured value OK?

- YES >> GO TO 4.

P007E CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 3.

3. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and charge air temperature sensor upstream of throttle valve harness connector.

+		-		Continuity
ECM		Charge air temperature sensor upstream of throttle valve		
Connector	Terminal	Connector	Terminal	
F150	11	F160	1	Existed
	61		2	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

Check charge air temperature sensor upstream of throttle valve. Refer to [EC4-339, "Component Inspection \(Charge Air Temperature Sensor Upstream of Throttle Valve\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Replace charge air temperature sensor upstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

Component Inspection (Charge Air Temperature Sensor Upstream of Throttle Valve)

INFOID:000000013466535

1. CHECK CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor upstream of throttle valve harness connector.
3. Check the resistance between charge air temperature sensor upstream of throttle valve harness connector terminals.

Charge air temperature sensor upstream of throttle valve		Temperature [°C (°F)]	Resistance (kΩ)
+	-		
Terminal			
1	2	0 (32)	31.00 – 34.00
		10 (50)	18.90 – 20.89
		20 (68)	11.87 – 13.11
		30 (86)	7.66 – 8.46
		40 (104)	5.06 – 5.59
		50 (122)	3.43 – 3.78
		60 (140)	2.37 – 2.61

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace charge air temperature sensor upstream of throttle valve. Refer to [EM-29, "Removal and Installation"](#).

P0087 FUEL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

P0087 FUEL SYSTEM

ECM

ECM : DTC Description

INFOID:0000000013290006

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0087	FUEL RAIL/ SYSTEM PRES-SURE (Fuel rail/system pressure - too low bank 1)	NO SUBTYPE INFORMATION	The fuel pressure in the system is too low.
		PFM/INCORRECT OPERATN	The fuel pressure in the system is too low. The function or the instruction has a malfunction.

POSSIBLE CAUSE

- Harness or connectors
(Fuel pressure and temperature sensor circuit is open or shorted.)
(Quantity control valve circuit is open or shorted.)
- High pressure fuel system leak
- Fuel pressure and temperature sensor
- Quantity control valve

FAIL-SAFE

Prohibits the stop/start operation.

ECM : Diagnosis Procedure

INFOID:0000000013466536

1. START ENGINE

Start the engine and let it idle.

Is it difficult to keep at idle?

- YES >> GO TO 4.
NO >> GO TO 2.

2. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

Ⓟ With CONSULT

1. Warm the engine up to engine coolant temperature reaches 75°C (167°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".
3. Keep the engine speed between 500 – 1,000 rpm.
4. Perform the Active Test.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

5. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> GO TO 6.

3. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

P0087 FUEL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> INSPECTION END

4. PRECONDITIONING FOR CHECKING FUEL PRESSURE AND TEMPERATURE SENSOR OUTPUT SIGNAL

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

With CONSULT

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "RAIL PRES (ACTUAL VALUE)".
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Slightly loosen the threaded connection of the fuel line to the fuel rail to reduce the fuel pressure.

CAUTION:

Collect escaping fuel with several rags.

4. Wait at least 60 seconds.
5. Retighten the threaded connection of fuel line.
6. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 0 kPa (0 bar, 0 kg-cm², 0 psi) and 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi).

>> GO TO 5.

5. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

3. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

6. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 8.

NO >> GO TO 7.

7. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

P0087 FUEL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

8. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

9. CHECK HIGH PRESSURE FUEL SYSTEM LEAK

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 75°C (167°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HI PRESS CIRC FOR LEAKTIGHTNESS".
5. Connect charger to battery.
6. Set the vehicle to the following conditions.

Item	Condition
Engine coolant temperature	75 – 105°C (167 – 221°F)
Fuel temperature	40 – 80°C (104 – 176°F)
Engine speed	550 – 800 rpm
Electrical load	OFF

7. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 19 MPa (190 bar, 193.8 kg-cm², 2755 psi) and 21 MPa (210 bar, 214.2 kg-cm², 3045 psi).
8. Perform the Active Test.

CAUTION:

Never turn ignition switch OFF.

NOTE:

When the result is normal, the fuel rail pressure value must not drop below 10 MPa (100 bar, 102 kg-cm², 1450 psi) within 3 minutes.

Is the inspection result normal?

P0087 FUEL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 10.
NO >> Check high pressure fuel line for fuel leak.

10. CHECK QUANTITY CONTROL VALVE FUNCTION

With CONSULT

1. Check that low fuel pressure system is normal.
2. Set the vehicle to the following conditions.

Item	Condition
Engine coolant temperature	75 – 105°C (167 – 221°F)
Fuel temperature	40 – 80°C (104 – 176°F)
Engine speed	50 rpm or more
A/C	OFF

3. On CONSULT screen, select “ENGINE” >> “ACTIVE TEST” >> “Quantity control valve”.
4. Perform the Active Test.

NOTE:

When the result is normal, the fuel rail pressure value is increased to approximately 20 MPa (200 bar, 204 kg-cm², 2900 psi).

Is the inspection result normal?

- YES >> GO TO 13.
NO >> GO TO 11.

11. CHECK QUANTITY CONTROL VALVE

Check quantity control valve. Refer to [EC4-344, "ECM : Component Inspection \(Quantity Control Valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 12.
NO >> Replace high pressure fuel pump. Refer to [EM-47, "Removal and Installation"](#).

12. CHECK QUANTITY CONTROL VALVE CONTROL CIRCUIT

1. Disconnect ECM harness connector and quantity control valve harness connector.
2. Check the continuity between ECM harness connector and quantity control valve harness connector.

+		-		Continuity
ECM		Quantity control valve		
Connector	Terminal	Connector	Terminal	
F150	75	F170	1	Existed
	76		2	

3. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

13. ERASE DTC

1. Check the following.
 - If the actuation angle of the quantity control valve matches the specified value exactly, synchronization between the camshaft and crankshaft must be checked. (Substitute value in emergency mode)
 - If DTC related to camshaft is detected, perform trouble diagnosis for the detected DTC.
 - If DTC related to crankshaft is detected, perform trouble diagnosis for the detected DTC.
2. Erase the DTC.
3. Turn ignition switch OFF and wait at least 30 seconds.
4. Start the engine and let it idle for 60 seconds.
5. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

P0087 FUEL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> INSPECTION END

ECM : Component Inspection (Quantity Control Valve)

INFOID:000000013466537

1. CHECK QUANTITY CONTROL VALVE-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the resistance between ECM harness connector terminals.

ECM		Resistance (Ω)
+	-	
Terminal		
75	76	0.3 – 1.1

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK QUANTITY CONTROL VALVE-2

1. Disconnect quantity control valve harness connector.
2. Check the resistance between quantity control valve terminals.

Quantity control valve		Resistance (Ω)
+	-	
Terminal		
1	2	0.3 – 1.1

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace high pressure fuel pump. Refer to [EM-47. "Removal and Installation"](#).

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : DTC Description

INFOID:000000013290009

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0087	FUEL RAIL/SYSTEM PRES-SURE (Fuel rail/System pressure - too low)	NO SUBTYPE INFO	The fuel pressure in the system is too low.

POSSIBLE CAUSE

- Harness and connectors (Fuel pump circuit is open or shorted.)
- Fuel pump
- Out of fuel
- Fuel line open

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and let it idle at least 10 seconds.
2. Check self-diagnostic result of "FPCM".

P0087 FUEL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC4-345. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

INFOID:000000013290010

EC4

1.INSPECTION START

Check the following items.

- Out of gas
- Low fuel pressure line open

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.COMPONENT FUNCTION CHECK

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Listen to fuel pump operation sound for a few seconds after ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

3.CHECK FPCM POWER SUPPLY

Check FPCM power supply and ground circuit. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK FUEL PUMP CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pump harness connector.
3. Check the continuity between FPCM harness connector and fuel pump harness connector.

+		-		Continuity
FPCM		Fuel pump		
Connector	Terminal	Connector	Terminal	
B133	11	B101	6	Existed
	12		5	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK FUEL PUMP

Check fuel pump. Refer to [EC4-346. "FUEL PUMP CONTROL MODULE \(FPCM\) : Component Inspection \(Fuel Pump\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace fuel pump.

6.CHECK FUEL PUMP ACTIVATION SIGNAL CIRCUIT

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

P0087 FUEL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
FPCM		ECM		
Connector	Terminal	Connector	Terminal	
B134	2	E200	127	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

FUEL PUMP CONTROL MODULE (FPCM) : Component Inspection (Fuel Pump)

INFOID:000000013290011

1. CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check resistance between fuel level sensor unit and fuel pump terminals.

Terminals	Condition	Resistance
5 and 6	Temperature: 25°C (77°F)	0.2 – 5.0 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel pump. Refer to [FL-30, "Removal and Installation"](#).

P0088 FUEL PRESSURE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0088 FUEL PRESSURE

DTC Description

INFOID:000000013290012

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0088	FUEL RAIL/ SYSTEM PRESSURE (Fuel rail/system pressure - too high bank 1)	NO SUBTYPE INFORMATION	The fuel pressure in the system is too high.

C

D

POSSIBLE CAUSE

- Harness or connectors
(Fuel pressure and temperature sensor circuit is open or shorted.)
- Fuel pressure and temperature sensor

E

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290013

1. START ENGINE

Start the engine and let it idle.

Is it difficult to keep at idle?

- YES >> GO TO 4.
- NO >> GO TO 2.

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2. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Warm the engine up to engine coolant temperature reaches 75°C (167°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".
3. Keep the engine speed between 500 – 1,000 rpm.
4. Perform the Active Test.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

5. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

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Is the inspection result normal?

- YES >> GO TO 3.
- NO >> GO TO 4.

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3. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

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Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
- NO >> INSPECTION END

4. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.

P0088 FUEL PRESSURE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 6.

NO >> GO TO 5.

5. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

6. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P0089 QUANTITY CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0089 QUANTITY CONTROL VALVE

DTC Description

INFOID:000000013290014

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0089	FUEL PRESSURE REGULATOR 1 (Fuel pressure regulator 1 performance)	NO SUBTYPE INFORMATION	Pressure regulating valve 1 has a malfunction.
		PFM/INCORRECT OPERATN	Pressure regulating valve 1 has a malfunction. The function or the instruction has a malfunction.
		UNEXPECTED OPERATION	Pressure regulating valve 1 has a malfunction. There is an unexpected instruction.

POSSIBLE CAUSE

- Harness or connectors (Fuel pressure and temperature sensor circuit is open or shorted.) (Quantity control valve circuit is open or shorted.)
- High pressure fuel system leak
- Fuel pressure and temperature sensor
- Quantity control valve

Diagnosis Procedure

INFOID:000000013290015

1. START ENGINE

Start the engine and let it idle.

Is it difficult to keep at idle?

- YES >> GO TO 4.
NO >> GO TO 2.

2. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Warm the engine up to engine coolant temperature reaches 75°C (167°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".
3. Keep the engine speed between 500 – 1,000 rpm.
4. Perform the Active Test.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

5. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> GO TO 6.

3. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> INSPECTION END

P0089 QUANTITY CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4. PRECONDITIONING FOR CHECKING FUEL PRESSURE AND TEMPERATURE SENSOR OUTPUT SIGNAL

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

With CONSULT

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "RAIL PRES (ACTUAL VALUE)".
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Slightly loosen the threaded connection of the fuel line to the fuel rail to reduce the fuel pressure.

CAUTION:

Collect escaping fuel with several rags.

4. Wait at least 60 seconds.
5. Retighten the threaded connection of fuel line.
6. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 0 kPa (0 bar, 0 kg-cm², 0 psi) and 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi).

>> GO TO 5.

5. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

3. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

- YES >> GO TO 9.
NO >> GO TO 6.

6. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

- YES >> GO TO 8.
NO >> GO TO 7.

7. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

P0089 QUANTITY CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

8. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

9. CHECK HIGH PRESSURE FUEL SYSTEM LEAK

With CONSULT

- Start the engine and warm it up to engine coolant temperature reaches 75°C (167°F).
- Turn ignition switch OFF.
- Turn ignition switch ON.
- On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HI PRESS CIRC FOR LEAKTIGHTNESS".
- Connect charger to battery.
- Set the vehicle to the following conditions.

Item	Condition
Engine coolant temperature	75 – 105°C (167 – 221°F)
Fuel temperature	40 – 80°C (104 – 176°F)
Engine speed	550 – 800 rpm
Electrical load	OFF

- Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 19 MPa (190 bar, 193.8 kg-cm², 2755 psi) and 21 MPa (210 bar, 214.2 kg-cm², 3045 psi).
- Perform the Active Test.

CAUTION:

Never turn ignition switch OFF.

NOTE:

When the result is normal, the fuel rail pressure value must not drop below 10 MPa (100 bar, 102 kg-cm², 1450 psi) within 3 minutes.

Is the inspection result normal?

P0089 QUANTITY CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 10.
NO >> Check high pressure fuel line for fuel leak.

10. CHECK QUANTITY CONTROL VALVE FUNCTION

With CONSULT

1. Check that low fuel pressure system is normal.
2. Set the vehicle to the following conditions.

Item	Condition
Engine coolant temperature	75 – 105°C (167 – 221°F)
Fuel temperature	40 – 80°C (104 – 176°F)
Engine speed	50 rpm or more
A/C	OFF

3. On CONSULT screen, select “ENGINE” >> “ACTIVE TEST” >> “Quantity control valve”.
4. Perform the Active Test.

NOTE:

When the result is normal, the fuel rail pressure value is increased to approximately 20 MPa (200 bar, 204 kg-cm², 2900 psi).

Is the inspection result normal?

- YES >> GO TO 13.
NO >> GO TO 11.

11. CHECK QUANTITY CONTROL VALVE

Check quantity control valve. Refer to [EC4-353, "Component Inspection \(Quantity Control Valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 12.
NO >> Replace high pressure fuel pump. Refer to [EM-47, "Removal and Installation"](#).

12. CHECK QUANTITY CONTROL VALVE CONTROL CIRCUIT

1. Disconnect ECM harness connector and quantity control valve harness connector.
2. Check the continuity between ECM harness connector and quantity control valve harness connector.

+		-		Continuity
ECM		Quantity control valve		
Connector	Terminal	Connector	Terminal	
F150	75	F170	1	Existed
	76		2	

3. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

13. ERASE DTC

1. Check the following.
 - If the actuation angle of the quantity control valve matches the specified value exactly, synchronization between the camshaft and crankshaft must be checked. (Substitute value in emergency mode)
 - If DTC related to camshaft is detected, perform trouble diagnosis for the detected DTC.
 - If DTC related to crankshaft is detected, perform trouble diagnosis for the detected DTC.
2. Erase the DTC.
3. Turn ignition switch OFF and wait at least 30 seconds.
4. Start the engine and let it idle for 60 seconds.
5. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

P0089 QUANTITY CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> INSPECTION END

Component Inspection (Quantity Control Valve)

INFOID:0000000013290016

A

1. CHECK QUANTITY CONTROL VALVE-1

EC4

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the resistance between ECM harness connector terminals.

ECM		Resistance (Ω)
+	-	
Terminal		
75	76	0.3 – 1.1

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Is the inspection result normal?

E

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK QUANTITY CONTROL VALVE-2

F

1. Disconnect quantity control valve harness connector.
2. Check the resistance between quantity control valve terminals.

Quantity control valve		Resistance (Ω)
+	-	
Terminal		
1	2	0.3 – 1.1

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Is the inspection result normal?

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YES >> INSPECTION END

NO >> Replace high pressure fuel pump. Refer to [EM-47, "Removal and Installation"](#).

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P008A LOW FUEL PRESSURE CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P008A LOW FUEL PRESSURE CONTROL SYSTEM

DTC Description

INFOID:000000013290017

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P008A	LOW PRESSURE FUEL SYSTEM (Low pressure fuel system pressure - too low)	NO SUBTYPE INFORMATION	The pressure in the fuel low pressure circuit is too low.

POSSIBLE CAUSE

- Low pressure fuel control system

Diagnosis Procedure

INFOID:000000013290018

1. CHECK DTC IN FPCM

With CONSULT

Check DTC in "FPCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-159, "DTC Index"](#).
NO >> INSPECTION END

P008B LOW FUEL PRESSURE CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P008B LOW FUEL PRESSURE CONTROL SYSTEM

DTC Description

INFOID:0000000013290019

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P008B	LOW PRESSURE FUEL SYSTEM (Low pressure fuel system pressure - too high)	NO SUBTYPE INFORMATION	The pressure in the fuel low pressure circuit is too high.

POSSIBLE CAUSE

- Low pressure fuel control system

Diagnosis Procedure

INFOID:0000000013466538

1. CHECK DTC IN FPCM

With CONSULT

Check DTC in "FPCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-159, "DTC Index"](#).
NO >> INSPECTION END

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EC4
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P0096 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0096 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

DTC Description

INFOID:000000013290021

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0096	INTAKE AIR TEMP SENSOR 2 B1 (Charge air cooler temperature sensor 2 circuit range/performance bank 1)	SG BS LVL O-OF RNG/ZR AJST ERR	The charge air temperature sensor downstream of throttle valve (cylinder bank 1) has a malfunction. The signal offset is outside the permissible range.
		SIGNAL PLAUSIBILITY ERROR	The charge air temperature sensor downstream of throttle valve (cylinder bank 1) has a malfunction. There is an implausible signal.
		SIG BELOW ALLOWABLE RANGE	The charge air temperature sensor downstream of throttle valve (cylinder bank 1) has a malfunction. There is a signal below the permissible limit value.

POSSIBLE CAUSE

- Harness or connectors (charge air temperature sensor downstream of throttle valve circuit is open or shorted.)
- Charge air temperature sensor downstream of throttle valve

Diagnosis Procedure

INFOID:000000013290022

1. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE SIGNAL

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 65°C (149°F).
2. Turn ignition switch OFF and wait at least 60 seconds.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "C/AIR TEMP/S U/STRM THRTL" and "C/AIR TEMP/S D/STRM THRTL".
5. Check that "C/AIR TEMP/S U/STRM THRTL" and "C/AIR TEMP/S D/STRM THRTL" indicate about the same value.

NOTE:

When the charge air temperature sensor downstream of throttle valve harness connector is disconnected, -30°C (-22°F) is displayed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK POWER SUPPLY OF CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor downstream of throttle valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between charge air temperature sensor downstream of throttle valve harness connector and ground.

Charge air temperature sensor downstream of throttle valve			Voltage
Connector	+	-	
	Terminal		
F158	2	1	4.75 – 5.25 V

P0096 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the measured value OK?

- YES >> GO TO 4.
- NO >> GO TO 3.

3. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and charge air temperature sensor downstream of throttle valve harness connector.

+		-		Continuity
ECM		Charge air temperature sensor downstream of throttle valve		
Connector	Terminal	Connector	Terminal	Existed
F150	11	F158	1	
	40		2	

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

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
- NO >> Repair or replace error-detected parts.

4. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

Check charge air temperature sensor downstream of throttle valve. Refer to [EC4-357, "Component Inspection \(Charge Air Temperature Sensor Downstream of Throttle Valve\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
- NO >> Replace charge air temperature sensor downstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

Component Inspection (Charge Air Temperature Sensor Downstream of Throttle Valve)

INFOID:0000000013290023

1. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor downstream of throttle valve harness connector.
3. Check the resistance between charge air temperature sensor downstream of throttle valve terminals.

Charge air temperature sensor downstream of throttle valve		Temperature [°C (°F)]	Resistance (kΩ)
+	-		
Terminal			
1	2	0 (32)	31.00 – 34.00
		10 (50)	18.90 – 20.89
		20 (68)	11.87 – 13.11
		30 (86)	7.66 – 8.46
		40 (104)	5.06 – 5.59
		50 (122)	3.43 – 3.78
		60 (140)	2.37 – 2.61

Is the inspection result normal?

- YES >> INSPECTION END

P0096 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

NO >> Replace charge air temperature sensor downstream of throttle valve. Refer to [EM-28. "Exploded View"](#).

P0097 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0097 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

DTC Description

INFOID:0000000013290024

A

EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0097	INTAKE AIR TEMP SENSOR 2 B1 (Charge air cooler temperature sensor 2 circuit low bank 1)	CIRCUIT SHORT TO GROUND	The charge air temperature sensor downstream of throttle valve (cylinder bank 1) has a short circuit to ground. There is a short circuit to ground.

C

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POSSIBLE CAUSE

- Harness or connectors
(charge air temperature sensor downstream of throttle valve circuit is open or shorted.)
- Charge air temperature sensor downstream of throttle valve

F

Diagnosis Procedure

INFOID:0000000013466539

G

1. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE SIGNAL

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 65°C (149°F).
2. Turn ignition switch OFF and wait at least 60 seconds.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "C/AIR TEMP/S U/STRM THRTL" and "C/AIR TEMP/S D/STRM THRTL".
5. Check that "C/AIR TEMP/S U/STRM THRTL" and "C/AIR TEMP/S D/STRM THRTL" indicate about the same value.

H

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J

NOTE:

When the charge air temperature sensor downstream of throttle valve harness connector is disconnected, -30°C (-22°F) is displayed.

K

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

L

2. CHECK POWER SUPPLY OF CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor downstream of throttle valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between charge air temperature sensor downstream of throttle valve harness connector and ground.

M

N

Charge air temperature sensor downstream of throttle valve			Voltage
Connector	+	-	
	Terminal		
F158	2	1	4.75 – 5.25 V

O

P

Is the measured value OK?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE POWER SUP-

P0097 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

PLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and charge air temperature sensor downstream of throttle valve harness connector.

+		-		Continuity
ECM		Charge air temperature sensor downstream of throttle valve		
Connector	Terminal	Connector	Terminal	
F150	11	F158	1	Existed
	40		2	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4.CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

Check charge air temperature sensor downstream of throttle valve. Refer to [EC4-364. "Component Inspection \(Charge Air Temperature Sensor Downstream of Throttle Valve\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Replace charge air temperature sensor downstream of throttle valve. Refer to [EM-28. "Exploded View"](#).

Component Inspection (Charge Air Temperature Sensor Downstream of Throttle Valve)

INFOID:000000013466540

1.CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor downstream of throttle valve harness connector.
3. Check the resistance between charge air temperature sensor downstream of throttle valve terminals.

Charge air temperature sensor downstream of throttle valve		Temperature [°C (°F)]	Resistance (kΩ)
+	-		
Terminal			
1	2	0 (32)	31.00 – 34.00
		10 (50)	18.90 – 20.89
		20 (68)	11.87 – 13.11
		30 (86)	7.66 – 8.46
		40 (104)	5.06 – 5.59
		50 (122)	3.43 – 3.78
		60 (140)	2.37 – 2.61

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace charge air temperature sensor downstream of throttle valve. Refer to [EM-28. "Exploded View"](#).

P0098 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0098 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

DTC Description

INFOID:0000000013290027

A

EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0098	INTAKE AIR TEMP SENSOR 2 B1 (Charge air cooler temperature sensor 2 circuit high bank 1)	SG BS LVL O-OF RNG/ZR AJST ERR	The charge air temperature sensor downstream of throttle valve (cylinder bank 1) has a short circuit to positive. There is a short circuit to positive.

C

D

E

POSSIBLE CAUSE

- Harness or connectors
(charge air temperature sensor downstream of throttle valve circuit is open or shorted.)
- Charge air temperature sensor downstream of throttle valve

F

Diagnosis Procedure

INFOID:0000000013466541

G

1. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE SIGNAL

④ With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 65°C (149°F).
2. Turn ignition switch OFF and wait at least 60 seconds.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "C/AIR TEMP/S U/STRM THRTL" and "C/AIR TEMP/S D/STRM THRTL".
5. Check that "C/AIR TEMP/S U/STRM THRTL" and "C/AIR TEMP/S D/STRM THRTL" indicate about the same value.

H

I

J

NOTE:

When the charge air temperature sensor downstream of throttle valve harness connector is disconnected, -30°C (-22°F) is displayed.

K

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

L

2. CHECK POWER SUPPLY OF CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor downstream of throttle valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between charge air temperature sensor downstream of throttle valve harness connector and ground.

M

N

Charge air temperature sensor downstream of throttle valve			Voltage
Connector	+	-	
	Terminal		
F158	2	1	4.75 – 5.25 V

O

P

Is the measured value OK?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE POWER SUP-

P0098 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

PLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and charge air temperature sensor downstream of throttle valve harness connector.

+		-		Continuity
ECM		Charge air temperature sensor downstream of throttle valve		
Connector	Terminal	Connector	Terminal	
F150	11	F158	1	Existed
	40		2	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4.CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

Check charge air temperature sensor downstream of throttle valve. Refer to [EC4-364, "Component Inspection \(Charge Air Temperature Sensor Downstream of Throttle Valve\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Replace charge air temperature sensor downstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

Component Inspection (Charge Air Temperature Sensor Downstream of Throttle Valve)

INFOID:000000013466542

1.CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor downstream of throttle valve harness connector.
3. Check the resistance between charge air temperature sensor downstream of throttle valve terminals.

Charge air temperature sensor downstream of throttle valve		Temperature [°C (°F)]	Resistance (kΩ)
+	-		
Terminal			
1	2	0 (32)	31.00 – 34.00
		10 (50)	18.90 – 20.89
		20 (68)	11.87 – 13.11
		30 (86)	7.66 – 8.46
		40 (104)	5.06 – 5.59
		50 (122)	3.43 – 3.78
		60 (140)	2.37 – 2.61

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace charge air temperature sensor downstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

P0099 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0099 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

DTC Description

INFOID:0000000013290030

A

EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0099	INTAKE AIR TEMP SENSOR 2 B1 (Charge air cooler temperature sensor 2 circuit intermittent/erratic bank 1)	SIG RTE OF CHNG ABV THRESHLD	The charge air temperature sensor downstream of throttle valve (cylinder bank 1) has a sporadic malfunction. The signal change rate is above the permissible limit value.
		SIGNAL STUCK IN RANGE	The charge air temperature sensor downstream of throttle valve (cylinder bank 1) has a sporadic malfunction. There is no signal change.

C

D

E

F

POSSIBLE CAUSE

- Harness or connectors
(charge air temperature sensor downstream of throttle valve circuit is open or shorted.)
- Charge air temperature sensor downstream of throttle valve

G

Diagnosis Procedure

INFOID:0000000013466543

H

1. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE SIGNAL

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 65°C (149°F).
2. Turn ignition switch OFF and wait at least 60 seconds.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "C/AIR TEMP/S U/STRM THRTL" and "C/AIR TEMP/S D/STRM THRTL".
5. Check that "C/AIR TEMP/S U/STRM THRTL" and "C/AIR TEMP/S D/STRM THRTL" indicate about the same value.

I

J

K

NOTE:

When the charge air temperature sensor downstream of throttle valve harness connector is disconnected, -30°C (-22°F) is displayed.

Is the inspection result normal?

L

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK POWER SUPPLY OF CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

M

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor downstream of throttle valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between charge air temperature sensor downstream of throttle valve harness connector and ground.

N

O

Charge air temperature sensor downstream of throttle valve			Voltage
Connector	+	-	
	Terminal		
F158	2	1	4.75 – 5.25 V

P

Is the measured value OK?

YES >> GO TO 4.

P0099 CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 3.

3. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and charge air temperature sensor downstream of throttle valve harness connector.

+		-		Continuity
ECM		Charge air temperature sensor downstream of throttle valve		
Connector	Terminal	Connector	Terminal	
F150	11	F158	1	Existed
	40		2	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

Check charge air temperature sensor downstream of throttle valve. Refer to [EC4-364, "Component Inspection \(Charge Air Temperature Sensor Downstream of Throttle Valve\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Replace charge air temperature sensor downstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

Component Inspection (Charge Air Temperature Sensor Downstream of Throttle Valve)

INFOID:000000013466544

1. CHECK CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect charge air temperature sensor downstream of throttle valve harness connector.
3. Check the resistance between charge air temperature sensor downstream of throttle valve terminals.

Charge air temperature sensor downstream of throttle valve		Temperature [°C (°F)]	Resistance (kΩ)
+	-		
Terminal			
1	2	0 (32)	31.00 – 34.00
		10 (50)	18.90 – 20.89
		20 (68)	11.87 – 13.11
		30 (86)	7.66 – 8.46
		40 (104)	5.06 – 5.59
		50 (122)	3.43 – 3.78
		60 (140)	2.37 – 2.61

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace charge air temperature sensor downstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

P0106 PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0106 PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE

DTC Description

INFOID:000000013290033

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0106	MAP/BARO PRESSURE SENSOR (Manifold absolute pressure/ barometric pressure sensor circuit range/performance)	CIRC VOLT BELOW THRESH-OLD	The pressure sensor downstream of throttle valve has a malfunction. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESH-OLD	The pressure sensor downstream of throttle valve has a malfunction. The limit value for electrical voltage has been exceeded.
		SG BS LVL O-OF RNG/ZR AJST ERR	The pressure sensor downstream of throttle valve has a malfunction. The signal offset is outside the permissible range.
		SIGNAL STUCK IN RANGE	The pressure sensor downstream of throttle valve has a malfunction. There is no signal change.
		NO OPERATION	The pressure sensor downstream of throttle valve has a malfunction. There are no instructions.

C

D

E

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G

POSSIBLE CAUSE

- Pressure sensor downstream of throttle valve

H

FAIL-SAFE

Prohibits the stop/start operation.

I

Diagnosis Procedure

INFOID:000000013290034

1. REPLACE PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE

J

Replace pressure sensor downstream of throttle valve. Refer to [EM-29, "Removal and Installation"](#).

K

>> INSPECTION END

L

M

N

O

P

P0107 PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0107 PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE

Diagnosis Description

INFOID:000000013290035

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0107	MAP/BARO PRESSURE SENSOR (Manifold absolute pressure/ barometric pressure sensor circuit low)	CIRCUIT SHORT TO GROUND	The pressure sensor downstream of throttle valve has a short circuit to ground. There is a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors
(Pressure sensor downstream of throttle valve circuit is open or shorted.)
- Pressure sensor downstream of throttle valve

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290036

1. CHECK PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE OUTPUT VOLTAGE

Ⓟ With CONSULT

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "PRES/S D/STRM THRTL VLV V".
2. Check the value as the following conditions.

Item	Condition	Value
PRES/S D/STRM THRTL VLV V	Ignition switch ON (engine stopped)	1 – 2 V
	Engine running at idle	0.5 – 0.8 V

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> GO TO 2.

2. CHECK PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and pressure sensor downstream of throttle valve harness connector.

+		-		Continuity
Pressure sensor downstream of throttle valve		ECM		
Connector	Terminal	Connector	Terminal	
F187	1	F150	91	Existed
	2		12	
	3		18	

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

Is the inspection result normal?

- YES >> Replace pressure sensor downstream of throttle valve. Refer to [EM-29, "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

P0108 PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0108 PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE

Diagnosis Description

INFOID:000000013290037

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0108	MAP/BARO PRESSURE SENSOR (Manifold absolute pressure/ barometric pressure sensor circuit high)	CIRCUIT SHORT TO BATTERY	The pressure sensor downstream of throttle valve has a short circuit to ground. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors
(Pressure sensor downstream of throttle valve circuit is open or shorted.)
- Pressure sensor downstream of throttle valve

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013466545

1. CHECK PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE OUTPUT VOLTAGE

With CONSULT

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "PRES/S D/STRM THRTL VLV V".
2. Check the value as the following conditions.

Item	Condition	Value
PRES/S D/STRM THRTL VLV V	Ignition switch ON (engine stopped)	1 – 2 V
	Engine running at idle	0.5 – 0.8 V

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> GO TO 2.

2. CHECK PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and pressure sensor downstream of throttle valve harness connector.

+		-		Continuity
Connector	Terminal	Connector	Terminal	
F187	1	F150	91	Existed
	2		12	
	3		18	

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

Is the inspection result normal?

- YES >> Replace pressure sensor downstream of throttle valve. Refer to [EM-29, "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

P0115 ENGINE COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0115 ENGINE COOLANT TEMPERATURE SENSOR

DTC Description

INFOID:000000013290039

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0115	ENGINE COOLANT TEMP SEN 1 (Engine coolant temperature sensor 1 circuit)	NO SUBTYPE INFORMATION	Coolant temperature sensor 1 has an electrical malfunction.

POSSIBLE CAUSE

- Harness and connectors
(Coolant temperature sensor circuit is open or shorted.)
- Coolant temperature sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290040

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between engine coolant temperature sensor harness connector and ground.

Engine coolant temperature sensor			Voltage
Connector	+	-	
	Terminal		
F165	2	1	4.75 – 5.25 V

Is the inspection result normal?

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

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between engine coolant temperature sensor harness connector and ECM harness connector.

+		-		Continuity
ECM		Engine coolant temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	11	F165	1	Existed
	86		2	

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

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

P0115 ENGINE COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC4-369. "Component Inspection \(Engine Coolant Temperature Sensor\)".](#)

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace engine coolant temperature sensor. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location".](#)

4. CHECK INTERMITTENT INCIDENT

Refer to [GI-45. "Intermittent Incident".](#)

>> INSPECTION END

Component Inspection (Engine Coolant Temperature Sensor)

INFOID:0000000013290041

1. TEST INTERNAL RESISTANCE OF COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check the resistance between coolant temperature sensor terminals.

Terminal		Temperature [°C (°F)]	Resistance (Ω)
+	-		
1	2	20°C (68°F)	3050 – 3150
		30°C (86°F)	1950 – 2050
		40°C (104°F)	1275 – 1375
		50°C (122°F)	850 – 950
		60°C (140°F)	600 – 650
		70°C (158°F)	425 – 465
		80°C (176°F)	305 – 335
		90°C (194°F)	225 – 245
		100°C (212°F)	165 – 185
110°C (230°F)	120 – 140		

Is the measured value OK?

YES >> INSPECTION END

NO >> Replace coolant temperature sensor. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location".](#)

P0116 ENGINE COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0116 ENGINE COOLANT TEMPERATURE SENSOR

DTC Description

INFOID:000000013290042

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0116	ENGINE COOLANT TEMP SEN 1 (Engine coolant temperature sensor 1 circuit range/performance)	SG BS LVL O-OF RNG/ZR AJST ERR	Engine coolant temperature sensor has a malfunction. The signal offset is outside the permissible range.
		SIGNAL COMPARE ERROR	Engine coolant temperature sensor has a malfunction. The signal comparison has a malfunction.
		SIGNAL PLAUSIBILITY ERROR	Engine coolant temperature sensor has a malfunction. There is an implausible signal.
		SIG BELOW ALLOWABLE RANGE	Engine coolant temperature sensor has a malfunction. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	Engine coolant temperature sensor has a malfunction. There is a signal above the permissible limit value.
		SIGNAL INVALID	Engine coolant temperature sensor has a malfunction. There is an incorrect signal.

POSSIBLE CAUSE

- Harness and connectors
(Coolant temperature sensor circuit is open or shorted.)
(Coolant thermostat heater element circuit is open or shorted.)
- Coolant temperature sensor
- Coolant thermostat heater element

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290043

1. INSPECTION START

Does the coolant temperature rise too quickly and become too high?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK COOLANT THERMOSTAT HEATING ELEMENT

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

Item	Condition
Vehicle speed	At idle
Engine coolant temperature	Less than 100°C (122°F)
A/C	OFF

4. Perform the Active Test.

NOTE:

P0116 ENGINE COOLANT TEMPERATURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- When a coolant temperature reaches between 92°C (198°F) and 100°C (212°F), the test is started automatically.
- The test takes up to approximately 10 minutes.

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 4.

3.CHECK COOLANT THERMOSTAT HEATING ELEMENT

Ⓜ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

Item	Condition
Vehicle speed	At idle
Engine coolant temperature	Less than 50°C (122°F)
A/C	OFF

4. Perform the Active Test.

NOTE:

- When a coolant temperature reaches between 65°C (149°F) and 70°C (158°F), the test is started automatically.
- The test takes up to approximately 10 minutes.

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 4.

4.CHECK COOLANT THERMOSTAT HEATER ELEMENT

Check engine coolant thermostat heating element. Refer to [EC4-373, "Component Inspection \(Coolant Thermostat Heater Element\)"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace error-detected parts.

5.CHECK ENGINE COOLANT THERMOSTAT HEATER ELEMENT POWER SUPPLY

1. Check that the #98 fuse is not fusing.
2. Disconnect coolant thermostat heater element harness connector.
3. Turn ignition switch ON.
4. Check the voltage between coolant thermostat heater element harness connector and ground.

+		-	Voltage
Connector	Terminal		
F169	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> Check engine coolant thermostat heating element power supply circuit.

6.CHECK COOLANT THERMOSTAT HEATER ELEMENT CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and coolant thermostat heater element harness connector.

P0116 ENGINE COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Coolant thermostat heater element		
Connector	Terminal	Connector	Terminal	
F150	4	F169	2	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

7. CHECK ENGINE COOLANT TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between engine coolant temperature sensor harness connector terminals.

Engine coolant temperature sensor			Voltage
Connector	+	-	
	Terminal		
F165	2	1	4.75 – 5.25 V

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

8. CHECK ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between engine coolant temperature sensor harness connector and ECM harness connector.

+		-		Continuity
ECM		Engine coolant temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	11	F165	1	Existed
	86		2	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

9. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC4-373. "Component Inspection \(Engine Coolant Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace engine coolant temperature sensor. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

10. CHECK INTERMITTENT INCIDENT

Refer to [GI-45. "Intermittent Incident"](#).

>> INSPECTION END

P0116 ENGINE COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Component Inspection (Coolant Thermostat Heater Element)

INFOID:000000013290044

1. CHECK COOLANT THERMOSTAT HEATER ELEMENT

1. Turn ignition switch OFF.
2. Disconnect coolant thermostat heater element harness connector.
3. Check the resistance between coolant thermostat heater element terminals.

Coolant thermostat heater element		Condition	Resistance (Ω)
+	-		
Terminal			
1	2	25°C (77°F)	8.5 – 10.5

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace coolant thermostat (built-in engine coolant thermostat heating element). Refer to [CO-18, "Removal and Installation"](#).

Component Inspection (Engine Coolant Temperature Sensor)

INFOID:000000013290045

1. TEST INTERNAL RESISTANCE OF COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check the resistance between coolant temperature sensor terminals.

		Temperature [°C (°F)]	Resistance (Ω)
+	-		
Terminal			
1	2	20°C (68°F)	3050 – 3150
		30°C (86°F)	1950 – 2050
		40°C (104°F)	1275 – 1375
		50°C (122°F)	850 – 950
		60°C (140°F)	600 – 650
		70°C (158°F)	425 – 465
		80°C (176°F)	305 – 335
		90°C (194°F)	225 – 245
		100°C (212°F)	165 – 185
		110°C (230°F)	120 – 140

Is the measured value OK?

YES >> INSPECTION END

NO >> Replace coolant temperature sensor. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P0117, P0118 ENGINE COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0117, P0118 ENGINE COOLANT TEMPERATURE SENSOR

DTC Description

INFOID:000000013290046

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0117	ENGINE COOLANT TEMP SEN 1 (Engine coolant temperature sensor 1 circuit low)	CIRCUIT SHORT TO GROUND	Engine coolant temperature sensor has a short circuit to ground. There is a short circuit to ground.
P0118	ENGINE COOLANT TEMP SEN 1 (Engine coolant temperature sensor 1 circuit high)	CIRCUIT SHORT TO BATTERY	Engine coolant temperature sensor has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors (Coolant temperature sensor circuit is open or shorted.)
- Coolant temperature sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013466546

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between engine coolant temperature sensor harness connector and ground.

Engine coolant temperature sensor			Voltage
Connector	+	-	
	Terminal		
F165	2	1	4.75 – 5.25 V

Is the inspection result normal?

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

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between engine coolant temperature sensor harness connector and ECM harness connector.

+		-		Continuity
ECM		Engine coolant temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	11	F165	1	Existed
	86		2	

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

P0117, P0118 ENGINE COOLANT TEMPERATURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

3.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC4-377, "Component Inspection \(Engine Coolant Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace engine coolant temperature sensor. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Engine Coolant Temperature Sensor)

INFOID:0000000013466547

1.TEST INTERNAL RESISTANCE OF COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check the resistance between coolant temperature sensor terminals.

Terminal		Temperature [°C (°F)]	Resistance (Ω)
+	-		
1	2	20°C (68°F)	3050 – 3150
		30°C (86°F)	1950 – 2050
		40°C (104°F)	1275 – 1375
		50°C (122°F)	850 – 950
		60°C (140°F)	600 – 650
		70°C (158°F)	425 – 465
		80°C (176°F)	305 – 335
		90°C (194°F)	225 – 245
		100°C (212°F)	165 – 185
110°C (230°F)	120 – 140		

Is the measured value OK?

YES >> INSPECTION END

NO >> Replace coolant temperature sensor. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P0119 ENGINE COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0119 ENGINE COOLANT TEMPERATURE SENSOR

DTC Description

INFOID:000000013290049

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0119	ENGINE COOLANT TEMP SEN 1 (Engine coolant temperature sensor 1 circuit intermittent)	NO SUBTYPE INFORMATION	Coolant temperature sensor 1 has an electrical malfunction.
		SIG RTE OF CHNG ABV THRESHLD	Coolant temperature sensor 1 has an electrical malfunction. The signal change rate is above the permissible limit value.

POSSIBLE CAUSE

- Harness and connectors
(Coolant temperature sensor circuit is open or shorted.)
- Coolant temperature sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013466548

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between engine coolant temperature sensor harness connector and ground.

Engine coolant temperature sensor			Voltage
Connector	+	-	
	Terminal		
F165	2	1	4.75 – 5.25 V

Is the inspection result normal?

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

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between engine coolant temperature sensor harness connector and ECM harness connector.

+		-		Continuity
ECM		Engine coolant temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	11	F165	1	Existed
	86		2	

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

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

P0119 ENGINE COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC4-377. "Component Inspection \(Engine Coolant Temperature Sensor\)".](#)

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace engine coolant temperature sensor. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location".](#)

4. CHECK INTERMITTENT INCIDENT

Refer to [GI-45. "Intermittent Incident".](#)

>> INSPECTION END

Component Inspection (Engine Coolant Temperature Sensor)

INFOID:0000000013466549

1. TEST INTERNAL RESISTANCE OF COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check the resistance between coolant temperature sensor terminals.

Terminal		Temperature [°C (°F)]	Resistance (Ω)
+	-		
1	2	20°C (68°F)	3050 – 3150
		30°C (86°F)	1950 – 2050
		40°C (104°F)	1275 – 1375
		50°C (122°F)	850 – 950
		60°C (140°F)	600 – 650
		70°C (158°F)	425 – 465
		80°C (176°F)	305 – 335
		90°C (194°F)	225 – 245
		100°C (212°F)	165 – 185
110°C (230°F)	120 – 140		

Is the measured value OK?

YES >> INSPECTION END

NO >> Replace coolant temperature sensor. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location".](#)

P0120 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0120 SENSOR POWER SUPPLY

DTC Description

INFOID:000000013290052

DESCRIPTION

EMCM supplies a voltage of 5 V to the sensors, respectively. Accordingly, when a short circuit develops in a sensor power source, a malfunction may occur simultaneously in the sensors belonging to the same group as the short-circuited sensor.

Sensor Power Supply

- Main battery current sensor
- Sub battery current sensor

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0120	THRTL POS SEN/CIRC (Throttle/pedal position sensor/switch "A" circuit)	NO SUBTYPE INFORMATION	EMCM detects a voltage of power supply source for sensor is excessively low or high.

POSSIBLE CAUSE

- Harness or connectors
(Main battery current sensor circuit is shorted.)
(Sub battery current sensor circuit is shorted.)
- Main battery current sensor
- Sub battery current sensor

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

- Turn ignition switch OFF and wait at least 10 seconds.
- Check that the battery voltage is more than 8 V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

Ⓟ With CONSULT

1. Start the engine and let it idle at least 1 second.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P0120" detected?

- YES >> Proceed to [EC4-378. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290053

1. CHECK SENSOR POWER SUPPLY

P0120 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

1. Turn ignition switch OFF.
2. Disconnect main battery current sensor harness connector.
3. Disconnect sub battery current sensor harness connector.
4. Turn ignition switch ON.
5. Check the voltage between main battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Connector	Terminal		
E208	4	Ground	5 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2.CHECK SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check harness for short to ground.

Item	+		-	Continuity
	Connector	Terminal		
Main battery current sensor	E208	4	Ground	Not existed
Sub battery current sensor	B135	1		

4. Also check the harness for short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK COMPONENTS

Check the following:

- Main battery current sensor. Refer to [EC4-379. "Component Inspection \(Main Battery Current Sensor\)"](#).
- Sub battery current sensor. Refer to [EC4-380. "Component Inspection \(Sub Battery Current Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace malfunctioning component.

4.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Main Battery Current Sensor)

INFOID:000000013290054

1.CHECK MAIN BATTERY CURRENT SENSOR

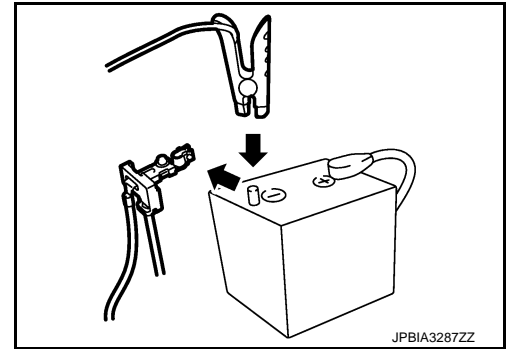
1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect main battery negative cable.

P0120 SENSOR POWER SUPPLY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4. Install jumper cable between main battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.



Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	24	35	2.5 V*

*: Before measuring the terminal voltage, confirm that the main battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

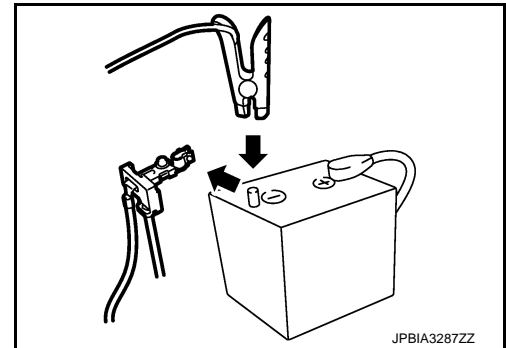
NO >> Replace main battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

Component Inspection (Sub Battery Current Sensor)

INFOID:000000013290055

1. CHECK SUB BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect sub battery negative cable.
4. Install jumper cable between sub battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.



Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	26	36	2.5 V*

*: Before measuring the terminal voltage, confirm that the sub battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace sub battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

P0122 THROTTLE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0122 THROTTLE POSITION SENSOR

Diagnosis Description

INFOID:0000000013290056

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0122	THROTTLE/PEDAL POS SEN/ SW A (Throttle/Pedal position sensor/ switch "A" circuit low)	NO SUBTYPE INFORMATION	Position sensor 1 for the throttle valve has a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

Diagnosis Procedure

INFOID:0000000013476207

1. CHECK THROTTLE VALVE POSITION

With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-382, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

P0122 THROTTLE POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	4	F150	17	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	3	F150	38	Existed
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:000000013476208

1. CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

P0122 THROTTLE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2.CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

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P0123 THROTTLE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0123 THROTTLE POSITION SENSOR

Diagnosis Description

INFOID:000000013290059

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0123	THROTTLE/PEDAL POS SEN/ SW A (Throttle/Pedal position sensor/ switch "A" circuit high)	NO SUBTYPE INFORMATION	Position sensor 1 for the throttle valve has a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

Diagnosis Procedure

INFOID:000000013476209

1. CHECK THROTTLE VALVE POSITION

Ⓜ With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-385, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

P0123 THROTTLE POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	4	F150	17	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5.CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	3	F150	38	Existed
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:0000000013476210

1.CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

P0123 THROTTLE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

P0128 THERMOSTAT FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0128 THERMOSTAT FUNCTION

DTC Description

INFOID:0000000013290062

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0128	COOLANT THERMOSTAT [Coolant thermostat (coolant temperature below thermostat regulating temperature)]	NO SUBTYPE INFORMATION	The coolant temperature is below the coolant thermostat specified temperature.

POSSIBLE CAUSE

- Harness and connectors (Coolant thermostat heater element circuit is open or shorted.)
- Coolant thermostat heater element

Diagnosis Procedure

INFOID:0000000013476211

1. INSPECTION START

Does the coolant temperature rise too quickly and become too high?

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

2. CHECK COOLANT THERMOSTAT HEATING ELEMENT

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

NOTE:

- When a coolant temperature reaches specified temperature, the test is started automatically.
- The test takes up to approximately 10 minutes.

Item	Condition
Engine speed	At idle
Engine coolant temperature	Less than 100°C (212°F)
A/C	OFF

4. Perform the Active Test.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> GO TO 4.

3. CHECK COOLANT THERMOSTAT HEATING ELEMENT

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

P0128 THERMOSTAT FUNCTION

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NOTE:

- When a coolant temperature reaches specified temperature, the test is started automatically.
- The test takes up to approximately 10 minutes.

Item	Condition
Engine speed	At idle
Engine coolant temperature	Less than 50°C (122°F)
A/C	OFF

4. Perform the Active Test.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> GO TO 4.

4.CHECK COOLANT THERMOSTAT HEATER ELEMENT

Check engine coolant thermostat heating element. Refer to [EC4-388, "Component Inspection \(Coolant Thermostat Heater Element\)"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace error-detected parts.

5.CHECK ENGINE COOLANT THERMOSTAT HEATER ELEMENT POWER SUPPLY

1. Check that the #98 fuse is not fusing.
2. Disconnect coolant thermostat heater element harness connector.
3. Turn ignition switch ON.
4. Check the voltage between coolant thermostat heater element harness connector and ground.

+		-	Voltage
Connector	Terminal		
F169	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> Check engine coolant thermostat heating element power supply circuit.

6.CHECK COOLANT THERMOSTAT HEATER ELEMENT CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and coolant thermostat heater element harness connector.

+		-		Continuity
Connector	Terminal	Connector	Terminal	
F150	4	F169	2	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Coolant Thermostat Heater Element)

INFOID:0000000013476212

1.CHECK COOLANT THERMOSTAT HEATER ELEMENT

P0128 THERMOSTAT FUNCTION

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect coolant thermostat heater element harness connector.
3. Check the resistance between coolant thermostat heater element terminals.

Coolant thermostat heater element		Condition	Resistance (Ω)
+	-		
Terminal			
1	2	25°C (77°F)	8.5 – 10.5

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace coolant thermostat (built-in engine coolant thermostat heating element). Refer to [CO-18](#), "[Exploded View](#)".

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P0130 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0130 A/F SENSOR

DTC Description

INFOID:000000013290065

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0130	O2 SENSOR B1 SENSOR 1 (O2 sensor circuit bank 1 sensor 1)	CIRCUIT SHORT TO GROUND	A/F sensor (cylinder bank 1) has an electrical malfunction. There is a short circuit to ground.
		CIRCUIT SHORT TO BATTERY	A/F sensor (cylinder bank 1) has an electrical malfunction. There is a short circuit to positive.
		SIG BELOW ALLOWABLE RANGE	A/F sensor (cylinder bank 1) has an electrical malfunction. There is a signal below the permissible limit value.

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

Diagnosis Procedure

INFOID:000000013290066

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.

P0130 A/F SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace A/F sensor. Refer to [EM-39. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0133 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0133 A/F SENSOR

DTC Description

INFOID:000000013290067

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0133	O2 SENSOR B1 SENSOR 1 (O2 sensor circuit slow response bank 1 sensor 1)	NO SUBTYPE INFORMATION	A/F sensor (cylinder bank 1) has an electrical malfunction. There is a signal below the permissible limit value.

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

Diagnosis Procedure

INFOID:000000013466550

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

P0133 A/F SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

YES >> Replace A/F sensor. Refer to [EM-39. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

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P0135 A/F SENSOR HEATER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0135 A/F SENSOR HEATER

DTC Description

INFOID:000000013290069

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0135	O2 SENSOR HEATER B1 SENSOR 1 (O2 sensor heater circuit bank 1 sensor 1)	SYSTEM INTERNAL MAL-FUNCTN	The heater for A/F sensor (cylinder bank 1) has an electrical malfunction. There is an internal malfunction.
		SIG BELOW ALLOWABLE RANGE	The heater for A/F sensor (cylinder bank 1) has an electrical malfunction. There is a signal below the permissible limit value.

POSSIBLE CAUSE

- Harness and connectors (A/F sensor heater circuit is open or shorted.)
- A/F sensor heater

Diagnosis Procedure

INFOID:000000013466551

1.CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2.CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3.CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

P0135 A/F SENSOR HEATER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace A/F sensor. Refer to [EM-39. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0136 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0136 O2 SENSOR

DTC Description

INFOID:0000000013290071

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0136	O2 SENSOR B1 SENSOR 2 (O2 sensor circuit bank 1 sensor 2)	NO SUBTYPE INFORMATION	Oxygen sensor (cylinder bank 1) has an electrical malfunction.

POSSIBLE CAUSE

- Harness and connectors (O2 sensor circuit is open or shorted.)
- O2 sensor

Diagnosis Procedure

INFOID:0000000013290072

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
 NO >> Repair or replace error-detected parts.

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P0136 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0137 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0137 O2 SENSOR

DTC Description

INFOID:000000013290073

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0137	O2 SENSOR B1 SENSOR 2 (O2 sensor circuit vov voltage bank 1 sensor 2)	CIRCUIT SHORT TO GROUND	Oxygen sensor (cylinder bank 1) has a short circuit to ground. There is a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors
(O2 sensor circuit is open or shorted.)
- O2 sensor

Diagnosis Procedure

INFOID:000000013466552

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P0137 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0138 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0138 O2 SENSOR

DTC Description

INFOID:0000000013290075

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0138	O2 SENSOR B1 SENSOR 2 (O2 sensor circuit high voltage bank 1 sensor 2)	CIRCUIT SHORT TO BATTERY	Oxygen sensor (cylinder bank 1) has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors (O2 sensor circuit is open or shorted.)
- O2 sensor

Diagnosis Procedure

INFOID:0000000013476213

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P0138 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P013A O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P013A O2 SENSOR

DTC Description

INFOID:0000000013290077

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P013A	O2 SENSOR B1 SENSOR 2 (O2 sensor slow response - rich to lean bank 1 sensor 2)	NO SUBTYPE INFORMATION	The rich/lean switchover of oxygen sensor (cylinder bank 1) is too slow.

POSSIBLE CAUSE

- Harness and connectors (O2 sensor circuit is open or shorted.)
- O2 sensor

Diagnosis Procedure

INFOID:0000000013466553

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P013A O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P013B O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P013B O2 SENSOR

DTC Description

INFOID:000000013290079

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P013B	O2 SENSOR B1 SENSOR 2 (O2 sensor slow response - lean to rich bank 1 sensor 2)	NO SUBTYPE INFORMATION	The lean/rich switchover of oxygen sensor (cylinder bank 1) is too slow.

POSSIBLE CAUSE

- Harness and connectors (O2 sensor circuit is open or shorted.)
- O2 sensor

Diagnosis Procedure

INFOID:000000013466554

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
 NO >> Repair or replace error-detected parts.

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P013B O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P013E O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P013E O2 SENSOR

DTC Description

INFOID:000000013290081

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P013E	O2 SENSOR B1 SENSOR 2 (O2 sensor delayed response - rich to lean bank 1 sensor 2)	NO SUBTYPE INFORMATION	The rich/lean switchover of oxygen sensor (cylinder bank 1) is delayed.

POSSIBLE CAUSE

- Harness and connectors
(O2 sensor circuit is open or shorted.)
- O2 sensor

Diagnosis Procedure

INFOID:000000013466555

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P013E O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P013F O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P013F O2 SENSOR

DTC Description

INFOID:000000013290083

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P013F	O2 SENSOR B1 SENSOR 2 (O2 sensor delayed response - lean to rich bank 1 sensor 2)	NO SUBTYPE INFORMATION	The lean/rich switchover of oxygen sensor (cylinder bank 1) is delayed.

POSSIBLE CAUSE

- Harness and connectors (O2 sensor circuit is open or shorted.)
- O2 sensor

Diagnosis Procedure

INFOID:000000013466556

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P013F O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0140 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0140 O2 SENSOR

DTC Description

INFOID:0000000013290085

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0140	O2 SENSOR B1 SENSOR 2 (O2 sensor circuit no activity detected bank 1 sensor 2)	CIRCUIT OPEN	The signal of oxygen sensor (cylinder bank 1) does not change. There is an open circuit.

POSSIBLE CAUSE

- Harness and connectors
(O2 sensor circuit is open or shorted.)
- O2 sensor

Diagnosis Procedure

INFOID:0000000013476214

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P0140 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0141 HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0141 HO2S2 HEATER

DTC Description

INFOID:000000013290087

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0141	O2 SENSOR HEATER B1 SENSOR 2 (O2 sensor heater circuit bank 1 sensor 2)	NO SUBTYPE INFORMATION	The heater for oxygen sensor (cylinder bank 1) has an electrical malfunction.

POSSIBLE CAUSE

- Harness and connectors
(O2 sensor heater circuit is open or shorted.)
- O2 sensor heater

Diagnosis Procedure

INFOID:000000013476215

1. CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P0141 HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0170 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0170 AIR-FUEL RATIO

DTC Description

INFOID:000000013290089

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0170	FUEL TRIM B1 (Fuel trim bank 1)	SYSTEM INTERNAL MAL-FUNCTN	The mixture formation (cylinder bank 1) has a malfunction. There is an internal malfunction.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013476216

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 –176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

4. CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

P0170 AIR-FUEL RATIO

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5. CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340, "ECM : Diagnosis Procedure"](#), [EC4-345, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876, "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860, "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320, "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538, "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687, "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465, "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P0171 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0171 AIR-FUEL RATIO

DTC Description

INFOID:000000013290091

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0171	SYSTEM LEAN B1 (System too lean bank 1)	SIG BELOW ALLOWABLE RANGE	The mixture (cylinder bank 1) is too lean. There is a signal below the permissible limit value.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013476226

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 –176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

4. CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

P0171 AIR-FUEL RATIO

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5. CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340, "ECM : Diagnosis Procedure"](#), [EC4-345, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876, "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860, "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320, "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538, "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687, "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465, "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P0172 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0172 AIR-FUEL RATIO

DTC Description

INFOID:000000013290093

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0172	SYSTEM RICH B1 (System too rich bank 1)	SIG ABOVE ALLOWABLE RANGE	The mixture (cylinder bank 1) is too rich. There is a signal above the permissible limit value.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013476227

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 –176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

4. CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

P0172 AIR-FUEL RATIO

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5. CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340, "ECM : Diagnosis Procedure"](#), [EC4-345, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876, "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860, "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320, "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538, "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687, "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465, "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P0181 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0181 FUEL TEMPERATURE SENSOR

DTC Description

INFOID:000000013290095

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0181	FUEL TEMPERATURE SENSOR A (Fuel temperature sensor "A" circuit range/performance)	CIRC VOLT BELOW THRESHOLD	The fuel temperature sensor has a malfunction. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	The fuel temperature sensor has a malfunction. The limit value for electrical voltage has been exceeded.
		SG BS LVL O-OF RNG/ZR AJST ERR	The fuel temperature sensor has a malfunction. The signal offset is outside the permissible range.
		SIG BELOW ALLOWABLE RANGE	The fuel temperature sensor has a malfunction. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	The fuel temperature sensor has a malfunction. There is a signal above the permissible limit value.

POSSIBLE CAUSE

- Harness or connectors (Fuel pressure and temperature sensor circuit is open or shorted.)
- Fuel pressure and temperature sensor

Diagnosis Procedure

INFOID:000000013290096

1. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Turn ignition switch OFF.
2. Leave the vehicle in a cool place at least 5 hours (soak the vehicle).
CAUTION:
Always perform this step to obtain correct results.
3. Turn ignition switch ON.
4. Turn OFF all electrical load.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "COOLANT TEMPERATURE" and "FUEL TEMPERATURE".
6. Start the engine and warm it up until the following conditions are met.

Item	Condition
COOLANT TEMPERATURE	75 – 105°C (167 – 221°F)
FUEL TEMPERATURE	40 – 80°C (104 – 176°F)

7. Turn ignition switch OFF.
8. Turn ignition switch ON.
9. Check that the difference between "COOLANT TEMPERATURE" and "FUEL TEMPERATURE" is within 10°C (50°F).

Is the inspection result normal?

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

2. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

P0181 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

- YES >> GO TO 4.
- NO >> GO TO 3.

3. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).
- NO >> Repair or replace error-detected parts.

4. CHECK FUEL TEMPERATURE SENSOR

Check fuel temperature sensor. Refer to [EC4-422. "Component Inspection \(Fuel Temperature Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace fuel pressure and temperature sensor. Refer to [EM-51. "Exploded View"](#).

5. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

- YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

6. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.

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P0181 FUEL TEMPERATURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> INSPECTION END

Component Inspection (Fuel Temperature Sensor)

INFOID:000000013290097

1. CHECK FUEL TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Check the resistance between fuel pressure and temperature sensor terminals.

Fuel pressure and temperature sensor		Condition	Resistance (Approx.)
+	-		
Terminal			
3	4	Temperature: 25°C (77°F)	10 kΩ

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

P0182 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0182 FUEL TEMPERATURE SENSOR

DTC Description

INFOID:000000013290098

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0182	FUEL TEMPERATURE SENSOR A (Fuel temperature sensor "A" circuit low)	CIRCUIT SHORT TO GROUND	The fuel temperature sensor has a short circuit to ground. There is a short circuit to ground.

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POSSIBLE CAUSE

- Harness or connectors
(Fuel pressure and temperature sensor circuit is open or shorted.)
- Fuel pressure and temperature sensor

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Diagnosis Procedure

INFOID:000000013466557

1. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

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Ⓜ With CONSULT

1. Turn ignition switch OFF.
2. Leave the vehicle in a cool place at least 5 hours (soak the vehicle).
CAUTION:
Always perform this step to obtain correct results.
3. Turn ignition switch ON.
4. Turn OFF all electrical load.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "COOLANT TEMPERATURE" and "FUEL TEMPERATURE".
6. Start the engine and warm it up until the following conditions are met.

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Item	Condition
COOLANT TEMPERATURE	75 – 105°C (167 – 221°F)
FUEL TEMPERATURE	40 – 80°C (104 – 176°F)

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7. Turn ignition switch OFF.
8. Turn ignition switch ON.
9. Check that the difference between "COOLANT TEMPERATURE" and "FUEL TEMPERATURE" is within 10°C (50°F).

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Is the inspection result normal?

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

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2. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

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Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

P0182 FUEL TEMPERATURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 4.
- NO >> GO TO 3.

3. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
- NO >> Repair or replace error-detected parts.

4. CHECK FUEL TEMPERATURE SENSOR

Check fuel temperature sensor. Refer to [EC4-431, "Component Inspection \(Fuel Temperature Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

5. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

- YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

6. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
- NO >> INSPECTION END

P0182 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Component Inspection (Fuel Temperature Sensor)

INFOID:000000013466558

1. CHECK FUEL TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Check the resistance between fuel pressure and temperature sensor terminals.

Fuel pressure and temperature sensor		Condition	Resistance (Approx.)
+	-		
Terminal			
3	4	Temperature: 25°C (77°F)	10 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel pressure and temperature sensor. Refer to [EM-51. "Exploded View"](#).

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P0183 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0183 FUEL TEMPERATURE SENSOR

DTC Description

INFOID:000000013290101

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0183	FUEL TEMPERATURE SENSOR A (Fuel temperature sensor "A" circuit high)	CIRCUIT SHORT TO BATTERY	The fuel temperature sensor has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors
(Fuel pressure and temperature sensor circuit is open or shorted.)
- Fuel pressure and temperature sensor

Diagnosis Procedure

INFOID:000000013466559

1. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

Ⓟ With CONSULT

1. Turn ignition switch OFF.
2. Leave the vehicle in a cool place at least 5 hours (soak the vehicle).
CAUTION:
Always perform this step to obtain correct results.
3. Turn ignition switch ON.
4. Turn OFF all electrical load.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "COOLANT TEMPERATURE" and "FUEL TEMPERATURE".
6. Start the engine and warm it up until the following conditions are met.

Item	Condition
COOLANT TEMPERATURE	75 – 105°C (167 – 221°F)
FUEL TEMPERATURE	40 – 80°C (104 – 176°F)

7. Turn ignition switch OFF.
8. Turn ignition switch ON.
9. Check that the difference between "COOLANT TEMPERATURE" and "FUEL TEMPERATURE" is within 10°C (50°F).

Is the inspection result normal?

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

2. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

P0183 FUEL TEMPERATURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 4.
- NO >> GO TO 3.

3. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	12	F185	1	
	18		4	

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

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
- NO >> Repair or replace error-detected parts.

4. CHECK FUEL TEMPERATURE SENSOR

Check fuel temperature sensor. Refer to [EC4-431, "Component Inspection \(Fuel Temperature Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

5. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	65	F185	3	
	67		2	

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

Is the inspection result normal?

- YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

6. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
- NO >> INSPECTION END

P0183 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Component Inspection (Fuel Temperature Sensor)

INFOID:000000013466560

1. CHECK FUEL TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Check the resistance between fuel pressure and temperature sensor terminals.

Fuel pressure and temperature sensor		Condition	Resistance (Approx.)
+	-		
Terminal			
3	4	Temperature: 25°C (77°F)	10 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel pressure and temperature sensor. Refer to [EM-51. "Exploded View"](#).

P0184 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0184 FUEL TEMPERATURE SENSOR

DTC Description

INFOID:000000013290104

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0184	FUEL TEMPERATURE SENSOR A (Fuel temperature sensor "A" circuit intermittent)	SIG RTE OF CHNG ABV THRESHLD	The fuel temperature sensor circuit intermittent signal rate of change above threshold.

POSSIBLE CAUSE

- Harness or connectors (Fuel pressure and temperature sensor circuit is open or shorted.)
- Fuel pressure and temperature sensor

Diagnosis Procedure

INFOID:000000013466561

1. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Turn ignition switch OFF.
2. Leave the vehicle in a cool place at least 5 hours (soak the vehicle).
CAUTION:
Always perform this step to obtain correct results.
3. Turn ignition switch ON.
4. Turn OFF all electrical load.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "COOLANT TEMPERATURE" and "FUEL TEMPERATURE".
6. Start the engine and warm it up until the following conditions are met.

Item	Condition
COOLANT TEMPERATURE	75 – 105°C (167 – 221°F)
FUEL TEMPERATURE	40 – 80°C (104 – 176°F)

7. Turn ignition switch OFF.
8. Turn ignition switch ON.
9. Check that the difference between "COOLANT TEMPERATURE" and "FUEL TEMPERATURE" is within 10°C (50°F).

Is the inspection result normal?

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

2. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

P0184 FUEL TEMPERATURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

4. CHECK FUEL TEMPERATURE SENSOR

Check fuel temperature sensor. Refer to [EC4-431, "Component Inspection \(Fuel Temperature Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

5. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

- YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).
NO >> Repair or replace error-detected parts.

6. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> INSPECTION END

P0184 FUEL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Component Inspection (Fuel Temperature Sensor)

INFOID:000000013466562

1. CHECK FUEL TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Check the resistance between fuel pressure and temperature sensor terminals.

Fuel pressure and temperature sensor		Condition	Resistance (Approx.)
+	-		
Terminal			
3	4	Temperature: 25°C (77°F)	10 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel pressure and temperature sensor. Refer to [EM-51. "Exploded View"](#).

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P0190 FUEL RAIL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0190 FUEL RAIL PRESSURE SENSOR

DTC Description

INFOID:000000013290107

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0190	FUEL RAIL PRESSURE SENSOR A (Fuel rail pressure sensor circuit bank 1)	CIRC VOLT BELOW THRESHOLD	The rail pressure sensor has an electrical malfunction. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	The rail pressure sensor has an electrical malfunction. The limit value for electrical voltage has been exceeded.

POSSIBLE CAUSE

- Harness or connectors
(Fuel pressure and temperature sensor circuit is open or shorted.)
- Fuel pressure and temperature sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013466563

1. START ENGINE

Start the engine and let it idle.

Is it difficult to keep at idle?

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

2. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

Ⓜ With CONSULT

1. Warm the engine up to engine coolant temperature reaches 75°C (167°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".
3. Keep the engine speed between 500 – 1,000 rpm.
4. Perform the Active Test.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

5. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 6.

3. PRECONDITIONING FOR CHECKING FUEL PRESSURE AND TEMPERATURE SENSOR OUTPUT SIGNAL

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

Ⓜ With CONSULT

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "RAIL PRES (ACTUAL VALUE)".
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Slightly loosen the threaded connection of the fuel line to the fuel rail to reduce the fuel pressure.

CAUTION:

Collect escaping fuel with several rags.

4. Wait at least 60 seconds.

P0190 FUEL RAIL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- Retighten the threaded connection of fuel line.
- Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 0 kPa (0 bar, 0 kg-cm², 0 psi) and 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi).

NOTE:

The pressure must drop within 60 seconds.

>> GO TO 4.

4. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

- Turn ignition switch ON.
- On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

- Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" and is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 5.

5. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

- Turn ignition switch OFF.
- Disconnect fuel pressure and temperature sensor harness connector.
- Turn ignition switch ON.
- Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 7.

NO >> GO TO 6.

6. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

7. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

- Turn ignition switch OFF.

P0190 FUEL RAIL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

- YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).
NO >> Repair or replace error-detected parts.

8. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> INSPECTION END

P0191 FUEL RAIL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0191 FUEL RAIL PRESSURE SENSOR

DTC Description

INFOID:000000013290109

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0191	FUEL RAIL PRESSURE SENSOR A (Fuel rail pressure sensor circuit range/performance bank 1)	CIRC VOLT BELOW THRESHOLD	The rail pressure sensor has a malfunction. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	The rail pressure sensor has a malfunction. The limit value for electrical voltage has been exceeded.

POSSIBLE CAUSE

- Harness or connectors
(Fuel pressure and temperature sensor circuit is open or shorted.)
- Fuel pressure and temperature sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290110

1. START ENGINE

Start the engine and let it idle.

Is it difficult to keep at idle?

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

2. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Warm the engine up to engine coolant temperature reaches 75°C (167°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".
3. Keep the engine speed between 500 – 1,000 rpm.
4. Perform the Active Test.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

5. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 6.

3. PRECONDITIONING FOR CHECKING FUEL PRESSURE AND TEMPERATURE SENSOR OUTPUT SIGNAL

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

With CONSULT

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "RAIL PRES (ACTUAL VALUE)".
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Slightly loosen the threaded connection of the fuel line to the fuel rail to reduce the fuel pressure.

CAUTION:

Collect escaping fuel with several rags.

4. Wait at least 60 seconds.
5. Retighten the threaded connection of fuel line.

P0191 FUEL RAIL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

6. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 0 kPa (0 bar, 0 kg-cm², 0 psi) and 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi).

NOTE:

The pressure must drop within 60 seconds.

>> GO TO 4.

4. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

3. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" and is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 5.

5. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 7.

NO >> GO TO 6.

6. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

7. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

P0191 FUEL RAIL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

8. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> INSPECTION END

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P0192 FUEL RAIL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0192 FUEL RAIL PRESSURE SENSOR

DTC Description

INFOID:0000000013290111

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0192	FUEL RAIL PRESSURE SENSOR A (Fuel rail pressure sensor circuit low bank 1)	CIRCUIT SHORT TO GROUND	The rail pressure sensor has a short circuit to ground. There is a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors
(Fuel pressure and temperature sensor circuit is open or shorted.)
- Fuel pressure and temperature sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:0000000013466564

1. START ENGINE

Start the engine and let it idle.

Is it difficult to keep at idle?

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

2. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Warm the engine up to engine coolant temperature reaches 75°C (167°F).
2. On CONSULT screen, select “ENGINE” >> “ACTIVE TEST” >> “Check fuel pressure and temperature sensor rail pressure”.
3. Keep the engine speed between 500 – 1,000 rpm.
4. Perform the Active Test.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

5. Check that the displayed value of “RAIL PRES (ACTUAL VALUE)” is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 6.

3. PRECONDITIONING FOR CHECKING FUEL PRESSURE AND TEMPERATURE SENSOR OUTPUT SIGNAL

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

With CONSULT

1. On CONSULT screen, select “ENGINE” >> “DATA MONITOR” >> “RAIL PRES (ACTUAL VALUE)”.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Slightly loosen the threaded connection of the fuel line to the fuel rail to reduce the fuel pressure.

CAUTION:

Collect escaping fuel with several rags.

4. Wait at least 60 seconds.
5. Retighten the threaded connection of fuel line.

P0192 FUEL RAIL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 0 kPa (0 bar, 0 kg-cm², 0 psi) and 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi).

NOTE:

The pressure must drop within 60 seconds.

>> GO TO 4.

4.CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

Ⓜ With CONSULT

- Turn ignition switch ON.
- On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

- Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" and is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 5.

5.CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

- Turn ignition switch OFF.
- Disconnect fuel pressure and temperature sensor harness connector.
- Turn ignition switch ON.
- Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 7.

NO >> GO TO 6.

6.CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

7.CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.

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P0192 FUEL RAIL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

8. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> INSPECTION END

P0193 FUEL RAIL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0193 FUEL RAIL PRESSURE SENSOR

DTC Description

INFOID:0000000013290113

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0193	FUEL RAIL PRESSURE SENSOR A (Fuel rail pressure sensor circuit high bank 1)	CIRCUIT SHORT TO BATTERY	The rail pressure sensor has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Fuel pressure and temperature sensor circuit is open or shorted.)
- Fuel pressure and temperature sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:0000000013466565

1. START ENGINE

Start the engine and let it idle.

Is it difficult to keep at idle?

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

2. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Warm the engine up to engine coolant temperature reaches 75°C (167°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".
3. Keep the engine speed between 500 – 1,000 rpm.
4. Perform the Active Test.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

5. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 6.

3. PRECONDITIONING FOR CHECKING FUEL PRESSURE AND TEMPERATURE SENSOR OUTPUT SIGNAL

CAUTION:

Refer to [EC4-21. "Precaution for Risk of Explosion and Injury"](#) for work in safety.

With CONSULT

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "RAIL PRES (ACTUAL VALUE)".
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Slightly loosen the threaded connection of the fuel line to the fuel rail to reduce the fuel pressure.

CAUTION:

Collect escaping fuel with several rags.

4. Wait at least 60 seconds.
5. Retighten the threaded connection of fuel line.

P0193 FUEL RAIL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

6. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 0 kPa (0 bar, 0 kg-cm², 0 psi) and 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi).

NOTE:

The pressure must drop within 60 seconds.

>> GO TO 4.

4. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

Ⓟ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

3. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" and is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 5.

5. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 7.

NO >> GO TO 6.

6. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

7. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

P0193 FUEL RAIL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

8. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> INSPECTION END

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P0201 FUEL INJECTOR (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0201 FUEL INJECTOR (CYLINDER 1)

DTC Description

INFOID:000000013290115

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0201	CYLINDER 1 FUEL INJECTOR (Cylinder 1 injector "A" circuit)	ELECTRICAL MALFUNCTION	The fuel injector (cylinder 1) has an electrical malfunction or an open circuit. There is a general electrical malfunction.
		CIRCUIT SHORT TO GROUND	The fuel injector (cylinder 1) has an electrical malfunction or an open circuit. There is a short circuit to ground.
		CIRCUIT OPEN	The fuel injector (cylinder 1) has an electrical malfunction or an open circuit. There is an open circuit.
		CIRC CRRNT ABOVE THRESHOLD	The fuel injector (cylinder 1) has an electrical malfunction or an open circuit. The limit value for current has been exceeded.
		CIRCUIT INTERMITTENT	The fuel injector (cylinder 1) has an electrical malfunction or an open circuit. There is a sporadic malfunction.
		INTERNAL ELECTRONIC ERROR	The fuel injector (cylinder 1) has an electrical malfunction or an open circuit. There is an internal electrical malfunction.
		PFM/INCORRECT OPERATN	The fuel injector (cylinder 1) has an electrical malfunction or an open circuit. The function or the instruction has malfunction.

POSSIBLE CAUSE

- Harness or connectors (Fuel injector circuit is open or shorted.)
- Fuel injector
- Fuel leak (fuel injector)

Diagnosis Procedure

INFOID:000000013290116

1. CHECK FUEL INJECTOR FUNCTION

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check cylinder fuel injectors".
3. Start the engine and let it idle.
4. Set the vehicle to the following conditions:

Monitor item	Condition
ENGINE SPEED	500 – 950 rpm
SMOOTH OPR OF CYL 1	2 or less
SMOOTH OPR OF CYL 2	2 or less
SMOOTH OPR OF CYL 3	2 or less
SMOOTH OPR OF CYL 4	2 or less
COOLANT TEMPERATURE	80°C (176°F)

5. Perform Active Test.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

P0201 FUEL INJECTOR (CYLINDER 1)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2.CHECK FUEL INJECTOR

Check cylinder 1 fuel injector. Refer to [EC4-445. "Component Inspection \(Fuel Injector\)".](#)

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace fuel injector. Refer to [EM-51. "Removal and Installation".](#)

3.CHECK FUEL INJECTOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Fuel injector		
Connector	Terminal	Connector	Terminal	
F150	1	F171	2	Existed
	2		1	

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK INJECTOR LEAKAGE

NOTE:

During this test, the fuel rail pressure is increased.

1. Remove spark plug.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HIGH PRESSURE CIRCUIT".
5. Set the vehicle the following conditions.
 - Engine stopped
 - Parking brake: applied
 - Selector lever: P or N
6. Start the Active Test.

CAUTION:

Never turn OFF ignition switch.

NOTE:

Fuel injectors are turned OFF.

7. Depress and hold down brake pedal.
8. Actuate the starter for several seconds.
9. Stop starter.
10. Check combustion chamber and fuel injector for fuel leakage by using suitable tool (e.g. endoscope light probe).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:000000013290117

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between injector terminals.

P0201 FUEL INJECTOR (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Cylinder	Injector		Resistance
	+	-	
	Terminal		
1	1	2	198 – 242 kΩ
2			
3			
4			

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector(s). Refer to [EM-51, "Removal and Installation"](#).

P0202 FUEL INJECTOR (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0202 FUEL INJECTOR (CYLINDER 2)

DTC Description

INFOID:0000000013290118

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0202	CYLINDER 2 FUEL INJECTOR (Cylinder 2 injector "A" circuit)	ELECTRICAL MALFUNCTION	The fuel injector (cylinder 2) has an electrical malfunction or an open circuit. There is a general electrical malfunction.
		CIRCUIT SHORT TO GROUND	The fuel injector (cylinder 2) has an electrical malfunction or an open circuit. There is a short circuit to ground.
		CIRCUIT OPEN	The fuel injector (cylinder 2) has an electrical malfunction or an open circuit. There is an open circuit.
		CIRC CRRNT ABOVE THRESHOLD	The fuel injector (cylinder 2) has an electrical malfunction or an open circuit. The limit value for current has been exceeded.
		CIRCUIT INTERMITTENT	The fuel injector (cylinder 2) has an electrical malfunction or an open circuit. There is a sporadic malfunction.
		INTERNAL ELECTRONIC ERROR	The fuel injector (cylinder 2) has an electrical malfunction or an open circuit. There is an internal electrical malfunction.
		PFM/INCORRECT OPERATN	The fuel injector (cylinder 2) has an electrical malfunction or an open circuit. The function or the instruction has malfunction.

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POSSIBLE CAUSE

- Harness or connectors (Fuel injector circuit is open or shorted.)
- Fuel injector
- Fuel leak (fuel injector)

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Diagnosis Procedure

INFOID:0000000013290119

1. CHECK FUEL INJECTOR FUNCTION

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With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check cylinder fuel injectors".
3. Start the engine and let it idle.
4. Set the vehicle to the following conditions:

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Monitor item	Condition
ENGINE SPEED	500 – 950 rpm
SMOOTH OPR OF CYL 1	2 or less
SMOOTH OPR OF CYL 2	2 or less
SMOOTH OPR OF CYL 3	2 or less
SMOOTH OPR OF CYL 4	2 or less
COOLANT TEMPERATURE	80°C (176°F)

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5. Perform Active Test.

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> GO TO 2.

P0202 FUEL INJECTOR (CYLINDER 2)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. CHECK FUEL INJECTOR

Check cylinder 2 fuel injector. Refer to [EC4-448. "Component Inspection \(Fuel Injector\)".](#)

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace fuel injector. Refer to [EM-51. "Removal and Installation".](#)

3. CHECK FUEL INJECTOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Fuel injector		
Connector	Terminal	Connector	Terminal	
F150	73	F172	2	Existed
	74		1	

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK INJECTOR LEAKAGE

NOTE:

During this test, the fuel rail pressure is increased.

1. Remove spark plug.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HIGH PRESSURE CIRCUIT".
5. Set the vehicle the following conditions.
 - Engine stopped
 - Parking brake: applied
 - Selector lever: P or N
6. Start the Active Test.

CAUTION:

Never turn OFF ignition switch.

NOTE:

Fuel injectors are turned OFF.

7. Depress and hold down brake pedal.
8. Actuate the starter for several seconds.
9. Stop starter.
10. Check combustion chamber and fuel injector for fuel leakage by using suitable tool (e.g. endoscope light probe).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:000000013290120

1. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between injector terminals.

P0202 FUEL INJECTOR (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Cylinder	Injector		Resistance
	+	-	
	Terminal		
1	1	2	198 – 242 kΩ
2			
3			
4			

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector(s). Refer to [EM-51, "Removal and Installation"](#).

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P0203 FUEL INJECTOR (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0203 FUEL INJECTOR (CYLINDER 3)

DTC Description

INFOID:000000013290121

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0203	CYLINDER 3 FUEL INJECTOR (Cylinder 3 injector "A" circuit)	ELECTRICAL MALFUNCTION	The fuel injector (cylinder 3) has an electrical malfunction or an open circuit. There is a general electrical malfunction.
		CIRCUIT SHORT TO GROUND	The fuel injector (cylinder 3) has an electrical malfunction or an open circuit. There is a short circuit to ground.
		CIRCUIT OPEN	The fuel injector (cylinder 3) has an electrical malfunction or an open circuit. There is an open circuit.
		CIRC CRRNT ABOVE THRESHOLD	The fuel injector (cylinder 3) has an electrical malfunction or an open circuit. The limit value for current has been exceeded.
		CIRCUIT INTERMITTENT	The fuel injector (cylinder 3) has an electrical malfunction or an open circuit. There is a sporadic malfunction.
		INTERNAL ELECTRONIC ERROR	The fuel injector (cylinder 3) has an electrical malfunction or an open circuit. There is an internal electrical malfunction.
		PFM/INCORRECT OPERATN	The fuel injector (cylinder 3) has an electrical malfunction or an open circuit. The function or the instruction has malfunction.

POSSIBLE CAUSE

- Harness or connectors (Fuel injector circuit is open or shorted.)
- Fuel injector
- Fuel leak (fuel injector)

Diagnosis Procedure

INFOID:000000013290122

1. CHECK FUEL INJECTOR FUNCTION

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check cylinder fuel injectors".
3. Start the engine and let it idle.
4. Set the vehicle to the following conditions:

Monitor item	Condition
ENGINE SPEED	500 – 950 rpm
SMOOTH OPR OF CYL 1	2 or less
SMOOTH OPR OF CYL 2	2 or less
SMOOTH OPR OF CYL 3	2 or less
SMOOTH OPR OF CYL 4	2 or less
COOLANT TEMPERATURE	80°C (176°F)

5. Perform Active Test.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

P0203 FUEL INJECTOR (CYLINDER 3)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. CHECK FUEL INJECTOR

Check cylinder 3 fuel injector. Refer to [EC4-451, "Component Inspection \(Fuel Injector\)"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace fuel injector. Refer to [EM-51, "Removal and Installation"](#).

3. CHECK FUEL INJECTOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Fuel injector		
Connector	Terminal	Connector	Terminal	
F150	49	F173	2	Existed
	50		1	

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK INJECTOR LEAKAGE

NOTE:

During this test, the fuel rail pressure is increased.

1. Remove spark plug.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HIGH PRESSURE CIRCUIT".
5. Set the vehicle the following conditions.
 - Engine stopped
 - Parking brake: applied
 - Selector lever: P or N
6. Start the Active Test.

CAUTION:

Never turn OFF ignition switch.

NOTE:

Fuel injectors are turned OFF.

7. Depress and hold down brake pedal.
8. Actuate the starter for several seconds.
9. Stop starter.
10. Check combustion chamber and fuel injector for fuel leakage by using suitable tool (e.g. endoscope light probe).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:000000013290123

1. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between injector terminals.

P0203 FUEL INJECTOR (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Cylinder	Injector		Resistance
	+	-	
	Terminal		
1	1	2	198 – 242 kΩ
2			
3			
4			

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector(s). Refer to [EM-51, "Removal and Installation"](#).

P0204 FUEL INJECTOR (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0204 FUEL INJECTOR (CYLINDER 4)

DTC Description

INFOID:0000000013290124

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0204	CYLINDER 4 FUEL INJECTOR (Cylinder 4 injector "A" circuit)	ELECTRICAL MALFUNCTION	The fuel injector (cylinder 4) has an electrical malfunction or an open circuit. There is a general electrical malfunction.
		CIRCUIT SHORT TO GROUND	The fuel injector (cylinder 4) has an electrical malfunction or an open circuit. There is a short circuit to ground.
		CIRCUIT OPEN	The fuel injector (cylinder 4) has an electrical malfunction or an open circuit. There is an open circuit.
		CIRC CRRNT ABOVE THRESHOLD	The fuel injector (cylinder 4) has an electrical malfunction or an open circuit. The limit value for current has been exceeded.
		CIRCUIT INTERMITTENT	The fuel injector (cylinder 4) has an electrical malfunction or an open circuit. There is a sporadic malfunction.
		INTERNAL ELECTRONIC ERROR	The fuel injector (cylinder 4) has an electrical malfunction or an open circuit. There is an internal electrical malfunction.
		PFM/INCORRECT OPERATN	The fuel injector (cylinder 4) has an electrical malfunction or an open circuit. The function or the instruction has malfunction.

POSSIBLE CAUSE

- Harness or connectors (Fuel injector circuit is open or shorted.)
- Fuel injector
- Fuel leak (fuel injector)

Diagnosis Procedure

INFOID:0000000013290125

1. CHECK FUEL INJECTOR FUNCTION

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check cylinder fuel injectors".
3. Start the engine and let it idle.
4. Set the vehicle to the following conditions:

Monitor item	Condition
ENGINE SPEED	500 – 950 rpm
SMOOTH OPR OF CYL 1	2 or less
SMOOTH OPR OF CYL 2	2 or less
SMOOTH OPR OF CYL 3	2 or less
SMOOTH OPR OF CYL 4	2 or less
COOLANT TEMPERATURE	80°C (176°F)

5. Perform Active Test.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

P0204 FUEL INJECTOR (CYLINDER 4)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. CHECK FUEL INJECTOR

Check cylinder 4 fuel injector. Refer to [EC4-454, "Component Inspection \(Fuel Injector\)"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace fuel injector. Refer to [EM-51, "Removal and Installation"](#).

3. CHECK FUEL INJECTOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Fuel injector		
Connector	Terminal	Connector	Terminal	
F150	25	F174	2	Existed
	26		1	

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK INJECTOR LEAKAGE

NOTE:

During this test, the fuel rail pressure is increased.

1. Remove spark plug.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HIGH PRESSURE CIRCUIT".
5. Set the vehicle the following conditions.
 - Engine stopped
 - Parking brake: applied
 - Selector lever: P or N
6. Start the Active Test.

CAUTION:

Never turn OFF ignition switch.

NOTE:

Fuel injectors are turned OFF.

7. Depress and hold down brake pedal.
8. Actuate the starter for several seconds.
9. Stop starter.
10. Check combustion chamber and fuel injector for fuel leakage by using suitable tool (e.g. endoscope light probe).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:000000013290126

1. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between injector terminals.

P0204 FUEL INJECTOR (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Cylinder	Injector		Resistance
	+	-	
	Terminal		
1	1	2	198 – 242 kΩ
2			
3			
4			

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector(s). Refer to [EM-51, "Removal and Installation"](#).

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P0217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0217 ENGINE OVER TEMPERATURE

DTC Description

INFOID:000000013290127

DTC DETECTION LOGIC

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

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

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0217	ENG COOLNT OVER TEMPERATURE (Engine coolant over temperature condition)	NO SUBTYPE INFORMATION	The coolant temperature of the engine is too high.

POSSIBLE CAUSE

- Radiator hose
- Radiator
- Radiator cap
- Thermostat
- Cooling fan

Diagnosis Procedure

INFOID:000000013290128

1. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

NO >> GO TO 2.

2. CHECK COOLANT LEVEL AND LEAK

Check cooling system. Refer to [CO-7, "Inspection"](#).

Is leakage detected?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK RADIATOR CAP AND RADIATOR

1. Check radiator cap. Refer to [CO-10, "RESERVOIR TANK CAP : Inspection"](#).

2. Check radiator. Refer to [CO-10, "RADIATOR : Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK COMPONENT

Check the following.

- Thermostat
- Cooling fan

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

P0219 ENGINE SPEED

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0219 ENGINE SPEED

DTC Description

INFOID:0000000013290129

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0219	ENGINE OVERSPEED CONDITION (Engine overspeed condition)	NO SUBTYPE INFORMATION	The engine speed is too high.
		SIGNAL HIGH TIME > MAX	The engine speed is too high. The on-time of the signal frequency is too long.

POSSIBLE CAUSE

- Engine overrevving has occurred.

Diagnosis Procedure

INFOID:0000000013290130

1.INSPECTION START

NOTE:

This DTC is displayed when the accelerator pedal is pressed in full-load position in neutral for 2 minutes or more.

>> INSPECTION END

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P0222, P0223 THROTTLE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0222, P0223 THROTTLE POSITION SENSOR

Diagnosis Description

INFOID:0000000013290131

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0222	THROTTLE/PEDAL POS SEN/ SW B (Throttle/Pedal position sensor/ switch "B" circuit low)	NO SUBTYPE INFORMATION	Position sensor 2 for the throttle valve has a short circuit to ground.
P0223	THROTTLE/PEDAL POS SEN/ SW B (Throttle/Pedal position sensor/ switch "B" circuit low)	NO SUBTYPE INFORMATION	Position sensor 2 for the throttle valve has a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

Diagnosis Procedure

INFOID:0000000013476217

1. CHECK THROTTLE VALVE POSITION

With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-459, "Component Inspection \(Throttle Valve Actuator\)"](#).

P0222, P0223 THROTTLE POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

3.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	4	F150	17	

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

5.CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	3	F150	38	
	5		62	
	6		14	

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:000000013476218

1.CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

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P0222, P0223 THROTTLE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

P0234 TURBOCHARGER BOOST PRESSURE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0234 TURBOCHARGER BOOST PRESSURE

DTC Description

INFOID:000000013448326

DTC DETECTION LOGIC

A

EC4

DTC	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	[Malfunction type]	
P0234	TC/SC A (Turbocharger/supercharger "A" overboost condition)	SIG AMPLITUDE > MAX	The boost pressure of turbocharger 1 is too high. The signal amplitude is greater than the maximum amplitude.

C

D

POSSIBLE CAUSE

- Boost pressure control vacuum transducer
- Foreign matter caught at the pressure sensor upstream of throttle valve.
- Turbocharger
- Exhaust gas pressure
- Charge air leakage

E

F

Diagnosis Procedure

INFOID:000000013472892

1. CHECK COMPONENT FUNCTION-1

G

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check boost pressure control".
3. Start the engine and let it idle.
4. Check that the value of "BOOST PRES POSITNR DUTY" is between 87% and 100%.

H

Is the inspection result normal?

I

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK FUSE

J

1. Turn ignition switch OFF.
2. Pull out No. 98 (15A) fuse.
3. Check that the fuse is not fusing.

K

Is the inspection result normal?

L

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY

M

1. Reinsert the fuse which pulled out.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Turn ignition switch ON.
4. Check the voltage between boost pressure control vacuum transducer harness connector and ground.

N

+		-	Voltage
Connector	Terminal		
F161	1	Ground	Battery voltage

O

P

Is the inspection result normal?

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

4. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

P0234 TURBOCHARGER BOOST PRESSURE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Pull out No. 98 (15 A) fuse.
3. Check the continuity between boost pressure control vacuum transducer harness connector and fuse terminal.

+		-	Continuity
Boost pressure control vacuum transducer			
Connector	Terminal	No. 98 fuse terminal	Existed
F161	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

Check boost pressure control vacuum transducer. Refer to [EC4-463, "Component Inspection \(Boost Pressure Control Vacuum Transducer\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace boost pressure control vacuum transducer.

6. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and boost pressure control vacuum transducer harness connector.

+		-		Continuity
ECM		Boost pressure control vacuum transducer		
Connector	Terminal	Connector	Terminal	Existed
F150	51	F161	2	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

7. CHECK COMPONENT FUNCTION-2

With CONSULT

1. Set the vehicle to the following conditions.

Item	Condition
Engine speed	500 rpm or more
Engine coolant temperature	Less than 75°C (167°F)
Electrical load	OFF

2. Perform Active Test.
3. Check that the turbocharger control rod moves smoothly by visually check.

CAUTION:

Never operate the control rod by hand.

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

P0234 TURBOCHARGER BOOST PRESSURE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

8. CHECK VACUUM PRESSURE

1. Turn ignition switch OFF.
2. Disconnect vacuum hose at boost pressure control vacuum transducer.
3. Connect vacuum tester.
4. Start the engine and let it idle.
5. Check that the vacuum pressure is more than -75 kPa (-750 mbar, -0.765 kg/cm², -10.9 psi).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Check vacuum line leakage, or vacuum pump performance.

9. CHECK COMPONENT

Check the following.

- Pressure sensor upstream of throttle valve (foreign matter is caught.)
- Turbocharger (obstructed movement)
- Exhaust gas pressure
- Charge air leakage
- Divert air switchover valve diaphragm

>> INSPECTION END

Component Inspection (Boost Pressure Control Vacuum Transducer)

INFOID:0000000013472893

1. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

1. Turn ignition switch OFF.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Check the resistance between boost pressure control vacuum transducer terminals.

Boost pressure control vacuum transducer	Resistance
Terminal	
1 and 2	9.5 – 13.5 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace boost pressure control vacuum transducer. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

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P0236 PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0236 PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE

DTC Description

INFOID:000000013290134

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0236	TC/SC BOOST SENSOR A (Turbocharger/Supercharger boost sensor "A" circuit range/performance)	SG BS LVL O-OF RNG/ZR AJST ERR	The pressure sensor upstream of throttle valve has a malfunction. The signal offset is outside the permissible range.
		SIGNAL STUCK IN RANGE	The pressure sensor upstream of throttle valve has a malfunction. There is no signal change.
		SIGNAL PLAUSIBILITY ERROR	The pressure sensor upstream of throttle valve has a malfunction. There is an implausible signal.

POSSIBLE CAUSE

Pressure sensor upstream of throttle valve

Diagnosis Procedure

INFOID:000000013290135

1. REPLACE PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE

Replace pressure sensor upstream of throttle valve. Refer to [EM-28. "Exploded View"](#).

>> INSPECTION END

P0237, P0238 PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0237, P0238 PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE

DTC Description

INFOID:0000000013290136

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0237	TC/SC BOOST SENSOR A (Turbocharger/Supercharger boost sensor "A" circuit low)	CIRCUIT SHORT TO GROUND	The pressure sensor upstream of throttle valve has a short circuit to ground. There is a short circuit to ground.
P0238	TC/SC BOOST SENSOR A (Turbocharger/Supercharger boost sensor "A" circuit high)	CIRCUIT SHORT TO BATTERY	The pressure sensor upstream of throttle valve has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors
(Pressure sensor upstream of throttle valve circuit is open or shorted.)
- Pressure sensor upstream of throttle valve

Diagnosis Procedure

INFOID:0000000013290137

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "PRS SEN U/STRM THRTL VLV".
3. Check the indicated value as the following conditions.

Monitor item	Condition	Value
PRS SEN U/STRM THRTL VLV	Ignition switch ON (engine stopped)	1 – 2 V
	<ul style="list-style-type: none">• At idle• Accelerator pedal: quickly depress	2 V or more

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK POWER SUPPLY OF PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE

1. Turn ignition switch OFF.
2. Disconnect pressure sensor upstream of throttle valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between pressure sensor upstream of throttle valve harness connector and ground.

+		-	Voltage
Connector	Terminal		
F186	3	Ground	4.75 – 5.25 V

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

P0237, P0238 PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and pressure sensor upstream of throttle valve harness connector.

+		-		Continuity
ECM		Pressure sensor upstream of throttle valve		
Connector	Terminal	Connector	Terminal	
F150	16	F186	3	Existed

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4.CHECK PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and pressure sensor upstream of throttle valve harness connector.

+		-		Continuity
ECM		Pressure sensor upstream of throttle valve		
Connector	Terminal	Connector	Terminal	
F150	11	F186	2	Existed
	41		1	

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

Is the inspection result normal?

YES >> Replace pressure sensor upstream of throttle valve. Refer to [EM-28, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P0243 BOOST PRESSURE CONTROL VACUUM TRANSDUCER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0243 BOOST PRESSURE CONTROL VACUUM TRANSDUCER

DTC Description

INFOID:0000000013290138

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0243	TC/SC WASTEGATE SOLENOID A (Turbocharger/Supercharger wastegate solenoid "A")	CIRCUIT OPEN	The output for the low-pressure turbocharger has an electrical malfunction. There is an open circuit.

C

D

POSSIBLE CAUSE

- Harness or connectors (Boost pressure control vacuum transducer circuit)
- Boost pressure control vacuum transducer

E

F

Diagnosis Procedure

INFOID:0000000013466566

1. COMPONENT FUNCTION CHECK

G

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check boost pressure control".
3. Start the engine and let it idle.
4. Perform Active Test.
5. Check that the indicated value of "BOOST PRES POSITNR DUTY" is between 87% and 100%.

H

I

Is the actuator actuated?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> GO TO 2.

J

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

K

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

L

3. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Turn ignition switch ON.
4. Check the voltage between boost pressure control vacuum transducer harness connector and ground.

M

N

+		-	Voltage
Connector	Terminal		
F161	1	Ground	Battery voltage

O

P

Is the inspection result normal?

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

4. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

P0243 BOOST PRESSURE CONTROL VACUUM TRANSDUCER

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Pull out No. 98 (15 A) fuse.
3. Check the continuity between boost pressure control vacuum transducer harness connector and fuse terminal.

+		-	Continuity
Boost pressure control vacuum transducer			
Connector	Terminal	No. 98 fuse terminal	Existed
F161	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

Check boost pressure control vacuum transducer. Refer to [EC4-470, "Component Inspection \(Boost Pressure Control Vacuum Transducer\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace boost pressure control vacuum transducer. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and boost pressure control vacuum transducer harness connector.

+		-		Continuity
ECM		Boost pressure control vacuum transducer		
Connector	Terminal	Connector	Terminal	Existed
F150	51	F161	2	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Boost Pressure Control Vacuum Transducer)

INFOID:0000000013466567

1.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

1. Turn ignition switch OFF.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Check the resistance between boost pressure control vacuum transducer terminals.

Boost pressure control vacuum transducer	Resistance
Terminal	
1 and 2	9.5 – 13.5 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace boost pressure control vacuum transducer. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P0245 BOOST PRESSURE CONTROL VACUUM TRANSDUCER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0245 BOOST PRESSURE CONTROL VACUUM TRANSDUCER

DTC Description

INFOID:000000013290141

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0245	TC/SC WASTEGATE SOLENOID A (Turbocharger/Supercharger wastegate solenoid "A" low)	CIRCUIT SHORT TO GROUND	The output for the low-pressure turbocharger has an electrical malfunction. There is a short circuit to ground.

C

D

POSSIBLE CAUSE

- Harness or connectors (Boost pressure control vacuum transducer circuit)
- Boost pressure control vacuum transducer

E

F

Diagnosis Procedure

INFOID:000000013466568

1. COMPONENT FUNCTION CHECK

G

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check boost pressure control".
3. Start the engine and let it idle.
4. Perform Active Test.
5. Check that the indicated value of "BOOST PRES POSITNR DUTY" is between 87% and 100%.

H

I

Is the actuator actuated?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> GO TO 2.

J

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

K

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

L

3. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Turn ignition switch ON.
4. Check the voltage between boost pressure control vacuum transducer harness connector and ground.

M

N

+		-	Voltage
Connector	Terminal		
F161	1	Ground	Battery voltage

O

P

Is the inspection result normal?

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

4. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

P0245 BOOST PRESSURE CONTROL VACUUM TRANSDUCER

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Pull out No. 98 (15 A) fuse.
3. Check the continuity between boost pressure control vacuum transducer harness connector and fuse terminal.

+		-	Continuity
Boost pressure control vacuum transducer			
Connector	Terminal	No. 98 fuse terminal	Existed
F161	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

Check boost pressure control vacuum transducer. Refer to [EC4-470, "Component Inspection \(Boost Pressure Control Vacuum Transducer\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace boost pressure control vacuum transducer. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and boost pressure control vacuum transducer harness connector.

+		-		Continuity
ECM		Boost pressure control vacuum transducer		
Connector	Terminal	Connector	Terminal	Existed
F150	51	F161	2	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Boost Pressure Control Vacuum Transducer)

INFOID:0000000013466569

1.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

1. Turn ignition switch OFF.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Check the resistance between boost pressure control vacuum transducer terminals.

Boost pressure control vacuum transducer	Resistance
Terminal	
1 and 2	9.5 – 13.5 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace boost pressure control vacuum transducer. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P0246 BOOST PRESSURE CONTROL VACUUM TRANSDUCER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0246 BOOST PRESSURE CONTROL VACUUM TRANSDUCER

DTC Description

INFOID:000000013290144

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0246	TC/SC WASTEGATE SOLENOID A (Turbocharger/Supercharger wastegate solenoid "A" high)	CIRCUIT SHORT TO BATTERY	The output for the low-pressure turbocharger has an electrical malfunction. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Boost pressure control vacuum transducer circuit)
- Boost pressure control vacuum transducer

Diagnosis Procedure

INFOID:000000013290145

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check boost pressure control".
3. Start the engine and let it idle.
4. Perform Active Test.
5. Check that the indicated value of "BOOST PRES POSITNR DUTY" is between 87% and 100%.

Is the actuator actuated?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Turn ignition switch ON.
4. Check the voltage between boost pressure control vacuum transducer harness connector and ground.

+		-	Voltage
Connector	Terminal		
F161	1	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

P0246 BOOST PRESSURE CONTROL VACUUM TRANSDUCER

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Pull out No. 98 (15 A) fuse.
3. Check the continuity between boost pressure control vacuum transducer harness connector and fuse terminal.

+		-	Continuity
Boost pressure control vacuum transducer			
Connector	Terminal	No. 98 fuse terminal	Existed
F161	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

Check boost pressure control vacuum transducer. Refer to [EC4-472, "Component Inspection \(Boost Pressure Control Vacuum Transducer\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace boost pressure control vacuum transducer. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and boost pressure control vacuum transducer harness connector.

+		-		Continuity
ECM		Boost pressure control vacuum transducer		
Connector	Terminal	Connector	Terminal	Existed
F150	51	F161	2	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Boost Pressure Control Vacuum Transducer)

INFOID:0000000013290146

1.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

1. Turn ignition switch OFF.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Check the resistance between boost pressure control vacuum transducer terminals.

Boost pressure control vacuum transducer	Resistance
Terminal	
1 and 2	9.5 – 13.5 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace boost pressure control vacuum transducer. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P0262 FUEL INJECTOR (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0262 FUEL INJECTOR (CYLINDER 1)

DTC Description

INFOID:000000013290147

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0262	CYLINDER 1 FUEL INJECTOR (Cylinder 1 injector "A" circuit high)	CIRCUIT SHORT TO BATTERY	The fuel injector (cylinder 1) has a short circuit to positive. There is a short circuit to positive.

C

D

POSSIBLE CAUSE

- Harness or connectors (Fuel injector circuit is open or shorted.)
- Fuel injector
- Fuel leak (fuel injector)

E

F

Diagnosis Procedure

INFOID:000000013466570

1. CHECK FUEL INJECTOR FUNCTION

G

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check cylinder fuel injectors".
3. Start the engine and let it idle.
4. Set the vehicle to the following conditions:

H

I

Monitor item	Condition
ENGINE SPEED	500 – 950 rpm
SMOOTH OPR OF CYL 1	2 or less
SMOOTH OPR OF CYL 2	2 or less
SMOOTH OPR OF CYL 3	2 or less
SMOOTH OPR OF CYL 4	2 or less
COOLANT TEMPERATURE	80°C (176°F)

J

K

5. Perform Active Test.

L

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

M

2. CHECK FUEL INJECTOR

Check cylinder 1 fuel injector. Refer to [EC4-474. "Component Inspection \(Fuel Injector\)".](#)

N

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace fuel injector. Refer to [EM-51. "Removal and Installation".](#)

O

3. CHECK FUEL INJECTOR CONTROL CIRCUIT

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

P

P0262 FUEL INJECTOR (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Fuel injector		
Connector	Terminal	Connector	Terminal	
F150	1	F171	2	Existed
	2		1	

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK INJECTOR LEAKAGE

NOTE:

During this test, the fuel rail pressure is increased.

1. Remove spark plug.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HIGH PRESSURE CIRCUIT".
5. Set the vehicle the following conditions.
 - Engine stopped
 - Parking brake: applied
 - Selector lever: P or N
6. Start the Active Test.

CAUTION:

Never turn OFF ignition switch.

NOTE:

Fuel injectors are turned OFF.

7. Depress and hold down brake pedal.
8. Actuate the starter for several seconds.
9. Stop starter.
10. Check combustion chamber and fuel injector for fuel leakage by using suitable tool (e.g. endoscope light probe).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:000000013466571

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between injector terminals.

Cylinder	Injector		Resistance
	+	-	
	Terminal		
1	1	2	198 – 242 kΩ
2			
3			
4			

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector(s). Refer to [EM-51, "Removal and Installation"](#).

P0265 FUEL INJECTOR (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0265 FUEL INJECTOR (CYLINDER 2)

DTC Description

INFOID:000000013290150

DTC DETECTION LOGIC

A
EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0265	CYLINDER 2 FUEL INJECTOR (Cylinder 2 injector "A" circuit high)	CIRCUIT SHORT TO BATTERY	The fuel injector (cylinder 2) has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Fuel injector circuit is open or shorted.)
- Fuel injector
- Fuel leak (fuel injector)

Diagnosis Procedure

INFOID:000000013466572

1. CHECK FUEL INJECTOR FUNCTION

Ⓜ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check cylinder fuel injectors".
3. Start the engine and let it idle.
4. Set the vehicle to the following conditions:

Monitor item	Condition
ENGINE SPEED	500 – 950 rpm
SMOOTH OPR OF CYL 1	2 or less
SMOOTH OPR OF CYL 2	2 or less
SMOOTH OPR OF CYL 3	2 or less
SMOOTH OPR OF CYL 4	2 or less
COOLANT TEMPERATURE	80°C (176°F)

5. Perform Active Test.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK FUEL INJECTOR

Check cylinder 2 fuel injector. Refer to [EC4-476. "Component Inspection \(Fuel Injector\)".](#)

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace fuel injector. Refer to [EM-51. "Removal and Installation".](#)

3. CHECK FUEL INJECTOR CONTROL CIRCUIT

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

P0265 FUEL INJECTOR (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Fuel injector		
Connector	Terminal	Connector	Terminal	
F150	73	F172	2	Existed
	74		1	

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK INJECTOR LEAKAGE

NOTE:

During this test, the fuel rail pressure is increased.

1. Remove spark plug.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HIGH PRESSURE CIRCUIT".
5. Set the vehicle the following conditions.
 - Engine stopped
 - Parking brake: applied
 - Selector lever: P or N
6. Start the Active Test.

CAUTION:

Never turn OFF ignition switch.

NOTE:

Fuel injectors are turned OFF.

7. Depress and hold down brake pedal.
8. Actuate the starter for several seconds.
9. Stop starter.
10. Check combustion chamber and fuel injector for fuel leakage by using suitable tool (e.g. endoscope light probe).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:000000013466573

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between injector terminals.

Cylinder	Injector		Resistance
	+	-	
	Terminal		
1	1	2	198 – 242 kΩ
2			
3			
4			

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector(s). Refer to [EM-51, "Removal and Installation"](#).

P0268 FUEL INJECTOR (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0268 FUEL INJECTOR (CYLINDER 3)

DTC Description

INFOID:000000013290153

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0268	CYLINDER 3 FUEL INJECTOR (Cylinder 3 injector "A" circuit high)	CIRCUIT SHORT TO BATTERY	The fuel injector (cylinder 3) has a short circuit to positive. There is a short circuit to positive.

C

D

POSSIBLE CAUSE

- Harness or connectors (Fuel injector circuit is open or shorted.)
- Fuel injector
- Fuel leak (fuel injector)

E

F

Diagnosis Procedure

INFOID:000000013466574

1. CHECK FUEL INJECTOR FUNCTION

G

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check cylinder fuel injectors".
3. Start the engine and let it idle.
4. Set the vehicle to the following conditions:

H

I

Monitor item	Condition
ENGINE SPEED	500 – 950 rpm
SMOOTH OPR OF CYL 1	2 or less
SMOOTH OPR OF CYL 2	2 or less
SMOOTH OPR OF CYL 3	2 or less
SMOOTH OPR OF CYL 4	2 or less
COOLANT TEMPERATURE	80°C (176°F)

J

K

L

5. Perform Active Test.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

M

2. CHECK FUEL INJECTOR

Check cylinder 3 fuel injector. Refer to [EC4-478. "Component Inspection \(Fuel Injector\)".](#)

N

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace fuel injector. Refer to [EM-51. "Removal and Installation".](#)

O

3. CHECK FUEL INJECTOR CONTROL CIRCUIT

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

P

P0268 FUEL INJECTOR (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Fuel injector		
Connector	Terminal	Connector	Terminal	
F150	49	F173	2	Existed
	50		1	

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK INJECTOR LEAKAGE

NOTE:

During this test, the fuel rail pressure is increased.

1. Remove spark plug.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HIGH PRESSURE CIRCUIT".
5. Set the vehicle the following conditions.
 - Engine stopped
 - Parking brake: applied
 - Selector lever: P or N
6. Start the Active Test.

CAUTION:

Never turn OFF ignition switch.

NOTE:

Fuel injectors are turned OFF.

7. Depress and hold down brake pedal.
8. Actuate the starter for several seconds.
9. Stop starter.
10. Check combustion chamber and fuel injector for fuel leakage by using suitable tool (e.g. endoscope light probe).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:000000013466575

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between injector terminals.

Cylinder	Injector		Resistance
	+	-	
	Terminal		
1	1	2	198 – 242 kΩ
2			
3			
4			

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector(s). Refer to [EM-51, "Removal and Installation"](#).

P0271 FUEL INJECTOR (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0271 FUEL INJECTOR (CYLINDER 4)

DTC Description

INFOID:000000013290156

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0271	CYLINDER 4 FUEL INJECTOR (Cylinder 4 injector "A" circuit high)	CIRCUIT SHORT TO BATTERY	The fuel injector (cylinder 4) has a short circuit to positive. There is a short circuit to positive.

C

D

POSSIBLE CAUSE

- Harness or connectors (Fuel injector circuit is open or shorted.)
- Fuel injector
- Fuel leak (fuel injector)

E

F

Diagnosis Procedure

INFOID:000000013466576

1. CHECK FUEL INJECTOR FUNCTION

G

Ⓜ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check cylinder fuel injectors".
3. Start the engine and let it idle.
4. Set the vehicle to the following conditions:

H

I

Monitor item	Condition
ENGINE SPEED	500 – 950 rpm
SMOOTH OPR OF CYL 1	2 or less
SMOOTH OPR OF CYL 2	2 or less
SMOOTH OPR OF CYL 3	2 or less
SMOOTH OPR OF CYL 4	2 or less
COOLANT TEMPERATURE	80°C (176°F)

J

K

L

5. Perform Active Test.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

M

2. CHECK FUEL INJECTOR

Check cylinder 4 fuel injector. Refer to [EC4-480. "Component Inspection \(Fuel Injector\)".](#)

N

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace fuel injector. Refer to [EM-51. "Removal and Installation".](#)

O

3. CHECK FUEL INJECTOR CONTROL CIRCUIT

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

P

P0271 FUEL INJECTOR (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Fuel injector		
Connector	Terminal	Connector	Terminal	
F150	25	F174	2	Existed
	26		1	

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK INJECTOR LEAKAGE

NOTE:

During this test, the fuel rail pressure is increased.

1. Remove spark plug.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HIGH PRESSURE CIRCUIT".
5. Set the vehicle the following conditions.
 - Engine stopped
 - Parking brake: applied
 - Selector lever: P or N
6. Start the Active Test.

CAUTION:

Never turn OFF ignition switch.

NOTE:

Fuel injectors are turned OFF.

7. Depress and hold down brake pedal.
8. Actuate the starter for several seconds.
9. Stop starter.
10. Check combustion chamber and fuel injector for fuel leakage by using suitable tool (e.g. endoscope light probe).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Fuel Injector)

INFOID:000000013466577

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check the resistance between injector terminals.

Cylinder	Injector		Resistance
	+	-	
	Terminal		
1	1	2	198 – 242 kΩ
2			
3			
4			

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector(s). Refer to [EM-51, "Removal and Installation"](#).

P0299 TC SYSTEM

DTC Description

INFOID:000000013448333

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0299	TC/SC A (Turbocharger/Supercharger "A" Underboost Condition)	SIGNAL AMPLITUDE < MIN	The boost pressure of turbocharger is too low. The signal amplitude is less than the minimum amplitude.

POSSIBLE CAUSE

- Boost pressure control vacuum transducer
- Foreign matter caught at the pressure sensor upstream of throttle valve.
- Turbocharger
- Exhaust gas pressure
- Charge air leakage

Diagnosis Procedure

INFOID:000000013472890

1. CHECK COMPONENT FUNCTION-1

 With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check boost pressure control".
3. Start the engine and let it idle.
4. Check that the value of "BOOST PRES POSITNR DUTY" is between 87% and 100%.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out No. 98 (15A) fuse.
3. Check that the fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY

1. Reinsert the fuse which pulled out.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Turn ignition switch ON.
4. Check the voltage between boost pressure control vacuum transducer harness connector and ground.

+		-	Voltage
Boost pressure control vacuum transducer			
Connector	Terminal	Ground	Battery voltage
F161	1		

Is the inspection result normal?

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

4. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Pull out No. 98 (15 A) fuse.
3. Check the continuity between boost pressure control vacuum transducer harness connector and fuse terminal.

+		-	Continuity
Boost pressure control vacuum transducer			
Connector	Terminal	No. 98 fuse terminal	Existed
F161	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

Check boost pressure control vacuum transducer. Refer to [EC4-483. "Component Inspection \(Boost Pressure Control Vacuum Transducer\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace boost pressure control vacuum transducer.

6.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and boost pressure control vacuum transducer harness connector.

+		-		Continuity
ECM		Boost pressure control vacuum transducer		
Connector	Terminal	Connector	Terminal	Existed
F150	51	F161	2	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

7.CHECK COMPONENT FUNCTION-2

 **With CONSULT**

1. Set the vehicle to the following conditions.

Item	Condition
Engine speed	500 rpm or more
Engine coolant temperature	Less than 75°C (167°F)
Electrical load	OFF

2. Perform Active Test.
3. Check that the turbocharger control rod moves smoothly by visually check.

CAUTION:

Never operate the control rod by hand.

Is the inspection result normal?

YES >> GO TO 9.

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 8.

8.CHECK VACUUM PRESSURE

1. Turn ignition switch OFF.
2. Disconnect vacuum hose at boost pressure control vacuum transducer.
3. Connect vacuum tester.
4. Start the engine and let it idle.
5. Check that the vacuum pressure is more than -75 kPa (-750 mbar, -0.765 kg/cm², -10.9 psi).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Check vacuum line leakage, or vacuum pump performance.

9.CHECK COMPONENT

Check the following.

- Pressure sensor upstream of throttle valve (foreign matter is caught.)
- Turbocharger (obstructed movement)
- Exhaust gas pressure
- Charge air leakage
- Divert air switchover valve diaphragm

>> INSPECTION END

Component Inspection (Boost Pressure Control Vacuum Transducer)

INFOID:000000013472891

1.CHECK BOOST PRESSRUE CONTROL VACUUM TRANSDUCER

1. Turn ignition switch OFF.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Check the resistance between boost pressure control vacuum transducer terminals.

Boost pressure control vacuum transducer		Resistance
Terminal		
1 and 2		9.5 – 13.5 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace boost pressure control vacuum transducer. Refer to [EC4-25, "ENGINE CONTROL SYS-TEM : Component Parts Location"](#).

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P0300, P0301, P0302, P0303, P0304 MISFIRE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0300, P0301, P0302, P0303, P0304 MISFIRE

DTC Description

INFOID:000000013290159

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0300	RANDOM/MULTIPLE CYL MISFIRE (Random/multiple cylinder misfire detected)	SIG ABOVE ALLOWABLE RANGE	Combustion misfiring has been detected. There is a signal above the permissible limit value.
P0301	CYLINDER 1 MISFIRE (Cylinder 1 misfire detected)	SIG ABOVE ALLOWABLE RANGE	Combustion misfiring of cylinder 1 has been detected. There is a signal above the permissible limit value.
P0302	CYLINDER 2 MISFIRE (Cylinder 2 misfire detected)	SIG ABOVE ALLOWABLE RANGE	Combustion misfiring of cylinder 2 has been detected. There is a signal above the permissible limit value.
P0303	CYLINDER 1 MISFIRE (Cylinder 3 misfire detected)	SIG ABOVE ALLOWABLE RANGE	Combustion misfiring of cylinder 3 has been detected. There is a signal above the permissible limit value.
P0304	CYLINDER 1 MISFIRE (Cylinder 4 misfire detected)	SIG ABOVE ALLOWABLE RANGE	Combustion misfiring of cylinder 4 has been detected. There is a signal above the permissible limit value.

POSSIBLE CAUSE

- Improper spark plug
- Insufficient compression
- Intake air leak
- Lack of fuel

FAIL-SAFE

P0300

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013466583

1. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK DTC

With CONSULT

1. Turn ignition switch ON.
2. Check "Self-diagnostic result" in "ENGINE".
3. Check that the DTC related to the following is not detected.
 - Fuel injector
 - Ignition system
 - Fuel pressure
 - A/F sensor and heated oxygen sensor
 - Charge air temperature sensor upstream of throttle valve
 - Charge air temperature sensor downstream of throttle valve
 - Pressure sensor downstream of throttle valve

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).

NO >> GO TO 3.

3. CHECK SPARK PLUG

P0300, P0301, P0302, P0303, P0304 MISFIRE

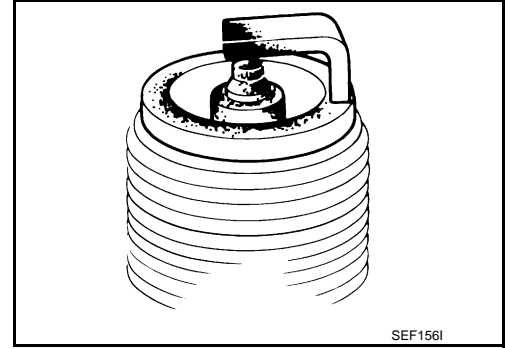
< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

1. Turn ignition switch OFF.
2. Remove spark plug.
3. Check the initial spark plug for fouling, etc.

Is the inspection result normal?

- YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-132, "Spark Plug"](#).
- NO >> Repair or clean spark plug. Then GO TO 4.



4. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-14, "Inspection"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

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P0324 KNOCK CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0324 KNOCK CONTROL

DTC Description

INFOID:000000013290161

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0324	KNOCK/COMBSTN VIBRTN CNT SYS (Knock/Combustion vibration control system error)	NO SUBTYPE INFORMATION	The knock control has a malfunction.
		SIG RTE OF CHNG ABV THRESHLD	The knock control has a malfunction. The signal change rate is above the permissible limit value.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290162

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P0327 KNOCK SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0327 KNOCK SENSOR 1

DTC Description

INFOID:000000013290163

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0327	KNOCK/COMBSTN VIBRTN SEN 1 B1 (Knock/combustion vibration sensor 1 circuit low bank 1 or single sensor)	CIRCUIT SHORT TO GROUND	Knock sensor 1 (cylinder bank 1) has a short circuit to ground. There is a short circuit to ground.
		CIRC SHORT TO GRND OR OPEN	Knock sensor 1 (cylinder bank 1) has a short circuit to ground. There is a short circuit to ground or an open circuit.
		SIG BELOW ALLOWABLE RANGE	Knock sensor 1 (cylinder bank 1) has a short circuit to ground. There is a signal below the permissible limit value.

C

D

E

F

POSSIBLE CAUSE

- Harness or connectors (Knock sensor 1 circuit is open or shorted.)
- Knock sensor 1

G

Diagnosis Procedure

INFOID:000000013466584

H

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 80°C (176°F).
2. On CONSULT screen, select “ENGINE” >> “DATA MONITOR” >> “COOLANT TEMPERATURE”, “ENGINE SPEED” and “KNOCK CONTROL ENABLE”.
3. Set the vehicle to the following conditions.

I

J

Item	Condition
ENGINE SPEED	50 rpm or more
COOLANT TEMPERATURE	80 – 110°C (176 – 230°F)

K

4. Check the indicated value of “KNOCK CONTROL ENABLE” as the following condition.

L

Item	Condition	Value
KNOCK CONTROL ENABLE	Fully depress accelerator pedal for a short time.	NO ⇔ YES

M

NOTE:

The status changes instantaneously.

Is the inspection result normal?

N

- YES >> INSPECTION END
- NO >> GO TO 2.

2. CHECK KNOCK SENSOR 1

Check knock sensor 1. Refer to [EC4-488. "Component Inspection \(Knock Sensor\)"](#).

Is the inspection result normal?

O

P

- YES >> GO TO 3.
- NO >> Replace knock sensor 1.

3. CHECK KNOCK SENSOR 1 CIRCUIT

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

P0327 KNOCK SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Knock sensor 1		
Connector	Terminal	Connector	Terminal	
F150	59	F155	1	Existed
	83		2	

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Knock Sensor)

INFOID:000000013466585

1.CHECK KNOCK SENSOR-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the resistance between ECM harness connector terminals.

Item	ECM			Resistance
	Connector	+	-	
		Terminal		
Knock sensor 1	F150	59	83	10 kΩ
Knock sensor 2		60	84	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK KNOCK SENSOR-2

1. Disconnect knock sensor harness connector.
2. Check the resistance between knock sensor terminals.

Knock sensor 1 Knock sensor 2		Resistance
+	-	
Terminal		
1	2	10 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace knock sensor.

P0328 KNOCK SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0328 KNOCK SENSOR 1

DTC Description

INFOID:000000013290166

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0328	KNOCK/COMBSTN VIBRTN SEN 1 B1 (Knock/combustion vibration sensor 1 circuit high bank 1 or single sensor)	CIRCUIT SHORT TO BATTERY	Knock sensor 1 (cylinder bank 1) has a short circuit to positive. There is a short circuit to positive.
		CIRC SHORT TO BATT OR OPEN	Knock sensor 1 (cylinder bank 1) has a short circuit to positive. There is a short circuit to positive or an open circuit.
		SIG ABOVE ALLOWABLE RANGE	Knock sensor 1 (cylinder bank 1) has a short circuit to positive. There is a signal above the permissible limit value.

C

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E

F

POSSIBLE CAUSE

- Harness or connectors (Knock sensor 1 circuit is open or shorted.)
- Knock sensor 1

G

Diagnosis Procedure

INFOID:000000013290167

1. COMPONENT FUNCTION CHECK

H

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 80°C (176°F).
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "COOLANT TEMPERATURE", "ENGINE SPEED" and "KNOCK CONTROL ENABLE".
3. Set the vehicle to the following conditions.

I

J

Item	Condition
ENGINE SPEED	50 rpm or more
COOLANT TEMPERATURE	80 – 110°C (176 – 230°F)

K

4. Check the indicated value of "KNOCK CONTROL ENABLE" as the following condition.

L

Item	Condition	Value
KNOCK CONTROL ENABLE	Fully depress accelerator pedal for a short time.	NO ⇔ YES

M

NOTE:

The status changes instantaneously.

Is the inspection result normal?

N

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK KNOCK SENSOR 1

O

Check knock sensor 1. Refer to [EC4-490. "Component Inspection \(Knock Sensor\)"](#).

Is the inspection result normal?

P

- YES >> GO TO 3.
NO >> Replace knock sensor 1.

3. CHECK KNOCK SENSOR 1 CIRCUIT

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

P0328 KNOCK SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Knock sensor 1		
Connector	Terminal	Connector	Terminal	
F150	59	F155	1	Existed
	83		2	

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Knock Sensor)

INFOID:000000013290168

1.CHECK KNOCK SENSOR-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the resistance between ECM harness connector terminals.

Item	Connector	ECM		Resistance
		+	-	
		Terminal		
Knock sensor 1	F150	59	83	10 kΩ
Knock sensor 2		60	84	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK KNOCK SENSOR-2

1. Disconnect knock sensor harness connector.
2. Check the resistance between knock sensor terminals.

Knock sensor 1 Knock sensor 2		Resistance
+	-	
Terminal		
1	2	10 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace knock sensor.

P032C KNOCK SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P032C KNOCK SENSOR 2

DTC Description

INFOID:000000013290169

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P032C	KNOCK/COMBSTN VIBRTN SEN 3 B1 (Knock/combustion vibration sensor 3 circuit low bank 1 or single sensor)	CIRCUIT SHORT TO GROUND	Knock sensor 2 (cylinder bank 1) has a short circuit to ground. There is a short circuit to ground.
		CIRC SHORT TO GRND OR OPEN	Knock sensor 2 (cylinder bank 1) has a short circuit to ground. There is a short circuit to ground or an open circuit.
		SIG BELOW ALLOWABLE RANGE	Knock sensor 2 (cylinder bank 1) has a short circuit to ground. There is a signal below the permissible limit value.

C

D

E

F

POSSIBLE CAUSE

- Harness or connectors (Knock sensor 2 circuit is open or shorted.)
- Knock sensor 2

G

Diagnosis Procedure

INFOID:000000013466586

H

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 80°C (176°F).
2. On CONSULT screen, select “ENGINE” >> “DATA MONITOR” >> “COOLANT TEMPERATURE”, “ENGINE SPEED” and “KNOCK CONTROL ENABLE”.
3. Set the vehicle to the following conditions.

I

J

Item	Condition
ENGINE SPEED	50 rpm or more
COOLANT TEMPERATURE	80 – 110°C (176 – 230°F)

K

4. Check the indicated value of “KNOCK CONTROL ENABLE” as the following condition.

L

Item	Condition	Value
KNOCK CONTROL ENABLE	Fully depress accelerator pedal for a short time.	NO ⇔ YES

M

NOTE:

The status changes instantaneously.

Is the inspection result normal?

N

- YES >> INSPECTION END
- NO >> GO TO 2.

2. CHECK KNOCK SENSOR 2

Check knock sensor 2. Refer to [EC4-492. "Component Inspection \(Knock Sensor\)"](#).

Is the inspection result normal?

O

P

- YES >> GO TO 3.
- NO >> Replace knock sensor 2.

3. CHECK KNOCK SENSOR 2 CIRCUIT

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

P032C KNOCK SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Knock sensor 2		
Connector	Terminal	Connector	Terminal	
F150	60	F164	2	Existed
	84		1	

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Knock Sensor)

INFOID:000000013466587

1. CHECK KNOCK SENSOR-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the resistance between ECM harness connector terminals.

Item	ECM			Resistance
	Connector	+	-	
		Terminal		
Knock sensor 1	F150	59	83	10 kΩ
Knock sensor 2		60	84	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK KNOCK SENSOR-2

1. Disconnect knock sensor harness connector.
2. Check the resistance between knock sensor terminals.

Knock sensor 1 Knock sensor 2		Resistance
+	-	
Terminal		
1	2	10 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace knock sensor.

P032D KNOCK SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P032D KNOCK SENSOR 2

DTC Description

INFOID:000000013290172

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P032D	KNOCK/COMBSTN VIBRTN SEN 3 B1 (Knock/combustion vibration sensor 3 circuit high bank 1 or single sensor)	CIRCUIT SHORT TO BATTERY	Knock sensor 2 (cylinder bank 1) has a short circuit to positive. There is a short circuit to positive.
		CIRC SHORT TO BATT OR OPEN	Knock sensor 2 (cylinder bank 1) has a short circuit to positive. There is a short circuit to positive or an open circuit.
		SIG ABOVE ALLOWABLE RANGE	Knock sensor 2 (cylinder bank 1) has a short circuit to positive. There is a signal above the permissible limit value.

C

D

E

F

POSSIBLE CAUSE

- Harness or connectors
(Knock sensor 2 circuit is open or shorted.)
- Knock sensor 2

G

Diagnosis Procedure

INFOID:000000013290173

1. COMPONENT FUNCTION CHECK

H

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 80°C (176°F).
2. On CONSULT screen, select “ENGINE” >> “DATA MONITOR” >> “COOLANT TEMPERATURE”, “ENGINE SPEED” and “KNOCK CONTROL ENABLE”.
3. Set the vehicle to the following conditions.

I

J

Item	Condition
ENGINE SPEED	50 rpm or more
COOLANT TEMPERATURE	80 – 110°C (176 – 230°F)

K

4. Check the indicated value of “KNOCK CONTROL ENABLE” as the following condition.

L

Item	Condition	Value
KNOCK CONTROL ENABLE	Fully depress accelerator pedal for a short time.	NO ⇔ YES

M

NOTE:

The status changes instantaneously.

Is the inspection result normal?

N

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK KNOCK SENSOR 2

O

Check knock sensor 2. Refer to [EC4-494. "Component Inspection \(Knock Sensor\)"](#).

Is the inspection result normal?

P

- YES >> GO TO 3.
NO >> Replace knock sensor 2.

3. CHECK KNOCK SENSOR 2 CIRCUIT

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

P032D KNOCK SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		Knock sensor 2		
Connector	Terminal	Connector	Terminal	
F150	60	F164	2	Existed
	84		1	

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Knock Sensor)

INFOID:000000013290174

1. CHECK KNOCK SENSOR-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the resistance between ECM harness connector terminals.

Item	ECM			Resistance
	Connector	+	-	
		Terminal		
Knock sensor 1	F150	59	83	10 kΩ
Knock sensor 2		60	84	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK KNOCK SENSOR-2

1. Disconnect knock sensor harness connector.
2. Check the resistance between knock sensor terminals.

Knock sensor 1 Knock sensor 2		Resistance
+	-	
Terminal		
1	2	10 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace knock sensor.

P0335 CRANKSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0335 CRANKSHAFT POSITION SENSOR

DTC Description

INFOID:0000000013290175

DTC DETECTION LOGIC

A
EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0335	CRANKSHAFT POSITION SENSOR A (Crankshaft position sensor "A" circuit)	NO SUBTYPE INFORMATION	The position of the crankshaft (cylinder bank 1) is implausible. There is a general electrical malfunction.
		GENERAL ELEC MALFUNCTN	Position sensor 1 for the crankshaft has an electrical malfunction. There is a general signal error.
		FM/PWM ERROR	Position sensor 1 for the crankshaft has an electrical malfunction. There is a frequency or pulse width modulation error.

POSSIBLE CAUSE

- Harness or connectors (Crankshaft position sensor circuit)
- Crankshaft position sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:0000000013466596

1. COMPONENT FUNCTION CHECK

1. Start the engine and let it idle.
2. Check signal between ECM harness connector terminals.

ECM			Reference value
Connector	+	-	
	Terminal		
F150	81	12	

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect crankshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between crankshaft position sensor harness connector terminals.

Crankshaft position sensor			Voltage
Connector	+	-	
	Terminal		
F168	1	3	4.8 – 5.3 V

P0335 CRANKSHAFT POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> GO TO 3.

3.CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY-2

Check the voltage between crankshaft position sensor harness connector and ground.

+		-	Voltage
Crankshaft position sensor			
Connector	Terminal		
F168	1	Ground	4.8 – 5.3 V

Is the inspection result normal?

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

4.CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	18	F168	1	Existed

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

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair or replace error-detected parts.

5.CHECK CRANKSHAFT POSITION SENSOR GROUND CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F168	3	Existed

4. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair or replace error-detected parts.

6.CHECK CRANKSHAFT POSITION SENSOR CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	81	F168	2	Existed

P0335 CRANKSHAFT POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> Replace crankshaft position sensor. Refer to [EM-86, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

7. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

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P0339 CRANKSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0339 CRANKSHAFT POSITION SENSOR

DTC Description

INFOID:000000013290177

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0339	CRANKSHAFT POSITION SENSOR A (Crankshaft position sensor "A" circuit intermittent)	NO SUBTYPE INFORMATION	Position sensor 1 for the crankshaft has a sporadic malfunction.
		ELECTRICAL MALFUNCTION	Position sensor 1 for the crankshaft has a sporadic malfunction. There is a general electrical malfunction.
		GENERAL ELEC MALFUNCTN	Position sensor 1 for the crankshaft has a sporadic malfunction. There is a general signal error.
		FM/PWM ERROR	Position sensor 1 for the crankshaft has a sporadic malfunction. There is a frequency or pulse width modulation error.
		SYSTEM INTERNAL MAL-FUNCTN	Position sensor 1 for the crankshaft has a sporadic malfunction. There is an internal malfunction.
		SYSTEM PROGRAMMING ERROR	Position sensor 1 for the crankshaft has a sporadic malfunction. There is a programming error.
		ALGORITHM BASED ERROR	Position sensor 1 for the crankshaft has a sporadic malfunction. There is an algorithm error.

POSSIBLE CAUSE

- Harness or connectors
(Crankshaft position sensor circuit)
- Crankshaft position sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290178

1.COMONENT FUNCTION CHECK

1. Start the engine and let it idle.
2. Check signal between ECM harness connector terminals.

Connector	ECM		Reference value
	+	-	
Terminal			
F150	81	12	

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2.CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.

P0339 CRANKSHAFT POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect crankshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between crankshaft position sensor harness connector terminals.

Crankshaft position sensor			Voltage
Connector	+	-	
	Terminal		
F168	1	3	4.8 – 5.3 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 3.

3.CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY-2

Check the voltage between crankshaft position sensor harness connector and ground.

+		-	Voltage
Crankshaft position sensor			
Connector	Terminal		
F168	1	Ground	4.8 – 5.3 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	18	F168	1	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

5.CHECK CRANKSHAFT POSITION SENSOR GROUND CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F168	3	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

6.CHECK CRANKSHAFT POSITION SENSOR CIRCUIT

P0339 CRANKSHAFT POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	81	F168	2	Existed

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

Is the inspection result normal?

YES >> Replace crankshaft position sensor. Refer to [EM-86, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

7.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

P0341 INTAKE CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0341 INTAKE CAMSHAFT POSITION SENSOR

DTC Description

INFOID:000000013290179

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0341	CAMSHAFT POSITION SENSOR A B1 (Camshaft position sensor "A" circuit range/performance bank 1 or single sensor)	NO SUBTYPE INFORMATION	The position sensor for the intake camshaft (cylinder bank 1) has a malfunction.

POSSIBLE CAUSE

- Harness or connectors (Intake camshaft position sensor circuit)
- Intake camshaft position sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290180

1. CHECK INTAKE CAMSHAFT POSITION SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect intake camshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake camshaft position sensor harness connector terminals.

Intake camshaft position sensor			Voltage
Connector	+	-	
F167	1	3	Battery voltage

Is the inspection result normal?

- YES >> GO TO 5.
NO >> GO TO 2.

2. CHECK INTAKE CAMSHAFT POSITION SENSOR POWER SUPPLY-2

Check the voltage between intake camshaft position sensor harness connector and ground.

+		-	Voltage
Connector	Terminal		
F167	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK INTAKE CAMSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between intake camshaft position sensor harness connector and fuse terminal.

P0341 INTAKE CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Intake camshaft position sensor			
Connector	Terminal	#98 fuse terminal	Existed
F167	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK INTAKE CAMSHAFT POSITION SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and intake camshaft position sensor harness connector.

+		-		Continuity
ECM		Intake camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	10	F167	3	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK INTAKE CAMSHAFT POSITION SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and intake camshaft position sensor harness connector.

+		-		Continuity
ECM		Intake camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	58	F167	2	

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

Is the inspection result normal?

YES >> Replace intake camshaft position sensor. Refer to [EM-70. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P0342 INTAKE CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0342 INTAKE CAMSHAFT POSITION SENSOR

DTC Description

INFOID:000000013290181

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0342	CAMSHAFT POSITION SENSOR A B1 (Camshaft position sensor "A" circuit low bank 1 or single sensor)	NO SUBTYPE INFORMATION	The position sensor of the intake camshaft (cylinder bank 1) has a short circuit to ground.

C

D

E

POSSIBLE CAUSE

- Harness or connectors (Intake camshaft position sensor circuit)
- Intake camshaft position sensor

F

FAIL-SAFE

Prohibits the stop/start operation.

G

Diagnosis Procedure

INFOID:000000013466597

1. CHECK INTAKE CAMSHAFT POSITION SENSOR POWER SUPPLY-1

H

1. Turn ignition switch OFF.
2. Disconnect intake camshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake camshaft position sensor harness connector terminals.

I

J

Intake camshaft position sensor			Voltage
Connector	+	-	
F167	1	3	Battery voltage

K

Is the inspection result normal?

L

- YES >> GO TO 5.
- NO >> GO TO 2.

2. CHECK INTAKE CAMSHAFT POSITION SENSOR POWER SUPPLY-2

M

Check the voltage between intake camshaft position sensor harness connector and ground.

+		-	Voltage
Connector	Terminal		
F167	1	Ground	Battery voltage

N

O

Is the inspection result normal?

P

- YES >> GO TO 4.
- NO >> GO TO 3.

3. CHECK INTAKE CAMSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between intake camshaft position sensor harness connector and fuse terminal.

P0342 INTAKE CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Intake camshaft position sensor			
Connector	Terminal	#98 fuse terminal	Existed
F167	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK INTAKE CAMSHAFT POSITION SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and intake camshaft position sensor harness connector.

+		-		Continuity
ECM		Intake camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	10	F167	3	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK INTAKE CAMSHAFT POSITION SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and intake camshaft position sensor harness connector.

+		-		Continuity
ECM		Intake camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	58	F167	2	

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

Is the inspection result normal?

YES >> Replace intake camshaft position sensor. Refer to [EM-29. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P0343 INTAKE CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0343 INTAKE CAMSHAFT POSITION SENSOR

DTC Description

INFOID:000000013290183

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0343	CAMSHAFT POSITION SENSOR A B1 (Camshaft position sensor "A" circuit high bank 1 or single sensor)	NO SUBTYPE INFORMATION	The position sensor of the intake camshaft (cylinder bank 1) has a short circuit to positive.

C

D

E

POSSIBLE CAUSE

- Harness or connectors (Intake camshaft position sensor circuit)
- Intake camshaft position sensor

F

FAIL-SAFE

Prohibits the stop/start operation.

G

Diagnosis Procedure

INFOID:000000013290184

1. CHECK INTAKE CAMSHAFT POSITION SENSOR POWER SUPPLY-1

H

1. Turn ignition switch OFF.
2. Disconnect intake camshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake camshaft position sensor harness connector terminals.

I

J

Intake camshaft position sensor			Voltage
Connector	+	-	
F167	1	3	Battery voltage

K

Is the inspection result normal?

L

- YES >> GO TO 5.
- NO >> GO TO 2.

2. CHECK INTAKE CAMSHAFT POSITION SENSOR POWER SUPPLY-2

M

Check the voltage between intake camshaft position sensor harness connector and ground.

+		-	Voltage
Connector	Terminal		
F167	1	Ground	Battery voltage

N

O

Is the inspection result normal?

P

- YES >> GO TO 4.
- NO >> GO TO 3.

3. CHECK INTAKE CAMSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between intake camshaft position sensor harness connector and fuse terminal.

P0343 INTAKE CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Intake camshaft position sensor			
Connector	Terminal	#98 fuse terminal	Existed
F167	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK INTAKE CAMSHAFT POSITION SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and intake camshaft position sensor harness connector.

+		-		Continuity
ECM		Intake camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	10	F167	3	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK INTAKE CAMSHAFT POSITION SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and intake camshaft position sensor harness connector.

+		-		Continuity
ECM		Intake camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	58	F167	2	

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

Is the inspection result normal?

YES >> Replace intake camshaft position sensor. Refer to [EM-29. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P0351 IGNITION COIL (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0351 IGNITION COIL (CYLINDER 1)

DTC Description

INFOID:000000013290185

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0351	IGNITION COIL A PRIMARY CONT (Ignition coil "A" primary control circuit/open)	MECHANICAL MALFUNCTION	The actuation of ignition coil 1 has an electrical malfunction or open circuit.
		CIRCUIT OPEN	The actuation of ignition coil 1 has an electrical malfunction or open circuit. There is an open circuit.
		INTERNAL ELECTRONIC ERROR	The actuation of ignition coil 1 has an electrical malfunction or open circuit. There is an internal electrical malfunction.
		COMPONENT INTERNAL MLFNCTN	The actuation of ignition coil 1 has an electrical malfunction or open circuit. There is an internal component malfunction.

C

D

E

F

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

G

Diagnosis Procedure

INFOID:000000013290186

1.INSPECTION START

CAUTION:

Refer to [EC4-21. "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0351 [CIRCUIT OPEN].

H

I

J

>> GO TO 2.

2.CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

K

L

+		-	Voltage
Ignition coil (No. 1)			
Connector	Terminal		
F179	1	Ground	Battery voltage

M

N

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

O

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

P

P0351 IGNITION COIL (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Ignition coil (No. 1)			
Connector	Terminal		
F179	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 1)			
Connector	Terminal		
F179	2	Ground	Existed
	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for ground circuit.

5. CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 1)		
Connector	Terminal	Connector	Terminal	
F150	79	F179	3	Existed

Is the inspection result normal?

YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P0352 IGNITION COIL (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0352 IGNITION COIL (CYLINDER 2)

DTC Description

INFOID:000000013290187

DTC DETECTION LOGIC

A
EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0352	IGNITION COIL B PRIMARY CONT (Ignition coil "B" primary control circuit/open)	MECHANICAL MALFUNCTION	The actuation of ignition coil 2 has an electrical malfunction or open circuit.
		CIRCUIT OPEN	The actuation of ignition coil 2 has an electrical malfunction or open circuit. There is an open circuit.
		INTERNAL ELECTRONIC ERROR	The actuation of ignition coil 2 has an electrical malfunction or open circuit. There is an internal electrical malfunction.
		COMPONENT INTERNAL MLFNCTN	The actuation of ignition coil 2 has an electrical malfunction or open circuit. There is an internal component malfunction.

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

Diagnosis Procedure

INFOID:000000013290188

1. INSPECTION START

CAUTION:

Refer to [EC4-21. "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0352 [CIRCUIT OPEN].

>> GO TO 2.

2. CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

+		-	Voltage
Ignition coil (No. 2)			
Connector	Terminal		
F180	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

P0352 IGNITION COIL (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Ignition coil (No. 2)			
Connector	Terminal		
F180	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 2)			
Connector	Terminal		
F180	2	Ground	Existed
	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for ground circuit.

5. CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 2)		
Connector	Terminal	Connector	Terminal	
F150	7	F180	3	Existed

Is the inspection result normal?

YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P0353 IGNITION COIL (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0353 IGNITION COIL (CYLINDER 3)

DTC Description

INFOID:000000013290189

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0353	IGNITION COIL C PRIMARY CONT (Ignition coil "C" primary control circuit/open)	MECHANICAL MALFUNCTION	The actuation of ignition coil 3 has an electrical malfunction or open circuit.
		CIRCUIT OPEN	The actuation of ignition coil 3 has an electrical malfunction or open circuit. There is an open circuit.
		INTERNAL ELECTRONIC ERROR	The actuation of ignition coil 3 has an electrical malfunction or open circuit. There is an internal electrical malfunction.
		COMPONENT INTERNAL MLFNCTN	The actuation of ignition coil 3 has an electrical malfunction or open circuit. There is an internal component malfunction.

C

D

E

F

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

G

Diagnosis Procedure

INFOID:000000013290190

1. INSPECTION START

CAUTION:

Refer to [EC4-21. "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0353 [CIRCUIT OPEN].

H

I

J

>> GO TO 2.

2. CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

K

L

+		-	Voltage
Ignition coil (No. 3)			
Connector	Terminal	Ground	Battery voltage
F181	1		

M

N

Is the inspection result normal?

O

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK IGNITION COIL POWER SUPPLY CIRCUIT

P

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

P0353 IGNITION COIL (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Ignition coil (No. 3)			
Connector	Terminal		
F181	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 3)			
Connector	Terminal		
F181	2	Ground	Existed
	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for ground circuit.

5. CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 3)		
Connector	Terminal	Connector	Terminal	
F150	55	F181	3	Existed

Is the inspection result normal?

YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P0354 IGNITION COIL (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0354 IGNITION COIL (CYLINDER 4)

DTC Description

INFOID:000000013290191

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0354	IGNITION COIL D PRIMARY CONT (Ignition coil "D" primary control circuit/open)	MECHANICAL MALFUNCTION	The actuation of ignition coil 4 has an electrical malfunction or open circuit.
		CIRCUIT OPEN	The actuation of ignition coil 4 has an electrical malfunction or open circuit. There is an open circuit.
		INTERNAL ELECTRONIC ERROR	The actuation of ignition coil 4 has an electrical malfunction or open circuit. There is an internal electrical malfunction.
		COMPONENT INTERNAL MLFNCTN	The actuation of ignition coil 4 has an electrical malfunction or open circuit. There is an internal component malfunction.

C

D

E

F

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

G

Diagnosis Procedure

INFOID:000000013290192

1. INSPECTION START

CAUTION:

Refer to [EC4-21. "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0354 [CIRCUIT OPEN].

H

I

J

>> GO TO 2.

2. CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

K

L

+		-	Voltage
Ignition coil (No. 4)			
Connector	Terminal		
F182	1	Ground	Battery voltage

M

N

Is the inspection result normal?

O

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK IGNITION COIL POWER SUPPLY CIRCUIT

P

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

P0354 IGNITION COIL (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Ignition coil (No. 4)			
Connector	Terminal		
F182	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 4)			
Connector	Terminal		
F182	2	Ground	Existed
	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for ground circuit.

5. CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 4)		
Connector	Terminal	Connector	Terminal	
F150	31	F182	3	Existed

Is the inspection result normal?

YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P0363 MISFIRE

DTC Description

INFOID:000000013290193

DTC DETECTION LOGIC

A
EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0363	MISFIRE (Misfire detected - fueling disabled)	NO SUBTYPE INFORMATION	Combustion misfiring was detected during stratified operation.

POSSIBLE CAUSE

- Improper spark plug
- Insufficient compression
- Intake air leak
- Lack of fuel

Diagnosis Procedure

INFOID:000000013290194

1. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

Is the inspection result normal?

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

2. CHECK DTC

 With CONSULT

1. Turn ignition switch ON.
2. Check "Self-diagnostic result" in "ENGINE".
3. Check that the DTC related to the following is not detected.
 - Fuel injector
 - Ignition system
 - Fuel pressure
 - A/F sensor and heated oxygen sensor
 - Charge air temperature sensor upstream of throttle valve
 - Charge air temperature sensor downstream of throttle valve
 - Pressure sensor downstream of throttle valve

Is any DTC detected?

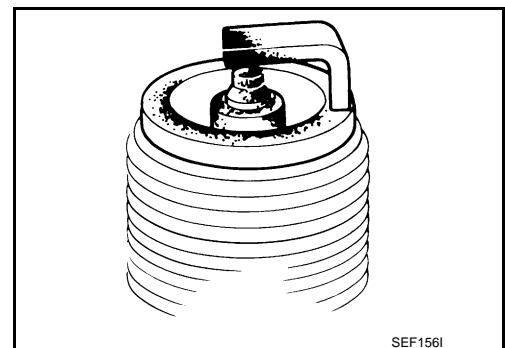
- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> GO TO 3.

3. CHECK SPARK PLUG

1. Turn ignition switch OFF.
2. Remove spark plug.
3. Check the initial spark plug for fouling, etc.

Is the inspection result normal?

- YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-132, "Spark Plug"](#).
- NO >> Repair or clean spark plug. Then GO TO 4.



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P0363 MISFIRE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-14. "Inspection"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

P0366 EXHAUST CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0366 EXHAUST CAMSHAFT POSITION SENSOR

DTC Description

INFOID:000000013290195

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0366	CAMSHAFT POSITION SENSOR B B1 (Camshaft position sensor "B" circuit range/performance bank 1 or single sensor)	NO SUBTYPE INFORMATION	The position sensor for the exhaust camshaft (cylinder bank 1) has a malfunction.

C

D

E

POSSIBLE CAUSE

- Harness or connectors (Exhaust camshaft position sensor circuit)
- Exhaust camshaft position sensor

F

FAIL-SAFE

Prohibits the stop/start operation.

G

Diagnosis Procedure

INFOID:000000013290196

1. CHECK EXHAUST CAMSHAFT POSITION SENSOR POWER SUPPLY-1

H

1. Turn ignition switch OFF.
2. Disconnect exhaust camshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between exhaust camshaft position sensor harness connector terminals.

I

J

Exhaust camshaft position sensor			Voltage
Connector	+	-	
F166	1	3	Battery voltage

K

Is the inspection result normal?

L

- YES >> GO TO 5.
NO >> GO TO 2.

2. CHECK EXHAUST CAMSHAFT POSITION SENSOR POWER SUPPLY-2

M

Check the voltage between exhaust camshaft position sensor harness connector and ground.

+		-	Voltage
Exhaust camshaft position sensor			
Connector	Terminal		
F166	1	Ground	Battery voltage

N

O

Is the inspection result normal?

P

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK EXHAUST CAMSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between exhaust camshaft position sensor harness connector and fuse terminal.

P0366 EXHAUST CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Exhaust camshaft position sensor			
Connector	Terminal	#98 fuse terminal	Existed
F166	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK EXHAUST CAMSHAFT POSITION SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and exhaust camshaft position sensor harness connector.

+		-		Continuity
ECM		Exhaust camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	10	F166	3	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK EXHAUST CAMSHAFT POSITION SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and exhaust camshaft position sensor harness connector.

+		-		Continuity
ECM		Exhaust camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	34	F166	2	

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

Is the inspection result normal?

YES >> Replace exhaust camshaft position sensor. Refer to [EM-65. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P0367 EXHAUST CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0367 EXHAUST CAMSHAFT POSITION SENSOR

DTC Description

INFOID:000000013290197

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0367	CAMSHAFT POSITION SENSOR B B1 (Camshaft position sensor "B" circuit low bank 1 or single sensor)	NO SUBTYPE INFORMATION	The position sensor of the exhaust camshaft (cylinder bank 1) has a short circuit to ground.

C

D

E

POSSIBLE CAUSE

- Harness or connectors (Exhaust camshaft position sensor circuit)
- Exhaust camshaft position sensor

F

FAIL-SAFE

Prohibits the stop/start operation.

G

Diagnosis Procedure

INFOID:000000013466598

1.CHECK EXHAUST CAMSHAFT POSITION SENSOR POWER SUPPLY-1

H

1. Turn ignition switch OFF.
2. Disconnect exhaust camshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between exhaust camshaft position sensor harness connector terminals.

I

J

Exhaust camshaft position sensor			Voltage
Connector	+	-	
	Terminal		
F166	1	3	Battery voltage

K

Is the inspection result normal?

L

- YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK EXHAUST CAMSHAFT POSITION SENSOR POWER SUPPLY-2

M

Check the voltage between exhaust camshaft position sensor harness connector and ground.

+		-	Voltage
Exhaust camshaft position sensor			
Connector	Terminal		
F166	1	Ground	Battery voltage

N

O

Is the inspection result normal?

P

- YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK EXHAUST CAMSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between exhaust camshaft position sensor harness connector and fuse terminal.

P0367 EXHAUST CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Exhaust camshaft position sensor			
Connector	Terminal	#98 fuse terminal	Existed
F166	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK EXHAUST CAMSHAFT POSITION SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and exhaust camshaft position sensor harness connector.

+		-		Continuity
ECM		Exhaust camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	10	F166	3	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK EXHAUST CAMSHAFT POSITION SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and exhaust camshaft position sensor harness connector.

+		-		Continuity
ECM		Exhaust camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	34	F166	2	

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

Is the inspection result normal?

YES >> Replace exhaust camshaft position sensor. Refer to [EM-65. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P0368 EXHAUST CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0368 EXHAUST CAMSHAFT POSITION SENSOR

DTC Description

INFOID:000000013290199

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0368	CAMSHAFT POSITION SENSOR B B1 (Camshaft position sensor "B" circuit high bank 1 or single sensor)	NO SUBTYPE INFORMATION	The position sensor of the exhaust camshaft (cylinder bank 1) has a short circuit to positive.

C

D

E

POSSIBLE CAUSE

- Harness or connectors (Exhaust camshaft position sensor circuit)
- Exhaust camshaft position sensor

F

FAIL-SAFE

Prohibits the stop/start operation.

G

Diagnosis Procedure

INFOID:000000013290200

1. CHECK EXHAUST CAMSHAFT POSITION SENSOR POWER SUPPLY-1

H

1. Turn ignition switch OFF.
2. Disconnect exhaust camshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between exhaust camshaft position sensor harness connector terminals.

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Exhaust camshaft position sensor			Voltage
Connector	+	-	
F166	1	3	Battery voltage

K

Is the inspection result normal?

L

- YES >> GO TO 5.
NO >> GO TO 2.

2. CHECK EXHAUST CAMSHAFT POSITION SENSOR POWER SUPPLY-2

M

Check the voltage between exhaust camshaft position sensor harness connector and ground.

+		-	Voltage
Connector	Terminal		
F166	1	Ground	Battery voltage

N

O

Is the inspection result normal?

P

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK EXHAUST CAMSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between exhaust camshaft position sensor harness connector and fuse terminal.

P0368 EXHAUST CAMSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Exhaust camshaft position sensor			
Connector	Terminal	#98 fuse terminal	Existed
F166	1		

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK EXHAUST CAMSHAFT POSITION SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and exhaust camshaft position sensor harness connector.

+		-		Continuity
ECM		Exhaust camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	10	F166	3	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK EXHAUST CAMSHAFT POSITION SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and exhaust camshaft position sensor harness connector.

+		-		Continuity
ECM		Exhaust camshaft position sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	34	F166	2	

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

Is the inspection result normal?

YES >> Replace exhaust camshaft position sensor. Refer to [EM-65. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P0420 EFFICIENCY OF THE CATALYTIC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0420 EFFICIENCY OF THE CATALYTIC CONVERTER

DTC Description

INFOID:0000000013290201

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0420	CATALYST SYSTEM EFFICIENCY B1 (Catalyst system efficiency below threshold bank 1)	NO SUBTYPE INFORMATION	The efficiency of the catalytic converter (cylinder bank 1) is not sufficient.

POSSIBLE CAUSE

- Harness and connectors
(A/F sensor circuit is open or shorted.)
(Heated oxygen sensor circuit is open or shorted.)
- A/F sensor
- Heated oxygen sensor

Diagnosis Procedure

INFOID:0000000013290202

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

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P0420 EFFICIENCY OF THE CATALYTIC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. Check the continuity between A/F sensor harness connector and ECM harness connector.

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5.CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

6.CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P0420 EFFICIENCY OF THE CATALYTIC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace heated oxygen sensor or A/F sensor. Refer to [EM-39, "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P0442 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0442 EVAP CONTROL SYSTEM

DTC Description

INFOID:000000013448339

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0442	Evaporation system leak [EVAP System Leak Detected (small leak)]	NO SUBTYPE INFORMATION	A fine leak in the evaporative emission control system was detected.

POSSIBLE CAUSE

- Incorrect fuel filler cap is used
- Fuel filler cap remains open.
- Poor installation of fuel filler cap
- Foreign matter caught in fuel filler cap.

Diagnosis Procedure

INFOID:000000013466606

1. CHECK FUEL FILLER CAP

Check the following.

- Proper fuel filler cap is used.
- Fuel filler cap installation condition
- Foreign matter is not attached.

>> INSPECTION END

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

DTC Description

INFOID:0000000013290203

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0444	EVAP SYS PURGE CONT VALVE A (EVAP system purge control valve "A" circuit open)	NO SUBTYPE INFORMATION	The EVAP purge control valve has an open circuit.

POSSIBLE CAUSE

- Harness or connectors (EVAP purge control valve circuit)
- EVAP purge control valve

Diagnosis Procedure

INFOID:0000000013290204

1. CHECK COMPONENT FUNCTION

Ⓜ With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK PURGING SWITCHOVER VALVE".
3. Perform the Active Test.
4. Check that the indicated value of "PWR CSMN (PURG SWOVR/V)" is between 390 – 495 mA.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP purge control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP purge control valve harness connector and ground.

+		-	Voltage
Connector	Terminal		
E202	2	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. Check the continuity between EVAP purge control valve harness connector and fuse terminal.

+		-	Continuity
EVAP purge control valve			
Connector	Terminal	No. 98 fuse terminal	Existed
E202	2		

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

5.CHECK EVAP PURGE CONTROL VALVE

Check EVAP purge control valve. Refer to [EC4-528, "Component Inspection \(EVAP Purge Control Valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace EVAP purge control valve. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK EVAP PURGE CONTROL VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP purge control valve harness connector.

+		-		Continuity
ECM		EVAP purge control valve		
Connector	Terminal	Connector	Terminal	Existed
E200	153	E202	1	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK EVAP PURGE CIRCUIT LEAKAGE

Check leakage of the following components.

- Hose and tube
- EVAP canister
- EVAP purge control valve (mechanical malfunction)

>> INSPECTION END

Component Inspection (EVAP Purge Control Valve)

INFOID:000000013290205

1.CHECK EVAP PURGE CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect EVAP purge control valve harness connector.
3. Check the resistance between EVAP purge control valve terminals.

EVAP purge control valve		Condition	Resistance (Approx.)
+	-		
Terminal		Temperature: 25°C (77°F)	14.2 Ω
1	2		

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP purge control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

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P0447 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0447 EVAP CANISTER VENT CONTROL VALVE

DTC Description

INFOID:000000013523380

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0447	Evaporation system vent control (EVAP System Vent Control Circuit Open)	NO SUBTYPE INFORMATION	The EVAP canister vent control valve of the activated charcoal canister has an open circuit

POSSIBLE CAUSE

- Harness or connectors (EVAP canister vent control valve circuit)
- EVAP canister vent control valve
- EVAP canister
- EVAP line

Diagnosis Procedure

INFOID:000000013523381

1. CHECK COMPONENT FUNCTION

Ⓢ With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK PURGING SWITCHOVER VALVE".
3. Perform the Active Test.
4. Check that the indicated value of "PWR CSMN (PURG SWOVR/V)" is between 300 – 600 mA.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP canister vent control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP canister vent control valve harness connector and ground.

+		-	Voltage
EVAP canister vent control valve Connector	Terminal		
B131	1	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.

P0447 EVAP CANISTER VENT CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between EVAP canister vent control valve harness connector and fuse terminal.

+		-	Continuity
Connector	Terminal		
B131	1	No. 98 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

5. CHECK EVAP CANISTER VENT CONTROL VALVE

- Clean the air passage of EVAP canister vent control valve using an air blower.
- Check air passage continuity and operation delay time under the following conditions.
Make sure that new O-ring is installed properly.

Condition	Air passage continuity
12 V direct current supply between terminals 1 and 2	Not existed
OFF	Existed

Operation takes less than 1 second.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace EVAP canister vent control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6. CHECK EVAP CANISTER VENT CONTROL VALVE CONTROL CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between ECM harness connector and EVAP canister vent control valve harness connector.

+		-		Continuity
ECM		EVAP canister vent control valve		
Connector	Terminal	Connector	Terminal	
E200	152	B131	2	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7. CHECK EVAP PURGE CIRCUIT LEAKAGE

Check leakage of the following components.

- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection
- EVAP canister for damage
- EVAP canister vent control valve (mechanical malfunction)

>> INSPECTION END

P0451 FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0451 FUEL PRESSURE SENSOR

DTC Description

INFOID:000000013448341

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0451	EVAP system pressure sensor/ sw (EVAP System Pressure Sensor/Switch Circuit Range/Performance)	NO SUBTYPE INFORMATION	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction.
		COMPONENT MALFUNCTION	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction. There is a component malfunction.
		CIRC VOLT BELOW THRESHOLD	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction. The limit value for electrical voltage has been exceeded.
		SIGNAL STUCK HIGH	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction. No signal change: Voltage level is too high.
		SIG RTE OF CHNG BLW THRESHLD	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction. The signal change rate is below the permissible limit value.
		SG BS LVL O-OF RNG/ZR AJST ERR	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction. The signal offset is outside the permissible range.

POSSIBLE CAUSE

Low pressure fuel control system

Diagnosis Procedure

INFOID:000000013448342

1. CHECK DTC IN FPCM

With CONSULT

Check DTC in "FPCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-159, "DTC Index"](#).
- NO >> INSPECTION END

P0452 FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0452 FUEL PRESSURE SENSOR

DTC Description

INFOID:000000013448343

DTC DETECTION LOGIC

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EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0452	EVAP system pressure sensor/ SW (EVAP System Pressure Sen- sor/Switch Circuit Low)	NO SUBTYPE INFORMATION	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction.
		CIRCUIT SHORT TO GROUND	The pressure sensor/pressure switch of the evaporative emission control system has a short circuit to ground. There is a short circuit to ground.
		CIRC VOLT BELOW THRESH- OLD	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction. The limit value for electrical voltage has not been attained.

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POSSIBLE CAUSE

Low pressure fuel control system

Diagnosis Procedure

INFOID:000000013466608

1. CHECK DTC IN FPCM

With CONSULT

Check DTC in "FPCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-159, "DTC Index"](#).
- NO >> INSPECTION END

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P0453 FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0453 FUEL PRESSURE SENSOR

DTC Description

INFOID:000000013448345

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0453	EVAP system pressure sensor/ sw (EVAP System Pressure Sen- sor/Switch Circuit High)	NO SUBTYPE INFORMATION	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction.
		CIRCUIT SHORT TO BATTERY	The pressure sensor/pressure switch of the evaporative emission control system has a short circuit to positive. There is a short circuit to positive.
		CIRC VOLT ABOVE THRESHOLD	The pressure sensor/pressure switch of the evaporative emission control system has a malfunction. The limit value for electrical voltage has been exceeded.

POSSIBLE CAUSE

Low pressure fuel control system

Diagnosis Procedure

INFOID:000000013466609

1. CHECK DTC IN FPCM

With CONSULT

Check DTC in "FPCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-159, "DTC Index"](#).
- NO >> INSPECTION END

P0455 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0455 EVAP CONTROL SYSTEM

DTC Description

INFOID:000000013448347

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0455	Evaporation system leak [EVAP System Leak Detected (large leak)]	NO SUBTYPE INFORMATION	A gross leak in the evaporative emission control system was detected.

C

D

POSSIBLE CAUSE

- Incorrect fuel filler cap is used
- Fuel filler cap remains open.
- Poor installation of fuel filler cap
- Foreign matter caught in fuel filler cap.

E

Diagnosis Procedure

INFOID:000000013466610

1. CHECK FUEL FILLER CAP

Check the following.

- Proper fuel filler cap is used.
- Fuel filler cap installation condition
- Foreign matter is not attached.

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>> INSPECTION END

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P0456 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0456 EVAP CONTROL SYSTEM

DTC Description

INFOID:000000013448349

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0456	Evaporation system leak [EVAP System Leak Detected (very small leak)]	NO SUBTYPE INFORMATION	A very fine leak in the evaporative emission control system was detected.

POSSIBLE CAUSE

- Incorrect fuel filler cap is used
- Fuel filler cap remains open.
- Poor installation of fuel filler cap
- Foreign matter caught in fuel filler cap.

Diagnosis Procedure

INFOID:000000013448350

1. CHECK FUEL FILLER CAP

Check the following.

- Proper fuel filler cap is used.
- Fuel filler cap installation condition
- Foreign matter is not attached.

>> INSPECTION END

P0457 EVAP SYSTEM LEAK

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0457 EVAP SYSTEM LEAK

DTC Description

INFOID:0000000013290206

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0457	EVAP SYSTEM LEAK (EVAP system leak detected (fuel cap loose/off))	NO SUBTYPE INFORMATION	Leakage in the evaporative emission control system was detected (tank cap missing).

C

D

POSSIBLE CAUSE

- Incorrect fuel filler cap is used
- Fuel filler cap remains open.
- Poor installation of fuel filler cap
- Foreign matter caught in fuel filler cap.

E

F

Diagnosis Procedure

INFOID:0000000013290207

1. CHECK FUEL FILLER CAP

Check the following.

- Proper fuel filler cap is used.
- Fuel filler cap installation condition
- Foreign matter is not attached.

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>> INSPECTION END

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P0458 EVAP PURGE CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0458 EVAP PURGE CONTROL VALVE

DTC Description

INFOID:000000013290208

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0458	EVAP SYS PURGE CONT VALVE A (EVAP system purge control valve "A" circuit low)	NO SUBTYPE INFORMATION	The EVAP purge control valve has a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors (EVAP purge control valve circuit)
- EVAP purge control valve

Diagnosis Procedure

INFOID:000000013466611

1. CHECK COMPONENT FUNCTION

Ⓟ With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK PURGING SWITCHOVER VALVE".
3. Perform the Active Test.
4. Check that the indicated value of "PWR CSMN (PURG SWOVR/V)" is between 390 – 495 mA.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP purge control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP purge control valve harness connector and ground.

+		-	Voltage
Connector	Terminal		
E202	2	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.

P0458 EVAP PURGE CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between EVAP purge control valve harness connector and fuse terminal.

+		-	Continuity
EVAP purge control valve			
Connector	Terminal		
E202	2	No. 98 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

5.CHECK EVAP PURGE CONTROL VALVE

Check EVAP purge control valve. Refer to [EC4-542. "Component Inspection \(EVAP Purge Control Valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace EVAP purge control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK EVAP PURGE CONTROL VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP purge control valve harness connector.

+		-		Continuity
ECM		EVAP purge control valve		
Connector	Terminal	Connector	Terminal	
E200	153	E202	1	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK EVAP PURGE CIRCUIT LEAKAGE

Check leakage of the following components.

- Hose and tube
- EVAP canister
- EVAP purge control valve (mechanical malfunction)

>> INSPECTION END

Component Inspection (EVAP Purge Control Valve)

INFOID:000000013466612

1.CHECK EVAP PURGE CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect EVAP purge control valve harness connector.
3. Check the resistance between EVAP purge control valve terminals.

EVAP purge control valve		Condition	Resistance (Approx.)
+	-		
Terminal			
1	2	Temperature: 25°C (77°F)	14.2 Ω

P0458 EVAP PURGE CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP purge control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P0459 EVAP PURGE CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0459 EVAP PURGE CONTROL VALVE

DTC Description

INFOID:000000013290211

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0459	EVAP SYS PURGE CONT VALVE A (EVAP system purge control valve "A" circuit high)	NO SUBTYPE INFORMATION	The EVAP purge control valve has a short circuit to positive.

C

D

POSSIBLE CAUSE

- Harness or connectors (EVAP purge control valve circuit)
- EVAP purge control valve

E

F

Diagnosis Procedure

INFOID:000000013466613

1. CHECK COMPONENT FUNCTION

G

With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK PURGING SWITCHOVER VALVE".
3. Perform the Active Test.
4. Check that the indicated value of "PWR CSMN (PURG SWOVR/V)" is between 390 – 495 mA.

H

I

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

J

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

K

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

L

3. CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP purge control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP purge control valve harness connector and ground.

M

N

+		-	Voltage
Connector	Terminal		
E202	2	Ground	Battery voltage

O

P

Is the inspection result normal?

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

4. CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.

P0459 EVAP PURGE CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between EVAP purge control valve harness connector and fuse terminal.

+		-	Continuity
EVAP purge control valve			
Connector	Terminal	No. 98 fuse terminal	Existed
E202	2		

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

5.CHECK EVAP PURGE CONTROL VALVE

Check EVAP purge control valve. Refer to [EC4-542, "Component Inspection \(EVAP Purge Control Valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace EVAP purge control valve. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK EVAP PURGE CONTROL VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP purge control valve harness connector.

+		-		Continuity
ECM		EVAP purge control valve		
Connector	Terminal	Connector	Terminal	Existed
E200	153	E202	1	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK EVAP PURGE CIRCUIT LEAKAGE

Check leakage of the following components.

- Hose and tube
- EVAP canister
- EVAP purge control valve (mechanical malfunction)

>> INSPECTION END

Component Inspection (EVAP Purge Control Valve)

INFOID:000000013466614

1.CHECK EVAP PURGE CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect EVAP purge control valve harness connector.
3. Check the resistance between EVAP purge control valve terminals.

EVAP purge control valve		Condition	Resistance (Approx.)
+	-		
Terminal		Temperature: 25°C (77°F)	14.2 Ω
1	2		

P0459 EVAP PURGE CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP purge control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

A

EC4

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P0461 FUEL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0461 FUEL LEVEL SENSOR

DTC Description

INFOID:000000013466615

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0461	FUEL LEVEL SENSOR A (Fuel Level Sensor "A" Circuit Range/Performance)	NO SUBTYPE INFORMATION	The left fuel level sensor has a malfunction.
		SIGNAL STUCK IN RANGE	The left fuel level sensor has a malfunction. There is no signal change.
		SIG BELOW ALLOWABLE RANGE	The left fuel level sensor has a malfunction. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	The left fuel level sensor has a malfunction. There is a signal above the permissible limit value.

POSSIBLE CAUSE

Fuel level sensor

Diagnosis Procedure

INFOID:000000013466617

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "METER/M&A"

With CONSULT

Check "Self-diagnostic result" of "METER/M&A".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [MWI-87, "DTC Index"](#).
- NO >> Replace combination meter. Refer to [MWI-141, "Removal and Installation"](#).

P0462 FUEL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0462 FUEL LEVEL SENSOR

DTC Description

INFOID:000000013448351

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0461	FUEL LEVEL SENSOR A (Fuel Level Sensor "A" Circuit Range/Performance)	NO SUBTYPE INFORMATION	The left fuel level sensor has a malfunction.
		SIGNAL STUCK IN RANGE	The left fuel level sensor has a malfunction. There is no signal change.
		SIG BELOW ALLOWABLE RANGE	The left fuel level sensor has a malfunction. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	The left fuel level sensor has a malfunction. There is a signal above the permissible limit value.

C

D

E

POSSIBLE CAUSE

Fuel level sensor

F

Diagnosis Procedure

INFOID:000000013448352

G

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "METER/M&A"

With CONSULT

Check "Self-diagnostic result" of "METER/M&A".

H

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [MWI-87, "DTC Index"](#).
- NO >> Replace combination meter. Refer to [MWI-141, "Removal and Installation"](#).

I

J

K

L

M

N

O

P

P0463 FUEL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0463 FUEL LEVEL SENSOR

DTC Description

INFOID:000000013448353

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0463	Fuel level sensor A (Fuel Level Sensor "A" Circuit High)	CIRCUIT SHORT TO BATTERY	The left fuel level sensor has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

Fuel level sensor

Diagnosis Procedure

INFOID:000000013466618

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "METER/M&A"

With CONSULT

Check "Self-diagnostic result" of "METER/M&A".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [MWI-87, "DTC Index"](#).
- NO >> Replace combination meter. Refer to [MWI-141, "Removal and Installation"](#).

P0480 COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0480 COOLING FAN

DTC Description

INFOID:0000000013290214

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0480	FAN 1 (Fan 1 control circuit)	CIRCUIT OPEN	The output of electric fan 1 has an electrical malfunction or an open circuit. There is an open circuit.

C

D

POSSIBLE CAUSE

- Harness and connectors
- Cooling fan motor
- Cooling fan control module

E

Diagnosis Procedure

INFOID:0000000013290215

F

1. CHECK DTC

With CONSULT

1. Turn ignition switch ON.
2. Check "Self-diagnostic result".
3. Check that ECM does not detect the engine coolant temperature sensor related DTC.

G

H

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).

I

2. COMPONENT FUNCTION CHECK-1

With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. Check that the engine coolant temperature is between 0°C (32°F) and 80°C (176°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CK ENG AND AC WITH INTGRTED CONT FAN MOTOR".
3. Perform test according to CONSULT screen.
4. Set ON/OFF ratio between 9.5 – 12.4%. (The fan is stopped.)
5. Check the voltage between cooling fan control module and ground.

J

K

L

+		-	Voltage
Cooling fan control module			
Connector	Terminal		
E213	4	Ground	1 – 1.7 V

M

N

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

O

3. COMPONENT FUNCTION CHECK-2

With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. On CONSULT screen, set ON/OFF ratio between 87.5 – 90.4%. (The fan operates at maximum speed.)
2. Check the voltage between cooling fan control module and ground.

P

P0480 COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	8 – 10.5 V
E213	4		

Is the inspection result normal?

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

4. CHECK COOLING FAN CONTROL SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and cooling fan control module harness connector.

+		-		Continuity
ECM		Cooling fan control module		
Connector	Terminal	Connector	Terminal	Existed
E200	103	E213	4	

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

5. CHECK COOLING FAN CONTROL MODULE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan control module harness connector.
3. Check the voltage between cooling fan control module harness connector and ground.

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	Battery voltage
E213	2		
	3		

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Perform trouble diagnosis for cooling fan control module power supply circuit.

6. CHECK COOLING FAN CONTROL MODULE GROUND CIRCUIT

Check the continuity between cooling fan control module harness connector and ground.

+		-	Continuity
Cooling fan control module			
Connector	Terminal	Ground	Existed
E213	1		

Is the inspection result normal?

- YES >> Replace cooling fan assembly. Refer to [CO-13, "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

P0483 COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0483 COOLING FAN

DTC Description

INFOID:0000000013290216

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0483	FAN RATIONALITY CHECK (Fan rationality check)	COMPONENT MALFUNCTION	The electric fan has a malfunction. There is a component malfunction.

C

D

POSSIBLE CAUSE

- Harness and connectors
- Cooling fan motor
- Cooling fan control module

E

Diagnosis Procedure

INFOID:0000000013466619

F

1. CHECK DTC

With CONSULT

1. Turn ignition switch ON.
2. Check "Self-diagnostic result".
3. Check that ECM does not detect the engine coolant temperature sensor related DTC.

G

H

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).

I

2. COMPONENT FUNCTION CHECK-1

With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. Check that the engine coolant temperature is between 0°C (32°F) and 80°C (176°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CK ENG AND AC WITH INTGRTED CONT FAN MOTOR".
3. Perform test according to CONSULT screen.
4. Set ON/OFF ratio between 9.5 – 12.4%. (The fan is stopped.)
5. Check the voltage between cooling fan control module and ground.

J

K

L

+		-	Voltage
Cooling fan control module			
Connector	Terminal		
E213	4	Ground	1 – 1.7 V

M

N

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

O

3. COMPONENT FUNCTION CHECK-2

With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. On CONSULT screen, set ON/OFF ratio between 87.5 – 90.4%. (The fan operates at maximum speed.)
2. Check the voltage between cooling fan control module and ground.

P

P0483 COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	8 – 10.5 V
E213	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK COOLING FAN CONTROL SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and cooling fan control module harness connector.

+		-		Continuity
ECM		Cooling fan control module		
Connector	Terminal	Connector	Terminal	Existed
E200	103	E213	4	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK COOLING FAN CONTROL MODULE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan control module harness connector.
3. Check the voltage between cooling fan control module harness connector and ground.

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	Battery voltage
E213	2		
	3		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform trouble diagnosis for cooling fan control module power supply circuit.

6. CHECK COOLING FAN CONTROL MODULE GROUND CIRCUIT

Check the continuity between cooling fan control module harness connector and ground.

+		-	Continuity
Cooling fan control module			
Connector	Terminal	Ground	Existed
E213	1		

Is the inspection result normal?

YES >> Replace cooling fan assembly. Refer to [CO-13, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P0485 COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0485 COOLING FAN

DTC Description

INFOID:0000000013290218

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0485	FAN POWER SUPPLY/ GROUND (Fan power/ground circuit)	EVENT INFORMATION	The power supply of the electric fan has a malfunction. There is incomplete information.

C

D

POSSIBLE CAUSE

- Harness and connectors
- Cooling fan motor
- Cooling fan control module

E

Diagnosis Procedure

INFOID:0000000013466620

F

1. CHECK DTC

With CONSULT

1. Turn ignition switch ON.
2. Check "Self-diagnostic result".
3. Check that ECM does not detect the engine coolant temperature sensor related DTC.

G

H

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).

I

2. COMPONENT FUNCTION CHECK-1

With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. Check that the engine coolant temperature is between 0°C (32°F) and 80°C (176°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CK ENG AND AC WITH INTGRTED CONT FAN MOTOR".
3. Perform test according to CONSULT screen.
4. Set ON/OFF ratio between 9.5 – 12.4%. (The fan is stopped.)
5. Check the voltage between cooling fan control module and ground.

J

K

L

+		-	Voltage
Connector	Terminal		
E213	4	Ground	1 – 1.7 V

M

N

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

O

3. COMPONENT FUNCTION CHECK-2

With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. On CONSULT screen, set ON/OFF ratio between 87.5 – 90.4%. (The fan operates at maximum speed.)
2. Check the voltage between cooling fan control module and ground.

P

P0485 COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	8 – 10.5 V
E213	4		

Is the inspection result normal?

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

4. CHECK COOLING FAN CONTROL SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and cooling fan control module harness connector.

+		-		Continuity
ECM		Cooling fan control module		
Connector	Terminal	Connector	Terminal	Existed
E200	103	E213	4	

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
- NO >> Repair or replace error-detected parts.

5. CHECK COOLING FAN CONTROL MODULE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan control module harness connector.
3. Check the voltage between cooling fan control module harness connector and ground.

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	Battery voltage
E213	2		
	3		

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Perform trouble diagnosis for cooling fan control module power supply circuit.

6. CHECK COOLING FAN CONTROL MODULE GROUND CIRCUIT

Check the continuity between cooling fan control module harness connector and ground.

+		-	Continuity
Cooling fan control module			
Connector	Terminal	Ground	Existed
E213	1		

Is the inspection result normal?

- YES >> Replace cooling fan assembly. Refer to [CO-13, "Removal and Installation"](#).
- NO >> Repair or replace error-detected parts.

P0496 EVAP PURGE CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0496 EVAP PURGE CONTROL VALVE

DTC Description

INFOID:0000000013290220

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0496	EVAP SYSTEM (EVAP system high purge flow)	NO SUBTYPE INFORMATION	The purge flow of the evaporative emission control system is too high.
		CMP/SYS OPR OBST OR BLKD	The purge flow of the evaporative emission control system is too high. The system function is restricted.

C

D

POSSIBLE CAUSE

- Harness or connectors (EVAP purge control valve circuit)
- EVAP purge control valve

E

F

Diagnosis Procedure

INFOID:0000000013290221

1. CHECK COMPONENT FUNCTION

G

With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK PURGING SWITCHOVER VALVE".
3. Perform the Active Test.
4. Check that the indicated value of "PWR CSMN (PURG SWOVR/V)" is between 390 – 495 mA.

H

I

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

J

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

K

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

L

3. CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY

M

1. Insert the fuse which pulled out.
2. Disconnect EVAP purge control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP purge control valve harness connector and ground.

N

+		-	Voltage
EVAP purge control valve			
Connector	Terminal		
E202	2	Ground	Battery voltage

O

Is the inspection result normal?

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

P

4. CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.

P0496 EVAP PURGE CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between EVAP purge control valve harness connector and fuse terminal.

+		-	Continuity
EVAP purge control valve			
Connector	Terminal	No. 98 fuse terminal	Existed
E202	2		

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

5.CHECK EVAP PURGE CONTROL VALVE

Check EVAP purge control valve. Refer to [EC4-554, "Component Inspection \(EVAP Purge Control Valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace EVAP purge control valve. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK EVAP PURGE CONTROL VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP purge control valve harness connector.

+		-		Continuity
ECM		EVAP purge control valve		
Connector	Terminal	Connector	Terminal	Existed
E200	153	E202	1	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK EVAP PURGE CIRCUIT LEAKAGE

Check leakage of the following components.

- Hose and tube
- EVAP canister
- EVAP purge control valve (mechanical malfunction)

>> INSPECTION END

Component Inspection (EVAP Purge Control Valve)

INFOID:000000013290222

1.CHECK EVAP PURGE CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect EVAP purge control valve harness connector.
3. Check the resistance between EVAP purge control valve terminals.

EVAP purge control valve		Condition	Resistance (Approx.)
+	-		
Terminal		Temperature: 25°C (77°F)	14.2 Ω
1	2		

P0496 EVAP PURGE CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP purge control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

A

EC4

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P

P0497 EVAP PURGE CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0497 EVAP PURGE CONTROL VALVE

DTC Description

INFOID:000000013290223

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0497	EVAP SYSTEM (EVAP system low purge flow)	NO SUBTYPE INFORMATION	The purge flow of the evaporative emission control system is too low.
		PFM/INCORRECT OPERATN	The purge flow of the evaporative emission control system is too low. The function or the instruction has malfunction.

POSSIBLE CAUSE

- Harness or connectors (EVAP purge control valve circuit)
- EVAP purge control valve

Diagnosis Procedure

INFOID:000000013466621

1.CHECK COMPONENT FUNCTION

④ With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select “ENGINE” >> “ACTIVE TEST” >> “CHECK PURGING SWITCHOVER VALVE”.
3. Perform the Active Test.
4. Check that the indicated value of “PWR CSMN (PURG SWOVR/V)” is between 390 – 495 mA.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2.CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3.CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP purge control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP purge control valve harness connector and ground.

+		-	Voltage
EVAP purge control valve			
Connector	Terminal	Ground	Battery voltage
E202	2		

Is the inspection result normal?

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

4.CHECK EVAP PURGE CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

P0497 EVAP PURGE CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Pull out No. 98 fuse.
3. Check the continuity between EVAP purge control valve harness connector and fuse terminal.

+		-	Continuity
EVAP purge control valve			
Connector	Terminal		
E202	2	No. 98 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

5.CHECK EVAP PURGE CONTROL VALVE

Check EVAP purge control valve. Refer to [EC4-557. "Component Inspection \(EVAP Purge Control Valve\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace EVAP purge control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK EVAP PURGE CONTROL VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP purge control valve harness connector.

+		-		Continuity
ECM		EVAP purge control valve		
Connector	Terminal	Connector	Terminal	
E200	153	E202	1	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK EVAP PURGE CIRCUIT LEAKAGE

Check leakage of the following components.

- Hose and tube
- EVAP canister
- EVAP purge control valve (mechanical malfunction)

>> INSPECTION END

Component Inspection (EVAP Purge Control Valve)

INFOID:0000000013466622

1.CHECK EVAP PURGE CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect EVAP purge control valve harness connector.
3. Check the resistance between EVAP purge control valve terminals.

P0497 EVAP PURGE CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

EVAP purge control valve		Condition	Resistance (Approx.)
+	-		
Terminal			
1	2	Temperature: 25°C (77°F)	14.2 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP purge control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P0498 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0498 EVAP CANISTER VENT CONTROL VALVE

DTC Description

INFOID:0000000013523416

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0498	Evaporation system vent valve (EVAP system vent valve control circuit low)	NO SUBTYPE INFORMATION	The EVAP canister vent control valve of the activated charcoal canister has an open circuit

C

D

POSSIBLE CAUSE

- Harness or connectors (EVAP canister vent control valve circuit)
- EVAP canister vent control valve
- EVAP canister
- EVAP line

E

F

Diagnosis Procedure

INFOID:0000000013523417

1. CHECK COMPONENT FUNCTION

G

With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK PURGING SWITCHOVER VALVE".
3. Perform the Active Test.
4. Check that the indicated value of "PWR CSMN (PURG SWOVR/V)" is between 300 – 600 mA.

H

I

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

J

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

K

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

L

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP canister vent control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP canister vent control valve harness connector and ground.

M

N

+		-	Voltage
Connector	Terminal		
B131	1	Ground	Battery voltage

O

P

Is the inspection result normal?

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

4. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.

P0498 EVAP CANISTER VENT CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between EVAP canister vent control valve harness connector and fuse terminal.

+		-	Continuity
EVAP canister vent control valve			
Connector	Terminal	No. 98 fuse terminal	Existed
B131	1		

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

5.CHECK EVAP CANISTER VENT CONTROL VALVE

1. Clean the air passage of EVAP canister vent control valve using an air blower.
2. Check air passage continuity and operation delay time under the following conditions.
Make sure that new O-ring is installed properly.

Condition	Air passage continuity
12 V direct current supply between terminals 1 and 2	Not existed
OFF	Existed

Operation takes less than 1 second.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace EVAP canister vent control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK EVAP CANISTER VENT CONTROL VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP canister vent control valve harness connector.

+		-		Continuity
ECM		EVAP canister vent control valve		
Connector	Terminal	Connector	Terminal	Existed
E200	152	B131	2	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK EVAP PURGE CIRCUIT LEAKAGE

Check leakage of the following components.

- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection
- EVAP canister for damage
- EVAP canister vent control valve (mechanical malfunction)

>> INSPECTION END

P0499 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0499 EVAP CANISTER VENT CONTROL VALVE

DTC Description

INFOID:0000000013523554

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P0499	Evaporation system vent valve (EVAP system vent valve control circuit high)	NO SUBTYPE INFORMATION	The EVAP canister vent control valve of the activated charcoal canister has an open circuit

C

D

POSSIBLE CAUSE

- Harness or connectors (EVAP canister vent control valve circuit)
- EVAP canister vent control valve
- EVAP canister
- EVAP line

E

F

Diagnosis Procedure

INFOID:0000000013523555

1. CHECK COMPONENT FUNCTION

G

With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK PURGING SWITCHOVER VALVE".
3. Perform the Active Test.
4. Check that the indicated value of "PWR CSMN (PURG SWOVR/V)" is between 300 – 600 mA.

H

I

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 2.

J

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

K

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace the fuse after repairing the applicable circuit.

L

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP canister vent control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP canister vent control valve harness connector and ground.

M

N

+		-	Voltage
Connector	Terminal		
B131	1	Ground	Battery voltage

O

P

Is the inspection result normal?

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

4. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.

P0499 EVAP CANISTER VENT CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between EVAP canister vent control valve harness connector and fuse terminal.

+		-	Continuity
EVAP canister vent control valve			
Connector	Terminal	No. 98 fuse terminal	Existed
B131	1		

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

5.CHECK EVAP CANISTER VENT CONTROL VALVE

1. Clean the air passage of EVAP canister vent control valve using an air blower.
2. Check air passage continuity and operation delay time under the following conditions.
Make sure that new O-ring is installed properly.

Condition	Air passage continuity
12 V direct current supply between terminals 1 and 2	Not existed
OFF	Existed

Operation takes less than 1 second.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace EVAP canister vent control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK EVAP CANISTER VENT CONTROL VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP canister vent control valve harness connector.

+		-		Continuity
ECM		EVAP canister vent control valve		
Connector	Terminal	Connector	Terminal	Existed
E200	152	B131	2	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK EVAP PURGE CIRCUIT LEAKAGE

Check leakage of the following components.

- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection
- EVAP canister for damage
- EVAP canister vent control valve (mechanical malfunction)

>> INSPECTION END

P04DB CRANKCASE VENTILATION SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P04DB CRANKCASE VENTILATION SYSTEM

DTC Description

INFOID:000000013290226

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P04DB	CRANKCASE VENTILATION SYSTEM (Crankcase Ventilation System Disconnected)	MECHANCL LINKAGE MALFNCTN	The crankcase ventilation system is interrupted. The mechanical connection has failed.

POSSIBLE CAUSE

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

Diagnosis Procedure

INFOID:000000013290227

1. CHECK FOR CRANKCASE VENTILATION COMPONENT PARTS

Check the following parts installation condition.

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE

Check the partial load operation crankcase ventilation valve. Refer to [EC4-950, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

P04F0 EVAP SYS HIGH PRESSURE PURGE LINE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P04F0 EVAP SYS HIGH PRESSURE PURGE LINE

DTC Description

INFOID:000000014722675

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P04F0	EVAP sys high pressure purge line (EVAP system high pressure purge line performance)	NO SUBTYPE INFORMA- TION	Wide open throttle regeneration of the activated charcoal canister has a malfunction.

POSSIBLE CAUSE

- Harness and connectors
(EVAP control system pressure sensor)
- EVAP control system pressure sensor
- EVAP canister purge line (leak or disconnected)

Diagnosis Procedure

INFOID:000000014722702

1. COMPONENT FUNCTION CHECK

④ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIV TEST" >> "Check purging pressure control".
3. Select "OPEN".
4. Check that the indicated value of purge pressure sensor is between (-)10 – (+)10 hPa [(-)0.01 – (+)0.01 bar, (-)0.01 – (+)0.01 kg-cm², (-)0.145 – (+)0.145 psi]

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK EVAP CANISTER PURGE HOSE FOR LEAKAGE AND INSTALLATION CONDITION

1. Turn ignition switch OFF.
2. Check EVAP canister purge hose for leakage and installation condition.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY

1. Disconnect EVAP control system pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between EVAP control system pressure sensor harness connector and ground.

EVAP control system pressure sensor		-	Voltage
Connector	Terminal		
F154	3	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP control system pressure sensor harness connector.

P04F0 EVAP SYS HIGH PRESSURE PURGE LINE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

ECM		EVAP control system pressure sensor		Continuity
Connector	Terminal	Connector	Terminal	
F150	16	F154	3	Existed

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP control system pressure sensor harness connector.

+		-		Continuity
ECM		EVAP control system pressure sensor		
Connector	Terminal	Connector	Terminal	
F150	36	F154	1	Existed
	11		2	

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

Is the inspection result normal?

YES >> Replace EVAP control system pressure sensor. Refer to [FL-40, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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P0500 VEHICLE SPEED SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0500 VEHICLE SPEED SIGNAL

DTC Description

INFOID:000000013290228

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0500	VEHICLE SPEED SENSOR A (Vehicle speed sensor "A")	NO SUBTYPE INFORMATION	Speed sensor has a malfunction.
		BUS SIGNAL/MESSAGE ERROR	Speed sensor has a malfunction. There is a signal error or the message error.

POSSIBLE CAUSE

- Vehicle speed signal

Diagnosis Procedure

INFOID:000000013290229

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

With CONSULT

Check "Self-diagnostic result" in "ABS".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Perform trouble diagnosis for detected DTC. Refer to [BRC-72, "DTC Index"](#).

P0505 IDLE SPEED CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0505 IDLE SPEED CONTROL

Diagnosis Description

INFOID:000000013290230

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0505	IDLE CONTROL SYSTEM (Idle control system)	NO SUBTYPE INFORMATION	The idle speed control has a malfunction.

POSSIBLE CAUSE

Intake air leak

Diagnosis Procedure

INFOID:000000013290231

1.CHECK DTC

 **With CONSULT**
Check DTC.

Is any DTC other than P0505 detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).
NO >> GO TO 2.

2.CHECK INTAKE AIR LEAKAGE

1. Start the engine.
2. Listen for an intake air leak.

Is intake air leak detected?

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

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P0506 IDLE SPEED CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0506 IDLE SPEED CONTROL

Diagnosis Description

INFOID:000000013290232

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0506	IDLE CONTROL SYSTEM RPM (Idle control system RPM - lower than expected)	NO SUBTYPE INFORMATION	Idle speed is too low when engine is warm.

POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
(Pressure sensor downstream of throttle valve circuit is open or shorted.)
- Throttle valve actuator
- Pressure sensor downstream of throttle valve
- Intake air leak

Diagnosis Procedure

INFOID:000000013290233

1. CHECK INTAKE AIR LEAKAGE

1. Start the engine.
2. Listen for an intake air leak.

Is intake air leak detected?

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

2. CHECK THROTTLE VALVE ACTUATOR FUNCTION

With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

P0506 IDLE SPEED CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 7.
- NO >> GO TO 3.

3. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-570. "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace throttle valve actuator. Refer to [EM-33. "Removal and Installation"](#).

4. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal		
F178	4	Ground	5 V

Is the inspection result normal?

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

5. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	4	F150	17	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).
- NO >> Repair or replace error-detected parts.

6. CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	3	F150	38	Existed
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
- NO >> Repair or replace error-detected parts.

7. CHECK PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE OUTPUT VOLTAGE

P0506 IDLE SPEED CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Ⓢ With CONSULT

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "PRES/S D/STRM THRTL VLV V".
2. Check the value as the following conditions.

Item	Condition	Value
PRES/S D/STRM THRTL VLV V	Ignition switch ON (engine stopped)	1 – 2 V
	Engine running at idle	0.5 – 0.8 V

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> GO TO 8.

8. CHECK PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and pressure sensor downstream of throttle valve harness connector.

+		-		Continuity
Pressure sensor downstream of throttle valve		ECM		
Connector	Terminal	Connector	Terminal	
F187	1	F150	91	Existed
	2		12	
	3		18	

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

Is the inspection result normal?

- YES >> Replace pressure sensor downstream of throttle valve. Refer to [EM-28, "Exploded View"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:0000000013290234

1. CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Replace throttle valve actuator. Refer to [EM-33, "Removal and Installation"](#).

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace throttle valve actuator. Refer to [EM-33, "Removal and Installation"](#).

P0507 IDLE SPEED CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0507 IDLE SPEED CONTROL

Diagnosis Description

INFOID:0000000013290235

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0507	IDLE CONTROL SYSTEM RPM (Idle control system RPM - higher than expected)	NO SUBTYPE INFORMATION	Idle speed is too high when engine is warm.

POSSIBLE CAUSE

Intake air leak

Diagnosis Procedure

INFOID:0000000013290236

1. CHECK DTC

With CONSULT

Check DTC.

Is any DTC other than P0507 detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> GO TO 2.

2. CHECK INTAKE AIR LEAKAGE

1. Start the engine.
2. Listen for an intake air leak.

Is intake air leak detected?

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

P050A COLD START IDLE SPEED CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P050A COLD START IDLE SPEED CONTROL

Diagnosis Description

INFOID:000000013290237

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P050A	COLD START IDLE CONT SYSTEM (Cold start idle control system performance)	PFM/INCORRECT OPERATN	Idle speed control has a malfunction during a cold start. The function or the instruction has malfunction.
		UNEXPECTED OPERATION	Idle speed control has a malfunction during a cold start. There is an unexpected instruction.

POSSIBLE CAUSE

Intake air leak

Diagnosis Procedure

INFOID:000000013290238

1. CHECK DTC

With CONSULT

Check DTC.

Is any DTC other than P050A detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).
- NO >> GO TO 2.

2. CHECK INTAKE AIR LEAKAGE

1. Start the engine.
2. Listen for an intake air leak.

Is intake air leak detected?

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

P050B IGNITION TIMING

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P050B IGNITION TIMING

Diagnosis Description

INFOID:000000013290239

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P050B	COLD START IGNITION TIMING (Cold start timing performance)	NO SUBTYPE INFORMATION	The ignition angle setting has a malfunction when cold starting.

POSSIBLE CAUSE

Ignition timing

Diagnosis Procedure

INFOID:000000013290240

1. CHECK DTC

With CONSULT

Check DTC.

Is any DTC other than P050B detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> Erase DTC.

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P050D COLD START ROUGH IDLE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P050D COLD START ROUGH IDLE

Diagnosis Description

INFOID:000000013290241

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P050D	COLD START ROUGH IDLE (Cold start rough idle)	NO SUBTYPE INFORMATION	The combustion engine idles roughly after a cold start.

POSSIBLE CAUSE

Intake air leak

Diagnosis Procedure

INFOID:000000013290242

1. CHECK DTC

With CONSULT

Check DTC.

Is any DTC other than P050D detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 2.

2. CHECK INTAKE AIR LEAKAGE

1. Start the engine.
2. Listen for an intake air leak.

Is intake air leak detected?

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

P0511

Diagnosis Description

INFOID:000000013290243

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

EC4

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P052A INTAKE CAMSHAFT POSITION CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P052A INTAKE CAMSHAFT POSITION CONTROL

DTC Description

INFOID:000000013290244

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P052A	COLD ST CAMSFT A POS TIMING B1 (Cold Start "A" Camshaft Position Timing Over-Advanced bank 1)	NO SUBTYPE INFORMATION	The position of the intake camshaft (cylinder bank 1) deviates from the specified value in direction ADVANCED during cold start.

POSSIBLE CAUSE

- Intake camshaft
- Exhaust camshaft

Diagnosis Procedure

INFOID:000000013476219

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Apply parking brake.
2. Shift the selector lever to P or N position.
3. Start the engine and let it idle.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CAMSHAFT POSITIONER".
5. Keep the engine speed between 2,700 – 3,500 rpm.
6. Perform Active Test.

NOTE:

Start the Active Test immediately after that engine speed reaches to specified range.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the malfunctioning camshaft. Refer to [EM-70, "Exploded View"](#).

P052E CRANKCASE VENTILATION SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P052E CRANKCASE VENTILATION SYSTEM

DTC Description

INFOID:0000000013290246

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P052E	POSITV C/CASE VENTILT N REG VLV (Positive Crankcase Ventilation Regulator Valve Performance)	CIRCUIT SHORT TO GROUND	The valve for crankcase ventilation has a malfunction. There is a short circuit to ground.
		CIRCUIT SHORT TO BATTERY	The valve for crankcase ventilation has a malfunction. There is a short circuit to positive.
		CIRCUIT OPEN	The valve for crankcase ventilation has a malfunction. There is an open circuit.
		EVENT INFORMATION	The valve for crankcase ventilation has a malfunction. The actuator is blocked.

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POSSIBLE CAUSE

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

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Diagnosis Procedure

INFOID:0000000013290247

1. CHECK FOR CRANKCASE VENTILATION COMPONENT PARTS

Check the following parts installation condition.

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

J

K

L

Is the inspection result normal?

M

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE

N

Check the partial load operation crankcase ventilation valve. Refer to [EC4-950, "Diagnosis Procedure"](#).

Is the inspection result normal?

O

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

P

P053A VENT LINE HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P053A VENT LINE HEATER ELEMENT

DTC Description

INFOID:000000013290248

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P053A	POSITIVE C/CASE VENTILTN HEATER (Positive crankcase ventilation heater control circuit /open)	NO SUBTYPE INFORMATION	The output for the Full-load operation vent line heater element has an electrical malfunction or an open circuit.

POSSIBLE CAUSE

- Harness and connectors
(Full-load operation vent line heater element circuit is open or shorted.)
- Full-load operation vent line heater element

Diagnosis Procedure

INFOID:000000013290249

1. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT

Check full-load operation vent line heater element. Refer to [EC4-579, "Component Inspection \(Full-load Operation Vent Line Heater Element\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace full-load operation vent line heater element. Refer to [EM-25, "Removal and Installation"](#).

2. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect full-load operation vent line heater element harness connector.
3. Turn ignition switch ON.
4. Check the voltage between full-load operation vent line heater element harness connector and ground.

+		-	Voltage
Connector	Terminal		
F156	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 3.

3. CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out No. 98 (15 A) fuse.
3. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repairing the applicable circuit.

4. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT POWER SUPPLY CIRCUIT

1. Check the continuity between full-load operation vent line heater element harness connector and fuse terminal.

P053A VENT LINE HEATER ELEMENT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Continuity
Full-load operation vent line heater element			
Connector	Terminal		
F156	1	No. 98 fuse terminal	Existed

2. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

5.CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT CONTROL CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and full-load operation vent line heater element harness connector.

+		-		Continuity
ECM		Full-load operation vent line heater element		
Connector	Terminal	Connector	Terminal	
F150	78	F156	2	Existed

3. 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.

6.CHECK ECM GROUND CIRCUIT

Check the continuity between ECM harness connector and ground.

+		-	Continuity
ECM			
Connector	Terminal		
E200	98	Ground	Existed
	100		
	102		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Full-load Operation Vent Line Heater Element)

INFOID:0000000013290250

1.CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT

1. Turn ignition switch OFF.
2. Disconnect full-load operation vent line heater element harness connector.
3. Check the resistance between full-load operation vent line heater element terminals.

Full-load operation vent line heater element		Resistance (Approx.)
+	-	
Terminal		
1	2	9.5 – 13.5 Ω

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P053A VENT LINE HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace full-load operation vent line heater element. Refer to [EM-25. "Removal and Installation"](#).

P053B VENT LINE HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P053B VENT LINE HEATER ELEMENT

DTC Description

INFOID:000000013290251

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P053B	POSITIVE C/CASE VENTILTN HEATER (Positive crankcase ventilation heater control circuit low)	NO SUBTYPE INFORMATION	The output for the full-load operation vent line heater element has a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors
(Full-load operation vent line heater element circuit is open or shorted.)
- Full-load operation vent line heater element

Diagnosis Procedure

INFOID:000000013472157

1. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT

Check full-load operation vent line heater element. Refer to [EC4-585, "Component Inspection \(Full-load Operation Vent Line Heater Element\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace full-load operation vent line heater element. Refer to [EM-25, "Removal and Installation"](#).

2. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect full-load operation vent line heater element harness connector.
3. Turn ignition switch ON.
4. Check the voltage between full-load operation vent line heater element harness connector and ground.

+		-	Voltage
Full-load operation vent line heater element			
Connector	Terminal		
F156	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 3.

3. CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out No. 98 (15 A) fuse.
3. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repairing the applicable circuit.

4. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT POWER SUPPLY CIRCUIT

1. Check the continuity between full-load operation vent line heater element harness connector and fuse terminal.

P053B VENT LINE HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Full-load operation vent line heater element			
Connector	Terminal	No. 98 fuse terminal	Existed
F156	1		

2. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

5.CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT CONTROL CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and full-load operation vent line heater element harness connector.

+		-		Continuity
ECM		Full-load operation vent line heater element		
Connector	Terminal	Connector	Terminal	Existed
F150	78	F156	2	

3. 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.

6.CHECK ECM GROUND CIRCUIT

Check the continuity between ECM harness connector and ground.

+		-	Continuity		
ECM					
Connector	Terminal	Ground	Existed		
E200	98				
	100				
	102				

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Full-load Operation Vent Line Heater Element)

INFOID:000000013472158

1.CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT

1. Turn ignition switch OFF.
2. Disconnect full-load operation vent line heater element harness connector.
3. Check the resistance between full-load operation vent line heater element terminals.

Full-load operation vent line heater element		Resistance (Approx.)
+	-	
Terminal		9.5 – 13.5 Ω
1	2	

P053B VENT LINE HEATER ELEMENT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace full-load operation vent line heater element. Refer to [EM-25. "Removal and Installation"](#).

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P053C VENT LINE HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P053C VENT LINE HEATER ELEMENT

DTC Description

INFOID:000000013290254

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P053C	POSITIVE C/CASE VENTILTN HEATER (Positive crankcase ventilation heater control circuit high)	NO SUBTYPE INFORMATION	The output for the full-load operation vent line heater element has a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors
(Full-load operation vent line heater element circuit is open or shorted.)
- Full-load operation vent line heater element

Diagnosis Procedure

INFOID:000000013472159

1. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT

Check full-load operation vent line heater element. Refer to [EC4-585, "Component Inspection \(Full-load Operation Vent Line Heater Element\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace full-load operation vent line heater element. Refer to [EM-25, "Removal and Installation"](#).

2. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect full-load operation vent line heater element harness connector.
3. Turn ignition switch ON.
4. Check the voltage between full-load operation vent line heater element harness connector and ground.

+		-	Voltage
Connector	Terminal		
F156	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 3.

3. CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out No. 98 (15 A) fuse.
3. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repairing the applicable circuit.

4. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT POWER SUPPLY CIRCUIT

1. Check the continuity between full-load operation vent line heater element harness connector and fuse terminal.

P053C VENT LINE HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Full-load operation vent line heater element			
Connector	Terminal	No. 98 fuse terminal	Existed
F156	1		

2. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

5. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT CONTROL CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and full-load operation vent line heater element harness connector.

+		-		Continuity
ECM		Full-load operation vent line heater element		
Connector	Terminal	Connector	Terminal	Existed
F150	78	F156	2	

3. 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.

6. CHECK ECM GROUND CIRCUIT

Check the continuity between ECM harness connector and ground.

+		-	Continuity		
ECM					
Connector	Terminal	Ground	Existed		
E200	98				
	100				
	102				

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Full-load Operation Vent Line Heater Element)

INFOID:0000000013472160

1. CHECK FULL-LOAD OPERATION VENT LINE HEATER ELEMENT

1. Turn ignition switch OFF.
2. Disconnect full-load operation vent line heater element harness connector.
3. Check the resistance between full-load operation vent line heater element terminals.

Full-load operation vent line heater element		Resistance (Approx.)
+	-	
Terminal		
1	2	9.5 – 13.5 Ω

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P053C VENT LINE HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace full-load operation vent line heater element. Refer to [EM-25. "Removal and Installation"](#).

P053F COLD START FUEL PRESSURE PERFORMANCE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P053F COLD START FUEL PRESSURE PERFORMANCE

DTC Description

INFOID:000000013290257

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P053F	COLD START FUEL PRES-SURE (Cold start fuel pressure performance)	PFM/INCORRECT OPERATN	The fuel pressure during a cold start is implausible. There is an unexpected instruction.
		UNEXPECTED OPERATION	The fuel pressure during a cold start is implausible. There is an unexpected instruction.

C

D

POSSIBLE CAUSE

- Harness or connectors
(Fuel pressure and temperature sensor circuit is open or shorted.)
(Quantity control valve circuit is open or shorted.)
- High pressure fuel system leak
- Fuel pressure and temperature sensor
- Quantity control valve

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Diagnosis Procedure

INFOID:000000013290258

1. START ENGINE

Start the engine and let it idle.

Is it difficult to keep at idle?

- YES >> GO TO 4.
- NO >> GO TO 2.

H

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2. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Warm the engine up to engine coolant temperature reaches 75°C (167°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".
3. Keep the engine speed between 500 – 1,000 rpm.
4. Perform the Active Test.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

5. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

J

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Is the inspection result normal?

- YES >> GO TO 3.
- NO >> GO TO 6.

N

3. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

O

P

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
- NO >> INSPECTION END

4. PRECONDITIONING FOR CHECKING FUEL PRESSURE AND TEMPERATURE SENSOR OUTPUT SIG-

P053F COLD START FUEL PRESSURE PERFORMANCE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

NAL

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

With CONSULT

1. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "RAIL PRES (ACTUAL VALUE)".
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Slightly loosen the threaded connection of the fuel line to the fuel rail to reduce the fuel pressure.

CAUTION:

Collect escaping fuel with several rags.

4. Wait at least 60 seconds.
5. Retighten the threaded connection of fuel line.
6. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 0 kPa (0 bar, 0 kg-cm², 0 psi) and 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi).

>> GO TO 5.

5.CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

3. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

6.CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 8.

NO >> GO TO 7.

7.CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

P053F COLD START FUEL PRESSURE PERFORMANCE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

8. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

9. CHECK HIGH PRESSURE FUEL SYSTEM LEAK

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 75°C (167°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HI PRESS CIRC FOR LEAKTIGHTNESS".
5. Connect charger to battery.
6. Set the vehicle to the following conditions.

Item	Condition
Engine coolant temperature	75 – 105°C (167 – 221°F)
Fuel temperature	40 – 80°C (104 – 176°F)
Engine speed	550 – 800 rpm
Electrical load	OFF

7. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 19 MPa (190 bar, 193.8 kg-cm², 2755 psi) and 21 MPa (210 bar, 214.2 kg-cm², 3045 psi).

8. Perform the Active Test.

CAUTION:

Never turn ignition switch OFF.

NOTE:

When the result is normal, the fuel rail pressure value must not drop below 10 MPa (100 bar, 102 kg-cm², 1450 psi) within 3 minutes.

Is the inspection result normal?

YES >> GO TO 10.

NO >> Check high pressure fuel line for fuel leak.

10. CHECK QUANTITY CONTROL VALVE FUNCTION

With CONSULT

1. Check that low fuel pressure system is normal.
2. Set the vehicle to the following conditions.

P053F COLD START FUEL PRESSURE PERFORMANCE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Item	Condition
Engine coolant temperature	75 – 105°C (167 – 221°F)
Fuel temperature	40 – 80°C (104 – 176°F)
Engine speed	50 rpm or more
A/C	OFF

3. On CONSULT screen, select “ENGINE” >> “ACTIVE TEST” >> “Quantity control valve”.
4. Perform the Active Test.

NOTE:

When the result is normal, the fuel rail pressure value is increased to approximately 20 MPa (200 bar, 204 kg-cm², 2900 psi).

Is the inspection result normal?

- YES >> GO TO 13.
NO >> GO TO 11.

11.CHECK QUANTITY CONTROL VALVE

Check quantity control valve. Refer to [EC4-590, "Component Inspection \(Quantity Control Valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 12.
NO >> Replace high pressure fuel pump. Refer to [EM-47, "Removal and Installation"](#).

12.CHECK QUANTITY CONTROL VALVE CONTROL CIRCUIT

1. Disconnect ECM harness connector and quantity control valve harness connector.
2. Check the continuity between ECM harness connector and quantity control valve harness connector.

+		-		Continuity
ECM		Quantity control valve		
Connector	Terminal	Connector	Terminal	
F150	75	F170	1	Existed
	76		2	

3. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

13.ERASE DTC

1. Check the following.
 - If the actuation angle of the quantity control valve matches the specified value exactly, synchronization between the camshaft and crankshaft must be checked. (Substitute value in emergency mode)
 - If DTC related to camshaft is detected, perform trouble diagnosis for the detected DTC.
 - If DTC related to crankshaft is detected, perform trouble diagnosis for the detected DTC.
2. Erase the DTC.
3. Turn ignition switch OFF and wait at least 30 seconds.
4. Start the engine and let it idle for 60 seconds.
5. Check DTC.

Is the DTC detected again?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> INSPECTION END

Component Inspection (Quantity Control Valve)

INFOID:000000013290259

1.CHECK QUANTITY CONTROL VALVE-1

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

P053F COLD START FUEL PRESSURE PERFORMANCE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. Check the resistance between ECM harness connector terminals.

ECM		Resistance (Ω)
+	-	
Terminal		
75	76	0.3 – 1.1

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK QUANTITY CONTROL VALVE-2

1. Disconnect quantity control valve harness connector.
2. Check the resistance between quantity control valve terminals.

Quantity control valve		Resistance (Ω)
+	-	
Terminal		
1	2	0.3 – 1.1

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace high pressure fuel pump. Refer to [EM-47, "Removal and Installation"](#).

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P054A EXHAUST CAMSHAFT POSITION CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P054A EXHAUST CAMSHAFT POSITION CONTROL

DTC Description

INFOID:000000013290260

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P054A	COLD ST CAMSFT B POS TIMING B1 (Cold start "B" Camshaft position - timing over-advanced bank 1)	NO SUBTYPE INFORMATION	The position of the exhaust camshaft (cylinder bank 1) deviates from the specified value during cold start.

POSSIBLE CAUSE

- Intake camshaft
- Exhaust camshaft

Diagnosis Procedure

INFOID:000000013476228

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Apply parking brake.
2. Shift the selector lever to P or N position.
3. Start the engine and let it idle.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CAMSHAFT POSITIONER".
5. Keep the engine speed between 2,700 – 3,500 rpm.
6. Perform Active Test.

NOTE:

Start the Active Test immediately after that engine speed reaches to specified range.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the malfunctioning camshaft. Refer to [EM-70, "Exploded View"](#).

P0562 POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0562 POWER SUPPLY

DTC Description

INFOID:0000000013290262

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0562	SYSTEM VOLTAGE (System voltage low)	NO SUBTYPE INFORMATION	The ECM power supply voltage is too low.
		CIRC VOLT BELOW THRESH-OLD	The ECM power supply voltage is too low. The limit value for electrical voltage has not been attained.

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POSSIBLE CAUSE

- Harness or connectors (ECM power supply circuit)

E

Diagnosis Procedure

INFOID:0000000013290263

F

1. CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

G

Is the inspection result normal?

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

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P0563 POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0563 POWER SUPPLY

DTC Description

INFOID:0000000013290264

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0563	SYSTEM VOLTAGE (System voltage low)	NO SUBTYPE INFORMATION	The ECM power supply voltage is too high.
		CIRC VOLT ABOVE THRESH-OLD	The ECM power supply voltage is too high. The limit value for electrical voltage has been exceeded.

POSSIBLE CAUSE

- Harness or connectors
(ECM power supply circuit)

Diagnosis Procedure

INFOID:0000000013290265

1. CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

Is the inspection result normal?

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

P0571 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0571 BRAKE SWITCH

DTC Description

INFOID:0000000013290266

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0571	BRAKE SWITCH A (Brake switch "A" circuit)	BUS SIGNAL/MESSAGE ERROR	Brake switch has a malfunction. There is a signal error or the message error.
		SIGNAL INVALID	Brake switch has a malfunction. There is an invalid signal.
		SIGNAL PLAUSIBILITY ERROR	Brake switch has a malfunction. There is an implausible signal.

POSSIBLE CAUSE

- Brake switch signal

Diagnosis Procedure

INFOID:0000000013290267

1. CHECK DTC IN EMCM

With CONSULT

Check "Self-diagnostic result" in "EMCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-165. "DTC Index"](#).
- NO >> GO TO 2.

2. CHECK DTC IN ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT

Check "Self-diagnostic result" in "ABS".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [BRC-72. "DTC Index"](#).
- NO >> INSPECTION END

P0575 CRUISE CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0575 CRUISE CONTROL

DTC Description

INFOID:000000013290268

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0575	CRUISE CONTROL INPUT CIRCUIT (Cruise control input circuit)	SIGNAL INVALID	The input Cruise Control has an electrical malfunction. There is an invalid signal.

POSSIBLE CAUSE

- Cruise control signal

Diagnosis Procedure

INFOID:000000013290269

1. CHECK DTC IN ADAS

With CONSULT

Check "Self-diagnostic result" in "ICC/ADAS".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [EC4-165, "DTC Index"](#).
NO >> GO TO 2.

2. CHECK DTC IN ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT

Check "Self-diagnostic result" in "ABS".

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [BRC-72, "DTC Index"](#).
NO >> INSPECTION END

P0597 COOLANT THERMOSTAT HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0597 COOLANT THERMOSTAT HEATER ELEMENT

DTC Description

INFOID:0000000013290270

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0597	THERMOSTAT HEATER (Thermostat heater control circuit/open)	NO SUBTYPE INFORMATION	The coolant thermostat has an electrical malfunction or open circuit.

POSSIBLE CAUSE

- Harness and connectors (Engine coolant thermostat heater element circuit is open or shorted.)
- Engine coolant thermostat heater element

Diagnosis Procedure

INFOID:0000000013290271

1. INSPECTION START

Does the coolant temperature rise too quickly and become too high?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK COOLANT THERMOSTAT HEATING ELEMENT

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

NOTE:

- When a coolant temperature reaches specified temperature, the test is started automatically.
- The test takes up to approximately 10 minutes.

Item	Condition
Engine speed	At idle
Engine coolant temperature	Less than 100°C (212°F)
A/C	OFF

4. Perform the Active Test.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> GO TO 4.

3. CHECK COOLANT THERMOSTAT HEATING ELEMENT

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

NOTE:

P0597 COOLANT THERMOSTAT HEATER ELEMENT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- When a coolant temperature reaches specified temperature, the test is started automatically.
- The test takes up to approximately 10 minutes.

Item	Condition
Engine speed	At idle
Engine coolant temperature	Less than 50°C (122°F)
A/C	OFF

4. Perform the Active Test.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> GO TO 4.

4.CHECK COOLANT THERMOSTAT HEATER ELEMENT

Check engine coolant thermostat heating element. Refer to [EC4-598, "Component Inspection \(Coolant Thermostat Heater Element\)"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace error-detected parts.

5.CHECK ENGINE COOLANT THERMOSTAT HEATER ELEMENT POWER SUPPLY

1. Check that the #98 fuse is not fusing.
2. Disconnect coolant thermostat heater element harness connector.
3. Turn ignition switch ON.
4. Check the voltage between coolant thermostat heater element harness connector and ground.

+		-	Voltage
Connector	Terminal		
F169	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Check engine coolant thermostat heating element power supply circuit.

6.CHECK COOLANT THERMOSTAT HEATER ELEMENT CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and coolant thermostat heater element harness connector.

+		-		Continuity
Connector	Terminal	Connector	Terminal	
F150	4	F169	2	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Coolant Thermostat Heater Element)

INFOID:000000013290272

1.CHECK COOLANT THERMOSTAT HEATER ELEMENT

1. Turn ignition switch OFF.

P0597 COOLANT THERMOSTAT HEATER ELEMENT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect coolant thermostat heater element harness connector.
3. Check the resistance between coolant thermostat heater element terminals.

A

Coolant thermostat heater element		Condition	Resistance (Ω)
+	-		
Terminal			
1	2	25°C (77°F)	8.5 – 10.5

EC4

Is the inspection result normal?

C

YES >> INSPECTION END

NO >> Replace coolant thermostat (built-in engine coolant thermostat heating element). Refer to [CO-18](#).
["Exploded View"](#).

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P0598 COOLANT THERMOSTAT HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0598 COOLANT THERMOSTAT HEATER ELEMENT

DTC Description

INFOID:0000000013290273

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0598	COOLANT THERMOSTAT (Thermostat heater control circuit low)	NO SUBTYPE INFORMATION	The coolant thermostat has a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors
(Engine coolant thermostat heater element circuit is open or shorted.)
- Engine coolant thermostat heater element

Diagnosis Procedure

INFOID:0000000013472161

1. INSPECTION START

Does the coolant temperature rise too quickly and become too high?

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

2. CHECK COOLANT THERMOSTAT HEATING ELEMENT

Ⓟ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

NOTE:

- When a coolant temperature reaches specified temperature, the test is started automatically.
- The test takes up to approximately 10 minutes.

Item	Condition
Engine speed	At idle
Engine coolant temperature	Less than 100°C (212°F)
A/C	OFF

4. Perform the Active Test.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> GO TO 4.

3. CHECK COOLANT THERMOSTAT HEATING ELEMENT

Ⓟ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

NOTE:

P0598 COOLANT THERMOSTAT HEATER ELEMENT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- When a coolant temperature reaches specified temperature, the test is started automatically.
- The test takes up to approximately 10 minutes.

Item	Condition
Engine speed	At idle
Engine coolant temperature	Less than 50°C (122°F)
A/C	OFF

4. Perform the Active Test.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> GO TO 4.

4.CHECK COOLANT THERMOSTAT HEATER ELEMENT

Check engine coolant thermostat heating element. Refer to [EC4-601. "Component Inspection \(Coolant Thermostat Heater Element\)"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace error-detected parts.

5.CHECK ENGINE COOLANT THERMOSTAT HEATER ELEMENT POWER SUPPLY

1. Check that the #98 fuse is not fusing.
2. Disconnect coolant thermostat heater element harness connector.
3. Turn ignition switch ON.
4. Check the voltage between coolant thermostat heater element harness connector and ground.

+		-	Voltage
Coolant thermostat heater element			
Connector	Terminal		
F169	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Check engine coolant thermostat heating element power supply circuit.

6.CHECK COOLANT THERMOSTAT HEATER ELEMENT CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and coolant thermostat heater element harness connector.

+		-		Continuity
ECM		Coolant thermostat heater element		
Connector	Terminal	Connector	Terminal	
F150	4	F169	2	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Coolant Thermostat Heater Element)

INFOID:0000000013472162

1.CHECK COOLANT THERMOSTAT HEATER ELEMENT

1. Turn ignition switch OFF.

P0598 COOLANT THERMOSTAT HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

2. Disconnect coolant thermostat heater element harness connector.
3. Check the resistance between coolant thermostat heater element terminals.

Coolant thermostat heater element		Condition	Resistance (Ω)
+	-		
Terminal			
1	2	25°C (77°F)	8.5 – 10.5

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace coolant thermostat (built-in engine coolant thermostat heating element). Refer to [CO-18](#).
["Exploded View"](#).

P0599 COOLANT THERMOSTAT HEATER ELEMENT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0599 COOLANT THERMOSTAT HEATER ELEMENT

DTC Description

INFOID:0000000013290276

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0599	THERMOSTAT HEATER (Thermostat heater control circuit high)	NO SUBTYPE INFORMATION	The coolant thermostat has a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors (Engine coolant thermostat heater element circuit is open or shorted.)
- Engine coolant thermostat heater element

Diagnosis Procedure

INFOID:0000000013472163

1. INSPECTION START

Does the coolant temperature rise too quickly and become too high?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK COOLANT THERMOSTAT HEATING ELEMENT

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

NOTE:

- When a coolant temperature reaches specified temperature, the test is started automatically.
- The test takes up to approximately 10 minutes.

Item	Condition
Engine speed	At idle
Engine coolant temperature	Less than 100°C (212°F)
A/C	OFF

4. Perform the Active Test.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> GO TO 4.

3. CHECK COOLANT THERMOSTAT HEATING ELEMENT

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check coolant thermostat heating element".
3. Set the vehicle under the following conditions:

CAUTION:

During the test, cooling fan is activated at maximum speed.

NOTE:

P0599 COOLANT THERMOSTAT HEATER ELEMENT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- When a coolant temperature reaches specified temperature, the test is started automatically.
- The test takes up to approximately 10 minutes.

Item	Condition
Engine speed	At idle
Engine coolant temperature	Less than 50°C (122°F)
A/C	OFF

4. Perform the Active Test.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> GO TO 4.

4.CHECK COOLANT THERMOSTAT HEATER ELEMENT

Check engine coolant thermostat heating element. Refer to [EC4-604. "Component Inspection \(Coolant Thermostat Heater Element\)"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace error-detected parts.

5.CHECK ENGINE COOLANT THERMOSTAT HEATER ELEMENT POWER SUPPLY

1. Check that the #98 fuse is not fusing.
2. Disconnect coolant thermostat heater element harness connector.
3. Turn ignition switch ON.
4. Check the voltage between coolant thermostat heater element harness connector and ground.

+		-	Voltage
Connector	Terminal		
F169	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Check engine coolant thermostat heating element power supply circuit.

6.CHECK COOLANT THERMOSTAT HEATER ELEMENT CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and coolant thermostat heater element harness connector.

+		-		Continuity
Connector	Terminal	Connector	Terminal	
F150	4	F169	2	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Coolant Thermostat Heater Element)

INFOID:000000013472164

1.CHECK COOLANT THERMOSTAT HEATER ELEMENT

1. Turn ignition switch OFF.

P0599 COOLANT THERMOSTAT HEATER ELEMENT

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect coolant thermostat heater element harness connector.
3. Check the resistance between coolant thermostat heater element terminals.

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Coolant thermostat heater element		Condition	Resistance (Ω)
+	-		
Terminal			
1	2	25°C (77°F)	8.5 – 10.5

EC4

Is the inspection result normal?

C

YES >> INSPECTION END

NO >> Replace coolant thermostat (built-in engine coolant thermostat heating element). Refer to [CO-18](#).
["Exploded View"](#).

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P0604 ECM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0604 ECM

DTC Description

INFOID:000000013290279

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0604	CONTROL MODULE [Internal control module Random Access Memory (RAM) error]	NO SUBTYPE INFORMATION	There is an internal control unit malfunction in the RAM memory.
		CIRC VOLT BELOW THRESHOLD	There is an internal control unit malfunction in the RAM memory. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	There is an internal control unit malfunction in the RAM memory. The limit value for electrical voltage has been exceeded.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290280

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
NO >> INSPECTION END

P0605 EMCM

DTC Description

INFOID:000000013290281

DTC DETECTION LOGIC

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EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0605	ECM (ECM)	NO SUBTYPE INFORMATION	<ul style="list-style-type: none"> EMCM calculation function is malfunctioning. EMCM EEPROM system is malfunctioning. EMCM self shut-off function is malfunctioning.

POSSIBLE CAUSE

- EMCM

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-1

 With CONSULT

1. Turn ignition switch ON.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P0605" detected?

YES >> Proceed to [EC4-608, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-2

 With CONSULT

1. Turn ignition switch OFF and wait for 10 seconds or more.
2. Turn ignition switch ON and wait at least 1 second.
3. Turn ignition switch OFF and wait for 10 seconds, and then turn ignition switch ON.
4. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P0605" detected?

YES >> Proceed to [EC4-608, "Diagnosis Procedure"](#).

NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE-3

 With CONSULT

1. Turn ignition switch OFF and wait for 10 seconds or more.
2. Turn ignition switch ON and wait at least 1 second.
3. Turn ignition switch OFF and wait for 10 seconds, and then turn ignition switch ON.
4. Repeat step 3 for 32 times.

P0605 EMCM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

5. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P0605" detected?

- YES >> Proceed to [EC4-608. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290282

1. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Perform DTC confirmation procedure. Refer to [EC4-607. "DTC Description"](#).
3. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P0605" detected again?

- YES >> Replace EMCM. Refer to [EC4-968. "Removal and Installation"](#).
- NO >> INSPECTION END

P0606 ECM

DTC Description

INFOID:000000013290283

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0606	CONTROL MODULE (Control module processor)	NO SUBTYPE INFORMATION	There is an internal control unit fault in the processor.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290284

1. ERASE DTC

 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
 NO >> INSPECTION END

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P0607 CONTROL MODULE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0607 CONTROL MODULE

ECM

ECM : DTC Description

INFOID:0000000013290285

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0607	CONTROL MODULE (Control module performance)	SYSTEM INTERNAL MAL-FUNCTN	The control unit has a malfunction. There is an internal malfunction.
		COMPONENT MALFUNCTION	The control unit has a malfunction. There is a component malfunction.
		—	The control unit has a malfunction.
		CIRCUIT SHORT TO BATTERY	The control unit has a malfunction. There is a short circuit to positive.
		CIRC SHORT TO GRND OR OPEN	The control unit has a malfunction. There is a short circuit to ground or an open circuit.
		CIRC VOLT BELOW THRESHOLD	The control unit has a malfunction. The limit value for electrical voltage has not been attained.
		CIRC CRRNT BELOW THRESHLD	The control unit has a malfunction. The limit value for current has not been attained.
		GENERAL CHECKSUM ERROR	The control unit has a malfunction. There is a general checksum error.
		SUPERVISION SOFTWARE ERROR	The control unit has a malfunction. There is an error in the control memory.
		SIGNAL COMPARE ERROR	The control unit has a malfunction. The signal comparison error.
		SIGNAL PLAUSIBILITY ERROR	The control unit has a malfunction. There is an implausible signal.

POSSIBLE CAUSE

ECM

ECM : Diagnosis Procedure

INFOID:0000000013290286

1. ERASE DTC

Ⓟ With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
NO >> INSPECTION END

EMCM

EMCM : DTC Description

INFOID:0000000013290287

DTC DETECTION LOGIC

P0607 CONTROL MODULE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0607	ECM (Control module performance)	NO SUBTYPE INFORMATION	When detecting error during the initial diagnosis of CAN controller of EMCM.

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EC4

POSSIBLE CAUSE

- EMCM

C

FAIL-SAFE

Stop/Start System

D

Stop/start system operating condition in fail safe mode

Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

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DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

Turn ignition switch OFF and wait at least 10 seconds.

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>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn ignition switch ON.
2. Check "Self Diagnostic Result" of "EMCM".

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Is DTC "P0607" detected?

- YES >> Proceed to [EC4-611, "EMCM : Diagnosis Procedure"](#).
 NO >> INSPECTION END

K

EMCM : Diagnosis Procedure

INFOID:000000013290288

1. PERFORM DTC CONFIRMATION PROCEDURE

L

1. Erase DTC.
2. Perform DTC CONFIRMATION PROCEDURE. Refer to [EC4-610, "EMCM : DTC Description"](#).
3. Check "Self Diagnostic Result" of "EMCM".

M

Is DTC "P0607" detected again?

- YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).
 NO >> INSPECTION END

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P060B ECM

DTC Description

INFOID:000000013290289

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P060B	CONTROL MODULE (Internal control module A/D processing performance)	NO SUBTYPE INFORMATION	There is an internal control unit malfunction in the analog/digital converter.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290290

1.ERASE DTC

 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
 NO >> INSPECTION END

P060C ECM

DTC Description

INFOID:000000013290291

DTC DETECTION LOGIC

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EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P060C	CONTROL MODULE (Internal control module main processor performance)	GENERAL ELEC MALFUNCTN	There is an internal control unit malfunction in the central processing unit. There is a general signal error.
		SYSTEM INTERNAL MAL-FUNCTN	There is an internal control unit malfunction in the central processing unit. There is an internal malfunction.
		COMPONENT MALFUNCTION	There is an internal control unit malfunction in the central processing unit. There is a component malfunction.
		CIRC VOLT ABOVE THRESH-OLD	There is an internal control unit malfunction in the central processing unit. The limit value for electrical voltage has been exceeded.
		SIGNAL INVALID	There is an internal control unit malfunction in the central processing unit. There is an invalid signal.
		WATCHDOG/SAFETY ÉpC ERROR	There is an internal control unit malfunction in the central processing unit. There is a runtime error.

POSSIBLE CAUSE
ECM

Diagnosis Procedure

INFOID:000000013290292

1. ERASE DTC

 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

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P060D ECM

DTC Description

INFOID:000000013290293

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P060D	CONTROL MODULE (Internal control module accelerator pedal position Performance)	NO SUBTYPE INFORMATION	There is an internal control unit malfunction affecting the calculation of the accelerator pedal position.
		SIGNAL PLAUSIBILITY ERROR	There is an internal control unit malfunction affecting the calculation of the accelerator pedal position. There is an implausible signal.

POSSIBLE CAUSE
ECM

Diagnosis Procedure

INFOID:000000013290294

1. ERASE DTC

 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P0611 ECM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0611 ECM

DTC Description

INFOID:000000013290295

DTC DETECTION LOGIC

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EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0611	FUEL INJECTOR CONTROL MODULE (Fuel injector control module performance)	NO SUBTYPE INFORMATION	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit).
		GENERAL ELEC MALFUNCTN	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). There is a general signal error.
		FM/PWM ERROR	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). There is a frequency or pulse width modulation error.
		SYSTEM INTERNAL MAL-FUNCTN	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). There is an internal malfunction.
		SYSTEM PROGRAMMING ERROR	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). There is a programming error.
		CIRCUIT OPEN	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). There is an open circuit.
		CIRC VOLT BELOW THRESH-OLD	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESH-OLD	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). The limit value for electrical voltage has been exceeded.
		MEMORY ERROR	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). There is a general memory error.
		INTERNAL ELECTRONIC ERROR	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). There is an internal electrical error.
		INCRRECT COMPNT INSTALLED	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). The wrong component is installed.
		SIG HAS TOO FEW TRNSIT/ EVNTS	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). The signal has too few transitions or events.
		SIGNAL INCORRECT AFTER EVENT	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). The signal is impermissible after an event.
		BUS OFF	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). Bus OFF.
PFM/INCORRECT OPERATN	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). The function or the instruction has malfunction.		
CMPNENT INTERNAL MLFNCTN	Control unit (Fuel injector) has a malfunction (output stage error of engine control unit). There is an internal component malfunction.		

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POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290296

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P0615 STARTER RELAY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0615 STARTER RELAY

DTC Description

INFOID:000000013290297

DTC DETECTION LOGIC

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EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0615	STARTER RELAY (Starter relay "A" circuit)	CIRCUIT OPEN	The starter relay has an electrical malfunction. There is an open circuit.

POSSIBLE CAUSE

- Harness and connector (starter relay circuit is open)
- Starter relay

Diagnosis Procedure

INFOID:000000013472165

1.CHECK ECM POWER SUPPLY

Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

Is the inspection result normal?

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

2.CHECK STARTER RELAY

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

+		-		Continuity
ECM		Starter relay		
Connector	Terminal	Connector	Terminal	
E200	116	E207	2	Existed
	148		1	

Is the inspection result normal?

- YES >> Replace starter relay.
 NO >> Repair or replace error-detected parts.

P0616 STARTER RELAY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0616 STARTER RELAY

DTC Description

INFOID:000000013290299

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0616	STARTER RELAY (Starter relay "A" circuit low)	SYSTEM PROGRAMMING ERROR	The starter relay has a short circuit to ground. There is a programming error.
		ALGORITHM BASED ERROR	The starter relay has a short circuit to ground. There is an algorithm error.
		CIRC SHORT TO GRND OR OPEN	The starter relay has a short circuit to ground. There is a short circuit to ground or an open circuit.

POSSIBLE CAUSE

- Harness and connector (starter relay circuit is short to ground)
- Starter relay

Diagnosis Procedure

INFOID:000000013290300

1. CHECK ECM POWER SUPPLY

Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK STARTER RELAY

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

+		-		Continuity
ECM		Starter relay		
Connector	Terminal	Connector	Terminal	
E200	116	E207	2	Existed
	148		1	

Is the inspection result normal?

YES >> Replace starter relay.

NO >> Repair or replace error-detected parts.

P0617 STARTER RELAY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0617 STARTER RELAY

DTC Description

INFOID:0000000013290301

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0617	STARTER RELAY (Starter relay circuit high)	FM/PWM ERROR	The starter relay has a short circuit to positive. There is a frequency or pulse width modulation error.
		SYSTEM INTERNAL MAL-FUNCTN	The starter relay has a short circuit to positive. There is an internal malfunction.
		CIRC SHORT TO BATT OR OPEN	The starter relay has a short circuit to positive. There is a short circuit to positive or an open circuit.

POSSIBLE CAUSE

- Harness and connector (starter relay circuit is short to power)
- Starter relay

Diagnosis Procedure

INFOID:0000000013472166

1. CHECK ECM POWER SUPPLY

Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).

Is the inspection result normal?

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

2. CHECK STARTER RELAY

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

+		-		Continuity
ECM		Starter relay		
Connector	Terminal	Connector	Terminal	
E200	116	E207	2	Existed
	148		1	

Is the inspection result normal?

- YES >> Replace starter relay.
 NO >> Repair or replace error-detected parts.

P061A ECM

DTC Description

INFOID:000000013290303

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P061A	CONTROL MODULE (Internal control module torque performance)	SG BS LVL O-OF RNG/ZR AJST ERR	The torque control of the control unit has a malfunction. The signal offset is outside the permissible range.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290304

1. ERASE DTC

 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
- NO >> INSPECTION END

P061B ECM

DTC Description

INFOID:000000013290305

DTC DETECTION LOGIC

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EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P061B	CONTROL MODULE (Internal control module torque calculation performance)	NO SUBTYPE INFORMATION	The torque calculation of the control unit has a malfunction.
		ELECTRICAL MALFUNCTION	The torque calculation of the control unit has a malfunction. There is a general electrical malfunction.
		SYSTEM PROGRAMMING ERROR	The torque calculation of the control unit has a malfunction. There is a programming error.
		ALGORITHM BASED ERROR	The torque calculation of the control unit has a malfunction. There is an algorithm error.
		BUS SIGNAL/MESSAGE ERROR	The torque calculation of the control unit has a malfunction. There is a signal error or the message error.
		SIG ABOVE ALLOWABLE RANGE	The torque calculation of the control unit has a malfunction. There is a signal above the permissible limit value.

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POSSIBLE CAUSE

ECM

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Diagnosis Procedure

INFOID:000000013290306

1. ERASE DTC

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 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

J

Is the DTC detected again?

K

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
 NO >> INSPECTION END

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P061C ECM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P061C ECM

DTC Description

INFOID:000000013290307

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P061C	CONTROL MODULE (Internal control module engine RPM performance)	NO SUBTYPE INFORMATION	There is an internal control unit error affecting the calculation of the engine speed.
		GENERAL ELEC MALFUNCTN	There is an internal control unit error affecting the calculation of the engine speed. There is a general signal error.
		SYSTEM INTERNAL MAL-FUNCTN	There is an internal control unit error affecting the calculation of the engine speed. There is an internal malfunction.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290308

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
NO >> INSPECTION END

P061D ECM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P061D ECM

DTC Description

INFOID:000000013290309

DTC DETECTION LOGIC

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EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P061D	CONTROL MODULE (Internal control module engine air mass performance)	NO SUBTYPE INFORMATION	There is an internal control unit error in the monitoring function for the air mass.
		CALIB/PRMTER MEMORY ERROR	There is an internal control unit error in the monitoring function for the air mass. There is an error in the calibration or parameterization memory.
		SIGNAL PLAUSIBILITY ERROR	There is an internal control unit error in the monitoring function for the air mass. There is an implausible signal.

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POSSIBLE CAUSE

ECM

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Diagnosis Procedure

INFOID:000000013290310

G

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

H

Is the DTC detected again?

I

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

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P0627 FUEL PUMP CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0627 FUEL PUMP CONTROL

ECM

ECM : DTC Description

INFOID:0000000013290311

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0627	FUEL PUMP A (Fuel pump "A" control circuit/open)	NO SUBTYPE INFORMATION	The output for the fuel pump has an electrical malfunction or open circuit.
		CIRCUIT OPEN	The output for the fuel pump has an electrical malfunction or open circuit. There is an open circuit.

POSSIBLE CAUSE

Harness and connector
(FPCM power supply circuit is open or shorted.)

ECM : Diagnosis Procedure

INFOID:0000000013290312

1. CHECK FPCM POWER SUPPLY

Check FPCM power supply circuit. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

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

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : DTC Description

INFOID:0000000013290313

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0627	FUEL PUMP A CONTROL (Fuel pump "A" control circuit/open)	NO SUBTYPE INFORMATION	All following condition are satisfied: <ul style="list-style-type: none">• Fuel pressure: below 140 kPa (1.4 bar, 1.428 kg/cm², 20.3 psi)• Fuel pump control reached max limit• Fuel pump: Not operates

POSSIBLE CAUSE

- Fuel pump
- Harness and connectors (fuel pump control circuit)

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start engine and let it idle for 5 seconds.
2. Check "Self Diagnostic Result" of "FPCM".

Is DTC "P0627" detected?

YES >> Proceed to [EC4-625. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
NO >> INSPECTION END

P0627 FUEL PUMP CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000013290314

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

1. INSPECTION START

Check the following items.

- Out of gas
- Low fuel pressure line open

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. COMPONENT FUNCTION CHECK

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Listen to fuel pump operation sound for a few seconds after ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

3. CHECK FPCM POWER SUPPLY

Check FPCM power supply and ground circuit. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK FUEL PUMP CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pump harness connector.
3. Check the continuity between FPCM harness connector and fuel pump harness connector.

+		-		Continuity
FPCM		Fuel pump		
Connector	Terminal	Connector	Terminal	
B133	11	B101	6	Existed
	12		5	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5. CHECK FUEL PUMP

Check fuel pump. Refer to [EC4-626. "FUEL PUMP CONTROL MODULE \(FPCM\) : Component Inspection \(Fuel Pump\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace fuel pump.

6. CHECK FUEL PUMP ACTIVATION SIGNAL CIRCUIT

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

+		-		Continuity
FPCM		ECM		
Connector	Terminal	Connector	Terminal	
B134	2	E200	127	Existed

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P0627 FUEL PUMP CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

FUEL PUMP CONTROL MODULE (FPCM) : Component Inspection (Fuel Pump)

INFOID:000000013290315

1. CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check resistance between fuel level sensor unit and fuel pump terminals.

Terminals	Condition	Resistance
5 and 6	Temperature: 25°C (77°F)	0.2 – 5.0 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel pump. Refer to [FL-30. "Removal and Installation"](#).

P0628 FUEL PUMP CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0628 FUEL PUMP CONTROL

ECM

ECM : DTC Description

INFOID:0000000013290316

EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0628	FUEL PUMP A (Fuel pump "A" control circuit low)	NO SUBTYPE INFORMATION	The output for the fuel pump has a short circuit to ground.
		CIRCUIT SHORT TO GROUND	The output for the fuel pump has a short circuit to ground. There is a short circuit to ground.

POSSIBLE CAUSE

Harness and connector
(FPCM power supply circuit is open or shorted.)

ECM : Diagnosis Procedure

INFOID:0000000013290317

1. CHECK FPCM POWER SUPPLY

Check FPCM power supply circuit. Refer to [EC4-237, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : DTC Description

INFOID:0000000013290318

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0628	FUEL PUMP A CONTROL (Fuel pump "A" control circuit low)	NO SUBTYPE INFO	The output for the fuel pump has a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors
(Fuel pump circuit is open or shorted.)
- Fuel pump
- Out of fuel
- Fuel line open

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and let it idle at least 10 seconds.
2. Check self-diagnostic result of "FPCM".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC4-628, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

P0628 FUEL PUMP CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

INFOID:000000013290319

1.INSPECTION START

Check the following items.

- Out of gas
- Low fuel pressure line open

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.COMPONENT FUNCTION CHECK

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Listen to fuel pump operation sound for a few seconds after ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

3.CHECK FPCM POWER SUPPLY

Check FPCM power supply and ground circuit. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK FUEL PUMP CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pump harness connector.
3. Check the continuity between FPCM harness connector and fuel pump harness connector.

+		-		Continuity
FPCM		Fuel pump		
Connector	Terminal	Connector	Terminal	
B133	11	B101	6	Existed
	12		5	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK FUEL PUMP

Check fuel pump. Refer to [EC4-629. "FUEL PUMP CONTROL MODULE \(FPCM\) : Component Inspection \(Fuel Pump\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace fuel pump.

6.CHECK FUEL PUMP ACTIVATION SIGNAL CIRCUIT

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

+		-		Continuity
FPCM		ECM		
Connector	Terminal	Connector	Terminal	
B134	2	E200	127	Existed

P0628 FUEL PUMP CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

FUEL PUMP CONTROL MODULE (FPCM) : Component Inspection (Fuel Pump)

INFOID:000000013290320

EC4

1. CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check resistance between fuel level sensor unit and fuel pump terminals.

Terminals	Condition	Resistance
5 and 6	Temperature: 25°C (77°F)	0.2 – 5.0 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel pump. Refer to [FL-30. "Removal and Installation"](#).

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P0629 FUEL PUMP CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0629 FUEL PUMP CONTROL

ECM

ECM : DTC Description

INFOID:0000000013290321

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0629	FUEL PUMP A (Fuel pump "A" control circuit high)	NO SUBTYPE INFORMATION	The output for the fuel pump has a short circuit to positive.

POSSIBLE CAUSE

Harness and connector
(FPCM power supply circuit is open or shorted.)

ECM : Diagnosis Procedure

INFOID:0000000013290322

1. CHECK FPCM POWER SUPPLY

Check FPCM power supply circuit. Refer to [EC4-237, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

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

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : DTC Description

INFOID:0000000013290323

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0629	FUEL PUMP A CONTROL (Fuel pump "A" control circuit high)	NO SUBTYPE INFO	The output for the fuel pump has a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors
(Fuel pump circuit is open or shorted.)
- Fuel pump
- Out of fuel
- Fuel line open

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and let it idle at least 10 seconds.
2. Check self-diagnostic result of "FPCM".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to [EC4-631, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

P0629 FUEL PUMP CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

INFOID:000000013290324

1.INSPECTION START

Check the following items.

- Out of gas
- Low fuel pressure line open

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.COMPONENT FUNCTION CHECK

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Listen to fuel pump operation sound for a few seconds after ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

3.CHECK FPCM POWER SUPPLY

Check FPCM power supply and ground circuit. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK FUEL PUMP CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pump harness connector.
3. Check the continuity between FPCM harness connector and fuel pump harness connector.

+		-		Continuity
FPCM		Fuel pump		
Connector	Terminal	Connector	Terminal	
B133	11	B101	6	Existed
	12		5	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK FUEL PUMP

Check fuel pump. Refer to [EC4-632. "FUEL PUMP CONTROL MODULE \(FPCM\) : Component Inspection \(Fuel Pump\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace fuel pump.

6.CHECK FUEL PUMP ACTIVATION SIGNAL CIRCUIT

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

+		-		Continuity
FPCM		ECM		
Connector	Terminal	Connector	Terminal	
B134	2	E200	127	Existed

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P0629 FUEL PUMP CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

FUEL PUMP CONTROL MODULE (FPCM) : Component Inspection (Fuel Pump)

INFOID:000000013290325

1. CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check resistance between fuel level sensor unit and fuel pump terminals.

Terminals	Condition	Resistance
5 and 6	Temperature: 25°C (77°F)	0.2 – 5.0 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel pump. Refer to [FL-30. "Removal and Installation"](#).

P062A FUEL PUMP CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P062A FUEL PUMP CONTROL

ECM

ECM : DTC Description

INFOID:0000000013290326

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EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P062A	FUEL PUMP A (Fuel pump "A" control circuit range/performance)	NO SUBTYPE INFORMATION	The output of the fuel pump is implausible.

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POSSIBLE CAUSE

Harness and connector
(FPCM power supply circuit is open or shorted.)

ECM : Diagnosis Procedure

INFOID:0000000013290327

1. CHECK FPCM POWER SUPPLY

Check FPCM power supply circuit. Refer to [EC4-237, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

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

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : DTC Description

INFOID:0000000013290328

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P062A	FUEL PUMP A CONTROL (Fuel pump "A" control circuit range/performance)	NO SUBTYPE INFORMATION	Fuel pump voltage is more than specified range for 20 minutes or more.

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POSSIBLE CAUSE

- Harness and connectors (fuel pump)
- Fuel pump

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Drive the vehicle at least 30 minutes or more.
2. Check "Self Diagnostic Result" of "FPCM".

Is DTC "P062A" detected?

- YES >> Proceed to [EC4-633, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- NO >> INSPECTION END

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

INFOID:0000000013290329

1. INSPECTION START

Check the following items.

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P062A FUEL PUMP CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- Out of gas
 - Low fuel pressure line open
- Is the inspection result normal?

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

2.COMPONENT FUNCTION CHECK

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Listen to fuel pump operation sound for a few seconds after ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 3.

3.CHECK FPCM POWER SUPPLY

Check FPCM power supply and ground circuit. Refer to [EC4-237, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

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

4.CHECK FUEL PUMP CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pump harness connector.
3. Check the continuity between FPCM harness connector and fuel pump harness connector.

+		-		Continuity
FPCM		Fuel pump		
Connector	Terminal	Connector	Terminal	
B133	11	B101	6	Existed
	12		5	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK FUEL PUMP

Check fuel pump. Refer to [EC4-635, "FUEL PUMP CONTROL MODULE \(FPCM\) : Component Inspection \(Fuel Pump\)"](#).

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace fuel pump.

6.CHECK FUEL PUMP ACTIVATION SIGNAL CIRCUIT

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

+		-		Continuity
FPCM		ECM		
Connector	Terminal	Connector	Terminal	
B134	2	E200	127	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

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

P062A FUEL PUMP CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

FUEL PUMP CONTROL MODULE (FPCM) : Component Inspection (Fuel Pump)

INFOID:0000000013290330

A

1. CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check resistance between fuel level sensor unit and fuel pump terminals.

EC4

Terminals	Condition	Resistance
5 and 6	Temperature: 25°C (77°F)	0.2 – 5.0 Ω

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Is the inspection result normal?

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YES >> INSPECTION END

NO >> Replace fuel pump. Refer to [FL-30, "Removal and Installation"](#).

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P062B ECM

DTC Description

INFOID:000000013290331

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P062B	CONTROL MODULE (Internal control module fuel injector control performance)	NO SUBTYPE INFORMATION	There is an internal control unit malfunction in the monitoring function for the fuel injectors.
		SIGNAL COMPARE ERROR	There is an internal control unit malfunction in the monitoring function for the fuel injectors. The signal comparison error.
		CIRC/COMP PROTECTN TIMEOUT	There is an internal control unit malfunction in the monitoring function for the fuel injectors. The duration of the actuation was exceeded: overload protection is active.
		SIGNAL PLAUSIBILITY ERROR	There is an internal control unit malfunction in the monitoring function for the fuel injectors. There is an implausible signal.
		SIG HAS TOO MANY TRANSIT/EVNTS	There is an internal control unit malfunction in the monitoring function for the fuel injectors. The signal has too many transitions or events.
		EVENT INFORMATION	There is an internal control unit malfunction in the monitoring function for the fuel injectors. There is incomplete information.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290332

1. ERASE DTC

Ⓢ With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
- NO >> INSPECTION END

P062C ECM

DTC Description

INFOID:000000013290333

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P062C	CONTROL MODULE (Internal control module vehicle speed performance)	NO SUBTYPE INFORMATION	There is an internal control unit error in the monitoring function for the vehicle speed.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290334

1. ERASE DTC

 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P062F ECM

DTC Description

INFOID:000000013290335

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P062F	CONTROL MODULE (Internal control module EEPROM error)	SYSTEM INTERNAL MAL-FUNCTN	There is an internal error in the EEPROM of the control unit. There is an internal error.
		SYSTEM PROGRAMMING ERROR	There is an internal error in the EEPROM of the control unit. There is a programming error.
		ALGORITHM BASED ERROR	There is an internal error in the EEPROM of the control unit. There is an algorithm error.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290336

1. ERASE DTC

 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P0634 ECM TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0634 ECM TEMPERATURE

DTC Description

INFOID:0000000013290337

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0634	CONT MODULE INTERNAL TEMP A (Control module internal temperature "A" too high)	NO SUBTYPE INFORMATION	The temperature in the control unit is too high.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:0000000013290338

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
NO >> INSPECTION END

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EC4

P0638 THROTTLE VALVE ACTUATOR CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0638 THROTTLE VALVE ACTUATOR CONTROL

Diagnosis Description

INFOID:000000013290339

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0638	THROTTLE ACTUATOR B1 (Throttle actuator control range/ performance bank 1)	SIG BELOW ALLOWABLE RANGE	The output for the throttle valve actuator (cylinder bank 1) has a malfunction. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	The output for the throttle valve actuator (cylinder bank 1) has a malfunction. There is a signal above the permissible limit value.

POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

Diagnosis Procedure

INFOID:000000013290340

1. CHECK THROTTLE VALVE POSITION

With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-641, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.

P0638 THROTTLE VALVE ACTUATOR CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

3.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	4	F150	17	

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

5.CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	3	F150	38	
	5		62	
	6		14	

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:0000000013290341

1.CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

P0638 THROTTLE VALVE ACTUATOR CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

P063E THROTTLE VALVE ACTUATOR CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P063E THROTTLE VALVE ACTUATOR CONTROL

Diagnosis Description

INFOID:0000000013290342

DTC DETECTION LOGIC

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EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P063E	AUTO CONFIG THROTTLE INPUT (Throttle/Pedal position sensor/switch "A" circuit low)	MECHANICAL MALFUNCTION	The throttle valve adaptation has a malfunction. There is a mechanical malfunction.

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POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

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Diagnosis Procedure

INFOID:0000000013472167

1. CHECK THROTTLE VALVE POSITION

G

With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

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Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

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- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

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Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 2.

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2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-644, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

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P063E THROTTLE VALVE ACTUATOR CONTROL

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	4	F150	17	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	3	F150	38	Existed
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:000000013472168

1. CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

P063E THROTTLE VALVE ACTUATOR CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

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P0641 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0641 SENSOR POWER SUPPLY

DTC Description

INFOID:000000013290345

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0641	SENSOR REFERENCE VOLT A (Sensor reference voltage "A" circuit/open)	SYSTEM INTERNAL MAL- FUNCTN	Output 1 for the reference voltage of the sensors has an electrical malfunction or an open circuit. There is an internal malfunction.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290346

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P0642 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0642 SENSOR POWER SUPPLY

DTC Description

INFOID:000000013290347

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0642	SENSOR REFERENCE VOLT A (Sensor reference voltage "A" circuit low)	NO SUBTYPE INFORMATION	Output 1 for the reference voltage of the sensors has a short circuit to ground.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290348

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
NO >> INSPECTION END

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EC4

P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0643 SENSOR POWER SUPPLY

ECM

ECM : DTC Description

INFOID:0000000013290349

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0643	SENSOR REFERENCE VOLT A (Sensor reference voltage "A" circuit high)	NO SUBTYPE INFORMATION	Output 1 for the reference voltage of the sensors has a short circuit to positive.

POSSIBLE CAUSE

ECM

ECM : Diagnosis Procedure

INFOID:0000000013290350

1. ERASE DTC

Ⓟ With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
NO >> INSPECTION END

EMCM

EMCM : DTC Description

INFOID:0000000013290351

DESCRIPTION

EMCM supplies a voltage of 5 V to the sensors, respectively. Accordingly, when a short circuit develops in a sensor power source, a malfunction may occur simultaneously in the sensors belonging to the same group as the short-circuited sensor.

Sensor Power Supply

- Main battery current sensor
- Sub battery current sensor

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0643	SENSOR POWER/CIRC (Sensor reference voltage "A" circuit high)	NO SUBTYPE INFORMATION	EMCM detects a voltage of power source for sensor is excessively low or high.

POSSIBLE CAUSE

- Harness or connectors
(Main battery current sensor circuit is shorted.)
(Sub battery current sensor circuit is shorted.)
- Main battery current sensor
- Sub battery current sensor

FAIL-SAFE

P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

- Turn ignition switch OFF and wait at least 10 seconds.
- Check that the battery voltage is more than 8 V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

Ⓜ With CONSULT

1. Start the engine and let it idle at least 1 second.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P0643" detected?

- YES >> Proceed to [EC4-649, "EMCM : Diagnosis Procedure"](#).
 NO >> INSPECTION END

EMCM : Diagnosis Procedure

INFOID:000000013290352

1. CHECK SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect main battery current sensor harness connector.
3. Disconnect sub battery current sensor harness connector.
4. Turn ignition switch ON.
5. Check the voltage between main battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Connector	Terminal		
E208	4	Ground	5 V

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> GO TO 2.

2. CHECK SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check harness for short to ground.

Item	+		-	Continuity
	Connector	Terminal		
Main battery current sensor	E208	4	Ground	Not existed
Sub battery current sensor	B135	1		

4. Also check the harness for short to power.

Is the inspection result normal?

- YES >> GO TO 3.

P0643 SENSOR POWER SUPPLY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

3.CHECK COMPONENTS

Check the following:

- Main battery current sensor. Refer to [EC4-650, "EMCM : Component Inspection \(Main Battery Current Sensor\)"](#).
- Sub battery current sensor. Refer to [EC4-650, "EMCM : Component Inspection \(Sub Battery Current Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace malfunctioning component.

4.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

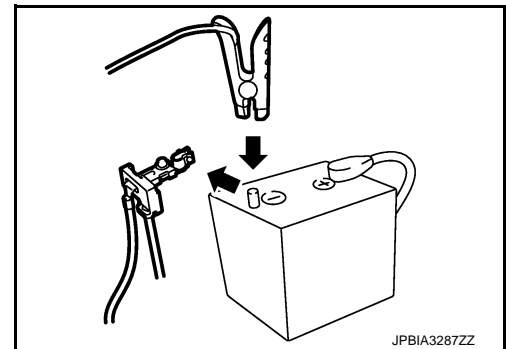
>> INSPECTION END

EMCM : Component Inspection (Main Battery Current Sensor)

INFOID:000000013290353

1.CHECK MAIN BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect main battery negative cable.
4. Install jumper cable between main battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.



Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	24	35	2.5 V*

*: Before measuring the terminal voltage, confirm that the main battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace main battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

EMCM : Component Inspection (Sub Battery Current Sensor)

INFOID:000000013290354

1.CHECK SUB BATTERY CURRENT SENSOR

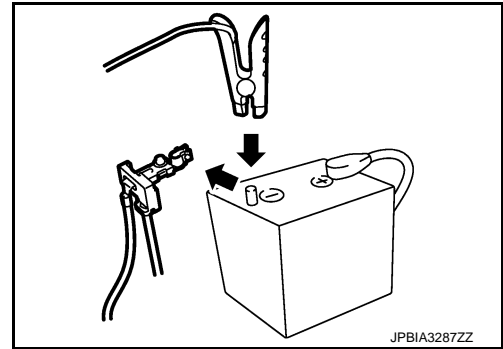
1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect sub battery negative cable.

P0643 SENSOR POWER SUPPLY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4. Install jumper cable between sub battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.



Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	26	36	2.5 V*

*: Before measuring the terminal voltage, confirm that the sub battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace sub battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

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P064D ECM

DTC Description

INFOID:000000013290355

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P064D	CONTROL MODULE (Internal control module O2 sensor processor performance bank 1)	SYSTEM INTERNAL MAL-FUNCTN	The processor of the oxygen sensor (cylinder bank 1) in the control unit has a malfunction. There is an internal malfunction.
		SIG BELOW ALLOWABLE RANGE	The processor of the oxygen sensor (cylinder bank 1) in the control unit has a malfunction. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	The processor of the oxygen sensor (cylinder bank 1) in the control unit has a malfunction. There is a signal above the permissible limit value.
		SIGNAL INVALID	The processor of the oxygen sensor (cylinder bank 1) in the control unit has a malfunction. There is an incorrect signal.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290356

1. ERASE DTC

 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P0651 SENSOR POWER SUPPLY 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0651 SENSOR POWER SUPPLY 2

DTC Description

INFOID:000000013290357

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0651	SENSOR REFERENCE VOLT B (Sensor reference voltage "B" circuit/open)	NO SUBTYPE INFORMATION	Output 2 for the reference voltage of the sensors has an electrical malfunction or an open circuit.
		SYSTEM INTERNAL MAL-FUNCTN	Output 2 for the reference voltage of the sensors has an electrical malfunction or an open circuit. There is an internal malfunction.
		CIRC VOLT BELOW THRESH-OLD	Output 2 for the reference voltage of the sensors has an electrical malfunction or an open circuit. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESH-OLD	Output 2 for the reference voltage of the sensors has an electrical malfunction or an open circuit. The limit value for electrical voltage has been exceeded.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290358

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

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P065B ALTERNATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P065B ALTERNATOR

DTC Description

INFOID:000000013290359

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P065B	GENERATOR CONTROL CIRCUIT (Generator control circuit range/performance)	NO SUBTYPE INFORMATION	The alternator has a malfunction.

POSSIBLE CAUSE

Alternator

Diagnosis Procedure

INFOID:000000013290360

1.CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is any DTC related to LIN communication detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> GO TO 2.

2.CHECK ALTERNATOR

Check alternator function. Refer to [CHG-14, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-18, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

Is the inspection result normal?

- YES >> Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).
- NO >> Repair or replace error-detected parts.

P0667 CONTROL MODULE INTERNAL TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0667 CONTROL MODULE INTERNAL TEMPERATURE SENSOR

DTC Description

INFOID:000000013290361

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0667	CONT MODULE INTRNL TEMP SEN A (Control module internal temperature sensor "A" range/performance)	NO SUBTYPE INFORMATION	The internal temperature sensor of the control unit has a malfunction.
		CIRC VOLT BELOW THRESHOLD	The internal temperature sensor of the control unit has a malfunction. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	The internal temperature sensor of the control unit has a malfunction. The limit value for electrical voltage has been exceeded.
		SIGNAL INVALID	The internal temperature sensor of the control unit has a malfunction. There is an invalid signal.

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POSSIBLE CAUSE

ECM

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Diagnosis Procedure

INFOID:000000013290362

H

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

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Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

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P0691 COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0691 COOLING FAN

DTC Description

INFOID:000000013290363

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0691	FAN 1 (Fan 1 control circuit low)	CIRCUIT SHORT TO GROUND	The output of electric fan has a short circuit to ground. There is a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors
- Cooling fan motor
- Cooling fan control module

Diagnosis Procedure

INFOID:000000013290364

1. CHECK DTC

Ⓟ With CONSULT

1. Turn ignition switch ON.
2. Check "Self-diagnostic result".
3. Check that ECM does not detect the engine coolant temperature sensor related DTC.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).

2. COMPONENT FUNCTION CHECK-1

Ⓟ With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. Check that the engine coolant temperature is between 0°C (32°F) and 80°C (176°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CK ENG AND AC WITH INTGRTED CONT FAN MOTOR".
3. Perform test according to CONSULT screen.
4. Set ON/OFF ratio between 9.5 – 12.4%. (The fan is stopped.)
5. Check the voltage between cooling fan control module and ground.

+		-	Voltage
Cooling fan control module			
Connector	Terminal		
E213	4	Ground	1 – 1.7 V

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

3. COMPONENT FUNCTION CHECK-2

Ⓟ With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. On CONSULT screen, set ON/OFF ratio between 87.5 – 90.4%. (The fan operates at maximum speed.)
2. Check the voltage between cooling fan control module and ground.

P0691 COOLING FAN

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	8 – 10.5 V
E213	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK COOLING FAN CONTROL SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and cooling fan control module harness connector.

+		-		Continuity
ECM		Cooling fan control module		
Connector	Terminal	Connector	Terminal	Existed
E200	103	E213	4	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK COOLING FAN CONTROL MODULE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan control module harness connector.
3. Check the voltage between cooling fan control module harness connector and ground.

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	Battery voltage
E213	2		
	3		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform trouble diagnosis for cooling fan control module power supply circuit.

6. CHECK COOLING FAN CONTROL MODULE GROUND CIRCUIT

Check the continuity between cooling fan control module harness connector and ground.

+		-	Continuity
Cooling fan control module			
Connector	Terminal	Ground	Existed
E213	1		

Is the inspection result normal?

YES >> Replace cooling fan assembly. Refer to [CO-13, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P0692 COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0692 COOLING FAN

DTC Description

INFOID:000000013290365

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0692	FAN 1 (Fan 1 control circuit high)	CIRCUIT SHORT TO BATTERY	The output of electric fan has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors
- Cooling fan motor
- Cooling fan control module

Diagnosis Procedure

INFOID:000000013472169

1. CHECK DTC

Ⓟ With CONSULT

1. Turn ignition switch ON.
2. Check "Self-diagnostic result".
3. Check that ECM does not detect the engine coolant temperature sensor related DTC.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).

2. COMPONENT FUNCTION CHECK-1

Ⓟ With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. Check that the engine coolant temperature is between 0°C (32°F) and 80°C (176°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CK ENG AND AC WITH INTGRTED CONT FAN MOTOR".
3. Perform test according to CONSULT screen.
4. Set ON/OFF ratio between 9.5 – 12.4%. (The fan is stopped.)
5. Check the voltage between cooling fan control module and ground.

+		-	Voltage
Cooling fan control module			
Connector	Terminal		
E213	4	Ground	1 – 1.7 V

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

3. COMPONENT FUNCTION CHECK-2

Ⓟ With CONSULT

CAUTION:

Never touch the cooling fan because the cooling fan activates automatically when the test starts.

1. On CONSULT screen, set ON/OFF ratio between 87.5 – 90.4%. (The fan operates at maximum speed.)
2. Check the voltage between cooling fan control module and ground.

P0692 COOLING FAN

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	8 – 10.5 V
E213	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK COOLING FAN CONTROL SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and cooling fan control module harness connector.

+		-		Continuity
ECM		Cooling fan control module		
Connector	Terminal	Connector	Terminal	Existed
E200	103	E213	4	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

5. CHECK COOLING FAN CONTROL MODULE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan control module harness connector.
3. Check the voltage between cooling fan control module harness connector and ground.

+		-	Voltage
Cooling fan control module			
Connector	Terminal	Ground	Battery voltage
E213	2		
	3		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform trouble diagnosis for cooling fan control module power supply circuit.

6. CHECK COOLING FAN CONTROL MODULE GROUND CIRCUIT

Check the continuity between cooling fan control module harness connector and ground.

+		-	Continuity
Cooling fan control module			
Connector	Terminal	Ground	Existed
E213	1		

Is the inspection result normal?

YES >> Replace cooling fan assembly. Refer to [CO-13, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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P0697 SENSOR POWER SUPPLY 3

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0697 SENSOR POWER SUPPLY 3

DTC Description

INFOID:000000013290367

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0697	SENSOR REFERENCE VOLT C (Sensor reference voltage "C" circuit/open)	SYSTEM INTERNAL MAL-FUNCTN	Output 3 for the reference voltage of the sensors has an electrical malfunction or an open circuit. There is an internal malfunction.

POSSIBLE CAUSE

ECM

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290368

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P06AF ECM

DTC Description

INFOID:000000013290369

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P06AF	TORQUE MANAGEMENT SYSTEM (Torque management system - forced engine shutdown)	NO SUBTYPE INFORMATION	The torque control system has triggered torque limitation or shutoff of the combustion engine.

POSSIBLE CAUSE
ECM

Diagnosis Procedure

INFOID:000000013290370

1. ERASE DTC

 With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P06DA OIL PUMP VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P06DA OIL PUMP VALVE

Diagnosis Description

INFOID:000000013290371

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P06DA	ENG OIL PRESSURE CONT CIRC (Engine oil pressure control circuit/open)	NO SUBTYPE INFORMATION	The actuation of the engine oil pump valve in the combustion engine has an electrical malfunction or open circuit.

POSSIBLE CAUSE

- Harness and connector
(Engine oil pump valve circuit is open or shorted.)
- Engine oil pump valve

Diagnosis Procedure

INFOID:000000013290372

1. CHECK COMPONENT FUNCTION

Ⓟ With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK ENGINE OIL PUMP VALVE".
3. Check that the indicated value of "ENG OIL PUMP VLV V (SHUNT)" is between 1 V and 2 V.
4. Perform active test.
5. Check that the indicated value of "ENG OIL PUMP VLV V (SHUNT)" under the following conditions.

Item	Condition	Value
ENG OIL PUMP VLV V (SHUNT)	Engine oil pump valve: Open	1 – 2 V
	Engine oil pump valve: Closed	0.10 – 0.18 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ENGINE OIL PUMP VALVE POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect engine oil pump valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between engine oil pump valve harness connector and ground.

+		-	Voltage
Connector	Terminal		
F176	2	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK ENGINE OIL PUMP VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 (15A) fuse.
3. Check that the fuse is not fusing.
4. Check the continuity between engine oil pump valve harness connector and fuse terminal.

P06DA OIL PUMP VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Continuity
Engine oil pump valve			
Connector	Terminal		
F176	2	No. 98 fuse terminal	Existed

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK ENGINE OIL PUMP VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between engine oil pump valve harness connector and ECM harness connector.

+		-		Continuity
Engine oil pump valve		ECM		
Connector	Terminal	Connector	Terminal	
F176	1	F150	28	Existed

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

Is the inspection result normal?

YES >> Replace engine oil pump valve. Refer to [EM-109. "2WD : Exploded View"](#) (2WD) or [EM-111. "AWD : Exploded View"](#) (AWD).

NO >> Repair or replace error-detected parts.

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P06DB OIL PUMP VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P06DB OIL PUMP VALVE

Diagnosis Description

INFOID:000000013290373

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P06DB	ENG OIL PRESSURE CONT CIRC (Engine oil pressure control circuit low)	NO SUBTYPE INFORMATION	The actuation of the engine oil pump valve has a short circuit to ground.

POSSIBLE CAUSE

- Harness and connector
(Engine oil pump valve circuit is open or shorted.)
- Engine oil pump valve

Diagnosis Procedure

INFOID:000000013472170

1. CHECK COMPONENT FUNCTION

Ⓟ With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK ENGINE OIL PUMP VALVE".
3. Check that the indicated value of "ENG OIL PUMP VLV V (SHUNT)" is between 1 V and 2 V.
4. Perform active test.
5. Check that the indicated value of "ENG OIL PUMP VLV V (SHUNT)" under the following conditions.

Item	Condition	Value
ENG OIL PUMP VLV V (SHUNT)	Engine oil pump valve: Open	1 – 2 V
	Engine oil pump valve: Closed	0.10 – 0.18 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ENGINE OIL PUMP VALVE POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect engine oil pump valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between engine oil pump valve harness connector and ground.

+		-	Voltage
Connector	Terminal		
F176	2	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK ENGINE OIL PUMP VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 (15A) fuse.
3. Check that the fuse is not fusing.
4. Check the continuity between engine oil pump valve harness connector and fuse terminal.

P06DB OIL PUMP VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Continuity
Engine oil pump valve			
Connector	Terminal		
F176	2	No. 98 fuse terminal	Existed

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK ENGINE OIL PUMP VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between engine oil pump valve harness connector and ECM harness connector.

+		-		Continuity
Engine oil pump valve		ECM		
Connector	Terminal	Connector	Terminal	
F176	1	F150	28	Existed

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

Is the inspection result normal?

YES >> Replace engine oil pump valve. Refer to [EM-109. "2WD : Exploded View"](#) (2WD) or [EM-111. "AWD : Exploded View"](#) (AWD).

NO >> Repair or replace error-detected parts.

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P06DC OIL PUMP VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P06DC OIL PUMP VALVE

Diagnosis Description

INFOID:000000013290375

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P06DC	ENG OIL PRESSURE CONT CIRC (Engine oil pressure control circuit high)	NO SUBTYPE INFORMATION	The actuation of the engine oil pump valve in the combustion engine has a short circuit to positive.

POSSIBLE CAUSE

- Harness and connector
(Engine oil pump valve circuit is open or shorted.)
- Engine oil pump valve

Diagnosis Procedure

INFOID:000000013472171

1. CHECK COMPONENT FUNCTION

Ⓟ With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select “ENGINE” >> “ACTIVE TEST” >> “CHECK ENGINE OIL PUMP VALVE”.
3. Check that the indicated value of “ENG OIL PUMP VLV V (SHUNT)” is between 1 V and 2 V.
4. Perform active test.
5. Check that the indicated value of “ENG OIL PUMP VLV V (SHUNT)” under the following conditions.

Item	Condition	Value
ENG OIL PUMP VLV V (SHUNT)	Engine oil pump valve: Open	1 – 2 V
	Engine oil pump valve: Closed	0.10 – 0.18 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ENGINE OIL PUMP VALVE POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect engine oil pump valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between engine oil pump valve harness connector and ground.

+		-	Voltage
Connector	Terminal		
F176	2	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK ENGINE OIL PUMP VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 (15A) fuse.
3. Check that the fuse is not fusing.
4. Check the continuity between engine oil pump valve harness connector and fuse terminal.

P06DC OIL PUMP VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
Engine oil pump valve			
Connector	Terminal	No. 98 fuse terminal	Existed
F176	2		

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4. CHECK ENGINE OIL PUMP VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between engine oil pump valve harness connector and ECM harness connector.

+		-		Continuity
Engine oil pump valve		ECM		
Connector	Terminal	Connector	Terminal	Existed
F176	1	F150	28	

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

Is the inspection result normal?

YES >> Replace engine oil pump valve. Refer to [EM-109. "2WD : Exploded View"](#) (2WD) or [EM-111. "AWD : Exploded View"](#) (AWD).

NO >> Repair or replace error-detected parts.

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P0702 TRANSMISSION CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0702 TRANSMISSION CONTROL SYSTEM

DTC Description

INFOID:000000013290377

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0702	TRANSMISSION CONTROL SYSTEM (Transmission control system electrical)	NO SUBTYPE INFORMATION	TCM has a malfunction.
		SIGNAL INVALID	TCM has a malfunction. There is an invalid signal.

POSSIBLE CAUSE

- Harness and connectors
(Drivetrain CAN circuit)
- TCM

Diagnosis Procedure

INFOID:000000013290378

1. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

1. Perform "All DTC reading".
2. Check DTC of "TRANSMISSION".

Is the DTC related to "communication error with ECM" detected?

YES >> GO TO 2.

NO >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

2. CHECK HARNESS AND CONNECTORS FOR CAN COMMUNICATION

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect A/T assembly harness connector.
4. Check the continuity between ECM harness connector and A/T assembly harness connector.

+		-		Continuity
ECM		A/T assembly		
Connector	Terminal	Connector	Terminal	
E200	138	E217	3	Existed
	151		8	

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. REPLACE ECM

With CONSULT

1. Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
2. Turn ignition switch ON and wait at least 5 seconds.
3. Check "Self-diagnostic result" of "ENGINE".

Is DTC "P0702" detected again?

YES >> Replace TCM. Refer to [TM-295, "Exploded View"](#).

NO >> INSPECTION END

P0715

Diagnosis Description

INFOID:000000013290379

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

EC4

- A
- C
- D
- E
- F
- G
- H
- I
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- K
- L
- M
- N
- O
- P

P0716**Diagnosis Description***INFOID:000000013290380*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P0717

Diagnosis Description

INFOID:000000013290381

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

A

EC4

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P0718**Diagnosis Description***INFOID:000000013290382*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P0740

Diagnosis Description

INFOID:000000013290383

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

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EC4

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P0743**Diagnosis Description***INFOID:000000013290384*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P0748

Diagnosis Description

INFOID:000000013290385

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

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EC4

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P0753**Diagnosis Description***INFOID:000000013290386*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P0758

Diagnosis Description

INFOID:000000013290387

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

A

EC4

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P0763**Diagnosis Description***INFOID:000000013290388*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P0778

Diagnosis Description

INFOID:000000013290389

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

EC4

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P0798**Diagnosis Description***INFOID:000000013290390*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P0A0F THE ENGINE DOES NOT START

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0A0F THE ENGINE DOES NOT START

DTC Description

INFOID:000000013290391

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0A0F	ENGINE FAILED TO START (Engine failed to start)	SYSTEM PROGRAMMING ERROR	The engine does not start. There is a programming error.
		CMP/SYS OPR OBST OR BLKD	The engine does not start. The system function is restricted.

POSSIBLE CAUSE

- Battery voltage
- Engine starting system
- Engine components (mechanical malfunction)

Diagnosis Procedure

INFOID:000000013290392

1. CHECK CHARGING SYSTEM

Check charging system. Refer to [CHG-14, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-18, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK BATTERY

Check battery. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK DTC

With CONSULT

Check DTC in "ENGINE" and "EMCM".

Is any DTC related to starter relay control detected?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index" \(ECM\)](#) or [EC4-165, "DTC Index" \(EMCM\)](#).

4. CHECK STARTING SYSTEM

Check engine starting system. Refer to [STR-12, "Work Flow \(With GR8-1200 NI\)"](#) or [STR-15, "Work Flow \(Without GR8-1200 NI\)"](#).

Is the inspection result normal?

YES >> Check engine (mechanical malfunction).

NO >> Repair or replace error-detected parts.

P0A1E**Diagnosis Description***INFOID:000000013290393*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P0A7C FPCM TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P0A7C FPCM TEMPERATURE

DTC Description

INFOID:000000013290394

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P0A7C	MOTOR ELECTRONICS OVER TEMP (Motor electronics over temperature)	NO SUBTYPE INFORMATION	FPCM internal temperature is more than 135°C (275°F).

POSSIBLE CAUSE

Overload

DTC CONFIRMATION PROCEDURE

NOTE:

This DTC is displayed as protection function history. If no malfunction is detected after the diagnosis, the customer must be informed of the activation of the protection function.

1. INTERVIEW THE CUSTOMER

Interview the customer about the driving conditions when the DTC is detected.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Perform test drive on equal conditions with the information from customer.
2. Stop the vehicle and wait at least 5 seconds.
3. Check "Self Diagnostic Result" of "FPCM".

Is DTC "P0A7C" detected?

- YES >> Proceed to [EC4-683, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290395

1. INSPECTION START

Check the following items.

- Out of gas
- Low fuel pressure line open

Is the inspection result normal?

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

2. COMPONENT FUNCTION CHECK

1. Turn ignition switch OFF and wait at least 30 seconds.
2. Listen to fuel pump operation sound for a few seconds after ignition switch is turned ON.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 3.

3. CHECK FPCM POWER SUPPLY

Check FPCM power supply and ground circuit. Refer to [EC4-237, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

P0A7C FPCM TEMPERATURE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

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

4.CHECK FUEL PUMP CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pump harness connector.
3. Check the continuity between FPCM harness connector and fuel pump harness connector.

+		-		Continuity
FPCM		Fuel pump		
Connector	Terminal	Connector	Terminal	
B133	11	B101	6	Existed
	12		5	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK FUEL PUMP

Check fuel pump. Refer to [EC4-684, "Component Inspection \(Fuel Pump\)"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace fuel pump.

6.CHECK FUEL PUMP ACTIVATION SIGNAL CIRCUIT

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

+		-		Continuity
FPCM		ECM		
Connector	Terminal	Connector	Terminal	
B134	2	E200	127	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

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

Component Inspection (Fuel Pump)

INFOID:000000013290396

1.CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check resistance between fuel level sensor unit and fuel pump terminals.

Terminals	Condition	Resistance
5 and 6	Temperature: 25°C (77°F)	0.2 – 5.0 Ω

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace fuel pump. Refer to [FL-29, "Exploded View"](#).

P1188 PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1188 PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

DTC Description

INFOID:0000000013290397

DTC DETECTION LOGIC

A
EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1188	INTAKE AIR PRESSURE SENSOR (Intake air pressure sensor)	SG BS LVL O-OF RNG/ZR AJST ERR	The pressure sensor downstream of air filter has a malfunction. The signal offset is outside the permissible range.

POSSIBLE CAUSE

- Harness and connectors (Pressure sensor downstream of air filter circuit is open or shorted.)
- Pressure sensor downstream of air filter

Diagnosis Procedure

INFOID:0000000013290398

1. CHECK POWER SUPPLY OF PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

1. Turn ignition switch OFF.
2. Disconnect pressure sensor downstream of air filter harness connector.
3. Turn ignition switch ON.
4. Check the voltage between pressure sensor downstream of air filter harness connector and ground.

+		-	Voltage
Pressure sensor downstream of air filter			
Connector	Terminal		
F188	3	Ground	4.75 – 5.25 V

Is the inspection result normal?

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

2. CHECK PRESSURE SENSOR DOWNSTREAM OF AIR FILTER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and pressure sensor downstream of air filter harness connector.

+		-		Continuity
ECM		Pressure sensor downstream of air filter		
Connector	Terminal	Connector	Terminal	
F150	16	F188	3	Existed

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

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

3. CHECK PRESSURE SENSOR DOWNSTREAM OF AIR FILTER CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

P1188 PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between ECM harness connector and pressure sensor downstream of air filter harness connector.

+		-		Continuity
ECM		Pressure sensor downstream of air filter		
Connector	Terminal	Connector	Terminal	
F150	11	F188	2	Existed
	90		1	

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

Is the inspection result normal?

YES >> Replace pressure sensor downstream of air filter. Refer to [EM-25. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P1189 PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1189 PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

DTC Description

INFOID:0000000013290399

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1189	INTAKE AIR PRESSURE SENSOR (Intake air pressure sensor)	CIRCUIT SHORT TO GROUND	The pressure sensor downstream of air filter has a short circuit to ground. There is a short circuit to ground.

C

D

POSSIBLE CAUSE

- Harness and connectors (Pressure sensor downstream of air filter circuit is open or shorted.)
- Pressure sensor downstream of air filter

E

Diagnosis Procedure

INFOID:0000000013472172

1. CHECK POWER SUPPLY OF PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

1. Turn ignition switch OFF.
2. Disconnect pressure sensor downstream of air filter harness connector.
3. Turn ignition switch ON.
4. Check the voltage between pressure sensor downstream of air filter harness connector and ground.

F

G

+		-	Voltage
Connector	Terminal		
F188	3	Ground	4.75 – 5.25 V

H

I

J

Is the inspection result normal?

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

K

2. CHECK PRESSURE SENSOR DOWNSTREAM OF AIR FILTER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and pressure sensor downstream of air filter harness connector.

L

M

+		-		Continuity
Connector	Terminal	Connector	Terminal	
F150	16	F188	3	Existed

N

O

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

Is the inspection result normal?

P

- YES >> Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

3. CHECK PRESSURE SENSOR DOWNSTREAM OF AIR FILTER CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

P1189 PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. Check the continuity between ECM harness connector and pressure sensor downstream of air filter harness connector.

+		-		Continuity
ECM		Pressure sensor downstream of air filter		
Connector	Terminal	Connector	Terminal	
F150	11	F188	2	Existed
	90		1	

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

Is the inspection result normal?

- YES >> Replace pressure sensor downstream of air filter. Refer to [EM-25. "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

P1190 PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1190 PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

DTC Description

INFOID:0000000013290401

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1190	INTAKE AIR PRESSURE SENSOR (Intake air pressure sensor)	CIRCUIT SHORT TO BATTERY	The pressure sensor downstream of air filter has a short circuit to positive. There is a short circuit to positive.

C

D

POSSIBLE CAUSE

- Harness and connectors (Pressure sensor downstream of air filter circuit is open or shorted.)
- Pressure sensor downstream of air filter

E

Diagnosis Procedure

INFOID:0000000013290402

1. CHECK POWER SUPPLY OF PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

1. Turn ignition switch OFF.
2. Disconnect pressure sensor downstream of air filter harness connector.
3. Turn ignition switch ON.
4. Check the voltage between pressure sensor downstream of air filter harness connector and ground.

F

G

+		-	Voltage
Pressure sensor downstream of air filter			
Connector	Terminal		
F188	3	Ground	4.75 – 5.25 V

H

I

J

Is the inspection result normal?

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

K

2. CHECK PRESSURE SENSOR DOWNSTREAM OF AIR FILTER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and pressure sensor downstream of air filter harness connector.

L

M

+		-		Continuity
ECM		Pressure sensor downstream of air filter		
Connector	Terminal	Connector	Terminal	
F150	16	F188	3	Existed

N

O

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

Is the inspection result normal?

P

- YES >> Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

3. CHECK PRESSURE SENSOR DOWNSTREAM OF AIR FILTER CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.

P1190 PRESSURE SENSOR DOWNSTREAM OF AIR FILTER

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. Check the continuity between ECM harness connector and pressure sensor downstream of air filter harness connector.

+		-		Continuity
ECM		Pressure sensor downstream of air filter		
Connector	Terminal	Connector	Terminal	
F150	11	F188	2	Existed
	90		1	

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

Is the inspection result normal?

YES >> Replace pressure sensor downstream of air filter. Refer to [EM-25. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P1240 FPCM

DTC Description

INFOID:000000013290403

DTC DETECTION LOGIC

A
EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1240	CAN BUS (Controller area network bus)	NO SUBTYPE INFORMATION	FPCM detects internal CAN bus error.

C
D

POSSIBLE CAUSE

- FPCM

E

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

- Turn ignition switch ON and wait at least 5 seconds.
- Check "Self Diagnostic Result" of "FPCM".

Is DTC "P1240" detected?

- YES >> Proceed to [EC4-691, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

F
G

Diagnosis Procedure

INFOID:000000013290404

1. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

- Erase "Self Diagnostic Result" of "FPCM".
- Perform DTC confirmation procedure again. Refer to [EC4-691, "DTC Description"](#).

Is DTC "P1240" detected again?

- YES >> Replace FPCM. Refer to [EC4-969, "Removal and Installation"](#).
- NO >> INSPECTION END

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P13B2 IGNITION COIL POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P13B2 IGNITION COIL POWER SUPPLY

DTC Description

INFOID:000000013290405

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P13B2	IGNITION COIL FUSE 1 (Ignition coil fuse 1)	NO SUBTYPE INFORMATION	Electrical fuse for the ignition coils has a malfunction.

POSSIBLE CAUSE

Fuse for ignition coils

Diagnosis Procedure

INFOID:000000013472173

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out No. 99 (20A) fuse.
3. Check that the fuse is not fusing.

Is the inspection result normal?

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

2.CHECK ECM POWER SUPPLY CIRCUIT

Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

Is the inspection result normal?

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

P13B3 IGNITION COIL POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P13B3 IGNITION COIL POWER SUPPLY

DTC Description

INFOID:000000013290407

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P13B3	IGNITION COIL FUSE 1 (Ignition coil fuse 1)	NO SUBTYPE INFORMATION	Electrical fuse for the ignition coils has a malfunction.

C

D

POSSIBLE CAUSE

Fuse for ignition coils

E

Diagnosis Procedure

INFOID:000000013290408

1. CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out No. 99 (20A) fuse.
3. Check that the fuse is not fusing.

F

G

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the fuse after repairing the applicable circuit.

H

2. CHECK ECM POWER SUPPLY CIRCUIT

Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

I

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

J

K

L

M

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P13C5, P13C6 ENGINE KNOCKING

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P13C5, P13C6 ENGINE KNOCKING

DTC Description

INFOID:000000013290409

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P13C5	TORQUE LIMIT BY KNOCK CONT (A short-term torque limitation was detected by the knock control)	SIGNAL STUCK LOW	A short-term torque limitation was detected by the knock control. No signal change: Voltage level is too low.
P13C6	TORQUE LIMIT BY KNOCK CONT (A long-term torque limitation was detected by the knock control)	SIGNAL STUCK HIGH	A long-term torque limitation was detected by the knock control. No signal change: Voltage level is too high.

POSSIBLE CAUSE

- Correction value of RON (research octane number)
- Fuel quality inferior
- Ignition system
- Knock sensors for tighten too much

Diagnosis Procedure

INFOID:000000013290410

1. CHECK COMPONENT

Check the following:

- Value of RON (research octane number)
- Fuel quality
- Ignition system
- Knock sensors installation condition.

>> INSPECTION END

P13EA IGNITION TIMING

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P13EA IGNITION TIMING

Diagnosis Description

INFOID:0000000013290411

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P13EA	COLD START IGN ANGLE SETTING (Cold start ignition angle setting)	NO SUBTYPE INFORMATION	The ignition angle setting has a malfunction during cold starting (partial load operation).

POSSIBLE CAUSE

Ignition timing

Diagnosis Procedure

INFOID:0000000013290412

1. CHECK DTC

With CONSULT

Check DTC.

Is any DTC other than P13EA detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
- NO >> Erase DTC.

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P1522 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1522 EVAP CONTROL SYSTEM PRESSURE SENSOR

DTC Description

INFOID:000000013448355

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P1522	EVAP control system check valve (EVAP control system check valve)	NO SUBTYPE INFORMATION	The check valve of the evaporative emission control system (at partial load) is jammed closed.

POSSIBLE CAUSE

Purging (At full load)

Diagnosis Procedure

INFOID:000000013448356

1. CHECK COMPONENT

Check the following:

- Check hoses and hose connections of EVAP system for blockage or damage.
- Check EVAP system line valves

>> INSPECTION END

Component Inspection (EVAP Purge Control Valve)

INFOID:000000013448357

1. CHECK EVAP PURGE CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect EVAP purge control valve harness connector.
3. Check the resistance between EVAP purge control valve terminals.

EVAP purge control valve		Condition	Resistance (Approx.)
+	-		
Terminal			
1	2	Temperature: 25°C (77°F)	14.2 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP purge control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P1523 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1523 EVAP CONTROL SYSTEM PRESSURE SENSOR

DTC Description

INFOID:000000013448358

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P1523	EVAP control system check valve (EVAP control system check valve)	NO SUBTYPE INFORMATION	The check valve of the evaporative emission control system (at partial load) is jammed open.

C

D

POSSIBLE CAUSE

Purging (At full load)

E

Diagnosis Procedure

INFOID:000000013472174

1. CHECK COMPONENT

Check the following:

- Check hoses and hose connections of EVAP system for blockage or damage.
- Check EVAP system line valves

F

G

>> INSPECTION END

H

Component Inspection (EVAP Purge Control Valve)

INFOID:000000013472175

1. CHECK EVAP PURGE CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect EVAP purge control valve harness connector.
3. Check the resistance between EVAP purge control valve terminals.

I

J

EVAP purge control valve		Condition	Resistance (Approx.)
+	-		
Terminal			
1	2	Temperature: 25°C (77°F)	14.2 Ω

K

L

Is the inspection result normal?

YES >> INSPECTION END

M

NO >> Replace EVAP purge control valve. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

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P1525 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1525 EVAP CONTROL SYSTEM PRESSURE SENSOR

DTC Description

INFOID:000000013448390

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P1525	EVAP control system check valve (EVAP control system check valve)	NO SUBTYPE INFORMATION	The check valve of the evaporative emission control system (at full load) is jammed open.

POSSIBLE CAUSE

Purging (At full load)

Diagnosis Procedure

INFOID:000000013472176

1. CHECK COMPONENT

Check the following:

- Check hoses and hose connections of EVAP system for blockage or damage.
- Check EVAP system line valves

>> INSPECTION END

Component Inspection (EVAP Purge Control Valve)

INFOID:000000013472177

1. CHECK EVAP PURGE CONTROL VALVE

1. Turn ignition switch OFF.
2. Disconnect EVAP purge control valve harness connector.
3. Check the resistance between EVAP purge control valve terminals.

EVAP purge control valve		Condition	Resistance (Approx.)
+	-		
Terminal			
1	2	Temperature: 25°C (77°F)	14.2 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP purge control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P1540 SUB BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1540 SUB BATTERY CURRENT SENSOR

DTC Description

INFOID:000000013290413

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1540	BATTERY CURRENT SENSOR B (Battery current sensor B)	NO SUBTYPE INFORMATION	The output voltage of the sub battery current sensor remains within the specified range while engine is running.

POSSIBLE CAUSE

- Harness or connectors (Sub battery current sensor circuit is open or shorted.)
- Sub battery current sensor
- Dead (Weak) sub battery

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC P1540 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-165, "DTC Index"](#).
- NO >> GO TO 2.

2. PRECONDITIONING

- Turn ignition switch OFF and wait at least 10 seconds.
- Check that the sub battery voltage is more than 8 V at idle.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn ignition switch ON.
2. Check that the sub battery voltage is less than 13.2 V.
3. Start the engine.
4. Check that the sub battery voltage is less than 13.2 V at least 5 seconds. And then, check that the sub battery voltage is more than 13.8 V at least 5 seconds.

NOTE:

With the engine is rotating, each of the condition that sub battery voltage is 13.2 V or less and 13.8 V or more for more 5 seconds are required.

5. Wait at least 10 seconds.
6. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P1540" detected?

P1540 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Proceed to [EC4-700. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290414

1. CHECK DTC PRIORITY

If DTC P1540 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-165. "DTC Index"](#).
NO >> GO TO 2.

2. CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect sub battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between sub battery current sensor harness connector terminals.

Sub battery current sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
B135	1	3	5 V

Is the inspection result normal?

- YES >> GO TO 9.
NO >> GO TO 3.

3. CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between sub battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Sub battery current sensor			
Connector	Terminal		
B135	1	Ground	5 V

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 4.

4. CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	1	M147	16	Existed

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

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5. CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235. "EMCM : Diagnosis Procedure"](#).

P1540 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).
- NO >> Repair or replace error-detected parts.

7.CHECK SUB BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	3	M147	36	Existed

4. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Repair or replace error-detected parts.

8.CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Repair or replace error-detected parts.

9.CHECK SUB BATTERY CURRENT SENSOR SIGNAL CIRCUIT

1. Check the continuity between sub battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	4	M147	26	Existed

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

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Repair or replace error-detected parts.

10.CHECK SUB BATTERY CURRENT SENSOR

Check sub battery current sensor. Refer to [EC4-702, "Component Inspection \(Sub Battery Current Sensor\)"](#).

Is the inspection result normal?

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P1540 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 11.

NO >> Replace sub battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

11. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

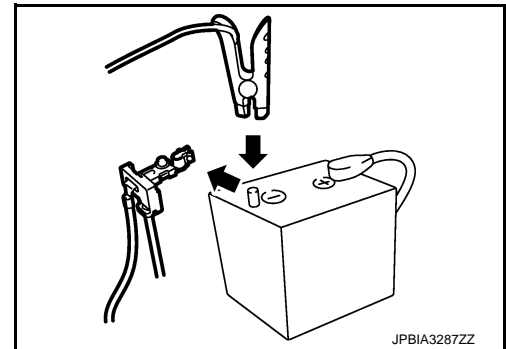
Component Inspection (Sub Battery Current Sensor)

INFOID:000000013290415

1. CHECK SUB BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect sub battery negative cable.
4. Install jumper cable between sub battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.

Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	26	36	2.5 V*



*: Before measuring the terminal voltage, confirm that the sub battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace sub battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

P1541, P1542 SUB BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1541, P1542 SUB BATTERY CURRENT SENSOR

DTC Description

INFOID:000000013290416

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1541	BATTERY CURRENT SENSOR B (Battery current sensor B)	NO SUBTYPE INFORMATION	An excessively low voltage from the sensor is sent to EMCM.
P1542			An excessively high voltage from the sensor is sent to EMCM.

POSSIBLE CAUSE

- Harness or connectors (Sub battery current sensor circuit is open or shorted.)
- Sub battery current sensor
- Dead (Weak) sub battery
- Sensor power supply

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC P1541 or P1542 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-648, "EMCM : DTC Description"](#).
NO >> GO TO 2.

2. PRECONDITIONING

- Turn ignition switch OFF and wait at least 10 seconds.
- Check that the sub battery voltage is more than 8 V at idle.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

Ⓜ With CONSULT

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P1541" or "P1542" detected?

- YES >> Proceed to [EC4-703, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290417

1. CHECK DTC PRIORITY

P1541, P1542 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

If DTC P1540 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-165. "DTC Index"](#).
- NO >> GO TO 2.

2.CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect sub battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between sub battery current sensor harness connector terminals.

Sub battery current sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
B135	1	3	5 V

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> GO TO 3.

3.CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between sub battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Sub battery current sensor			
Connector	Terminal		
B135	1	Ground	5 V

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 4.

4.CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	1	M147	16	Existed

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

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair or replace error-detected parts.

5.CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235. "EMCM : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

P1541, P1542 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

7. CHECK SUB BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	3	M147	36	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8. CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

9. CHECK SUB BATTERY CURRENT SENSOR SIGNAL CIRCUIT

1. Check the continuity between sub battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	4	M147	26	Existed

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

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10. CHECK SUB BATTERY CURRENT SENSOR

Check sub battery current sensor. Refer to [EC4-706, "Component Inspection \(Sub Battery Current Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace sub battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

11. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

P1541, P1542 SUB BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

>> INSPECTION END

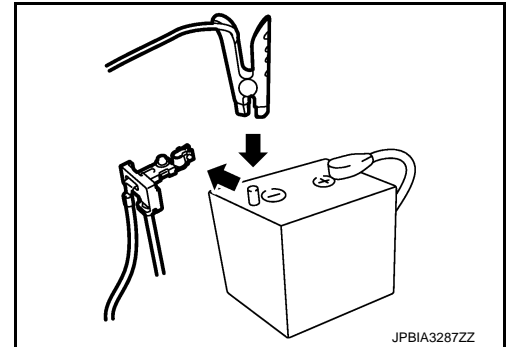
Component Inspection (Sub Battery Current Sensor)

INFOID:000000013290418

1. CHECK SUB BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect sub battery negative cable.
4. Install jumper cable between sub battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.

Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	26	36	2.5 V*



*: Before measuring the terminal voltage, confirm that the sub battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace sub battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

P1543 SUB BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1543 SUB BATTERY CURRENT SENSOR

DTC Description

INFOID:000000013290419

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1543	BATTERY CURRENT SENSOR B (Battery current sensor B)	NO SUBTYPE INFORMATION	The signal voltage transmitted from the sensor to EMCM is higher than the amount of the maximum power generation.

POSSIBLE CAUSE

- Harness or connectors (Sub battery current sensor circuit is open or shorted.)
- Sub battery current sensor
- Sensor power supply

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC P1543 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-648, "EMCM : DTC Description"](#).
- NO >> GO TO 2.

2. PRECONDITIONING

- Turn ignition switch OFF and wait at least 10 seconds.
- Check that the sub battery voltage is more than 8 V at idle.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

 **With CONSULT**

1. Start the engine and wait at least 10 seconds.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P1543" detected?

- YES >> Proceed to [EC4-707, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290420

1. CHECK DTC PRIORITY

If DTC P1540 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

P1543 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [EC4-165, "DTC Index"](#).

NO >> GO TO 2.

2.CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect sub battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between sub battery current sensor harness connector terminals.

Sub battery current sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
B135	1	3	5 V

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 3.

3.CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between sub battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Sub battery current sensor			
Connector	Terminal		
B135	1	Ground	5 V

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 4.

4.CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	1	M147	16	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

P1543 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

7. CHECK SUB BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	3	M147	36	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8. CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

9. CHECK SUB BATTERY CURRENT SENSOR SIGNAL CIRCUIT

1. Check the continuity between sub battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	4	M147	26	Existed

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

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10. CHECK SUB BATTERY CURRENT SENSOR

Check sub battery current sensor. Refer to [EC4-710. "Component Inspection \(Sub Battery Current Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace sub battery current sensor. Refer to [PG-266. "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

11. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

>> INSPECTION END

P1543 SUB BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

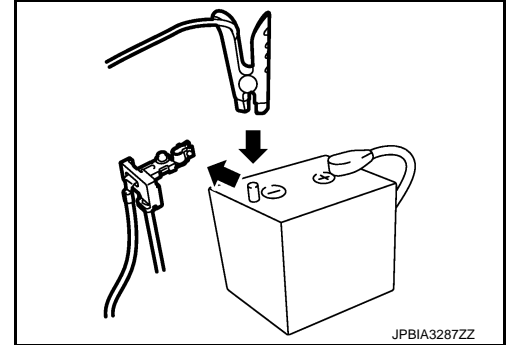
Component Inspection (Sub Battery Current Sensor)

INFOID:000000013290421

1. CHECK SUB BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect sub battery negative cable.
4. Install jumper cable between sub battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.

Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	26	36	2.5 V*



*: Before measuring the terminal voltage, confirm that the sub battery is fully charged. Refer to [PG-248. "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace sub battery current sensor. Refer to [PG-266. "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

P1544 SUB BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1544 SUB BATTERY CURRENT SENSOR

DTC Description

INFOID:000000013290422

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1544	BATTERY CURRENT SENSOR B (Battery current sensor B)	NO SUBTYPE INFORMATION	The output voltage of the sub battery current sensor is lower than the specified value while the battery voltage is high enough.

POSSIBLE CAUSE

- Harness or connectors (Sub battery current sensor circuit is open or shorted.)
- Sub battery current sensor
- Dead (Weak) battery

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC P1544 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-648, "EMCM : DTC Description"](#).
- NO >> GO TO 2.

2. PRECONDITIONING

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 12.8 V at idle.
- Before performing the following procedure, confirm that all load switches and A/C switch are turned OFF.

>> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK

With CONSULT

1. Start engine and let it idle.
2. Select "SUB-BAT CURRENT SN V" in "DATA MONITOR" mode of "EMCM" using CONSULT.
3. Check "SUB-BAT CURRENT SN V" indication for 10 seconds.
"SUB-BAT CURRENT SN V" should be above 2,300 mV at least once.

Without CONSULT

1. Start engine and let it idle.
2. Check the voltage between EMCM harness connector and ground.

P1544 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

EMCM			Voltage (Approx.)
Connector	+	-	
	Terminal		
M147	26	36	Above 2.3 V at least once

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC4-712, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000013290423

1.CHECK DTC PRIORITY

If DTC P1540 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [EC4-165, "DTC Index"](#).

NO >> GO TO 2.

2.CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect sub battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between sub battery current sensor harness connector terminals.

Sub battery current sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
B135	1	3	5 V

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 3.

3.CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between sub battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Sub battery current sensor			
Connector	Terminal		
B135	1	Ground	5 V

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 4.

4.CHECK SUB BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	1	M147	16	Existed

P1544 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

7.CHECK SUB BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	3	M147	36	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

9.CHECK SUB BATTERY CURRENT SENSOR SIGNAL CIRCUIT

1. Check the continuity between sub battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	4	M147	26	Existed

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

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P1544 SUB BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Repair or replace error-detected parts.

10. CHECK SUB BATTERY CURRENT SENSOR

Check sub battery current sensor. Refer to [EC4-714, "Component Inspection \(Sub Battery Current Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Replace sub battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

11. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

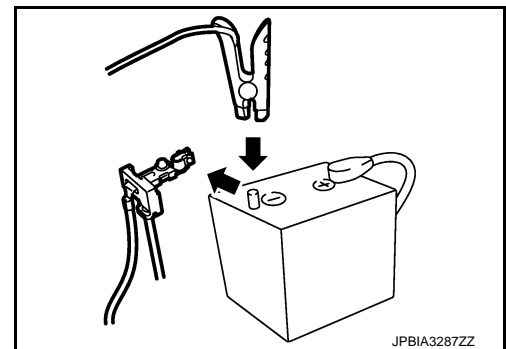
Component Inspection (Sub Battery Current Sensor)

INFOID:000000013290424

1. CHECK SUB BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect sub battery negative cable.
4. Install jumper cable between sub battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.

Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	26	36	2.5 V*



*: Before measuring the terminal voltage, confirm that the sub battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace sub battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

P1546, P1547 SUB BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1546, P1547 SUB BATTERY TEMPERATURE SENSOR

DTC Description

INFOID:0000000013290425

DTC DETECTION LOGIC

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EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1546	BATTERY TEMPERATURE SENSOR B (Battery temperature sensor B)	NO SUBTYPE INFORMATION	Signal voltage from sub battery temperature sensor remains 0.16 V or less for 5 seconds or more.
P1547			Signal voltage from sub battery temperature sensor remains 4.84 V or more for 5 seconds or more.

C

D

POSSIBLE CAUSE

- Harness or connectors (Sub battery temperature sensor circuit is open or shorted.)
- Sub battery temperature sensor

E

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FAIL-SAFE

Stop/Start System

G

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

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DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC P1546 or P1547 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-165, "DTC Index"](#).
- NO >> GO TO 2.

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2.PRECONDITIONING

Turn ignition switch OFF and wait at least 10 seconds.

M

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and wait at least 5 seconds.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P1546" or "P1547" detected?

- YES >> Proceed to [EC4-715, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

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Diagnosis Procedure

INFOID:0000000013290426

1.CHECK DTC PRIORITY

If DTC P1546 or P1547 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

P1546, P1547 SUB BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [EC4-165, "DTC Index"](#).

NO >> GO TO 2.

2. CHECK SUB BATTERY TEMPERATURE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect sub battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between sub battery current sensor harness connector terminals.

+		-	Voltage (Approx.)
Sub battery current sensor			
Connector	Terminal		
B135	2	Ground	5 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 3.

3. CHECK SUB BATTERY TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	2	M147	27	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

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-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

6. CHECK SUB BATTERY TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between sub battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Sub battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
B135	3	M147	36	Existed

P1546, P1547 SUB BATTERY TEMPERATURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK SUB BATTERY TEMPERATURE SENSOR

Check sub battery temperature sensor. Refer to [EC4-717, "Component Inspection \(Sub Battery Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace sub battery current sensor (with sub battery temperature sensor). Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

9.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Sub Battery Temperature Sensor)

INFOID:000000013290427

1.CHECK SUB BATTERY TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect sub battery current sensor.
3. Check the resistance between sub battery current sensor connector terminals.

Sub battery current sensor		Resistance
+	-	
Terminal		
2	3	Continuity with the resistance value 100 Ω or more

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace sub battery current sensor (with sub battery temperature sensor). Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

P1550 MAIN BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1550 MAIN BATTERY CURRENT SENSOR

DTC Description

INFOID:000000013290428

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1550	BAT CURRENT SENSOR (Battery current sensor)	NO SUBTYPE INFORMATION	The output voltage of the main battery current sensor remains within the specified range while engine is running.

POSSIBLE CAUSE

- Harness or connectors (Main battery current sensor circuit is open or shorted.)
- Main battery current sensor
- Dead (Weak) main battery

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC P1550 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-165. "DTC Index"](#).
 NO >> GO TO 2.

2. PRECONDITIONING

- Turn ignition switch OFF and wait at least 10 seconds.
- Check that the main battery voltage is more than 8 V at idle.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and wait at least 45 seconds.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P1550" detected?

- YES >> Proceed to [EC4-718. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290429

1. CHECK DTC PRIORITY

If DTC P1550 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

P1550 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-165, "DTC Index"](#).
NO >> GO TO 2.

2.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect main battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between main battery current sensor harness connector terminals.

Main battery current sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
E208	4	2	5 V

Is the inspection result normal?

- YES >> GO TO 9.
NO >> GO TO 3.

3.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between main battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Main battery current sensor			
Connector	Terminal		
E208	4	Ground	5 V

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 4.

4.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	4	M147	15	Existed

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

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

P1550 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

7. CHECK MAIN BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	2	M147	35	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8. CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

9. CHECK MAIN BATTERY CURRENT SENSOR SIGNAL CIRCUIT

1. Check the continuity between main battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	1	M147	24	Existed

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

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10. CHECK MAIN BATTERY CURRENT SENSOR

Check main battery current sensor. Refer to [EC4-721. "Component Inspection \(Main Battery Current Sensor\)".](#)

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace main battery current sensor. Refer to [PG-266. "2.0L TURBO GASOLINE ENGINE : Removal and Installation".](#)

11. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident".](#)

>> INSPECTION END

P1550 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

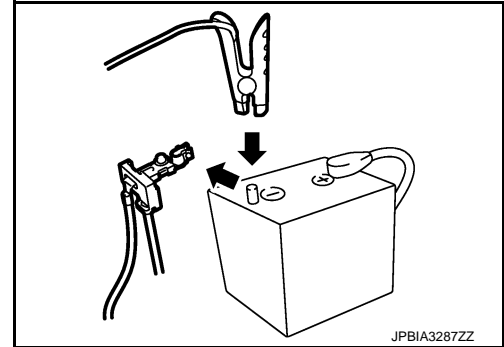
INFOID:000000013290430

Component Inspection (Main Battery Current Sensor)

1. CHECK MAIN BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect main battery negative cable.
4. Install jumper cable between main battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.

Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	24	35	2.5 V*



*: Before measuring the terminal voltage, confirm that the main battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace main battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

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P1551, P1552 MAIN BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1551, P1552 MAIN BATTERY CURRENT SENSOR

DTC Description

INFOID:000000013290431

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1551	BAT CURRENT SENSOR (Battery current sensor)	NO SUBTYPE INFORMATION	An excessively low voltage from the sensor is sent to EMCM.
P1552			An excessively high voltage from the sensor is sent to EMCM.

POSSIBLE CAUSE

- Harness or connectors
(Main battery current sensor circuit is open or shorted.)
- Main battery current sensor
- Dead (Weak) main battery
- Sensor power supply

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC P1551 or P1552 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-648, "EMCM : DTC Description"](#).
NO >> GO TO 2.

2. PRECONDITIONING

- Turn ignition switch OFF and wait at least 10 seconds.
- Check that the sub battery voltage is more than 8 V at idle.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

Ⓟ With CONSULT

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P1551" or "P1552" detected?

- YES >> Proceed to [EC4-722, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290432

1. CHECK DTC PRIORITY

P1551, P1552 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

If DTC P1551 and P1552 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-165, "DTC Index"](#).
- NO >> GO TO 2.

2.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect main battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between main battery current sensor harness connector terminals.

Main battery current sensor			Voltage (Approx.)
Connector	+	-	
Terminal			
E208	4	2	5 V

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> GO TO 3.

3.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between main battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Main battery current sensor			
Connector	Terminal		
E208	4	Ground	5 V

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 4.

4.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	4	M147	15	Existed

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

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair or replace error-detected parts.

5.CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

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EC4

P1551, P1552 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

7. CHECK MAIN BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	2	M147	35	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8. CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

9. CHECK MAIN BATTERY CURRENT SENSOR SIGNAL CIRCUIT

1. Check the continuity between main battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	1	M147	24	Existed

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

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10. CHECK MAIN BATTERY CURRENT SENSOR

Check main battery current sensor. Refer to [EC4-725, "Component Inspection \(Main Battery Current Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace main battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

11. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

P1551, P1552 MAIN BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

>> INSPECTION END

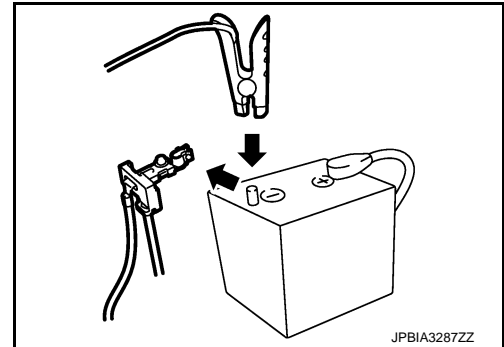
Component Inspection (Main Battery Current Sensor)

INFOID:000000013290433

1. CHECK MAIN BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect main battery negative cable.
4. Install jumper cable between main battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.

Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	24	35	2.5 V*



*: Before measuring the terminal voltage, confirm that the main battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace main battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

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P1553 MAIN BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1553 MAIN BATTERY CURRENT SENSOR

DTC Description

INFOID:000000013290434

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1553	BAT CURRENT SENSOR (Battery current sensor)	NO SUBTYPE INFORMATION	The signal voltage transmitted from the sensor to EMCM is higher than the amount of the maximum power generation.

POSSIBLE CAUSE

- Harness or connectors (Main battery current sensor circuit is open or shorted.)
- Main battery current sensor
- Sensor power supply

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC P1553 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-648. "EMCM : DTC Description"](#).
NO >> GO TO 2.

2. PRECONDITIONING

- Turn ignition switch OFF and wait at least 10 seconds.
- Check that the sub battery voltage is more than 8 V at idle.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and wait at least 10 seconds.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P1553" detected?

- YES >> Proceed to [EC4-726. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290435

1. CHECK DTC PRIORITY

If DTC P1553 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

P1553 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-165, "DTC Index"](#).
NO >> GO TO 2.

2.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect main battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between main battery current sensor harness connector terminals.

Main battery current sensor			Voltage (Approx.)
Connector	+	-	
Terminal			
E208	4	2	5 V

Is the inspection result normal?

- YES >> GO TO 9.
NO >> GO TO 3.

3.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between main battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Main battery current sensor Connector	Terminal		
E208	4	Ground	5 V

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 4.

4.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor and EMCM harness connector.

+		-		Continuity
Main battery current sensor Connector	Terminal	EMCM Connector	Terminal	
E208	4	M147	15	Existed

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

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

P1553 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

7. CHECK MAIN BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	2	M147	35	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8. CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

9. CHECK MAIN BATTERY CURRENT SENSOR SIGNAL CIRCUIT

1. Check the continuity between main battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	1	M147	24	Existed

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

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10. CHECK MAIN BATTERY CURRENT SENSOR

Check main battery current sensor. Refer to [EC4-729. "Component Inspection \(Main Battery Current Sensor\)".](#)

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace main battery current sensor. Refer to [PG-266. "2.0L TURBO GASOLINE ENGINE : Removal and Installation".](#)

11. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident".](#)

>> INSPECTION END

P1553 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

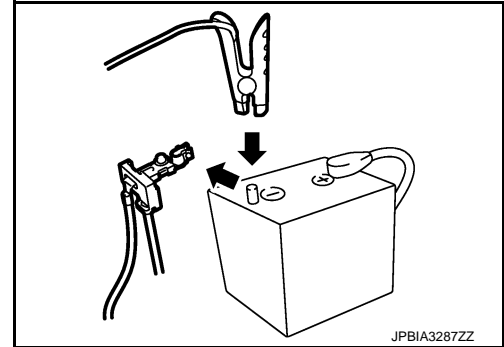
INFOID:000000013290436

Component Inspection (Main Battery Current Sensor)

1. CHECK MAIN BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect main battery negative cable.
4. Install jumper cable between main battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.

Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	24	35	2.5 V*



*: Before measuring the terminal voltage, confirm that the main battery is fully charged. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace main battery current sensor. Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

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P1554 MAIN BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1554 MAIN BATTERY CURRENT SENSOR

DTC Description

INFOID:000000013290437

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1554	BAT CURRENT SENSOR (Battery current sensor)	NO SUBTYPE INFORMATION	The output voltage of the main battery current sensor is lower than the specified value while the battery voltage is high enough.

POSSIBLE CAUSE

- Harness or connectors (Main battery current sensor circuit is open or shorted.)
- Main battery current sensor
- Dead (Weak) battery

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC P1554 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-648. "EMCM : DTC Description"](#).
 NO >> GO TO 2.

2. PRECONDITIONING

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 12.8 V at idle.
- Before performing the following procedure, confirm that all load switches and A/C switch are turned OFF.

>> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK

☑ With CONSULT

1. Start engine and let it idle.
2. Select "BAT CURRENT SEN" in "DATA MONITOR" mode of "EMCM" using CONSULT.
3. Check "BAT CURRENT SEN" indication for 10 seconds.
"BAT CURRENT SEN" should be above 2,300 mV at least once.

☒ Without CONSULT

1. Start engine and let it idle.
2. Check the voltage between EMCM harness connector and ground.

P1554 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

EMCM			Voltage (Approx.)
Connector	+	-	
	Terminal		
M147	24	35	Above 2.3 V at least once

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC4-731, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000013290438

1.CHECK DTC PRIORITY

If DTC P1554 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [EC4-165, "DTC Index"](#).

NO >> GO TO 2.

2.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect main battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between main battery current sensor harness connector terminals.

Main battery current sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
E208	4	2	5 V

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 3.

3.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between main battery current sensor harness connector and ground.

+		-	Voltage (Approx.)
Main battery current sensor			
Connector	Terminal		
E208	4	Ground	5 V

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 4.

4.CHECK MAIN BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	4	M147	15	Existed

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P1554 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

7.CHECK MAIN BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	2	M147	35	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

9.CHECK MAIN BATTERY CURRENT SENSOR SIGNAL CIRCUIT

1. Check the continuity between main battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	1	M147	24	Existed

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

P1554 MAIN BATTERY CURRENT SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Repair or replace error-detected parts.

10. CHECK MAIN BATTERY CURRENT SENSOR

Check main battery current sensor. Refer to [EC4-733. "Component Inspection \(Main Battery Current Sensor\)"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Replace main battery current sensor. Refer to [PG-266. "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

11. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

>> INSPECTION END

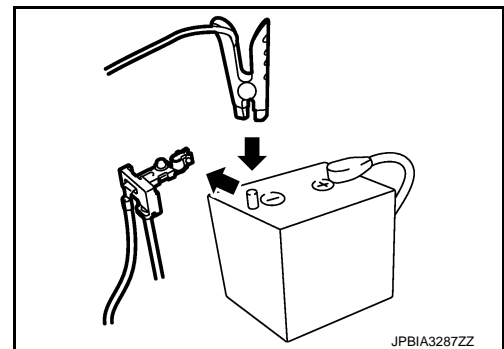
Component Inspection (Main Battery Current Sensor)

INFOID:000000013290439

1. CHECK MAIN BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect main battery negative cable.
4. Install jumper cable between main battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between EMCM harness connector terminals as per the following conditions.

Connector	EMCM		Voltage (Approx.)
	+	-	
	Terminal		
M147	24	35	2.5 V*



*: Before measuring the terminal voltage, confirm that the main battery is fully charged. Refer to [PG-248. "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace main battery current sensor. Refer to [PG-266. "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

P1556, P1557 MAIN BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1556, P1557 MAIN BATTERY TEMPERATURE SENSOR

DTC Description

INFOID:000000013290440

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1556	BAT TMP SEN/CIRC (Battery temperature sensor/circuit)	NO SUBTYPE INFORMATION	Signal voltage from main battery temperature sensor remains 0.16 V or less for 5 seconds or more.
P1557			Signal voltage from main battery temperature sensor remains 4.84 V or more for 5 seconds or more.

POSSIBLE CAUSE

- Harness or connectors (Main battery temperature sensor circuit is open or shorted.)
- Main battery temperature sensor

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC P1556 or P1557 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

Is applicable DTC detected?

- YES >> Perform diagnosis of applicable. Refer to [EC4-648, "EMCM : DTC Description"](#).
NO >> GO TO 2.

2.PRECONDITIONING

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and wait at least 5 seconds.
2. Check "Self Diagnostic Result" of "EMCM".

Is DTC "P1556" or "P1557" detected?

- YES >> Proceed to [EC4-734, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290441

1.CHECK DTC PRIORITY

If DTC P1556 or P1557 is displayed with DTC P0120 or P0643, first perform the confirmation procedure (trouble diagnosis) for DTC P0120 or DTC P0643.

P1556, P1557 MAIN BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [EC4-648, "EMCM : DTC Description"](#).

NO >> GO TO 2.

2. CHECK MAIN BATTERY TEMPERATURE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect main battery current sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between main battery current sensor harness connector terminals.

+		-	Voltage (Approx.)
Main battery current sensor			
Connector	Terminal		
E208	3	Ground	5 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 3.

3. CHECK MAIN BATTERY TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	3	M147	25	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK EMCM POWER SUPPLY

Check EMCM power supply. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).

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-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace EMCM. Refer to [EC4-968, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

6. CHECK MAIN BATTERY TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EMCM harness connector.
3. Check the continuity between main battery current sensor harness connector and EMCM harness connector.

+		-		Continuity
Main battery current sensor		EMCM		
Connector	Terminal	Connector	Terminal	
E208	2	M147	35	Existed

P1556, P1557 MAIN BATTERY TEMPERATURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK MAIN BATTERY TEMPERATURE SENSOR

Check main battery temperature sensor. Refer to [EC4-736, "Component Inspection \(Main Battery Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace main battery current sensor (with main battery temperature sensor). Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

9.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Main Battery Temperature Sensor)

INFOID:000000013290442

1.CHECK MAIN BATTERY TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect main battery current sensor.
3. Check the resistance between battery current sensor connector terminals.

Main battery current sensor		Resistance
+	-	
Terminal		
2	3	Continuity with the resistance value 100 Ω or more

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace main battery current sensor (with main battery temperature sensor). Refer to [PG-266, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

P1575 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1575 BRAKE SWITCH

DTC Description

INFOID:000000013290443

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1575	BRAKE SW (Brake switch)	NO SUBTYPE INFORMATION	A stop lamp switch signal remains ON for extremely long time while the vehicle is being driven.

C

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POSSIBLE CAUSE

- Harness or connectors (Stop lamp switch circuit is open or shorted.)
- Stop lamp switch

E

FAIL-SAFE

Stop/Start System

F

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

G

H

DTC CONFIRMATION PROCEDURE

CAUTION:

Erase DTCs for EMCM and ECM.

1. INSPECTION START

I

NOTE:

Since this DTC is difficult to be confirmed, check component function to judge the normality.

J

K

>> GO TO 2.

2. CHECK STOP LAMP SWITCH FUNCTION

L

With CONSULT

1. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "BRAKE SW2".
2. Check "BRAKE SW2" indication under the following conditions.

M

Monitor item	Condition		Indication
BRAKE SW2	Brake pedal	Slightly depressed	ON
		Fully released	OFF

N

O

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC4-737, "Diagnosis Procedure"](#).

P

Diagnosis Procedure

INFOID:000000013290444

1. CHECK STOP LAMP INSTALLATION CONDITION

Check stop lamp installation condition. Refer to [BR-12, "Inspection and Adjustment"](#).

Is the inspection result normal?

P1575 BRAKE SWITCH

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 2.
NO >> Install stop lamp switch normally.

2.CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to [EC4-738. "Component Inspection \(Stop Lamp Switch\)".](#)

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace stop lamp switch. Refer to [BR-24. "Removal and Installation".](#)

3.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect EMCM harness connector.
2. Check harness for short to power, between stop lamp switch harness connector and EMCM harness connector.

With ICC

+		-	Voltage
Stop lamp switch			
Connector	Terminal	Ground	0 V
E57	2		

Without ICC

+		-	Voltage
Stop lamp switch			
Connector	Terminal	Ground	0 V
E57	4		

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-45. "Intermittent Incident".](#)

Is the inspection result normal?

- YES >> Replace EMCM. Refer to [EC4-968. "Removal and Installation".](#)
NO >> Repair or replace error-detected parts.

Component Inspection (Stop Lamp Switch)

INFOID:000000013290445

1.CHECK STOP LAMP SWITCH-1

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

With ICC

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Without ICC

Terminals	Condition		Continuity
3 and 4	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

P1575 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

2. CHECK STOP LAMP SWITCH-2

1. Adjust stop lamp switch installation. Refer to [BR-12. "Inspection and Adjustment"](#).
2. Check the continuity between stop lamp switch terminals under the following conditions.

With ICC

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Without ICC

Terminals	Condition		Continuity
3 and 4	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to [BR-24. "Removal and Installation"](#).

A

EC4

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P

P1576 BRAKE PEDAL POSITION SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1576 BRAKE PEDAL POSITION SWITCH

DTC Description

INFOID:000000013290446

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1576	ASCD BRAKE SW (ASCD brake switch)	NO SUBTYPE INFORMATION	A brake pedal position switch signal is not sent to EMCM for extremely long time while the vehicle is being driven.

POSSIBLE CAUSE

- Harness or connectors (Brake pedal position switch circuit is open or shorted.)
- Brake pedal position switch

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

CAUTION:

Erase DTCs for EMCM and ECM.

1.INSPECTION START

NOTE:

Since this DTC is difficult to be confirmed, check component function to judge the normality.

>> GO TO 2.

2.CHECK STOP LAMP SWITCH FUNCTION

With CONSULT

1. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "BRAKE PEDAL POSITION SW".
2. Check "BRAKE PEDAL POSITION SW" indication under the following conditions.

Monitor item	Condition		Indication
BRAKE PEDAL POSITION SW	Brake pedal	Slightly depressed	OFF
		Fully released	ON

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Proceed to [EC4-740, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000013290447

1.CHECK STOP LAMP INSTALLATION CONDITION

Check stop lamp installation condition. Refer to [BR-12, "Inspection and Adjustment"](#).

Is the inspection result normal?

P1576 BRAKE PEDAL POSITION SWITCH

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 2.
NO >> Install brake pedal position switch normally.

2.CHECK BRAKE PEDAL POSITION SWITCH

Check brake pedal position switch. Refer to [EC4-742. "Component Inspection \(Brake Pedal Position Switch\)".](#)

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace brake pedal position switch. Refer to [BR-24. "Removal and Installation".](#)

3.CHECK BRAKE PEDAL POSITION SWITCH POWER SUPPLY

Check the voltage between brake pedal position switch harness connector and ground.

+		-	Voltage
Brake pedal position switch			
Connector	Terminal		
E44	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 4.

4.CHECK BRAKE PEDAL POSITION SWITCH POWER SUPPLY CIRCUIT

1. Pull out #12 fuse.
2. Check that the fuse is not fusing.
3. Check the continuity between brake pedal position switch harness connector and fuse terminal.

+		-	Continuity
Brake pedal position switch			
Connector	Terminal		
E44	1	#12 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK POWER SUPPLY CIRCUIT

Perform trouble diagnosis for battery power supply circuit.

>> INSPECTION END

6.CHECK BRAKE PEDAL POSITION SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect EMCM harness connector.
2. Check continuity between brake pedal position switch harness connector and EMCM harness connector.

+		-		Continuity
Brake pedal position switch		EMCM		
Connector	Terminal	Connector	Terminal	
E44	2	M147	23	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

P1576 BRAKE PEDAL POSITION SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

7. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Brake Pedal Position Switch)

INFOID:000000013290448

1. CHECK BRAKE PEDAL POSITION SWITCH-1

1. Turn power switch OFF.
2. Disconnect brake pedal position switch harness connector.
3. Check the continuity between brake pedal position switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK BRAKE PEDAL POSITION SWITCH-2

1. Adjust brake pedal position switch installation. Refer to [BR-12, "Inspection and Adjustment"](#).
2. Check the continuity between brake pedal position switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake pedal position switch. Refer to [BR-24, "Removal and Installation"](#).

P1577 BRAKE PEDAL POSITION SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1577 BRAKE PEDAL POSITION SWITCH

DTC Description

INFOID:000000013290449

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1577	ASCDC BRAKE SW (ASCDC brake switch)	NO SUBTYPE INFORMATION	A brake pedal position switch signal remains ON for extremely long time while the vehicle is being driven.

C

D

POSSIBLE CAUSE

- Harness or connectors (Brake pedal position switch circuit is open or shorted.)
- Brake pedal position switch

E

FAIL-SAFE

Stop/Start System

F

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

G

H

DTC CONFIRMATION PROCEDURE

CAUTION:

Erase DTCs for EMCM and ECM.

1.INSPECTION START

I

NOTE:

Since this DTC is difficult to be confirmed, check component function to judge the normality.

J

K

>> GO TO 2.

2.CHECK BRAKE PEDAL POSITION SWITCH FUNCTION

L

With CONSULT

1. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "BRAKE PEDAL POSITION SW".
2. Check "BRAKE PEDAL POSITION SW" indication under the following conditions.

M

Monitor item	Condition		Indication
BRAKE PEDAL POSITION SW	Brake pedal	Slightly depressed	OFF
		Fully released	ON

N

O

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC4-743, "Diagnosis Procedure"](#).

P

Diagnosis Procedure

INFOID:000000013290450

1.CHECK STOP LAMP INSTALLATION CONDITION

Check stop lamp installation condition. Refer to [BR-12, "Inspection and Adjustment"](#)

Is the inspection result normal?

P1577 BRAKE PEDAL POSITION SWITCH

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 2.
NO >> Install brake pedal position switch normally.

2.CHECK BRAKE PEDAL POSITION SWITCH

Check brake pedal position switch. Refer to [EC4-744. "Component Inspection \(Brake Pedal Position Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace brake pedal position switch. Refer to [BR-24. "Removal and Installation"](#)

3.CHECK BRAKE PEDAL POSITION SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect EMCM harness connector.
2. Check harness for short to power, between brake pedal position switch harness connector and EMCM harness connector.

+		-	Voltage
Brake pedal position switch			
Connector	Terminal	Ground	0 V
E44	2		

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-45. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace EMCM. Refer to [EC4-968. "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Brake Pedal Position Switch)

INFOID:000000013290451

1.CHECK BRAKE PEDAL POSITION SWITCH-1

1. Turn power switch OFF.
2. Disconnect brake pedal position switch harness connector.
3. Check the continuity between brake pedal position switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK BRAKE PEDAL POSITION SWITCH-2

1. Adjust brake pedal position switch installation. Refer to [BR-12. "Inspection and Adjustment"](#).
2. Check the continuity between brake pedal position switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace brake pedal position switch. Refer to [BR-24. "Removal and Installation"](#).

P1611 FPCM POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1611 FPCM POWER SUPPLY

DTC Description

INFOID:0000000013290452

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1611	FUEL PUMP (Fuel pump)	NO SUBTYPE INFORMATION	FPCM power supply voltage is more than 16.5 V for 60 seconds or more.

C

D

POSSIBLE CAUSE

- Harness and connectors (FPCM power supply circuit)
- Battery
- Charging system

E

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

F

With CONSULT

1. Turn ignition switch ON and wait at least 70 seconds.
2. Check "Self Diagnostic Result" of "FPCM".

G

Is DTC "P1611" detected?

H

- YES >> Proceed to [EC4-745, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000013290453

1. CHECK FPCM POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector.
3. Turn ignition switch ON.
4. Check the voltage between FPCM harness connector terminals.

J

K

Connector	FPCM		voltage
	+	-	
	Terminal		
B133	10	9	11 – 15 V

L

Is the inspection result normal?

M

- YES >> INSPECTION END
 NO >> GO TO 2.

2. CHECK FPCM POWER SUPPLY CIRCUIT

N

Check FPCM power supply circuit. Refer to [EC4-237, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

O

Is the inspection result normal?

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

P

P1614 ECM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1614 ECM

DTC Description

INFOID:000000013290456

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1614	INTERNAL CONTROL UNIT RESET (Internal control unit reset)	SYSTEM INTERNAL MAL- FUNCTN	An internal control unit reset was performed. There is an internal malfunction.
		SYSTEM PROGRAMMING ERROR	An internal control unit reset was performed. There is a programming error.
		ALGORITHM BASED ERROR	An internal control unit reset was performed. There is an algorithm error.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290457

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P1616 BACK-UP LAMP RELAY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1616 BACK-UP LAMP RELAY

DTC Description

INFOID:0000000014226453

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1616	REVERSE DRIVING LIGHT OUTPUT (Reverse driving light output)	NO SUBTYPE INFORMATION	ECM detects that back-up lamp relay circuit is open.

POSSIBLE CAUSE

- Harness or connectors (Back-up lamp relay circuit is open.)
- Back-up lamp relay

Diagnosis Procedure

INFOID:0000000014226454

NOTE:

For back-up lamp relay circuit, refer to [EXL-73, "Wiring Diagram"](#).

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out No. 98 (15A) fuse.
3. Check that the fuse is not blown (open).

Is the inspection result normal?

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

2.CHECK BACK-UP LAMP RELAY POWER SUPPLY (COIL SIDE)

1. Remove back-up lamp relay.
2. Check the voltage between back-up lamp relay harness connector and ground.

+		-	Voltage
Back-up lamp relay			
Connector	Terminal		
M97	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK BACK-UP LAMP RELAY POWER SUPPLY CIRCUIT (COIL SIDE)

Perform trouble diagnosis for battery power supply circuit.

>> INSPECTION END

4.CHECK BACK-UP LAMP RELAY DRIVE CIRCUIT

1. Disconnect ECM harness connector.
2. Check the continuity between back-up lamp relay harness connector and ECM harness connector.

+		-		Continuity
Back-up lamp relay		ECM		
Connector	Terminal	Connector	Terminal	
M97	2	E200	142	Existed

P1616 BACK-UP LAMP RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK BACK-UP LAMP RELAY

Check back-up lamp relay. Refer to [EC4-748, "Component Inspection \(Back-up Lamp Relay\)"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Replace back-up lamp relay.

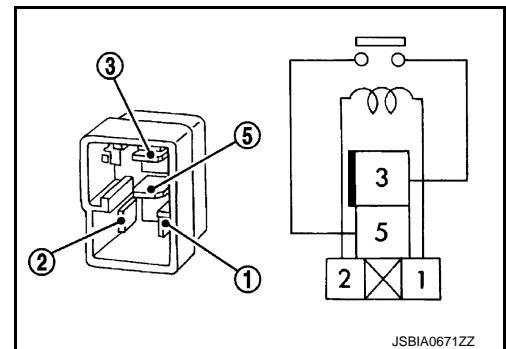
Component Inspection (Back-up Lamp Relay)

INFOID:000000014226455

1.CHECK BACK-UP LAMP RELAY

1. Turn ignition switch OFF.
2. Remove back-up lamp relay.
3. Check continuity between back-up lamp relay terminals as per the following condition.

Back-up lamp relay		Condition	Continuity
+	-		
Terminal			
3	5	12 V direct current supply between terminals 1 and 2	Existed
		No current supply	Not existed



JSBIA0671ZZ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace back-up lamp relay.

P162A FPCM

DTC Description

INFOID:000000013290454

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P162A	CONTROL UNIT "FUEL PUMP" (Control unit "fuel pump")	NO SUBTYPE INFORMATION	FPCM detects internal error.

POSSIBLE CAUSE

FPCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

 With CONSULT

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check "Self Diagnostic Result" of "FPCM".

Is DTC "P162A" detected?

- YES >> Proceed to [EC4-749, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290455

1. REPLACE FPCM

Replace FPCM. Refer to [EC4-969, "Removal and Installation"](#).

>> INSPECTION END

P1644 CONFIGURATION INCORRECT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1644 CONFIGURATION INCORRECT

DTC Description

INFOID:000000013290458

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1644	CONFIGURATION INCORRECT (Configuration incorrect)	NO SUBTYPE INFORMATION	An incorrect variant coding or configuration was detected.
		SYSTEM INTERNAL MAL-FUNCTN	An incorrect variant coding or configuration was detected. There is an internal malfunction.
		BUS SIGNAL/MESSAGE ERROR	An incorrect variant coding or configuration was detected. There is a signal error or the message error.
		SIGNAL INVALID	An incorrect variant coding or configuration was detected. There is an invalid signal.
		SIGNAL PLAUSIBILITY ERROR	An incorrect variant coding or configuration was detected. There is an implausible signal.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290459

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
- NO >> INSPECTION END

P1655 ENGINE RESTART BYPASS RELAY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1655 ENGINE RESTART BYPASS RELAY

DTC Description

INFOID:000000013290460

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1655	ENGINE RESTART BYPASS-RELAY (Engine restart bypass relay)	NO SUBTYPE INFORMATION	At an engine restart by stop/start system, the voltage drop allowance is less than 0.08 V when the engine restart bypass relay becomes closed from the open status, and this condition is repeated three times in a row.

POSSIBLE CAUSE

- 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

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

Ⓜ With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "BATTERY STS".
3. Check that "OK" is indicated.

NOTE:

If NG is indicated, check battery condition. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "AUTO STOP START".
5. Touch "START" and operate stop/start system. (engine stop.)
6. Touch "CANCEL" and restart the engine.
7. Repeat Step 3 and Step 4 twice.

Is DTC "P1655" detected?

- YES >> Proceed to [EC4-751, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290461

1. CHECK ENGINE RESTART BYPASS CONTROL RELAY POWER SUPPLY

P1655 ENGINE RESTART BYPASS RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect 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
E205	1		
	3		

Is the inspection result normal?

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

2.CHECK ENGINE RESTART BYPASS CONTROL RELAY POWER SUPPLY CIRCUIT

Check the following:

- Fuse
- Ignition relay
- Ignition relay control circuit
- Harness and connectors between ignition relay and engine restart bypass control relay
- Battery power supply routing circuit
- BCM

>> INSPECTION END

3.CHECK ENGINE RESTART BYPASS CONTROL RELAY

Check engine restart bypass control relay. Refer to [EC4-753. "Component Inspection \(Engine Restart Bypass Control Relay\)"](#).

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace engine restart bypass control relay. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

4.CHECK ENGINE RESTART BYPASS RELAY INSTALLATION

Check engine restart bypass relay installation condition visually and tactually.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair error-detected parts.

5.CHECK ENGINE RESTART BYPASS RELAY POWER SUPPLY CIRCUIT

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	Existed
E205	5	E210	1	

3. 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 BYPASS CONTROL RELAY CONTROL CIRCUIT

P1655 ENGINE RESTART BYPASS RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

1. Disconnect EMCM harness connector.
2. Check the continuity between engine restart bypass control relay harness connector and EMCM harness connector.

+		-		Continuity
Engine restart bypass control relay		EMCM		
Connector	Terminal	Connector	Terminal	
E205	2	M147	22	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal	Ground	Existed
M147	47		
	48		

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace engine restart bypass relay. Refer to [EC4-971, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

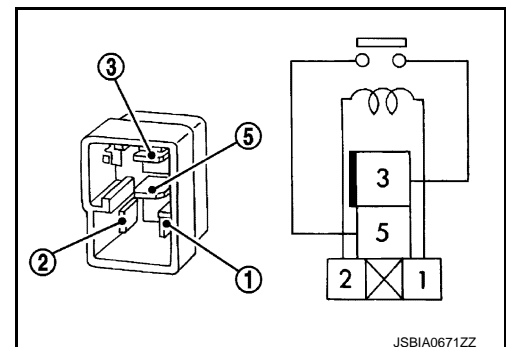
Component Inspection (Engine Restart Bypass Control Relay)

INFOID:0000000013290462

1. CHECK ENGINE RESTART BYPASS CONTROL RELAY

1. Turn ignition switch OFF.
2. Remove engine restart bypass control relay. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).
3. Check continuity between engine restart bypass control relay terminals as per the following condition.

Engine restart bypass control relay		Condition	Continuity
+	-		
Terminal		12 V direct current supply between terminals 1 and 2	Existed
3	5		



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine restart bypass control relay. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P1656 ENGINE RESTART BYPASS RELAY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1656 ENGINE RESTART BYPASS RELAY

DTC Description

INFOID:000000013290463

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1656	ENGINE RESTART BYPASS-RELAY (Engine restart bypass relay)	NO SUBTYPE INFORMATION	At an engine restart by stop/start system, the voltage right after the starter motor activation is less than 7.28 V.

POSSIBLE CAUSE

- 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

FAIL-SAFE

Stop/Start System

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	—	Prohibit the stop/start system operation from the next time

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and warm it up to normal operating temperature.
2. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "BATTERY STS".
3. Check that "OK" is indicated.

NOTE:

If NG is indicated, check battery condition. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "AUTO STOP START".
5. Touch "START" and operate stop/start system. (engine stop.)
6. Touch "CANCEL" and restart the engine.
7. Repeat Step 3 and Step 4 twice.

Is DTC "P1656" detected?

- YES >> Proceed to [EC4-754, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013290464

1. CHECK ENGINE RESTART BYPASS CONTROL RELAY POWER SUPPLY

1. Turn ignition switch OFF.

P1656 ENGINE RESTART BYPASS RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect 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
E205	1		
	3		

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. CHECK ENGINE RESTART BYPASS CONTROL RELAY POWER SUPPLY CIRCUIT

Check the following:

- Fuse
- Ignition relay
- Ignition relay control circuit
- Harness and connectors between ignition relay and engine restart bypass control relay
- Battery power supply routing circuit
- BCM

>> INSPECTION END

3. CHECK ENGINE RESTART BYPASS CONTROL RELAY

Check engine restart bypass control relay. Refer to [EC4-756. "Component Inspection \(Engine Restart Bypass Control Relay\)"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace engine restart bypass control relay. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

4. CHECK ENGINE RESTART BYPASS RELAY INSTALLATION

Check engine restart bypass relay installation condition visually and tactually.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair error-detected parts.

5. CHECK ENGINE RESTART BYPASS RELAY POWER SUPPLY CIRCUIT

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	Existed
E205	5	E210	1	

3. 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 BYPASS CONTROL RELAY CONTROL CIRCUIT

1. Disconnect EMCM harness connector.

P1656 ENGINE RESTART BYPASS RELAY

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- Check the continuity between engine restart bypass control relay harness connector and EMCM harness connector.

+		-		Continuity
Engine restart bypass control relay		EMCM		
Connector	Terminal	Connector	Terminal	
E205	2	M147	22	Existed

- Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK EMCM GROUND CIRCUIT

Check the continuity between EMCM harness connector and ground.

+		-	Continuity
EMCM			
Connector	Terminal		
M147	47	Ground	Existed
	48		

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace engine restart bypass relay. Refer to [EC4-971. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

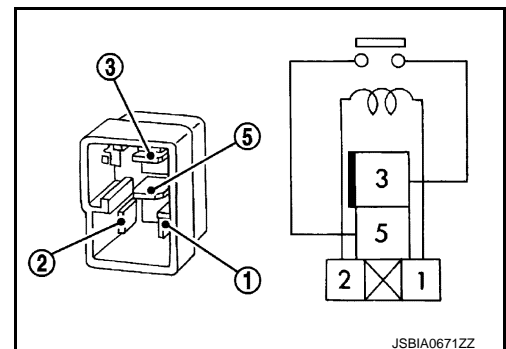
Component Inspection (Engine Restart Bypass Control Relay)

INFOID:000000013290465

1.CHECK ENGINE RESTART BYPASS CONTROL RELAY

- Turn ignition switch OFF.
- Remove engine restart bypass control relay. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).
- 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. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P1670 CALIBRATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1670 CALIBRATION ERROR

DTC Description

INFOID:000000013290466

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1670	TORQUE CURVE CALIBRATION (Torque curve calibration)	SIG ABOVE ALLOWABLE RANGE	Calibration of the torque curve of the control unit has a malfunction. There is a signal above the permissible limit value.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290467

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
NO >> INSPECTION END

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P167B CRASH SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P167B CRASH SIGNAL

DTC Description

INFOID:000000013290468

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P167B	DRIVTRN SHUTOFF DUE TO CRASH (Drivetrain shutoff due to crash)	NO SUBTYPE INFORMATION	The drivetrain has been switched off due to a crash signal.

POSSIBLE CAUSE

Car crash detection signal error

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290469

1. CHECK SELF-DIAGNOSTIC RESULT

With CONSULT

Perform "All DTC reading".

Is any DTC related other than P167B?

- YES >> Rerform trouble diagnosis for the detected DTC.
- NO >> INSPECTION END

P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1805 BRAKE SWITCH

DTC Description

INFOID:000000013290470

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1805	BRAKE SW/CIRCUIT (Brake switch/circuit)	NO SUBTYPE INFORMATION	A stop lamp switch signal is not sent to EMCM for extremely long time while the vehicle is being driven.

C

D

POSSIBLE CAUSE

- Harness or connectors (Stop lamp switch circuit is open or shorted.)
- Stop lamp switch

E

FAIL-SAFE

Stop/Start System

F

Stop/start system operating condition in fail safe mode		
Idling or driving the vehicle	Stop/start system operating	
	Stop	During cranking (Restart)
Prohibit the stop/start system operation	Restart the engine	Prohibit the stop/start system operation from the next time

G

H

DTC CONFIRMATION PROCEDURE

CAUTION:

Erase DTCs for EMCM and ECM.

1. INSPECTION START

I

NOTE:

Since this DTC is difficult to be confirmed, check component function to judge the normality.

J

K

>> GO TO 2.

2. CHECK STOP LAMP SWITCH FUNCTION

L

With CONSULT

1. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "BRAKE SW2".
2. Check "BRAKE SW2" indication under the following conditions.

M

Monitor item	Condition		Indication
BRAKE SW2	Brake pedal	Slightly depressed	ON
		Fully released	OFF

N

O

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC4-759, "Diagnosis Procedure"](#).

P

Diagnosis Procedure

INFOID:000000013290471

1. CHECK STOP LAMP INSTALLATION CONDITION

Check stop lamp installation condition. Refer to [BR-12, "Inspection and Adjustment"](#).

Is the inspection result normal?

P1805 BRAKE SWITCH

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 2.
NO >> Install stop lamp switch normally.

2.CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to [EC4-761. "Component Inspection \(Stop Lamp Switch\)".](#)

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace stop lamp switch. Refer to [BR-24. "Removal and Installation".](#)

3.CHECK STOP LAMP SWITCH POWER SUPPLY

Check the voltage between stop lamp switch harness connector and ground.

With ICC

+		-	Voltage
Stop lamp switch			
Connector	Terminal		
E57	1	Ground	Battery voltage

Without ICC

+		-	Voltage
Stop lamp switch			
Connector	Terminal		
E57	3	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 4.

4.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Pull out #19 fuse.
2. Check that the fuse is not fusing.
3. Check the continuity between stop lamp switch harness connector and fuse terminal.

With ICC

+		-	Continuity
Stop lamp switch			
Connector	Terminal		
E57	1	#19 fuse terminal	Existed

Without ICC

+		-	Continuity
Stop lamp switch			
Connector	Terminal		
E57	3	#19 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5.CHECK POWER SUPPLY CIRCUIT

Perform trouble diagnosis for battery power supply circuit.

>> INSPECTION END

P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

6. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect EMCM harness connector.
2. Check continuity between stop lamp switch harness connector and EMCM harness connector.

With ICC

+		-		Continuity
Connector	Terminal	Connector	Terminal	
E57	2	M147	6	Existed

Without ICC

+		-		Continuity
Connector	Terminal	Connector	Terminal	
E57	4	M147	6	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Stop Lamp Switch)

INFOID:000000013290472

1. CHECK STOP LAMP SWITCH-1

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

With ICC

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Without ICC

Terminals	Condition		Continuity
3 and 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-12, "Inspection and Adjustment"](#).
2. Check the continuity between stop lamp switch terminals under the following conditions.

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EC4
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P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

With ICC

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly de-pressed	Existed

Without ICC

Terminals	Condition		Continuity
3 and 4	Brake pedal	Fully released	Not existed
		Slightly de-pressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to [BR-24, "Removal and Installation"](#).

P1CCF HIGH PRESSURE FUEL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1CCF HIGH PRESSURE FUEL SYSTEM

DTC Description

INFOID:000000013290473

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1CCF	HIGH PRESSURE SYSTEM (High pressure system)	NO SUBTYPE INFORMATION	High pressure could not be built up during engine start.

POSSIBLE CAUSE

- Harness or connectors
(Fuel pressure and temperature sensor circuit is open or shorted.)
(Quantity control valve circuit is open or shorted.)
- High pressure fuel system leak
- Fuel pressure and temperature sensor
- Quantity control valve

Diagnosis Procedure

INFOID:000000013476220

1. START ENGINE

Start the engine and let it idle.

Is it difficult to keep at idle?

YES >> GO TO 4.

NO >> GO TO 2.

2. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

With CONSULT

1. Warm the engine up to engine coolant temperature reaches 75°C (167°F).
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check fuel pressure and temperature sensor rail pressure".
3. Keep the engine speed between 500 – 1,000 rpm.
4. Perform the Active Test.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

5. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 6.

3. ERASE DTC

1. Erase the DTC.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Start the engine and let it idle for 60 seconds.
4. Turn ignition switch OFF.
5. Turn ignition switch ON.
6. Check DTC.

Is the DTC detected again?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> INSPECTION END

4. PRECONDITIONING FOR CHECKING FUEL PRESSURE AND TEMPERATURE SENSOR OUTPUT SIGNAL

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

P1CCF HIGH PRESSURE FUEL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Ⓟ With CONSULT

1. On CONSULT screen, select “ENGINE” >> “DATA MONITOR” >> “RAIL PRES (ACTUAL VALUE)”.
2. Turn ignition switch OFF and wait at least 30 seconds.
3. Slightly loosen the threaded connection of the fuel line to the fuel rail to reduce the fuel pressure.

CAUTION:

Collect escaping fuel with several rags.

4. Wait at least 60 seconds.
5. Retighten the threaded connection of fuel line.
6. Check that the displayed value of “RAIL PRES (ACTUAL VALUE)” is between 0 kPa (0 bar, 0 kg-cm², 0 psi) and 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi).

>> GO TO 5.

5. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL

Ⓟ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select “ENGINE” >> “ACTIVE TEST” >> “Check fuel pressure and temperature sensor rail pressure”.

NOTE:

When start the test, fuel pump is activated and quantity control valve is not activated.

3. Check that the displayed value of “RAIL PRES (ACTUAL VALUE)” is between 300 kPa (3 bar, 3.06 kg-cm², 43.5 psi) and 1200 kPa (12 bar, 12.24 kg-cm², 174 psi).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

6. CHECK POWER SUPPLY OF FUEL PRESSURE AND TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel pressure and temperature sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure and temperature sensor harness connector and ground.

Fuel pressure and temperature sensor			Voltage
Connector	+	-	
	Terminal		
F185	4	1	4.75 – 5.25 V

Is the measured value OK?

YES >> GO TO 8.

NO >> GO TO 7.

7. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F185	1	Existed
	18		4	

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

Is the inspection result normal?

P1CCF HIGH PRESSURE FUEL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

8. CHECK FUEL PRESSURE AND TEMPERATURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and fuel pressure and temperature sensor harness connector.

+		-		Continuity
ECM		Fuel pressure and temperature sensor		
Connector	Terminal	Connector	Terminal	
F150	65	F185	3	Existed
	67		2	

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

Is the inspection result normal?

- YES >> Replace fuel pressure and temperature sensor. Refer to [EM-51. "Exploded View"](#).
NO >> Repair or replace error-detected parts.

9. CHECK HIGH PRESSURE FUEL SYSTEM LEAK

With CONSULT

1. Start the engine and warm it up to engine coolant temperature reaches 75°C (167°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON.
4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK FUEL HI PRESS CIRC FOR LEAKTIGHTNESS".
5. Connect charger to battery.
6. Set the vehicle to the following conditions.

Item	Condition
Engine coolant temperature	75 – 105°C (167 – 221°F)
Fuel temperature	40 – 80°C (104 – 176°F)
Engine speed	550 – 800 rpm
Electrical load	OFF

7. Check that the displayed value of "RAIL PRES (ACTUAL VALUE)" is between 19 MPa (190 bar, 193.8 kg-cm², 2755 psi) and 21 MPa (210 bar, 214.2 kg-cm², 3045 psi).
8. Perform the Active Test.

CAUTION:

Never turn ignition switch OFF.

NOTE:

When the result is normal, the fuel rail pressure value must not drop below 10 MPa (100 bar, 102 kg-cm², 1450 psi) within 3 minutes.

Is the inspection result normal?

- YES >> GO TO 10.
NO >> Check high pressure fuel line for fuel leak.

10. CHECK QUANTITY CONTROL VALVE FUNCTION

With CONSULT

1. Check that low fuel pressure system is normal.
2. Set the vehicle to the following conditions.

P1CCF HIGH PRESSURE FUEL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Item	Condition
Engine coolant temperature	75 – 105°C (167 – 221°F)
Fuel temperature	40 – 80°C (104 – 176°F)
Engine speed	50 rpm or more
A/C	OFF

3. On CONSULT screen, select “ENGINE” >> “ACTIVE TEST” >> “Quantity control valve”.

4. Perform the Active Test.

NOTE:

When the result is normal, the fuel rail pressure value is increased to approximately 20 MPa (200 bar, 204 kg-cm², 2900 psi).

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 11.

11.CHECK QUANTITY CONTROL VALVE

Check quantity control valve. Refer to [EC4-766, "Component Inspection \(Quantity Control Valve\)"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace high pressure fuel pump. Refer to [EM-47, "Removal and Installation"](#).

12.CHECK QUANTITY CONTROL VALVE CONTROL CIRCUIT

1. Disconnect ECM harness connector and quantity control valve harness connector.

2. Check the continuity between ECM harness connector and quantity control valve harness connector.

+		-		Continuity
ECM		Quantity control valve		
Connector	Terminal	Connector	Terminal	
F150	75	F170	1	Existed
	76		2	

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

13.ERASE DTC

1. Check the following.

- If the actuation angle of the quantity control valve matches the specified value exactly, synchronization between the camshaft and crankshaft must be checked. (Substitute value in emergency mode)
- If DTC related to camshaft is detected, perform trouble diagnosis for the detected DTC.
- If DTC related to crankshaft is detected, perform trouble diagnosis for the detected DTC.

2. Erase the DTC.

3. Turn ignition switch OFF and wait at least 30 seconds.

4. Start the engine and let it idle for 60 seconds.

5. Check DTC.

Is the DTC detected again?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> INSPECTION END

Component Inspection (Quantity Control Valve)

INFOID:000000013476221

1.CHECK QUANTITY CONTROL VALVE-1

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

P1CCF HIGH PRESSURE FUEL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the resistance between ECM harness connector terminals.

ECM		Resistance (Ω)
+	-	
Terminal		
75	76	0.3 – 1.1

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK QUANTITY CONTROL VALVE-2

1. Disconnect quantity control valve harness connector.
2. Check the resistance between quantity control valve terminals.

Quantity control valve		Resistance (Ω)
+	-	
Terminal		
1	2	0.3 – 1.1

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace high pressure fuel pump. Refer to [EM-47, "Removal and Installation"](#).

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P1CDE STOP/START SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1CDE STOP/START SYSTEM

DTC Description

INFOID:000000013290476

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1CDE	ECO START/STOP FUNCTION (ECO start/stop function)	NO SUBTYPE INFORMATION	Stop/Start function has detected excessively low engine speed during the starting procedure.

POSSIBLE CAUSE

- Engine combustion system
 - Crankshaft position sensor
 - Fuel system
- Excessive load of starting engine
 - Friction or wareout of engine components
 - Transmission

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290477

1. CHECK DTC

With CONSULT

Check "All DTC reading".

Is any DTC other than "P1CDE" detected?

- YES >> Perform trouble diagnosis for the detected DTC.
NO >> GO TO 2.

2. CHECK ENGINE START OPERATION

1. Start engine.
2. Check that the engine starts normally.

Does the engine turn over? Does the starter motor operate?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> Engine or transmission has a mechanical malfunction.

P1CDF STOP/START SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1CDF STOP/START SYSTEM

DTC Description

INFOID:0000000013290478

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1CDF	ECO START/STOP FUNCTION (ECO start/stop function)	NO SUBTYPE INFORMATION	Stop/Start function has aborted an engine start due to a fault at Neutral position sensor.

POSSIBLE CAUSE

- Transmission system

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:0000000013290479

1.CHECK DTC IN TCM

With CONSULT

Check DTC in "TRANSMISSION".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [TM-102, "2.0L TURBO GASOLINE ENGINE : DTC Index"](#).

NO >> GO TO 2.

2.CHECK DTC IN ECM

With CONSULT

Check DTC in "ENGINE".

Is any DTC related to Drivetrain CAN communication detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

NO >> INSPECTION END

P1CE2 STOP/START SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1CE2 STOP/START SYSTEM

DTC Description

INFOID:000000013290480

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1CE2	ECO START/STOP FUNCTION (ECO start/stop function)	NO SUBTYPE INFORMATION	Stop/Start function has detected excessively low engine speed.

POSSIBLE CAUSE

- Hard/No engine start
- Weak battery
- Starter system
- Crankshaft position sensor
- Fuel system
- Mechanical malfunction of engine
- Transmission system

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290481

1.CHECK ENGINE START OPERATION

1. Start engine.
2. Check that the engine starts normally.

Does the engine turn over? Does the starter motor operate?

- YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK BATTERY

Check battery. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK STARTING SYSTEM

Check starting system. Refer to [STR-12, "Work Flow \(With GR8-1200 NI\)"](#), [STR-15, "Work Flow \(Without GR8-1200 NI\)"](#).

Is the inspection result normal?

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

4.CHECK DTC IN ECM

With CONSULT

Check DTC in "ENGINE".

Is any DTC other than "P1CE2" detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> Engine or transmission has a mechanical malfunction.

P1CE7 CRANKCASE VENTILATION SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1CE7 CRANKCASE VENTILATION SYSTEM

DTC Description

INFOID:000000013290482

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1CE7	CRANKCASE VENTILATION SYSTEM (Crankcase ventilation system)	NO SUBTYPE INFORMATION	Crankcase ventilation in wide open throttle operation has a malfunction.

POSSIBLE CAUSE

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

Diagnosis Procedure

INFOID:000000013290483

1. CHECK FOR CRANKCASE VENTILATION COMPONENT PARTS

Check the following parts installation condition.

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE

Check the partial load operation crankcase ventilation valve. Refer to [EC4-950. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

P1D01 CRANKCASE VENTILATION SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1D01 CRANKCASE VENTILATION SYSTEM

DTC Description

INFOID:000000013290484

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1D01	CRANKCASE VENT VALVE (Crankcase ventilation system)	CIRCUIT SHORT TO GROUND	The valve for crankcase ventilation has a malfunction. There is a short circuit to ground.

POSSIBLE CAUSE

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

Diagnosis Procedure

INFOID:000000013472178

1. CHECK FOR CRANKCASE VENTILATION COMPONENT PARTS

Check the following parts installation condition.

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE

Check the partial load operation crankcase ventilation valve. Refer to [EC4-950. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

P1D02 CRANKCASE VENTILATION SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1D02 CRANKCASE VENTILATION SYSTEM

DTC Description

INFOID:000000013290486

DTC DETECTION LOGIC

A

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1D02	CRANKCASE VENT VALVE (Crankcase ventilation system)	CIRCUIT SHORT TO BATTERY	The valve for crankcase ventilation has a malfunction. There is a short circuit to positive.

C

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POSSIBLE CAUSE

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

E

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Diagnosis Procedure

INFOID:000000013472179

1. CHECK FOR CRANKCASE VENTILATION COMPONENT PARTS

Check the following parts installation condition.

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

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Is the inspection result normal?

K

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE

L

Check the partial load operation crankcase ventilation valve. Refer to [EC4-950. "Diagnosis Procedure"](#).

Is the inspection result normal?

M

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

N

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P1D03 CRANKCASE VENTILATION SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1D03 CRANKCASE VENTILATION SYSTEM

DTC Description

INFOID:000000013290488

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1D03	CRANKCASE VENT VALVE (Crankcase ventilation system)	CIRCUIT OPEN	The valve for crankcase ventilation has a malfunction. There is an open circuit.

POSSIBLE CAUSE

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

Diagnosis Procedure

INFOID:000000013472180

1. CHECK FOR CRANKCASE VENTILATION COMPONENT PARTS

Check the following parts installation condition.

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE

Check the partial load operation crankcase ventilation valve. Refer to [EC4-950. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

P1D04 STOP/START SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1D04 STOP/START SYSTEM

DTC Description

INFOID:000000013290490

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1D04	ECO START/STOP FUNCTION (ECO start/stop function)	NO SUBTYPE INFORMATION	Stop/Start function has requested a manual engine start.

POSSIBLE CAUSE

- Hood switch
- Torque converter lockup clutch
- Drivetrain CAN
- Transmission system

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290491

1. CHECK DTC IN TCM

With CONSULT

Check DTC in "TRANSMISSION".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [TM-102, "2.0L TURBO GASOLINE ENGINE : DTC Index"](#).

NO >> GO TO 2.

2. CHECK DTC IN ECM

With CONSULT

Check DTC in "ENGINE".

Is any DTC related to Drivetrain CAN communication detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

NO >> GO TO 3.

3. CHECK HOOD SWITCH

Check hood switch routing circuit. Refer to [EC4-927, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

P1D05 STOP/START SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1D05 STOP/START SYSTEM

DTC Description

INFOID:000000013290492

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1D05	ECO START/STOP FUNCTION (ECO start/stop function)	NO SUBTYPE INFORMATION	Stop/Start function has prevented an engine stop.

POSSIBLE CAUSE

- Door switch circuit
- seat belt buckle switch circuit
- Brake signal
- Torque converter lockup clutch status

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290493

1.CHECK DTC IN TCM

With CONSULT

Check DTC in "TRANSMISSION".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [TM-102, "2.0L TURBO GASOLINE ENGINE : DTC Index"](#).

NO >> GO TO 2.

2.CHECK DTC IN ECM

With CONSULT

Check DTC in "ENGINE".

Is any DTC related to CAN communication with EMCM detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

NO >> GO TO 3.

3.CHECK DTC IN EMCM

With CONSULT

Check DTC in "EMCM".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-165, "DTC Index"](#).

NO >> GO TO 4.

4.CHECK DTC IN ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT

Check DTC in "ABS".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [BRC-72, "DTC Index"](#).

NO >> GO TO 5.

5.CHECK STOP LAMP SWITCH

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "BRAKE SW2" and "BRAKE PEDAL POSITION SW".

P1D05 STOP/START SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check "BRAKE SW2" and "BRAKE PEDAL POSITION SW" indication under the following conditions.

Monitor item	Condition	Indication
BRAKE SW2	Slightly depressed	On
	Fully released	Off
BRAKE PEDAL POSITION SW	Slightly depressed	Off
	Fully released	On

Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform trouble diagnosis for stop lamp switch or brake pedal position switch. Refer to [BR-24](#), "[Removal and Installation](#)".

6.CHECK DOOR SWITCH

Check door switch (driver side). Refer to [DLK-117](#), "[Component Function Check](#)".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK SEAT BELT BUCKLE SWITCH

Check seat belt buckle switch. Refer to [SBC-67](#), "[Component Function Check](#)".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

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P1D06 STOP/START SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1D06 STOP/START SYSTEM

DTC Description

INFOID:000000013290494

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1D06	ECO START/STOP FUNCTION (ECO start/stop function)	NO SUBTYPE INFORMATION	Maximum operation count of the starter has been exceeded.

POSSIBLE CAUSE

Starter motor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013290495

1. REPLACE STARTER MOTOR

Replace starter motor. Refer to [STR-23, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

NOTE:

This DTC shows that the starter motor operation count exceeds the specified number.

>> INSPECTION END

P1D07 STOP/START SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1D07 STOP/START SYSTEM

DTC Description

INFOID:0000000013290496

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1D07	ECO START/STOP FUNCTION (ECO start/stop function)	NO SUBTYPE INFORMATION	Stop/Start function has prevented an engine start.

POSSIBLE CAUSE

- Door switch circuit
- seat belt buckle switch circuit
- Brake signal
- Torque converter lockup clutch status

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:0000000013290497

1. CHECK DTC IN TCM

With CONSULT

Check DTC in "TRANSMISSION".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [TM-102, "2.0L TURBO GASOLINE ENGINE : DTC Index"](#).

NO >> GO TO 2.

2. CHECK DTC IN ECM

With CONSULT

Check DTC in "ENGINE".

Is any DTC related to CAN communication with EMCM detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).

NO >> GO TO 3.

3. CHECK DTC IN EMCM

With CONSULT

Check DTC in "EMCM".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-165, "DTC Index"](#).

NO >> GO TO 4.

4. CHECK DTC IN ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT

Check DTC in "ABS".

Is any DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [BRC-72, "DTC Index"](#).

NO >> GO TO 5.

5. CHECK STOP LAMP SWITCH

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "BRAKE SW2" and "BRAKE PEDAL POSITION SW".

P1D07 STOP/START SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check "BRAKE SW2" and "BRAKE PEDAL POSITION SW" indication under the following conditions.

Monitor item	Condition	Indication
BRAKE SW2	Slightly depressed	On
	Fully released	Off
BRAKE PEDAL POSITION SW	Slightly depressed	Off
	Fully released	On

Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform trouble diagnosis for stop lamp switch or brake pedal position switch. Refer to [BR-24, "Removal and Installation"](#).

6.CHECK DOOR SWITCH

Check door switch (driver side). Refer to [DLK-117, "Component Function Check"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK SEAT BELT BUCKLE SWITCH

Check seat belt buckle switch. Refer to [SBC-67, "Component Function Check"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

P1D68 CRANKCASE VENTILATION SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P1D68 CRANKCASE VENTILATION SYSTEM

DTC Description

INFOID:000000013290498

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P1D68	CRANKCASE VENT LINE (Crankcase ventilation system)	FLUID LEAK OR SEAL FAILURE	The vent line for the crankcase is leaky. Leakage or a defective seal was detected.

C

D

POSSIBLE CAUSE

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

E

F

Diagnosis Procedure

INFOID:000000013472182

G

1. CHECK FOR CRANKCASE VENTILATION COMPONENT PARTS

H

Check the following parts installation condition.

- Partial load operation crankcase ventilation valve
- Engine coolant temperature sensor
- Coolant thermostat heater element
- Knock sensor 1
- Knock sensor 2
- Starter motor
- Pressure sensor upstream of throttle valve
- Throttle valve actuator

I

J

Is the inspection result normal?

K

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE

L

Check the partial load operation crankcase ventilation valve. Refer to [EC4-950. "Diagnosis Procedure"](#).

Is the inspection result normal?

M

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

N

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P2072 MAP/MAF-THROTTLE POSITION CORRELATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2072 MAP/MAF-THROTTLE POSITION CORRELATION

Diagnosis Description

INFOID:000000013290500

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2072	MAP/MAF - TP CORRELATION (MAP/MAF - throttle position correlation)	SYSTEM INTERNAL MAL-FUNCTN	The throttle valve is blocked due to ice. There is an internal malfunction.
		SIG BELOW ALLOWABLE RANGE	The throttle valve is blocked due to ice. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	The throttle valve is blocked due to ice. There is a signal above the permissible limit value.
		SIGNAL INVALID	The throttle valve is blocked due to ice. There is an incorrect signal.

POSSIBLE CAUSE

- Throttle valve stick (iced up)
- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
(Pressure sensor downstream of throttle valve circuit is open or shorted.)
- Throttle valve actuator
- Pressure sensor downstream of throttle valve

Diagnosis Procedure

INFOID:000000013290501

1. CHECK THROTTLE VALVE

Visually check the throttle valve for that the valve is iced up.

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. ERASE DTC

Erase DTC after performing the following.

- Ice-out the throttle valve.
- Check air cleaner filter for water content and replace it (if necessary).
- Check engine oil for water content and perform oil change (if necessary).

>> INSPECTION END

3. CHECK THROTTLE VALVE ACTUATOR FUNCTION

Ⓟ With CONSULT

1. Install the removed parts.
 2. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
 3. Turn ignition switch OFF.
 4. Turn ignition switch ON (engine stopped).
 5. Wait at least 60 seconds.
 6. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
 7. Perform Active Test.
- Check the value of monitor items as following condition

P2072 MAP/MAF-THROTTLE POSITION CORRELATION

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 4.

4.CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-784, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

5.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal		
F178	4	Ground	5 V

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 6.

6.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	4	F150	17	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
- NO >> Repair or replace error-detected parts.

7.CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

P2072 MAP/MAF-THROTTLE POSITION CORRELATION

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	3	F150	38	Existed
	5		62	
	6		14	

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:000000013290502

1. CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29. "Removal and Installation"](#).

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29. "Removal and Installation"](#).

P2088 INTAKE CAMSHAFT ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2088 INTAKE CAMSHAFT ACTUATOR

DTC Description

INFOID:0000000013290503

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2088	CAMSHAFT A POSITN ACTU-ATR B1 ("A" camshaft position actuator control circuit low bank 1)	NO SUBTYPE INFORMATION	The Intake camshaft actuator (cylinder bank 1) has a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors (Intake camshaft actuator circuit)
- Intake camshaft actuator

Diagnosis Procedure

INFOID:0000000013290504

1. COMPONENT FUNCTION CHECK

Ⓜ With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
3. Set the vehicle as the following conditions:

Item	Condition
ENGINE SPEED	500 rpm or more
COOLANT TEMPERATURE	80°C (176°F)

4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check intake camshaft solenoid".
5. Perform Active Test.

NOTE:

After performing Active Test, erase DTC if necessary.

Is the actuator actuated?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 97 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK INTAKE CAMSHAFT ACTUATOR POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect intake camshaft actuator harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake camshaft actuator harness connector and ground.

+		-	Voltage
Connector	Terminal		
F162	2	Ground	Battery voltage

P2088 INTAKE CAMSHAFT ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for intake camshaft actuator power supply circuit.

4.CHECK INTAKE CAMSHAFT ACTUATOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Intake camshaft actuator		
Connector	Terminal	Connector	Terminal	
F150	29	F162	1	Existed

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

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-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace intake camshaft actuator. Refer to [EM-93, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P2089 INTAKE CAMSHAFT ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2089 INTAKE CAMSHAFT ACTUATOR

DTC Description

INFOID:0000000013290505

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2089	CAMSHAFT A POSITN ACTU-ATR B1 ("A" camshaft position actuator control circuit high bank 1)	NO SUBTYPE INFORMATION	The Intake camshaft actuator (cylinder bank 1) has a short circuit to power.

C

D

POSSIBLE CAUSE

- Harness or connectors (Intake camshaft actuator circuit)
- Intake camshaft actuator

E

F

Diagnosis Procedure

INFOID:0000000013472183

1. COMPONENT FUNCTION CHECK

G

Ⓜ With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
3. Set the vehicle as the following conditions:

H

Item	Condition
ENGINE SPEED	500 rpm or more
COOLANT TEMPERATURE	80°C (176°F)

I

J

4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check intake camshaft solenoid".
5. Perform Active Test.

NOTE:

After performing Active Test, erase DTC if necessary.

K

Is the actuator actuated?

- YES >> INSPECTION END
NO >> GO TO 2.

L

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 97 (15 A) fuse is not fusing.

M

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

N

3. CHECK INTAKE CAMSHAFT ACTUATOR POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect intake camshaft actuator harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake camshaft actuator harness connector and ground.

O

P

+		-	Voltage
Connector	Terminal		
F162	2	Ground	Battery voltage

P2089 INTAKE CAMSHAFT ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for intake camshaft actuator power supply circuit.

4. CHECK INTAKE CAMSHAFT ACTUATOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Intake camshaft actuator		
Connector	Terminal	Connector	Terminal	
F150	29	F162	1	Existed

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

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-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace intake camshaft actuator. Refer to [EM-93, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P2090 EXHAUST CAMSHAFT ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2090 EXHAUST CAMSHAFT ACTUATOR

DTC Description

INFOID:0000000013290507

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2090	CAMSHAFT B POSITN ACTU-ATR B1 ("B" camshaft position actuator control circuit low bank 1)	NO SUBTYPE INFORMATION	The exhaust camshaft actuator (cylinder bank 1) has a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors (Exhaust camshaft actuator circuit)
- Exhaust camshaft actuator

Diagnosis Procedure

INFOID:0000000013472184

1. COMPONENT FUNCTION CHECK

Ⓜ With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
3. Set the vehicle as the following conditions:

Item	Condition
ENGINE SPEED	500 rpm or more
COOLANT TEMPERATURE	80°C (176°F)

4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check exhaust camshaft solenoid".
5. Perform Active Test.

NOTE:

After performing Active Test, erase DTC if necessary.

Is the actuator actuated?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 97 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK EXHAUST CAMSHAFT ACTUATOR POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect exhaust camshaft actuator harness connector.
3. Turn ignition switch ON.
4. Check the voltage between exhaust camshaft actuator harness connector and ground.

+		-	Voltage
Connector	Terminal		
F163	2	Ground	Battery voltage

P2090 EXHAUST CAMSHAFT ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for exhaust camshaft actuator power supply circuit.

4. CHECK EXHAUST CAMSHAFT ACTUATOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Exhaust camshaft actuator		
Connector	Terminal	Connector	Terminal	
F150	53	F163	1	Existed

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

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-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace exhaust camshaft actuator. Refer to [EM-93, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P2091 EXHAUST CAMSHAFT ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2091 EXHAUST CAMSHAFT ACTUATOR

DTC Description

INFOID:0000000013290509

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2091	CAMSHAFT B POSITN ACTU-ATR B1 ("B" camshaft position actuator control circuit high bank 1)	NO SUBTYPE INFORMATION	The exhaust camshaft actuator (cylinder bank 1) has a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Exhaust camshaft actuator circuit)
- Exhaust camshaft actuator

Diagnosis Procedure

INFOID:0000000013290510

1. COMPONENT FUNCTION CHECK

Ⓜ With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
3. Set the vehicle as the following conditions:

Item	Condition
ENGINE SPEED	500 rpm or more
COOLANT TEMPERATURE	80°C (176°F)

4. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check exhaust camshaft solenoid".
5. Perform Active Test.

NOTE:

After performing Active Test, erase DTC if necessary.

Is the actuator actuated?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 97 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK EXHAUST CAMSHAFT ACTUATOR POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect exhaust camshaft actuator harness connector.
3. Turn ignition switch ON.
4. Check the voltage between exhaust camshaft actuator harness connector and ground.

+		-	Voltage
Connector	Terminal		
F163	2	Ground	Battery voltage

P2091 EXHAUST CAMSHAFT ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for exhaust camshaft actuator power supply circuit.

4. CHECK EXHAUST CAMSHAFT ACTUATOR CONTROL CIRCUIT

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

+		-		Continuity
ECM		Exhaust camshaft actuator		
Connector	Terminal	Connector	Terminal	
F150	53	F163	1	Existed

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

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-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace exhaust camshaft actuator. Refer to [EM-93, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P2096 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2096 AIR-FUEL RATIO

DTC Description

INFOID:0000000013290511

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2096	POST CAT FUEL TRIM SYSTEM B1 (Post catalyst fuel trim system too lean bank 1)	NO SUBTYPE INFORMATION	The mixture is too lean downstream of the catalytic converter (cylinder bank 1).

C

D

POSSIBLE CAUSE

Mixture adaptation

E

Diagnosis Procedure

INFOID:0000000013472185

F

1. PERFORM ACTIVE TEST

With CONSULT

- Start the engine and let it idle.
- On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
- Set the vehicle under the following conditions:

G

H

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 –176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

I

J

- Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

- Check that "CMPLT" is displayed.

L

Is "CMPLT" displayed on CONSULT screen?

YES >> INSPECTION END

NO >> GO TO 2.

M

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

N

Is other DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).

NO >> GO TO 3.

O

3. CHECK FUEL QUANTITY

P

CAUTION:

[FL-22. "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace fuel. Refer to [FL-30. "Removal and Installation"](#).

P2096 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340. "ECM : Diagnosis Procedure"](#), [EC4-345. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876. "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860. "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320. "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538. "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687. "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465. "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

P2097 AIR-FUEL RATIO

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

P2097 AIR-FUEL RATIO

DTC Description

INFOID:0000000013290513

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2097	POST CAT FUEL TRIM SYSTEM B1 (Post catalyst fuel trim system too rich bank 1)	NO SUBTYPE INFORMATION	The mixture is too rich downstream of the catalytic converter (cylinder bank 1).

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:0000000013472186

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 –176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146. "DTC Index"](#).

NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22. "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace fuel. Refer to [FL-30. "Removal and Installation"](#).

P2097 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340. "ECM : Diagnosis Procedure"](#), [EC4-345. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876. "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860. "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320. "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538. "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687. "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465. "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

P2101 THROTTLE VALVE ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2101 THROTTLE VALVE ACTUATOR

DTC Description

INFOID:000000013448395

DTC DETECTION LOGIC

A

EC4

DTC	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P2101	THROTTLE ACT A CONT MOTOR (Throttle Actuator "A" Control Motor Circuit Range/Performance)	NO SUBTYPE INFORMATION	The throttle valve actuator has a malfunction.
		SG BS LVL O-OF RNG/ZR AJST ERR	The throttle valve actuator has a malfunction. The signal offset is outside the permissible range.
		SIGNAL INVALID	The throttle valve actuator has a malfunction. There is an invalid signal.
		SIGNAL PLAUSIBILITY ERROR	The throttle valve actuator has a malfunction. There is an implausible signal.
		SIG BELOW ALLOWABLE RANGE	The throttle valve actuator has a malfunction. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	The throttle valve actuator has a malfunction. There is a signal above the permissible limit value.

C

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POSSIBLE CAUSE

- Harness and connectors (Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

G

Diagnosis Procedure

INFOID:000000013472895

1. CHECK THROTTLE VALVE POSITION

H

With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

I

J

K

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

L

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

M

N

O

P

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

P2101 THROTTLE VALVE ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-798. "Component Inspection \(Throttle Valve Actuator\)".](#)

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace throttle valve actuator. Refer to [EM-28. "Exploded View".](#)

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	4	F150	17	

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure".](#)

NO >> Repair or replace error-detected parts.

5. CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	3	F150	38	
	5		62	
	6		14	

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident".](#)

NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:000000013472896

1. CHECK THROTTLE VALVE MOTOR

P2101 THROTTLE VALVE ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

A

Terminal	Resistance
1 and 2	1 – 10 Ω

EC4

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29. "Removal and Installation"](#).

C

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

D

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29. "Removal and Installation"](#).

E

F

G

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P2102 THROTTLE VALVE ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2102 THROTTLE VALVE ACTUATOR

DTC Description

INFOID:000000013448397

DTC DETECTION LOGIC

DTC	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P2102	THROTTLE ACT A CONT MOTOR (Throttle Actuator "A" Control Motor Circuit Low)	NO SUBTYPE INFORMATION	The throttle valve actuator has a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors (Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

Diagnosis Procedure

INFOID:000000013475472

1. CHECK THROTTLE VALVE POSITION

Ⓟ With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-834, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.

P2102 THROTTLE VALVE ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	4	F150	17	

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5.CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	3	F150	38	
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:0000000013475473

1.CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

P2102 THROTTLE VALVE ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2.CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

P2103 THROTTLE VALVE ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2103 THROTTLE VALVE ACTUATOR

DTC Description

INFOID:000000013448399

DTC DETECTION LOGIC

A

EC4

DTC	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P2103	THROTTLE ACT A CONT MOTOR (Throttle Actuator "A" Control Motor Circuit High)	NO SUBTYPE INFORMATION	The throttle valve actuator has a short circuit to positive.

C

D

POSSIBLE CAUSE

- Harness and connectors (Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

E

Diagnosis Procedure

INFOID:000000013475474

1. CHECK THROTTLE VALVE POSITION

F

With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

G

H

I

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

J

K

- Check the value of monitor items as following condition

L

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

M

N

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 2.

O

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-834, "Component Inspection \(Throttle Valve Actuator\)"](#).

P

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.

P2103 THROTTLE VALVE ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	4	F150	17	

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	3	F150	38	
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:000000013475475

1. CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

P2103 THROTTLE VALVE ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

A

2.CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

EC4

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

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P2111 THROTTLE VALVE ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2111 THROTTLE VALVE ACTUATOR

DTC Description

INFOID:000000013448401

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P2111	Throttle actuator A control system (Throttle Actuator "A" Control System - Stuck Open)	NO SUBTYPE INFORMATION	The throttle valve is jammed open.

POSSIBLE CAUSE

- Harness and connectors (Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

Diagnosis Procedure

INFOID:000000013475476

1. CHECK THROTTLE VALVE POSITION

Ⓟ With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-834, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.

P2111 THROTTLE VALVE ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between throttle valve actuator harness connector and ECM harness connector.

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	4	F150	17	

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5.CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between throttle valve actuator harness connector and ECM harness connector.

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	3	F150	38	
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45. "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:0000000013475477

1.CHECK THROTTLE VALVE MOTOR

- Turn ignition switch OFF.
- Disconnect throttle valve actuator harness connector.
- Check the resistance between throttle valve actuator terminals.

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

P2111 THROTTLE VALVE ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2.CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

P2122 ACCELERATOR PEDAL POSITION SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2122 ACCELERATOR PEDAL POSITION SENSOR 1

Diagnosis Description

INFOID:0000000013290515

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2122	THROTTLE/PDL POSITION SEN/SW D (Throttle/Pedal position sensor/switch "D" circuit low)	NO SUBTYPE INFORMATION	Accelerator pedal position sensor 1 has a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors
(Accelerator pedal position sensor 1 circuit is open or shorted.)
- Accelerator pedal position sensor 1

Diagnosis Procedure

INFOID:0000000013472187

1. CHECK ACCELERATOR PEDAL POSITION SENSOR FUNCTION

④ With CONSULT

1. Turn ignition switch ON (engine stopped).
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "ACCELERATOR PEDAL SEN 1" and "ACCELERATOR PEDAL SEN 2".
3. Check the value of monitor items as following conditions.

Item	Condition	Value
ACCELERATOR PEDAL SEN 1	Accelerator pedal: fully released	0.2 – 0.8 V
	Accelerator pedal: fully depressed	4.3 – 4.8 V
ACCELERATOR PEDAL SEN 2	Accelerator pedal: fully released	0.1 – 0.5 V
	Accelerator pedal: fully depressed	2.1 – 2.5 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect accelerator pedal position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between accelerator pedal position sensor harness connector and ground.

With ICC

+		-	Voltage (Approx.)
Connector	Terminal		
M124	4	Ground	4.75 – 5.25 V
	10		

P2122 ACCELERATOR PEDAL POSITION SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Without ICC

+		-	Voltage (Approx.)
Accelerator pedal position sensor	Connector		
	Terminal	Ground	4.75 – 5.25 V
M126	5		
	6		

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	
M124	4	E200	104	Existed
	10		105	

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	
M126	5	E200	104	Existed
	6		105	

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	
M124	12	E200	145	Existed
	11		119	
	6		132	
	5		106	

P2122 ACCELERATOR PEDAL POSITION SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M126	1	E200	145	
	2		119	
	3		132	
	4		106	

4. Also check harness for short to ground, short to power and short to each circuit.

Is the inspection result normal?

YES >> Replace accelerator pedal position sensor. Refer to [ACC-4. "MODELS WITHOUT DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models without DISTANCE CONTROL ASSIST SYSTEM), [ACC-6. "MODELS WITH DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models with DISTANCE CONTROL ASSIST SYSTEM).

NO >> Repair or replace error-detected parts.

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P2123 ACCELERATOR PEDAL POSITION SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2123 ACCELERATOR PEDAL POSITION SENSOR 1

Diagnosis Description

INFOID:000000013290517

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2123	THROTTLE/PDL POSITION SEN/SW D (Throttle/Pedal position sensor/switch "D" circuit high)	NO SUBTYPE INFORMATION	Accelerator pedal position sensor 1 has a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors
(Accelerator pedal position sensor 1 circuit is open or shorted.)
- Accelerator pedal position sensor 1

Diagnosis Procedure

INFOID:000000013472188

1. CHECK ACCELERATOR PEDAL POSITION SENSOR FUNCTION

Ⓔ With CONSULT

1. Turn ignition switch ON (engine stopped).
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "ACCELERATOR PEDAL SEN 1" and "ACCELERATOR PEDAL SEN 2".
3. Check the value of monitor items as following conditions.

Item	Condition	Value
ACCELERATOR PEDAL SEN 1	Accelerator pedal: fully released	0.2 – 0.8 V
	Accelerator pedal: fully depressed	4.3 – 4.8 V
ACCELERATOR PEDAL SEN 2	Accelerator pedal: fully released	0.1 – 0.5 V
	Accelerator pedal: fully depressed	2.1 – 2.5 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect accelerator pedal position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between accelerator pedal position sensor harness connector and ground.

With ICC

+		-	Voltage (Approx.)
Accelerator pedal position sensor Connector	Terminal		
M124	4	Ground	4.75 – 5.25 V
	10		

P2123 ACCELERATOR PEDAL POSITION SENSOR 1

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Without ICC

+		-	Voltage (Approx.)
Accelerator pedal position sensor			
Connector	Terminal	Ground	4.75 – 5.25 V
M126	5		
	6		

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M124	4	E200	104	
	10		105	

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M126	5	E200	104	
	6		105	

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity	
Accelerator pedal position sensor		ECM			
Connector	Terminal	Connector	Terminal	Existed	
M124	12	E200	145		Existed
	11		119		
	6		132		
	5		106		

P2123 ACCELERATOR PEDAL POSITION SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M126	1	E200	145	
	2		119	
	3		132	
	4		106	

4. Also check harness for short to ground, short to power and short to each circuit.

Is the inspection result normal?

YES >> Replace accelerator pedal position sensor. Refer to [ACC-4. "MODELS WITHOUT DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models without DISTANCE CONTROL ASSIST SYSTEM), [ACC-6. "MODELS WITH DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models with DISTANCE CONTROL ASSIST SYSTEM).

NO >> Repair or replace error-detected parts.

P2127 ACCELERATOR PEDAL POSITION SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2127 ACCELERATOR PEDAL POSITION SENSOR 2

Diagnosis Description

INFOID:000000013290519

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2127	THROTTLE/PDL POSITION SEN/SW E (Throttle/Pedal position sensor/switch "E" circuit low)	CIRCUIT SHORT TO GROUND	Accelerator pedal position sensor 2 has a short circuit to ground. There is a short circuit to ground.

C

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POSSIBLE CAUSE

- Harness and connectors
(Accelerator pedal position sensor 2 circuit is open or shorted.)
- Accelerator pedal position sensor 2

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Diagnosis Procedure

INFOID:000000013472189

1. CHECK ACCELERATOR PEDAL POSITION SENSOR FUNCTION

G

Ⓜ With CONSULT

1. Turn ignition switch ON (engine stopped).
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "ACCELERATOR PEDAL SEN 1" and "ACCELERATOR PEDAL SEN 2".
3. Check the value of monitor items as following conditions.

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Item	Condition	Value
ACCELERATOR PEDAL SEN 1	Accelerator pedal: fully released	0.2 – 0.8 V
	Accelerator pedal: fully depressed	4.3 – 4.8 V
ACCELERATOR PEDAL SEN 2	Accelerator pedal: fully released	0.1 – 0.5 V
	Accelerator pedal: fully depressed	2.1 – 2.5 V

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Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

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2. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY

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1. Turn ignition switch OFF.
2. Disconnect accelerator pedal position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between accelerator pedal position sensor harness connector and ground.

N

With ICC

+		-	Voltage (Approx.)
Connector	Terminal		
M124	4	Ground	4.75 – 5.25 V
	10		

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P2127 ACCELERATOR PEDAL POSITION SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Without ICC

+		-	Voltage (Approx.)
Accelerator pedal position sensor			
Connector	Terminal	Ground	4.75 – 5.25 V
M126	5		
	6		

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M124	4	E200	104	
	10		105	

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M126	5	E200	104	
	6		105	

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity	
Accelerator pedal position sensor		ECM			
Connector	Terminal	Connector	Terminal	Existed	
M124	12	E200	145		
	11		119		
	6		132		
	5		106		

P2127 ACCELERATOR PEDAL POSITION SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	
M126	1	E200	145	Existed
	2		119	
	3		132	
	4		106	

4. Also check harness for short to ground, short to power and short to each circuit.

Is the inspection result normal?

YES >> Replace accelerator pedal position sensor. Refer to [ACC-4. "MODELS WITHOUT DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models without DISTANCE CONTROL ASSIST SYSTEM), [ACC-6. "MODELS WITH DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models with DISTANCE CONTROL ASSIST SYSTEM).

NO >> Repair or replace error-detected parts.

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P2128 ACCELERATOR PEDAL POSITION SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2128 ACCELERATOR PEDAL POSITION SENSOR 2

Diagnosis Description

INFOID:000000013290521

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2128	THROTTLE/PDL POSITION SEN/SW E (Throttle/Pedal position sensor/switch "E" circuit low)	CIRCUIT SHORT TO BATTERY	Accelerator pedal position sensor 2 has a short circuit to positive There is a short circuit to positive.

POSSIBLE CAUSE

- Harness and connectors (Accelerator pedal position sensor 2 circuit is open or shorted.)
- Accelerator pedal position sensor 2

Diagnosis Procedure

INFOID:000000013472190

1. CHECK ACCELERATOR PEDAL POSITION SENSOR FUNCTION

Ⓢ With CONSULT

1. Turn ignition switch ON (engine stopped).
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "ACCELERATOR PEDAL SEN 1" and "ACCELERATOR PEDAL SEN 2".
3. Check the value of monitor items as following conditions.

Item	Condition	Value
ACCELERATOR PEDAL SEN 1	Accelerator pedal: fully released	0.2 – 0.8 V
	Accelerator pedal: fully depressed	4.3 – 4.8 V
ACCELERATOR PEDAL SEN 2	Accelerator pedal: fully released	0.1 – 0.5 V
	Accelerator pedal: fully depressed	2.1 – 2.5 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect accelerator pedal position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between accelerator pedal position sensor harness connector and ground.

With ICC

+		-	Voltage (Approx.)
Connector	Terminal		
M124	4	Ground	4.75 – 5.25 V
	10		

P2128 ACCELERATOR PEDAL POSITION SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Without ICC

+		-	Voltage (Approx.)
Accelerator pedal position sensor			
Connector	Terminal	Ground	4.75 – 5.25 V
M126	5		
	6		

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M124	4	E200	104	
	10		105	

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M126	5	E200	104	
	6		105	

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR CIRCUIT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M124	12	E200	145	
	11		119	
	6		132	
	5		106	

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P2128 ACCELERATOR PEDAL POSITION SENSOR 2

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M126	1	E200	145	
	2		119	
	3		132	
	4		106	

4. Also check harness for short to ground, short to power and short to each circuit.

Is the inspection result normal?

YES >> Replace accelerator pedal position sensor. Refer to [ACC-4. "MODELS WITHOUT DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models without DISTANCE CONTROL ASSIST SYSTEM), [ACC-6. "MODELS WITH DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models with DISTANCE CONTROL ASSIST SYSTEM).

NO >> Repair or replace error-detected parts.

P2135 THROTTLE VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2135 THROTTLE VALVE POSITION SENSOR

Diagnosis Description

INFOID:0000000013290523

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2135	THTL/PDL POS SEN/SW A/B CRRLTN (Throttle/Pedal position sensor/switch A/B voltage correlation)	NO SUBTYPE INFORMATION	The values from the position sensors of the throttle valve are implausible relative to each other.

POSSIBLE CAUSE

- Harness and connectors (Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

Diagnosis Procedure

INFOID:0000000013476222

1. CHECK THROTTLE VALVE POSITION

Ⓜ With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-822, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

P2135 THROTTLE VALVE POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	4	F150	17	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	3	F150	38	Existed
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:000000013476223

1. CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

P2135 THROTTLE VALVE POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

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P2136 THROTTLE VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2136 THROTTLE VALVE POSITION SENSOR

Diagnosis Description

INFOID:000000013290526

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2136	THTL/PDL POS SEN/SW A/C CRRLTN (Throttle/Pedal position sensor/ switch A/C voltage correlation)	NO SUBTYPE INFORMATION	The values from the position sensors "A"/"C" of the throttle valve are implausible relative to each other. There is an invalid signal.

POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

Diagnosis Procedure

INFOID:000000013476229

1. CHECK THROTTLE VALVE POSITION

Ⓜ With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

- Check the value of monitor items as following condition

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-828, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

P2136 THROTTLE VALVE POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	4	F150	17	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	
F178	3	F150	38	Existed
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:0000000013476230

1. CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

P2136 THROTTLE VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2. CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

P2137 THROTTLE VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2137 THROTTLE VALVE POSITION SENSOR

Diagnosis Description

INFOID:0000000013290529

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2137	THTL/PDL POS SEN/SW B/C CRRLTN (Throttle/Pedal position sensor/switch B/C voltage correlation)	NO SUBTYPE INFORMATION	The values from the position sensors "B"/"C" of the throttle valve are implausible relative to each other.

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POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

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Diagnosis Procedure

INFOID:0000000013476231

1. CHECK THROTTLE VALVE POSITION

G

With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

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Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

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- Check the value of monitor items as following condition

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Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

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Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 2.

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2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-828, "Component Inspection \(Throttle Valve Actuator\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

P2137 THROTTLE VALVE POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

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

4. CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	4	F150	17	

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	3	F150	38	
	5		62	
	6		14	

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

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:000000013476232

1. CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

P2137 THROTTLE VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2.CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

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P2138 ACCELERATOR PEDAL POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2138 ACCELERATOR PEDAL POSITION SENSOR

Diagnosis Description

INFOID:000000013290532

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2138	THTL/PDL POS SEN/SW D/E CRRLTN (Throttle/Pedal position sensor/ switch "D"/"E" voltage correla- tion)	NO SUBTYPE INFORMATION	Accelerator pedal position sensors are implausible relative to each other.

POSSIBLE CAUSE

- Harness and connectors
(Accelerator pedal position sensor circuit is open or shorted.)
- Accelerator pedal position sensor

Diagnosis Procedure

INFOID:000000013290533

1. CHECK ACCELERATOR PEDAL POSITION SENSOR FUNCTION

With CONSULT

1. Turn ignition switch ON (engine stopped).
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "ACCELERATOR PEDAL SEN 1" and "ACCELERATOR PEDAL SEN 2".
3. Check the value of monitor items as following conditions.

Item	Condition	Value
ACCELERATOR PEDAL SEN 1	Accelerator pedal: fully released	0.2 – 0.8 V
	Accelerator pedal: fully depressed	4.3 – 4.8 V
ACCELERATOR PEDAL SEN 2	Accelerator pedal: fully released	0.1 – 0.5 V
	Accelerator pedal: fully depressed	2.1 – 2.5 V

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect accelerator pedal position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between accelerator pedal position sensor harness connector and ground.

With ICC

+		-	Voltage (Approx.)
Accelerator pedal position sensor Connector	Terminal		
M124	4	Ground	4.75 – 5.25 V
	10		

P2138 ACCELERATOR PEDAL POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Without ICC

+		-	Voltage (Approx.)
Accelerator pedal position sensor			
Connector	Terminal	Ground	4.75 – 5.25 V
M126	5		
	6		

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M124	4	E200	104	
	10		105	

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M126	5	E200	104	
	6		105	

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between accelerator pedal position sensor harness connector and ECM harness connector.

With ICC

+		-		Continuity	
Accelerator pedal position sensor		ECM			
Connector	Terminal	Connector	Terminal	Existed	
M124	12	E200	145		Existed
	11		119		
	6		132		
	5		106		

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P2138 ACCELERATOR PEDAL POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Without ICC

+		-		Continuity
Accelerator pedal position sensor		ECM		
Connector	Terminal	Connector	Terminal	Existed
M126	1	E200	145	
	2		119	
	3		132	
	4		106	

4. Also check harness for short to ground, short to power and short to each circuit.

Is the inspection result normal?

YES >> Replace accelerator pedal position sensor. Refer to [ACC-4. "MODELS WITHOUT DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models without DISTANCE CONTROL ASSIST SYSTEM), [ACC-6. "MODELS WITH DISTANCE CONTROL ASSIST SYSTEM : Removal and Installation"](#) (in models with DISTANCE CONTROL ASSIST SYSTEM).

NO >> Repair or replace error-detected parts.

P2176 THROTTLE VALVE ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2176 THROTTLE VALVE ACTUATOR

DTC Description

INFOID:000000013448404

DTC DETECTION LOGIC

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DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P2176	Throttle actuator A control system (Throttle Actuator "A" Control System - Idle Position Not Learned)	COMPONENT MALFUNCTION	Adaptation of the idle position of the throttle valve actuator was not performed. There is a component malfunction.
		CIRC VOLT BELOW THRESHOLD	Adaptation of the idle position of the throttle valve actuator was not performed. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	Adaptation of the idle position of the throttle valve actuator was not performed. The limit value for electrical voltage has been exceeded.

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POSSIBLE CAUSE

- Harness and connectors
(Throttle valve actuator circuit is open or shorted.)
- Throttle valve actuator

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Diagnosis Procedure

INFOID:000000013475478

1. CHECK THROTTLE VALVE POSITION

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With CONSULT

1. Start the engine and warm it up to coolant temperature reaches more than 80°C (176°F).
2. Turn ignition switch OFF.
3. Turn ignition switch ON (engine stopped).
4. Wait at least 60 seconds.
5. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK THROTTLE VALVE ACTUATOR".
6. Perform Active Test.
 - Check the value of monitor items as following condition

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Item	Condition	Value
KICKDOWN	Accelerator pedal: fully released	NOT ACTIVE
ACCELERATOR PEDAL SEN 1		0.2 – 0.8 V
THRTL VALVE ACTUATOR1 V		0.6 – 1.0 V
THRTL VALVE ACTUATOR2 V		4.0 – 4.4 V

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- Check the value of monitor items as following condition

N

Item	Condition	Value
KICKDOWN	Accelerator pedal: fully depressed	ACTIVE
ACCELERATOR PEDAL SEN 1		4.3 – 4.8 V
THRTL VALVE ACTUATOR1 V		3.8 – 4.6 V
THRTL VALVE ACTUATOR2 V		0.4 – 1.2 V

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Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 2.

2. CHECK THROTTLE VALVE ACTUATOR

Check throttle valve actuator. Refer to [EC4-834, "Component Inspection \(Throttle Valve Actuator\)"](#).

P2176 THROTTLE VALVE ACTUATOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace throttle valve actuator. Refer to [EM-28, "Exploded View"](#).

3.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check the voltage between throttle valve actuator harness connector and ground.

+		-	Voltage (Approx.)
Throttle valve actuator			
Connector	Terminal	Ground	5 V
F178	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.CHECK THROTTLE VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	4	F150	17	

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

5.CHECK THROTTLE VALVE POSITION SENSOR CIRCUIT

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

+		-		Continuity
Throttle valve actuator		ECM		
Connector	Terminal	Connector	Terminal	Existed
F178	3	F150	38	
	5		62	
	6		14	

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

Component Inspection (Throttle Valve Actuator)

INFOID:0000000013475479

1.CHECK THROTTLE VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect throttle valve actuator harness connector.
3. Check the resistance between throttle valve actuator terminals.

P2176 THROTTLE VALVE ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Terminal	Resistance
1 and 2	1 – 10 Ω

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

2.CHECK THROTTLE VALVE

1. Remove throttle valve actuator.
2. Operate throttle valve slowly by hand as far as the wide open position.
3. Check that the throttle valve does not stick and returning to closed position by spring force.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace throttle valve actuator. Refer to [EM-29, "Removal and Installation"](#).

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P2177 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2177 AIR-FUEL RATIO

DTC Description

INFOID:000000013290534

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2177	SYSTEM LEAN B1 (System too lean off idle bank 1)	NO SUBTYPE INFORMATION	The mixture (cylinder bank 1) is too lean in partial load operation.
		CMP/SYS OPR OBST OR BLKD	The mixture (cylinder bank 1) is too lean in partial load operation. The system function is restricted.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013290535

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 – 176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

P2177 AIR-FUEL RATIO

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340. "ECM : Diagnosis Procedure"](#), [EC4-345. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876. "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860. "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320. "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538. "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687. "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465. "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P2178 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2178 AIR-FUEL RATIO

DTC Description

INFOID:000000013290536

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2178	SYSTEM RICH B1 (System too rich off idle bank 1)	NO SUBTYPE INFORMATION	The mixture (cylinder bank 1) is too rich in partial load operation.
		CMP/SYS OPR OBST OR BLKD	The mixture (cylinder bank 1) is too rich in partial load operation. The system function is restricted.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013472191

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 – 176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

P2178 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340, "ECM : Diagnosis Procedure"](#), [EC4-345, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876, "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860, "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320, "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538, "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687, "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465, "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P2187 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2187 AIR-FUEL RATIO

DTC Description

INFOID:000000013290538

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2187	SYSTEM LEAN B1 (System too lean at idle bank 1)	SIGNAL COMPARE ERROR	The mixture (cylinder bank 1) is too lean at idle speed. The signal comparison has a malfunction.
		CMP/SYS OPR OBST OR BLKD	The mixture (cylinder bank 1) is too lean at idle speed. The system function is restricted.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013472192

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 – 176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

P2187 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340, "ECM : Diagnosis Procedure"](#), [EC4-345, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876, "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860, "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320, "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538, "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687, "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465, "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P2188 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2188 AIR-FUEL RATIO

DTC Description

INFOID:000000013290540

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2188	SYSTEM RICH B1 (System too rich at idle bank 1)	SIGNAL COMPARE ERROR	The mixture (cylinder bank 1) is too rich at idle speed. The signal comparison has a malfunction.
		CMP/SYS OPR OBST OR BLKD	The mixture (cylinder bank 1) is too rich at idle speed. The system function is restricted.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013472193

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 – 176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

P2188 AIR-FUEL RATIO

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340, "ECM : Diagnosis Procedure"](#), [EC4-345, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876, "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860, "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320, "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538, "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687, "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465, "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P2195 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2195 A/F SENSOR

DTC Description

INFOID:000000013290542

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2195	O2 SENSOR B1 SENSOR 1 (O2 sensor signal biased/stuck lean bank 1 sensor 1)	NO SUBTYPE INFORMATION	The signal from A/F sensor (cylinder bank 1) is shifted towards LEAN.
		SIG ABOVE ALLOWABLE RANGE	The signal from A/F sensor (cylinder bank 1) is shifted towards LEAN. There is a signal above the permissible limit value.

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

Diagnosis Procedure

INFOID:000000013290543

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

P2195 A/F SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace A/F sensor. Refer to [EM-42. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P2196 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2196 A/F SENSOR

DTC Description

INFOID:000000013290544

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2196	O2 SENSOR B1 SENSOR 1 (O2 sensor signal biased/stuck rich bank 1 sensor 1)	NO SUBTYPE INFORMATION	The signal from A/F sensor (cylinder bank 1) is shifted towards RICH.
		SIG BELOW ALLOWABLE RANGE	The signal from A/F sensor (cylinder bank 1) is shifted towards RICH. There is a signal below the permissible limit value.

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

Diagnosis Procedure

INFOID:000000013472194

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

P2196 A/F SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace A/F sensor. Refer to [EM-42. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P219C AIR-FUEL RATIO IMBALANCE (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P219C AIR-FUEL RATIO IMBALANCE (CYLINDER 1)

DTC Description

INFOID:000000013290546

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P219C	CYL1 AIR-FUEL RATIO IMBALANCE (Cylinder 1 air-fuel ratio imbalance)	COMMAND POSI NOT REACHABLE	Mixture formation (cylinder 1) is irregular. The commanded position cannot be reached.
		ALGNMNT OR ADJSTMNT IN-CRRCT	Mixture formation (cylinder 1) is irregular. The adaptation or adjustment is incorrect.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013290547

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 – 176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

P219C AIR-FUEL RATIO IMBALANCE (CYLINDER 1)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340. "ECM : Diagnosis Procedure"](#), [EC4-345. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876. "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860. "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320. "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538. "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687. "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465. "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P219D AIR-FUEL RATIO IMBALANCE (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P219D AIR-FUEL RATIO IMBALANCE (CYLINDER 2)

DTC Description

INFOID:000000013290548

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P219D	CYL2 AIR-FUEL RATIO IMBALANCE (Cylinder 2 air-fuel ratio imbalance)	COMMAND POSI NOT REACHABLE	Mixture formation (cylinder 2) is irregular. The commanded position cannot be reached.
		ALGNMNT OR ADJSTMNT IN-CRRCT	Mixture formation (cylinder 2) is irregular. The adaptation or adjustment is incorrect.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013472195

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 – 176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

P219D AIR-FUEL RATIO IMBALANCE (CYLINDER 2)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340, "ECM : Diagnosis Procedure"](#), [EC4-345, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876, "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860, "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320, "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538, "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687, "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465, "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P219E AIR-FUEL RATIO IMBALANCE (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P219E AIR-FUEL RATIO IMBALANCE (CYLINDER 3)

DTC Description

INFOID:000000013290550

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P219E	CYL3 AIR-FUEL RATIO IMBALANCE (Cylinder 3 air-fuel ratio imbalance)	COMMAND POSI NOT REACHABLE	Mixture formation (cylinder 3) is irregular. The commanded position cannot be reached.
		ALGNMNT OR ADJSTMNT IN-CRRCT	Mixture formation (cylinder 3) is irregular. The adaptation or adjustment is incorrect.

POSSIBLE CAUSE

Mixture ataptation

Diagnosis Procedure

INFOID:000000013472196

1.PERFORM ACTIVE TEST

ⓅWith CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 – 176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK DTC

ⓅWith CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3.CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

P219E AIR-FUEL RATIO IMBALANCE (CYLINDER 3)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340. "ECM : Diagnosis Procedure"](#), [EC4-345. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876. "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860. "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320. "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538. "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687. "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465. "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P219F AIR-FUEL RATIO IMBALANCE (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P219F AIR-FUEL RATIO IMBALANCE (CYLINDER 4)

DTC Description

INFOID:000000013290552

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P219F	CYL4 AIR-FUEL RATIO IMBALANCE (Cylinder 4 air-fuel ratio imbalance)	COMMAND POSI NOT REACHABLE	Mixture formation (cylinder 4) is irregular. The commanded position cannot be reached.
		ALGNMNT OR ADJSTMNT IN-CRRCT	Mixture formation (cylinder 4) is irregular. The adaptation or adjustment is incorrect.

POSSIBLE CAUSE

Mixture adaptation

Diagnosis Procedure

INFOID:000000013472197

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 – 176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

Is "CMPLT" displayed on CONSULT screen?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK DTC

With CONSULT

Check DTC in "ENGINE".

Is other DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-146, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK FUEL QUANTITY

CAUTION:

[FL-22, "General Precautions"](#).

Check the fuel quantity.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace fuel. Refer to [FL-30, "Removal and Installation"](#).

P219F AIR-FUEL RATIO IMBALANCE (CYLINDER 4)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

4.CHECK EXHAUST SYSTEM FOR LEAK

Check the exhaust system for leak.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMPONENTS

Check the following.

- Check high pressure fuel circuit. Refer to [EC4-340. "ECM : Diagnosis Procedure"](#), [EC4-345. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
- Check charge air system for leaktightness. Refer to [EC4-876. "Diagnosis Procedure"](#).
- Check A/F sensor. Refer to [EC4-860. "Diagnosis Procedure"](#).
- Check heated oxygen sensor. Refer to [EC4-320. "Diagnosis Procedure"](#).
- Check EVAP purge control valve. Refer to [EC4-538. "Diagnosis Procedure"](#).
- Check Pressure sensor downstream of air filter. Refer to [EC4-687. "Diagnosis Procedure"](#).
- Check Pressure sensor upstream of throttle valve. Refer to [EC4-465. "Diagnosis Procedure"](#).
- Check throttle valve actuator. Refer to [EC4-640. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning component.

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P2227 BAROMETRIC PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2227 BAROMETRIC PRESSURE SENSOR

DTC Description

INFOID:000000013290554

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2227	BAROMETRIC PRESSURE SEN A (Barometric pressure sensor "A" circuit range/performance)	SG BS LVL O-OF RNG/ZR AJST ERR	The barometric pressure sensor has a malfunction. The signal offset is outside the permissible range.
		SIGNAL INVALID	The barometric pressure sensor has a malfunction. There is an incorrect signal.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290555

1. ERASE DTC

Ⓟ With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
- NO >> INSPECTION END

P2228 BAROMETRIC PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2228 BAROMETRIC PRESSURE SENSOR

DTC Description

INFOID:000000013290556

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2228	BAROMETRIC PRESSURE SEN A (Barometric pressure sensor "A" circuit low)	CIRCUIT SHORT TO GROUND	The barometric pressure sensor has a short circuit to ground. There is a short circuit to ground.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290557

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
NO >> INSPECTION END

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P2229 BAROMETRIC PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2229 BAROMETRIC PRESSURE SENSOR

DTC Description

INFOID:000000013290558

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2229	BAROMETRIC PRESSURE SEN A (Barometric pressure sensor "A" circuit high)	CIRCUIT SHORT TO BATTERY	The barometric pressure sensor has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:000000013290559

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).
- NO >> INSPECTION END

P2230 BAROMETRIC PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2230 BAROMETRIC PRESSURE SENSOR

DTC Description

INFOID:0000000013290560

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2230	BAROMETRIC PRESSURE SEN A (Barometric pressure sensor "A" circuit intermittent/erratic)	SIG RTE OF CHNG ABV THRESHLD	The barometric pressure sensor has a sporadic malfunction. The signal change rate is above the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	has a sporadic malfunction. There is a signal above the permissible limit value.

POSSIBLE CAUSE

ECM

Diagnosis Procedure

INFOID:0000000013290561

1. ERASE DTC

With CONSULT

1. Erase the DTC.
2. Turn ignition switch OFF.
3. Start the engine.
4. Check DTC.

Is the DTC detected again?

- YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).
NO >> INSPECTION END

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P2231 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2231 A/F SENSOR

DTC Description

INFOID:000000013290562

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2231	O2 SENSOR B1 SENSOR 1 (O2 sensor signal circuit shorted to heater circuit bank 1 sensor 1)	NO SUBTYPE INFORMATION	The signal line of A/F sensor (cylinder bank 1) and the electrical heater circuit have a short circuit to each other.

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

Diagnosis Procedure

INFOID:000000013476224

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

P2231 A/F SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

YES >> Replace A/F sensor. Refer to [EM-39. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

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P2237 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2237 A/F SENSOR

DTC Description

INFOID:000000013290564

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2237	O2 SENSOR B1 SENSOR 1 (O2 sensor positive current control circuit/open bank 1 sensor 1)	SIG BELOW ALLOWABLE RANGE	The pump current connection of A/F sensor (cylinder bank 1) has an electrical malfunction or open circuit. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	The pump current connection of A/F sensor (cylinder bank 1) has an electrical malfunction or open circuit. There is a signal above the permissible limit value.
		SIGNAL INVALID	The pump current connection of A/F sensor (cylinder bank 1) has an electrical malfunction or open circuit. There is an incorrect signal.

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

Diagnosis Procedure

INFOID:000000013476233

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

P2237 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace A/F sensor. Refer to [EM-39, "Exploded View"](#).
NO >> Repair or replace error-detected parts.

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P2243 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2243 A/F SENSOR

DTC Description

INFOID:000000013290566

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2243	O2 SENSOR B1 SENSOR 1 (O2 sensor reference voltage circuit/open bank 1 sensor 1)	NO SUBTYPE INFORMATION	The reference voltage connection of A/F sensor (cylinder bank 1) has an electrical malfunction or open circuit.

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

Diagnosis Procedure

INFOID:000000013476234

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

P2243 A/F SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace A/F sensor. Refer to [EM-39. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P2251 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2251 A/F SENSOR

DTC Description

INFOID:000000013290568

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2251	O2 SENSOR B1 SENSOR 1 (O2 Sensor negative current control circuit/open bank 1 sensor 1)	NO SUBTYPE INFORMATION	The signal return line connection of A/F sensor (cylinder bank 1) has an electrical malfunction or open circuit.

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

Diagnosis Procedure

INFOID:000000013476235

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

P2251 A/F SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

- YES >> Replace A/F sensor. Refer to [EM-39. "Exploded View"](#).
- NO >> Repair or replace error-detected parts.

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P2263 TC BOOST CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2263 TC BOOST CONTROL SYSTEM

DTC Description

INFOID:000000013290570

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2263	TC/SC BOOST SYSTEM (Turbocharger/Supercharger boost system performance)	SIGNAL AMPLITUDE < MIN	The boost pressure deviates from the specified value. The signal amplitude is less than the minimum amplitude.
		SIG AMPLITUDE > MAX	The boost pressure deviates from the specified value. The signal amplitude is greater than the maximum amplitude.

POSSIBLE CAUSE

- Boost pressure control vacuum transducer
- Foreign matter caught at the pressure sensor upstream of throttle valve.
- Turbocharger
- Exhaust gas pressure
- Charge air leakage

Diagnosis Procedure

INFOID:000000013290571

1. CHECK COMPONENT FUNCTION-1

Ⓟ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "Check boost pressure control".
3. Start the engine and let it idle.
4. Check that the value of "BOOST PRES POSITNR DUTY" is between 87% and 100%.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out No. 98 (15A) fuse.
3. Check that the fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY

1. Reinsert the fuse which pulled out.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Turn ignition switch ON.
4. Check the voltage between boost pressure control vacuum transducer harness connector and ground.

+		-	Voltage
Boost pressure control vacuum transducer			
Connector	Terminal	Ground	Battery voltage
F161	1		

Is the inspection result normal?

- YES >> GO TO 5.

P2263 TC BOOST CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 4.

4. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 (15 A) fuse.
3. Check the continuity between boost pressure control vacuum transducer harness connector and fuse terminal.

+		-	Continuity
Boost pressure control vacuum transducer			
Connector	Terminal		
F161	1	No. 98 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

5. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

Check boost pressure control vacuum transducer. Refer to [EC4-870, "Component Inspection \(Boost Pressure Control Vacuum Transducer\)"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace boost pressure control vacuum transducer.

6. CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and boost pressure control vacuum transducer harness connector.

+		-		Continuity
ECM		Boost pressure control vacuum transducer		
Connector	Terminal	Connector	Terminal	
F150	51	F161	2	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

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

7. CHECK COMPONENT FUNCTION-2

 **With CONSULT**

1. Set the vehicle to the following conditions.

Item	Condition
Engine speed	500 rpm or more
Engine coolant temperature	Less than 75°C (167°F)
Electrical load	OFF

2. Perform Active Test.
3. Check that the turbocharger control rod moves smoothly by visually check.

CAUTION:

Never operate the control rod by hand.

P2263 TC BOOST CONTROL SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

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

8.CHECK VACUUM PRESSURE

1. Turn ignition switch OFF.
2. Disconnect vacuum hose at boost pressure control vacuum transducer.
3. Connect vacuum tester.
4. Start the engine and let it idle.
5. Check that the vacuum pressure is more than -75 kPa (-750 mbar, -0.765 kg/cm², -10.9 psi).

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Check vacuum line leakage, or vacuum pump performance.

9.CHECK COMPONENT

Check the following.

- Pressure sensor upstream of throttle valve (foreign matter is caught.)
- Turbocharger (obstructed movement)
- Exhaust gas pressure
- Charge air leakage
- Divert air switchover valve diaphragm

>> INSPECTION END

Component Inspection (Boost Pressure Control Vacuum Transducer)

INFOID:000000013290572

1.CHECK BOOST PRESSURE CONTROL VACUUM TRANSDUCER

1. Turn ignition switch OFF.
2. Disconnect boost pressure control vacuum transducer harness connector.
3. Check the resistance between boost pressure control vacuum transducer terminals.

Boost pressure control vacuum transducer	Resistance
Terminal	
1 and 2	9.5 – 13.5 Ω

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace boost pressure control vacuum transducer. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

P2270 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2270 O2 SENSOR

DTC Description

INFOID:0000000013290573

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2270	O2 SENSOR B1 SENSOR 2 (O2 sensor signal biased/stuck lean bank 1 sensor 2)	NO SUBTYPE INFORMATION	The signal from oxygen sensor (cylinder bank 1) is shifted towards LEAN.
		SIG RTE OF CHNG BLW THRESHLD	The signal from oxygen sensor (cylinder bank 1) is shifted towards LEAN. The signal change rate is below the permissible limit value.

POSSIBLE CAUSE

- Harness and connectors (Heated oxygen sensor circuit is open or shorted.)
- Heated oxygen sensor

Diagnosis Procedure

INFOID:0000000013290574

1.CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

Is the inspection result normal?

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

2.CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3.CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

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P2270 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P2271 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2271 O2 SENSOR

DTC Description

INFOID:000000013290575

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2271	O2 SENSOR B1 SENSOR 2 (O2 sensor signal biased/stuck rich bank 1 sensor 2)	NO SUBTYPE INFORMATION	The signal from oxygen sensor (cylinder bank 1) is shifted towards RICH.
		SIG RTE OF CHNG BLW THRESHLD	The signal from oxygen sensor (cylinder bank 1) is shifted towards RICH. The signal change rate is below the permissible limit value.

C

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E

POSSIBLE CAUSE

- Harness and connectors (Heated oxygen sensor circuit is open or shorted.)
- Heated oxygen sensor

F

Diagnosis Procedure

INFOID:000000013472198

1.CHECK HEATED OXYGEN SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between heated oxygen sensor harness connector and ground.

G

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+		-	Voltage
Heated oxygen sensor			
Connector	Terminal		
F183	1	Ground	Battery voltage

J

Is the inspection result normal?

K

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

2.CHECK HEATED OXYGEN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between heated oxygen sensor harness connector and fuse terminal.

L

M

+		-	Continuity
Heated oxygen sensor			
Connector	Terminal		
F183	1	#98 fuse terminal	Existed

N

O

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

Is the inspection result normal?

P

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

3.CHECK HEATED OXYGEN SENSOR HEATER CONTROL CIRCUIT

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

P2271 O2 SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
Heated oxygen sensor		ECM		
Connector	Terminal	Connector	Terminal	
F183	2	F150	95	Existed
	3		13	
	4		37	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

YES >> Replace heated oxygen sensor. Refer to [EM-39, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P2279 INTAKE AIR SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2279 INTAKE AIR SYSTEM

DTC Description

INFOID:000000013290577

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2279	INTAKE AIR SYSTEM LEAK (Intake air system leak)	NO SUBTYPE INFORMATION	A leak was detected in the intake air system.

C

D

POSSIBLE CAUSE

Intake air leakage (between air cleaner and turbocharger)

E

Diagnosis Procedure

INFOID:000000013290578

1. CHECK INTAKE AIR LEAK

Check intake air leak as the following part.

- Between air cleaner and turbocharger
- Intake air system
- Charge air system (for leaks and tighten all clamps)
- Crankcase ventilation system

F

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Is the inspection result normal?

H

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

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P2280 INTAKE AIR SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2280 INTAKE AIR SYSTEM

DTC Description

INFOID:000000013290579

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2280	A/FLOW RESTRICTION/AIR LEAK B1 (Air flow restriction/air leak between air filter and MAF bank 1)	NO SUBTYPE INFORMATION	The air mass flow in the intake air system (cylinder bank 1) has a malfunction. The system function is restricted.

POSSIBLE CAUSE

Intake air leakage (between turbocharger and charge air cooler)

Diagnosis Procedure

INFOID:000000013290580

1. CHECK INTAKE AIR LEAK

Check seal boot on charge air pipe between turbocharger and charge air cooler for leaks.

>> INSPECTION END

P2282 INTAKE AIR LEAK

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2282 INTAKE AIR LEAK

DTC Description

INFOID:0000000013521736

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2282	— (—)	NO SUBTYPE INFORMATION	The intake air system is leaky between the throttle valve and intake valve. Leakage or a defective seal was detected.

C

D

POSSIBLE CAUSE

The intake air system is not leaktight.

E

Diagnosis Procedure

INFOID:0000000013521735

1.CHECK INTAKE AIR LEAK

F

Check seal boot on charge air pipe between turbocharger and charge air cooler for leaks.

G

>> INSPECTION END

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P2300 IGNITION COIL CONTROL (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2300 IGNITION COIL CONTROL (CYLINDER 1)

DTC Description

INFOID:000000013290581

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2300	IGNITION COIL A PRIMARY CONT (Ignition coil "A" primary control circuit low)	NO SUBTYPE INFORMATION	The actuation of ignition coil 1 has a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors
(Ignition coil circuit is open or shorted.)
- Ignition coil

Diagnosis Procedure

INFOID:000000013290582

1.INSPECTION START

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0351 [CIRCUIT OPEN].

>> GO TO 2.

2.CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

+		-	Voltage
Ignition coil (No. 1)			
Connector	Terminal		
F179	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

+		-	Continuity
Ignition coil (No. 1)			
Connector	Terminal		
F179	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

P2300 IGNITION COIL CONTROL (CYLINDER 1)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

4.CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 1)			
Connector	Terminal	Ground	Existed
F179	2		
	4		

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Perform trouble diagnosis for ground circuit.

5.CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 1)		
Connector	Terminal	Connector	Terminal	Existed
F150	79	F179	3	

Is the inspection result normal?

- YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

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P2301 IGNITION COIL CONTROL (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2301 IGNITION COIL CONTROL (CYLINDER 1)

DTC Description

INFOID:000000013290583

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2301	IGNITION COIL A PRIMARY CONT (Ignition coil "A" primary control circuit high)	NO SUBTYPE INFORMATION	The actuation of ignition coil 1 has a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

Diagnosis Procedure

INFOID:000000013290584

1.INSPECTION START

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0351 [CIRCUIT OPEN].

>> GO TO 2.

2.CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

+		-	Voltage
Ignition coil (No. 1)			
Connector	Terminal		
F179	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

+		-	Continuity
Ignition coil (No. 1)			
Connector	Terminal		
F179	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

P2301 IGNITION COIL CONTROL (CYLINDER 1)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

4.CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 1)			
Connector	Terminal	Ground	Existed
F179	2		
	4		

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Perform trouble diagnosis for ground circuit.

5.CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 1)		
Connector	Terminal	Connector	Terminal	Existed
F150	79	F179	3	

Is the inspection result normal?

- YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

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P2303 IGNITION COIL CONTROL (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2303 IGNITION COIL CONTROL (CYLINDER 2)

DTC Description

INFOID:000000013290585

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2303	IGNITION COIL B PRIMARY CONT (Ignition coil "B" primary control circuit low)	NO SUBTYPE INFORMATION	The actuation of ignition coil 2 has a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

Diagnosis Procedure

INFOID:000000013290586

1.INSPECTION START

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0352 [CIRCUIT OPEN].

>> GO TO 2.

2.CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

+		-	Voltage
Ignition coil (No. 2)			
Connector	Terminal		
F180	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

+		-	Continuity
Ignition coil (No. 2)			
Connector	Terminal		
F180	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

P2303 IGNITION COIL CONTROL (CYLINDER 2)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4.CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 2)			
Connector	Terminal	Ground	Existed
F180	2		
	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for ground circuit.

5.CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 2)		
Connector	Terminal	Connector	Terminal	Existed
F150	7	F180	3	

Is the inspection result normal?

YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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P2304 IGNITION COIL CONTROL (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2304 IGNITION COIL CONTROL (CYLINDER 2)

DTC Description

INFOID:000000013290587

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2304	IGNITION COIL B PRIMARY CONT (Ignition coil "B" primary control circuit high)	NO SUBTYPE INFORMATION	The actuation of ignition coil 2 has a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

Diagnosis Procedure

INFOID:000000013290588

1.INSPECTION START

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0352 [CIRCUIT OPEN].

>> GO TO 2.

2.CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

+		-	Voltage
Ignition coil (No. 2)			
Connector	Terminal		
F180	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

+		-	Continuity
Ignition coil (No. 2)			
Connector	Terminal		
F180	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

P2304 IGNITION COIL CONTROL (CYLINDER 2)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

4.CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 2)			
Connector	Terminal	Ground	Existed
F180	2		
	4		

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Perform trouble diagnosis for ground circuit.

5.CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 2)		
Connector	Terminal	Connector	Terminal	Existed
F150	7	F180	3	

Is the inspection result normal?

- YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

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P2306 IGNITION COIL CONTROL (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2306 IGNITION COIL CONTROL (CYLINDER 3)

DTC Description

INFOID:000000013290589

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2306	IGNITION COIL C PRIMARY CONT (Ignition coil "C" primary control circuit low)	NO SUBTYPE INFORMATION	The actuation of ignition coil 3 has a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

Diagnosis Procedure

INFOID:000000013290590

1.INSPECTION START

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0353 [CIRCUIT OPEN].

>> GO TO 2.

2.CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

+		-	Voltage
Ignition coil (No. 3)			
Connector	Terminal		
F181	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

+		-	Continuity
Ignition coil (No. 3)			
Connector	Terminal		
F181	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

P2306 IGNITION COIL CONTROL (CYLINDER 3)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

4.CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 3)			
Connector	Terminal	Ground	Existed
F181	2		
	4		

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Perform trouble diagnosis for ground circuit.

5.CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 3)		
Connector	Terminal	Connector	Terminal	Existed
F150	55	F181	3	

Is the inspection result normal?

- YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

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P2307 IGNITION COIL CONTROL (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2307 IGNITION COIL CONTROL (CYLINDER 3)

DTC Description

INFOID:000000013290591

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2307	IGNITION COIL C PRIMARY CONT (Ignition coil "C" primary control circuit high)	NO SUBTYPE INFORMATION	The actuation of ignition coil 3 has a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

Diagnosis Procedure

INFOID:000000013290592

1.INSPECTION START

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0353 [CIRCUIT OPEN].

>> GO TO 2.

2.CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

+		-	Voltage
Ignition coil (No. 3)			
Connector	Terminal		
F181	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

+		-	Continuity
Ignition coil (No. 3)			
Connector	Terminal		
F181	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

P2307 IGNITION COIL CONTROL (CYLINDER 3)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Perform trouble diagnosis for power supply circuit.
- NO >> Repair or replace error-detected parts.

4.CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 3)			
Connector	Terminal	Ground	Existed
F181	2		
	4		

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Perform trouble diagnosis for ground circuit.

5.CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 3)		
Connector	Terminal	Connector	Terminal	Existed
F150	55	F181	3	

Is the inspection result normal?

- YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).
- NO >> Repair or replace error-detected parts.

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P2309 IGNITION COIL CONTROL (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2309 IGNITION COIL CONTROL (CYLINDER 4)

DTC Description

INFOID:000000013290593

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2309	IGNITION COIL D PRIMARY CONT (Ignition coil "D" primary control circuit low)	NO SUBTYPE INFORMATION	The actuation of ignition coil 4 has a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

Diagnosis Procedure

INFOID:000000013290594

1. INSPECTION START

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0354 [CIRCUIT OPEN].

>> GO TO 2.

2. CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

+		-	Voltage
Ignition coil (No. 4)			
Connector	Terminal		
F182	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

+		-	Continuity
Ignition coil (No. 4)			
Connector	Terminal		
F182	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

P2309 IGNITION COIL CONTROL (CYLINDER 4)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

4.CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 4)			
Connector	Terminal	Ground	Existed
F182	2		
	4		

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Perform trouble diagnosis for ground circuit.

5.CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 4)		
Connector	Terminal	Connector	Terminal	Existed
F150	31	F182	3	

Is the inspection result normal?

- YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

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EC4
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P230A AIR-FUEL RATIO IMBALANCE (CYLINDER 1)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P230A AIR-FUEL RATIO IMBALANCE (CYLINDER 1)

DTC Description

INFOID:000000013448406

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P230A	Cylinder 1 Air-Fuel Ratio Imbalance (Cylinder 1 Air-Fuel Ratio Imbalance - Adjustment At Limit During Balance)	[NO SUBTYPE INFORMATION]	The mixture formation (cylinder 1) is erratic and injector injection quantity adjustment is disabled.

POSSIBLE CAUSE

Injector injection quantity adjustment

Diagnosis Procedure

INFOID:000000013448407

1.PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 –176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

>> GO TO 2.

2.CHECK CONDITION

With CONSULT

Check that all items fill each conditions as follows.

Item	Condition
SELF ADJ LWR P/LOAD RANGE	0.85 – 1.15
IN/MNFLD P CRR VL (STRTFD)	Less than 25 hPa (0.025 bar, 0.0255 kg-cm ² , 0.3625 psi)
MASS AIR FLOW CRRCTN VAL	0 – 15 kg/h

>> INSPECTION END

P230B AIR-FUEL RATIO IMBALANCE (CYLINDER 2)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P230B AIR-FUEL RATIO IMBALANCE (CYLINDER 2)

DTC Description

INFOID:000000013448408

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P230B	Cylinder 2 air-fuel ratio imbalance (Cylinder 2 Air-Fuel Ratio Imbalance - Adjustment At Limit During Balance)	[NO SUBTYPE INFORMATION]	The mixture formation (cylinder 2) is erratic and injector injection quantity adjustment is disabled.

C

D

E

POSSIBLE CAUSE

Injector injection quantity adjustment

Diagnosis Procedure

INFOID:000000013448409

F

1.PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

G

H

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 –176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

I

J

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

L

>> GO TO 2.

M

2.CHECK CONDITION

With CONSULT

Check that all items fill each conditions as follows.

N

Item	Condition
SELF ADJ LWR P/LOAD RANGE	0.85 – 1.15
IN/MNFLD P CRR VL (STRTFD)	Less than 25 hPa (0.025 bar, 0.0255 kg-cm ² , 0.3625 psi)
MASS AIR FLOW CRRCTN VAL	0 – 15 kg/h

O

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>> INSPECTION END

P230C AIR-FUEL RATIO IMBALANCE (CYLINDER 3)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P230C AIR-FUEL RATIO IMBALANCE (CYLINDER 3)

DTC Description

INFOID:000000013448410

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P230C	Cylinder 3 Air-Fuel Ratio Imbalance (Cylinder 3 Air-Fuel Ratio Imbalance - Adjustment At Limit During Balance)	[NO SUBTYPE INFORMATION]	The mixture formation (cylinder 3) is erratic and injector injection quantity adjustment is disabled.

POSSIBLE CAUSE

Injector injection quantity adjustment

Diagnosis Procedure

INFOID:000000013448411

1. PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 –176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

>> GO TO 2.

2. CHECK CONDITION

With CONSULT

Check that all items fill each conditions as follows.

Item	Condition
SELF ADJ LWR P/LOAD RANGE	0.85 – 1.15
IN/MNFLD P CRR VL (STRTFD)	Less than 25 hPa (0.025 bar, 0.0255 kg-cm ² , 0.3625 psi)
MASS AIR FLOW CRRCTN VAL	0 – 15 kg/h

>> INSPECTION END

P230D AIR-FUEL RATIO IMBALANCE (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P230D AIR-FUEL RATIO IMBALANCE (CYLINDER 4)

DTC Description

INFOID:000000013448412

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P230D	Cylinder 4 Air-Fuel Ratio Imbalance (Cylinder 4 Air-Fuel Ratio Imbalance - Adjustment At Limit During Balance)	[NO SUBTYPE INFORMATION]	The mixture formation (cylinder 4) is erratic and injector injection quantity adjustment is disabled.

C

D

E

POSSIBLE CAUSE

Injector injection quantity adjustment

Diagnosis Procedure

INFOID:000000013448413

F

1.PERFORM ACTIVE TEST

With CONSULT

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "MIXTURE ADAPTATION".
3. Set the vehicle under the following conditions:

G

H

Monitor item	Condition
ENGINE SPEED	400 – 800 rpm
C/AIR TEMP/S U/STRM THRTL	40 – 80°C (104 –176°F)
ENGINE LOAD	30% or less
COOLANT TEMPERATURE	80°C (176°F) or more
L/CONT STAT U/STRM RH CAT	ACTIVE
GEAR RANGE ENGAGED	P/N

I

J

4. Perform the Active Test.

NOTE:

The test takes up to approximately 60 seconds.

5. Check that "CMPLT" is displayed.

L

>> GO TO 2.

M

2.CHECK CONDITION

With CONSULT

Check that all items fill each conditions as follows.

N

Item	Condition
SELF ADJ LWR P/LOAD RANGE	0.85 – 1.15
IN/MNFLD P CRR VL (STRTFD)	Less than 25 hPa (0.025 bar, 0.0255 kg-cm ² , 0.3625 psi)
MASS AIR FLOW CRRCTN VAL	0 – 15 kg/h

O

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>> INSPECTION END

P2310 IGNITION COIL CONTROL (CYLINDER 4)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2310 IGNITION COIL CONTROL (CYLINDER 4)

DTC Description

INFOID:000000013290595

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2310	IGNITION COIL D PRIMARY CONT (Ignition coil "D" primary control circuit high)	NO SUBTYPE INFORMATION	The actuation of ignition coil 4 has a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Ignition coil circuit is open or shorted.)
- Ignition coil

Diagnosis Procedure

INFOID:000000013290596

1.INSPECTION START

CAUTION:

Refer to [EC4-21, "Precaution for Risk of Explosion and Injury"](#) for work in safety.

NOTE:

When the power supply of ignition coil is abnormal, ECM detects DTC P0354 [CIRCUIT OPEN].

>> GO TO 2.

2.CHECK IGNITION COIL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ignition coil harness connector and ground.

+		-	Voltage
Ignition coil (No. 4)			
Connector	Terminal		
F182	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #99 fuse is not fusing.
3. Check the continuity between ignition coil harness connector and fuse terminal.

+		-	Continuity
Ignition coil (No. 4)			
Connector	Terminal		
F182	1	#99 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

P2310 IGNITION COIL CONTROL (CYLINDER 4)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

4.CHECK IGNITION COIL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between ignition coil harness connector and ground.

+		-	Continuity
Ignition coil (No. 4)			
Connector	Terminal	Ground	Existed
F182	2		
	4		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for ground circuit.

5.CHECK IGNITION COIL CIRCUIT

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

+		-		Continuity
ECM		Ignition coil (No. 4)		
Connector	Terminal	Connector	Terminal	Existed
F150	31	F182	3	

Is the inspection result normal?

YES >> Replace ignition coil. Refer to [EM-62. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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P2336, P2337, P2338, P2339 ENGINE KNOCKING

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2336, P2337, P2338, P2339 ENGINE KNOCKING

DTC Description

INFOID:000000013290597

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2336	CLY1 KNOCK/CMBSTN VIBRTN SEN (Cylinder 1 above knock/combustion vibration sensor threshold)	SIG RTE OF CHNG ABV THRESHLD	The knock limit of cylinder 1 was exceeded. The signal change rate is above the permissible limit value.
P2337	CLY2 KNOCK/CMBSTN VIBRTN SEN (Cylinder 2 above knock/combustion vibration sensor threshold)		The knock limit of cylinder 2 was exceeded. The signal change rate is above the permissible limit value.
P2338	CLY3 KNOCK/CMBSTN VIBRTN SEN (Cylinder 3 above knock/combustion vibration sensor threshold)		The knock limit of cylinder 3 was exceeded. The signal change rate is above the permissible limit value.
P2339	CLY4 KNOCK/CMBSTN VIBRTN SEN (Cylinder 4 above knock/combustion vibration sensor threshold)		The knock limit of cylinder 4 was exceeded. The signal change rate is above the permissible limit value.

POSSIBLE CAUSE

- Correction value of RON (research octane number)
- Fuel quality inferior
- Ignition system
- Knock sensors for tighten too much

Diagnosis Procedure

INFOID:000000013290598

1.CHECK COMPONENT

Check the following:

- Value of RON (research octane number)
- Fuel quality
- Ignition system
- Knock sensors installation condition.

>> INSPECTION END

P2414 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2414 A/F SENSOR

DTC Description

INFOID:0000000013290599

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2414	O2 SENSOR B1 SENSOR 1 (O2 sensor exhaust sample error bank 1 sensor 1)	NO SUBTYPE INFORMATION	The signal of A/F sensor (cylinder bank 1) is implausible.

C

D

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

E

Diagnosis Procedure

INFOID:0000000013476236

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

F

G

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

H

I

Is the inspection result normal?

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

J

K

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

L

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

M

N

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

O

P

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

P2414 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

YES >> Replace A/F sensor. Refer to [EM-39. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P2422 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2422 EVAP CANISTER VENT CONTROL VALVE

DTC Description

INFOID:0000000013523560

DTC DETECTION LOGIC

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	(Trouble diagnosis content)	Malfunction type	
P2422	Evaporation system vent valve (EVAP system vent valve stuck closed)	NO SUBTYPE INFORMATION	The shutoff valve of the activated charcoal canister sticks in the closed position.

POSSIBLE CAUSE

- Harness or connectors (EVAP canister vent control valve circuit)
- EVAP canister vent control valve
- EVAP canister
- EVAP line

Diagnosis Procedure

INFOID:0000000013523561

1. CHECK COMPONENT FUNCTION

With CONSULT

1. Turn ignition switch ON. (Engine stopped.)
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK PURGING SWITCHOVER VALVE".
3. Perform the Active Test.
4. Check that the indicated value of "PWR CSMN (PURG SWOVR/V)" is between 300 – 600 mA.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the fuse after repairing the applicable circuit.

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP canister vent control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP canister vent control valve harness connector and ground.

+		-	Voltage
Connector	Terminal		
B131	1	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.

P2422 EVAP CANISTER VENT CONTROL VALVE

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between EVAP canister vent control valve harness connector and fuse terminal.

+		-	Continuity
EVAP canister vent control valve			
Connector	Terminal		
B131	1	No. 98 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

5.CHECK EVAP CANISTER VENT CONTROL VALVE

1. Clean the air passage of EVAP canister vent control valve using an air blower.
2. Check air passage continuity and operation delay time under the following conditions.
Make sure that new O-ring is installed properly.

Condition	Air passage continuity
12 V direct current supply between terminals 1 and 2	Not existed
OFF	Existed

Operation takes less than 1 second.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace EVAP canister vent control valve. Refer to [EC4-25. "ENGINE CONTROL SYSTEM : Component Parts Location"](#).

6.CHECK EVAP CANISTER VENT CONTROL VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP canister vent control valve harness connector.

+		-		Continuity
ECM		EVAP canister vent control valve		
Connector	Terminal	Connector	Terminal	
E200	152	B131	2	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK EVAP PURGE CIRCUIT LEAKAGE

Check leakage of the following components.

- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection
- EVAP canister for damage
- EVAP canister vent control valve (mechanical malfunction)

>> INSPECTION END

P24D6 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P24D6 EVAP CONTROL SYSTEM PRESSURE SENSOR

DTC Description

INFOID:000000013521738

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P24D6	EVAP system pressure sensor/ sw B (EVAP system pressure sensor/ switch B circuit range/perfor- mance)	GENERAL ELEC MAL- FUNCTN	Pressure sensor/pressure switch 2 of the evaporative emission control system has a malfunction. There is a general signal fault.
		CIRC VOLT BELOW THRESHOLD	Pressure sensor/pressure switch 2 of the evaporative emission control system has a malfunction. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	Pressure sensor/pressure switch 2 of the evaporative emission control system has a malfunction. The limit value for electrical voltage has been exceeded.
		SIG RTE OF CHNG BLW THRESHLD Signal	Pressure sensor/pressure switch 2 of the evaporative emission control system has a malfunction. The signal change rate is below the permissible limit value.
		SG BS LVL O-OF RNG/ZR AJST FLR	Pressure sensor/pressure switch 2 of the evaporative emission control system has a malfunction. The signal offset is outside the permissible range.
		SIGNAL STUCK IN RANGE	Pressure sensor/pressure switch 2 of the evaporative emission control system has a malfunction. There is no signal change.

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POSSIBLE CAUSE

- Harness and connectors (EVAP control system pressure sensor)
- EVAP control system pressure sensor

J

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Diagnosis Procedure

INFOID:000000013521739

1.COMONENT FUNCTION CHECK

L

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIV TEST" >> "Check purging pressure control".
3. Select "OPEN".
4. Check that the indicated value of purge pressure sensor is between (-)1 – (+)1 kPa [(-)0.01 – (+)0.01 bar, (-)0.01 – (+)0.01 kg-cm², (-)0.145 – (+)0.145 psi]

M

N

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

O

2.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP control system pressure sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP control system pressure sensor harness connector and ground.

P

P24D6 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Voltage
EVAP control system pressure sensor			
Connector	Terminal	Ground	Battery voltage
F154	3		

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP control system pressure sensor harness connector.

+		-		Continuity
ECM		EVAP control system pressure sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	16	F154	3	

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP control system pressure sensor harness connector.

+		-		Continuity
ECM		EVAP control system pressure sensor		
Connector	Terminal	Connector	Terminal	Existed
F150	36	F154	1	
	11		2	

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

Is the inspection result normal?

YES >> Replace EVAP control system pressure sensor. Refer to [FL-40. "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P24D7 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P24D7 EVAP CONTROL SYSTEM PRESSURE SENSOR

DTC Description

INFOID:000000013521740

DTC DETECTION LOGIC

A
EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P24D7	EVAP system pressure sen/sw B (EVAP system pressure sensor/switch B circuit low)	CIRCUIT SHORT TO GROUND	Pressure sensor/pressure switch 2 of the evaporative emission control system has a short circuit to ground. There is a short circuit to ground.

POSSIBLE CAUSE

- Harness and connectors (EVAP control system pressure sensor)
- EVAP control system pressure sensor

Diagnosis Procedure

INFOID:000000013521741

1. COMPONENT FUNCTION CHECK

Ⓜ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIV TEST" >> "Check purging pressure control".
3. Select "OPEN".
4. Check that the indicated value of purge pressure sensor is between (-)1 – (+)1 kPa [(-)0.01 – (+)0.01 bar, (-)0.01 – (+)0.01 kg-cm², (-)0.145 – (+)0.145 psi]

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect EVAP control system pressure sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP control system pressure sensor harness connector and ground.

+		-	Voltage
EVAP control system pressure sensor			
Connector	Terminal	Ground	Battery voltage
F154	3		

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP control system pressure sensor harness connector.

P24D7 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		EVAP control system pressure sensor		
Connector	Terminal	Connector	Terminal	
F150	16	F154	3	Existed

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP control system pressure sensor harness connector.

+		-		Continuity
ECM		EVAP control system pressure sensor		
Connector	Terminal	Connector	Terminal	
F150	36	F154	1	Existed
	11		2	

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

Is the inspection result normal?

YES >> Replace EVAP control system pressure sensor. Refer to [FL-40, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P24D8 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P24D8 EVAP CONTROL SYSTEM PRESSURE SENSOR

DTC Description

INFOID:0000000013521742

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P24D8	EVAP pressure sensor/switch B (EVAP system pressure sensor/switch B circuit high)	CIRCUIT SHORT TO BATTERY	Pressure sensor/pressure switch 2 of the evaporative emission control system has a short circuit to positive. There is a short circuit to positive.

C

D

POSSIBLE CAUSE

- Harness and connectors (EVAP control system pressure sensor)
- EVAP control system pressure sensor

E

Diagnosis Procedure

INFOID:0000000013521743

F

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "ENGINE" >> "ACTIV TEST" >> "Check purging pressure control".
3. Select "OPEN".
4. Check that the indicated value of purge pressure sensor is between (-)1 – (+)1 kPa [(-)0.01 – (+)0.01 bar, (-)0.01 – (+)0.01 kg-cm², (-)0.145 – (+)0.145 psi]

G

H

Is the inspection result normal?

I

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY

J

1. Insert the fuse which pulled out.
2. Disconnect EVAP control system pressure sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP control system pressure sensor harness connector and ground.

K

+		-	Voltage
Connector	Terminal		
F154	3	Ground	Battery voltage

L

M

Is the inspection result normal?

N

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

O

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP control system pressure sensor harness connector.

P

P24D8 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
ECM		EVAP control system pressure sensor		
Connector	Terminal	Connector	Terminal	
F150	16	F154	3	Existed

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

Is the inspection result normal?

YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and EVAP control system pressure sensor harness connector.

+		-		Continuity
ECM		EVAP control system pressure sensor		
Connector	Terminal	Connector	Terminal	
F150	36	F154	1	Existed
	11		2	

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

Is the inspection result normal?

YES >> Replace EVAP control system pressure sensor. Refer to [FL-40, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P2505 ECM POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2505 ECM POWER SUPPLY

DTC Description

INFOID:0000000013290601

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2505	ECM/PCM POWER INLET SIGNAL (ECM/PCM power input signal)	NO SUBTYPE INFORMATION	The power supply at the input of ECM has a malfunction.
		CIRCUIT OPEN	The power supply at the input of ECM has a malfunction. There is an open circuit.
		CIRC VOLT BELOW THRESHOLD	The power supply at the input of ECM has a malfunction. The limit value for electrical voltage has not been attained.
		CIRC VOLT ABOVE THRESHOLD	The power supply at the input of ECM has a malfunction. The limit value for electrical voltage has been exceeded.
		CIRC VOLTAGE OUT OF RANGE	The power supply at the input of ECM has a malfunction. The voltage value is outside the permissible range.

POSSIBLE CAUSE

- Harness or connectors (ECM power supply circuit)
- Charging system (ECM power supply voltage is 19 V or more.)

Diagnosis Procedure

INFOID:0000000013290602

1. CHECK CHARGING SYSTEM

Check charging system. Refer to [CHG-14. "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#), [CHG-18. "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

Is the inspection result normal?

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

2. CHECK ECM POWER SUPPLY AND GROUND CIRCUIT

Check ECM power supply and ground circuit. Refer to [EC4-233. "ECM : Diagnosis Procedure"](#).

Is the inspection result normal?

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

P250B OIL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P250B OIL LEVEL SENSOR

Diagnosis Description

INFOID:000000013290603

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P250B	ENGINE OIL LEVEL SENSOR (Engine oil level sensor circuit range/performance)	CALIB/PRMTER MEMORY ERROR	The engine oil level switch has a malfunction. There is an error in the calibration or parameterization memory.
		PFM/INCORRECT OPERATN	The engine oil level switch has a malfunction. The function or the instruction has malfunction.
		CMPNENT INTERNAL MLFNCTN	The engine oil level switch has a malfunction. There is an internal component malfunction.

POSSIBLE CAUSE

- Harness and connector
(Engine oil level switch circuit is open or shorted.)
- Engine oil level switch

Diagnosis Procedure

INFOID:000000013290604

1. CHECK ENGINE OIL LEVEL SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Disconnect engine oil level switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between engine oil level switch harness connector and ground.

+		-	Voltage
Engine oil level switch			
Connector	Terminal	Ground	Battery voltage
F175	2		

Is the inspection result normal?

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

2. CHECK ENGINE OIL LEVEL SWITCH SIGNAL CIRCUIT

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

+		-		Continuity
Engine oil level switch		ECM		
Connector	Terminal	Connector	Terminal	Existed
F175	2	F150	82	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

3. CHECK ENGINE OIL LEVEL SWITCH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between engine oil level switch harness connector and ground.

P250B OIL LEVEL SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Continuity
Engine oil level switch			
Connector	Terminal		
F175	1	Ground	Existed

A

EC4

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

C

4.CHECK ENGINE OIL LEVEL SWITCH

Check engine oil level switch. Refer to [EC4-911, "Component Inspection \(Engine Oil Level Switch\)"](#).

D

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine oil level switch. Refer to [LU-16, "Removal and Installation"](#).

E

Component Inspection (Engine Oil Level Switch)

INFOID:000000013290605

1.CHECK ENGINE OIL LEVEL SWITCH

F

1. Turn ignition switch OFF.
2. Disconnect engine oil level switch harness connector.
3. Check the resistance between engine oil level switch terminals.

G

Engine oil level switch	Condition	Resistance
Terminal		
1 and 2	Engine oil level: Filled enough	0 Ω

H

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine oil level switch. Refer to [LU-16, "Removal and Installation"](#).

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P250E ENGINE OIL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P250E ENGINE OIL LEVEL SENSOR

Diagnosis Description

INFOID:000000013290606

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P250E	ENGINE OIL LEVEL SENSOR (Engine oil level sensor circuit intermittent/erratic)	SIGNAL STUCK IN RANGE	The oil level sensor has a sporadic malfunction. There is no signal change.
		CALIB/PRMTER MEMORY ERROR	The oil level sensor has a sporadic malfunction. There is an error in the calibration or parameterization memory.

POSSIBLE CAUSE

- Harness and connector (Engine oil level switch circuit is open or shorted.)
- Engine oil level switch

Diagnosis Procedure

INFOID:000000013472265

1.CHECK ENGINE OIL LEVEL SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Disconnect engine oil level switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between engine oil level switch harness connector and ground.

+		-	Voltage
Engine oil level switch			
Connector	Terminal	Ground	Battery voltage
F175	2		

Is the inspection result normal?

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

2.CHECK ENGINE OIL LEVEL SWITCH SIGNAL CIRCUIT

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

+		-		Continuity
Engine oil level switch		ECM		
Connector	Terminal	Connector	Terminal	Existed
F175	2	F150	82	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check ECM power supply circuit. Refer to [EC4-233, "ECM : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

3.CHECK ENGINE OIL LEVEL SWITCH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between engine oil level switch harness connector and ground.

P250E ENGINE OIL LEVEL SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Continuity
Engine oil level switch			
Connector	Terminal		
F175	1	Ground	Existed

A

EC4

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

C

4.CHECK ENGINE OIL LEVEL SWITCH

Check engine oil level switch. Refer to [EC4-913, "Component Inspection \(Engine Oil Level Switch\)"](#).

D

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine oil level switch. Refer to [LU-16, "Removal and Installation"](#).

E

Component Inspection (Engine Oil Level Switch)

INFOID:0000000013472266

F

1.CHECK ENGINE OIL LEVEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect engine oil level switch harness connector.
3. Check the resistance between engine oil level switch terminals.

G

Engine oil level switch	Condition	Resistance
Terminal		
1 and 2	Engine oil level: Filled enough	0 Ω

H

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine oil level switch. Refer to [LU-16, "Removal and Installation"](#).

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P252B**Diagnosis Description***INFOID:000000013290609*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P2539 FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2539 FUEL PRESSURE SENSOR

ECM

ECM : DTC Description

INFOID:0000000013290610

A

EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2539	LOW PRESS FUEL SYSTEM SENSOR (Low pressure fuel system sensor circuit)	NO SUBTYPE INFORMATION	The pressure sensor of the low-pressure fuel circuit has a malfunction.

C

D

E

POSSIBLE CAUSE

Low pressure fuel control system

ECM : Diagnosis Procedure

INFOID:0000000013290611

1. CHECK DTC IN FPCM

With CONSULT

Check DTC in "FPCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-159, "DTC Index"](#).
- NO >> INSPECTION END

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : DTC Description

INFOID:0000000013290612

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2539	LOW PRESS FUEL SYSTEM SENSOR (Low pressure fuel system sensor circuit)	NO SUBTYPE INFO	<ul style="list-style-type: none">• Fuel pressure sensor power supply voltage is less than 4 V.• Fuel pressure sensor power supply voltage is more than 6 V.

J

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POSSIBLE CAUSE

- Harness and connectors
(Fuel pressure sensor circuit is open or shorted.)
- Fuel pressure sensor

FAIL-SAFE

Open loop pressure control

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and let it idle at least 10 seconds.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check self-diagnostic result of "FPCM".

Is the inspection result normal?

- YES >> INSPECTION END

N

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P2539 FUEL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Proceed to [EC4-916. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

INFOID:000000013290613

1. COMPONENT FUNCTION CHECK

④ With CONSULT

1. Turn ignition switch OFF.
2. Start the engine and let it idle.
3. On CONSULT screen, select "FPCM" >> "DATA MONITOR" >> "FUEL PRESSURE".
4. Check that the indicated value is between 400 kPa (4 bar, 4.08 kg/cm², 58 psi) and 670 kPa (6.7 bar, 6.834 kg/cm², 97.15 psi).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK FUEL PRESSURE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect fuel pressure sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure sensor harness connector terminals.

Fuel pressure sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
E199	1	2	5 V

Is the inspection result normal?

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

3. CHECK FUEL PRESSURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pressure sensor harness connector.
3. Check the continuity between FPCM harness connector and fuel pressure sensor harness connector.

+		-		Continuity
FPCM		Fuel pressure sensor		
Connector	Terminal	Connector	Terminal	
B134	6	E199	2	Existed
	8		1	

4. Also check harness for short to ground.

Is the inspection result normal?

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

4. CHECK FPCM POWER SUPPLY AND GROUND CIRCUIT

Check FPCM power supply and ground circuit. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Replace FPCM. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK FUEL PRESSURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.

P2539 FUEL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect FPCM harness connector and fuel pressure sensor harness connector.
3. Check the continuity between FPCM harness connector and fuel pressure sensor harness connector.

+		-		Continuity
FPCM		Fuel pressure sensor		
Connector	Terminal	Connector	Terminal	
B134	7	E199	3	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Replace fuel pressure sensor.
NO >> Repair or replace error-detected parts.

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P2540 FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2540 FUEL PRESSURE SENSOR

ECM

ECM : DTC Description

INFOID:000000013290614

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2540	LOW PRESS FUEL SYSTEM SENSOR (Low pressure fuel system sensor circuit range/performance)	NO SUBTYPE INFORMATION	The signal for the pressure sensor of the low-pressure fuel circuit is implausible.

POSSIBLE CAUSE

Low pressure fuel control system

ECM : Diagnosis Procedure

INFOID:000000013290615

1. CHECK DTC IN FPCM

With CONSULT

Check DTC in "FPCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-159, "DTC Index"](#).
- NO >> INSPECTION END

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : DTC Description

INFOID:000000013290616

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2540	LOW PRESS FUEL SYSTEM SENSOR (Low pressure fuel system sensor circuit range/performance)	NO SUBTYPE INFO	The signal for the pressure sensor of the low-pressure fuel circuit is implausible.

POSSIBLE CAUSE

- Harness and connectors
(Fuel pressure sensor circuit is open or shorted.)
- Fuel pressure sensor

FAIL-SAFE

Open loop pressure control

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start the engine and let it idle at least 30 seconds.
3. Check self-diagnostic result of "FPCM".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to [EC4-919, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

P2540 FUEL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

INFOID:000000013290617

1. COMPONENT FUNCTION CHECK

④ With CONSULT

1. Turn ignition switch OFF.
2. Start the engine and let it idle.
3. On CONSULT screen, select "FPCM" >> "DATA MONITOR" >> "FUEL PRESSURE".
4. Check that the indicated value is between 400 kPa (4 bar, 4.08 kg/cm², 58 psi) and 670 kPa (6.7 bar, 6.834 kg/cm², 97.15 psi).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK FUEL PRESSURE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect fuel pressure sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure sensor harness connector terminals.

Fuel pressure sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
E199	1	2	5 V

Is the inspection result normal?

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

3. CHECK FUEL PRESSURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pressure sensor harness connector.
3. Check the continuity between FPCM harness connector and fuel pressure sensor harness connector.

+		-		Continuity
FPCM		Fuel pressure sensor		
Connector	Terminal	Connector	Terminal	
B134	6	E199	2	Existed
	8		1	

4. Also check harness for short to ground.

Is the inspection result normal?

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

4. CHECK FPCM POWER SUPPLY AND GROUND CIRCUIT

Check FPCM power supply and ground circuit. Refer to [EC4-237, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Replace FPCM. Refer to [EC4-237, "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK FUEL PRESSURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pressure sensor harness connector.
3. Check the continuity between FPCM harness connector and fuel pressure sensor harness connector.

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P2540 FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
FPCM		Fuel pressure sensor		
Connector	Terminal	Connector	Terminal	
B134	7	E199	3	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Replace fuel pressure sensor.

NO >> Repair or replace error-detected parts.

P2541 FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2541 FUEL PRESSURE SENSOR

ECM

ECM : DTC Description

INFOID:0000000013290618

A

EC4

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2541	LOW PRESS FUEL SYSTEM SENSOR (Low pressure fuel system sensor circuit low)	NO SUBTYPE INFORMATION	The pressure sensor of the low-pressure fuel circuit has a short circuit to ground.

C

D

E

POSSIBLE CAUSE

Low pressure fuel control system

ECM : Diagnosis Procedure

INFOID:0000000013290619

1. CHECK DTC IN FPCM

With CONSULT
Check DTC in "FPCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-159, "DTC Index"](#).
- NO >> INSPECTION END

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : DTC Description

INFOID:0000000013290620

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2541	LOW PRESS FUEL SYSTEM SENSOR (Low pressure fuel system sensor circuit low)	NO SUBTYPE INFO	Fuel pressure sensor signal voltage is less than 0.3 V.

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POSSIBLE CAUSE

- Harness and connectors
(Fuel pressure sensor circuit is open or shorted.)
- Fuel pressure sensor

FAIL-SAFE

Open loop pressure control

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- With CONSULT**
1. Start the engine and let it idle at least 10 seconds.
 2. Turn ignition switch OFF and wait at least 10 seconds.
 3. Turn ignition switch ON.
 4. Check self-diagnostic result of "FPCM".

Is the inspection result normal?

- YES >> INSPECTION END

N

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P2541 FUEL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Proceed to [EC4-922. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

INFOID:000000013290621

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Turn ignition switch OFF.
2. Start the engine and let it idle.
3. On CONSULT screen, select "FPCM" >> "DATA MONITOR" >> "FUEL PRESSURE".
4. Check that the indicated value is between 400 kPa (4 bar, 4.08 kg/cm², 58 psi) and 670 kPa (6.7 bar, 6.834 kg/cm², 97.15 psi).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK FUEL PRESSURE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect fuel pressure sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure sensor harness connector terminals.

Fuel pressure sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
E199	1	2	5 V

Is the inspection result normal?

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

3. CHECK FUEL PRESSURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pressure sensor harness connector.
3. Check the continuity between FPCM harness connector and fuel pressure sensor harness connector.

+		-		Continuity
FPCM		Fuel pressure sensor		
Connector	Terminal	Connector	Terminal	
B134	6	E199	2	Existed
	8		1	

4. Also check harness for short to ground.

Is the inspection result normal?

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

4. CHECK FPCM POWER SUPPLY AND GROUND CIRCUIT

Check FPCM power supply and ground circuit. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Replace FPCM. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK FUEL PRESSURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.

P2541 FUEL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect FPCM harness connector and fuel pressure sensor harness connector.
3. Check the continuity between FPCM harness connector and fuel pressure sensor harness connector.

+		-		Continuity
FPCM		Fuel pressure sensor		
Connector	Terminal	Connector	Terminal	
B134	7	E199	3	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Replace fuel pressure sensor.
NO >> Repair or replace error-detected parts.

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P2542 FUEL PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2542 FUEL PRESSURE SENSOR

ECM

ECM : DTC Description

INFOID:000000013290622

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2542	LOW PRESS FUEL SYSTEM SENSOR (Low pressure fuel system sensor circuit high)	NO SUBTYPE INFORMATION	The pressure sensor of the low-pressure fuel circuit has a short circuit to positive.

POSSIBLE CAUSE

Low pressure fuel control system

ECM : Diagnosis Procedure

INFOID:000000013290623

1. CHECK DTC IN FPCM

With CONSULT

Check DTC in "FPCM".

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC. Refer to [EC4-159, "DTC Index"](#).
- NO >> INSPECTION END

FUEL PUMP CONTROL MODULE (FPCM)

FUEL PUMP CONTROL MODULE (FPCM) : DTC Description

INFOID:000000013290624

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2542	LOW PRESS FUEL SYSTEM SENSOR (Low pressure fuel system sensor circuit high)	NO SUBTYPE INFO	Fuel pressure sensor signal voltage is more than 4.7 V.

POSSIBLE CAUSE

- Harness and connectors
(Fuel pressure sensor circuit is open or shorted.)
- Fuel pressure sensor

FAIL-SAFE

Open loop pressure control

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start the engine and let it idle at least 10 seconds.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check self-diagnostic result of "FPCM".

Is the inspection result normal?

- YES >> INSPECTION END

P2542 FUEL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Proceed to [EC4-925. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

FUEL PUMP CONTROL MODULE (FPCM) : Diagnosis Procedure

INFOID:000000013290625

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Turn ignition switch OFF.
2. Start the engine and let it idle.
3. On CONSULT screen, select "FPCM" >> "DATA MONITOR" >> "FUEL PRESSURE".
4. Check that the indicated value is between 400 kPa (4 bar, 4.08 kg/cm², 58 psi) and 670 kPa (6.7 bar, 6.834 kg/cm², 97.15 psi).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK FUEL PRESSURE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect fuel pressure sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel pressure sensor harness connector terminals.

Fuel pressure sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
E199	1	2	5 V

Is the inspection result normal?

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

3. CHECK FUEL PRESSURE SENSOR POWER SUPPLY AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect FPCM harness connector and fuel pressure sensor harness connector.
3. Check the continuity between FPCM harness connector and fuel pressure sensor harness connector.

+		-		Continuity
FPCM		Fuel pressure sensor		
Connector	Terminal	Connector	Terminal	
B134	6	E199	2	Existed
	8		1	

4. Also check harness for short to ground.

Is the inspection result normal?

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

4. CHECK FPCM POWER SUPPLY AND GROUND CIRCUIT

Check FPCM power supply and ground circuit. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Replace FPCM. Refer to [EC4-237. "FUEL PUMP CONTROL MODULE \(FPCM\) : Diagnosis Procedure"](#).
NO >> Repair or replace error-detected parts.

5. CHECK FUEL PRESSURE SENSOR SIGNAL CIRCUIT

1. Turn ignition switch OFF.

P2542 FUEL PRESSURE SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect FPCM harness connector and fuel pressure sensor harness connector.
3. Check the continuity between FPCM harness connector and fuel pressure sensor harness connector.

+		-		Continuity
FPCM		Fuel pressure sensor		
Connector	Terminal	Connector	Terminal	
B134	7	E199	3	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Replace fuel pressure sensor.
NO >> Repair or replace error-detected parts.

P257D ENGINE HOOD SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P257D ENGINE HOOD SWITCH

DTC Description

INFOID:0000000013290626

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P257D	ENGINE HOOD SWITCH (Engine hood switch circuit range/performance)	NO SUBTYPE INFORMATION	ECM detects hood switch signal malfunction.

POSSIBLE CAUSE

- Harness or connectors (Hood switch circuit is open or shorted.)
- Hood switch

Diagnosis Procedure

INFOID:0000000013290627

1. COMPONENT FUNCTION CHECK

Ⓜ With CONSULT

1. Turn ignition switch ON.
2. On CONSULT screen, select "IPDM E/R" >> "DATA MONITOR" >> "HOOD SW".
3. Check indication ad per the following conditions.

Monitor item	Condition		Indication
HOOD SW	Engine hood	Close	Off
		Open	On

Is the inspection result normal?

- YES >> INSPECTION END
NO >> GO TO 2.

2. CHECK IPDM E/R OUTPUT

1. Open the engine hood.
2. Check the voltage between IPDM E/R harness connector and ground.

+		-	Voltage
IPDM E/R			
Connector	Terminal		
E126	96	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Check IPDM E/R power supply and ground circuit. Refer to [PCS-43, "Diagnosis Procedure"](#).

3. CHECK HOOD SWITCH SIGNAL CIRCUIT-1

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector.
3. Set the hood lock to LOCK position.
4. Check the continuity between IPDM E/R harness connector and ground.

P257D ENGINE HOOD SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Continuity
IPDM E/R			
Connector	Terminal	Ground	Existed
E126	96		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

NO >> GO TO 4.

4. CHECK HOOD SWITCH SIGNAL CIRCUIT-2

1. Disconnect hood switch harness connector.
2. Check the continuity between IPDM E/R harness connector and hood switch harness connector.

+		-		Continuity
IPDM E/R		Hood switch		
Connector	Terminal	Connector	Terminal	Existed
E126	96	E77	2	

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5. CHECK HOOD SWITCH GROUND CIRCUIT

Check the continuity between hood switch harness connector and ground.

+		-	Continuity
Hood switch			
Connector	Terminal	Ground	Existed
E77	1		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6. COMPONENT INSPECTION

Check the continuity between hood switch terminals as per the following conditions.

Hood switch		Condition	Continuity
+	-		
Terminal		hood lock	Existed
1	2		
		UNLOCK	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace hood lock. Refer to [DLK-227, "Exploded View"](#).

P2600 COOLANT PUMP

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2600 COOLANT PUMP

DTC Description

INFOID:000000013290628

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2600	COOLANT PUMP A (Coolant pump "A" circuit/open)	CIRCUIT OPEN	The output for the coolant pump has an electrical malfunction or an open circuit. There is an open circuit.

POSSIBLE CAUSE

- Harness or connectors (Coolant pump switchover valve circuit)
- Coolant pump switchover valve

Diagnosis Procedure

INFOID:000000013290629

1. PRECONDITIONING

Set the vehicle to the following conditions.

- Check that the engine coolant is filled enough.
- Air conditioning system is turned OFF.
- Coolant temperature is between 65°C (149°F) and 85°C (185°F).

>> GO TO 2.

2. CHECK COMPONENT FUNCTION

With CONSULT

NOTE:

Perform this procedure at room temperature.

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK COOLANT PUMP SWICHOVER VALVE".
3. Perform the Active Test.
4. Listen to the coolant pump switchover valve operation sound using suitable tool.
5. Check that the coolant pump vacuum actuator linkage moves.

Is the inspection result normal?

YES >> INSPECTION END

NO-1 (coolant pump switchover valve is not activated.)>>GO TO 3.

NO-2 (coolant vacuum actuator linkage is not moved.)>>GO TO 7.

3. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repairing the applicable circuit.

4. CHECK COOLANT PUMP SWICHOVER VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect coolant pump switchover valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between coolant pump switchover valve harness connector and ground.

P2600 COOLANT PUMP

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Voltage
Coolant pump switchover valve			
Connector	Terminal	Ground	Battery voltage
F152	1		

Is the inspection result normal?

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

5. CHECK COOLANT PUMP SWITCHOVER VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.
3. Check the continuity between coolant pump switchover valve harness connector and fuse terminal.

+		-	Continuity
Coolant pump switchover valve			
Connector	Terminal	No. 98 fuse terminal	Existed
F152	1		

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
- NO >> Repair or replace error-detected parts.

6. CHECK COOLANT PUMP SWITCHOVER VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and coolant pump switchover valve harness connector.

+		-		Continuity
ECM		Coolant pump switchover valve		
Connector	Terminal	Connector	Terminal	Existed
F150	54	F152	2	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Replace coolant pump switchover valve. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).
- NO >> Repair or replace error-detected parts.

7. CHECK VACUUM PRESSURE

1. Turn ignition switch OFF.
2. Disconnect vacuum hose at boost pressure control vacuum transducer.
3. Connect vacuum tester.
4. Start the engine and let it idle.
5. Check that the vacuum pressure is more than -75 kPa (-750 mbar, -0.765 kg/cm², -10.9 psi).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Check vacuum line leakage, or vacuum pump performance.

P2602 COOLANT PUMP

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2602 COOLANT PUMP

DTC Description

INFOID:000000013290630

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2602	COOLANT PUMP A (Coolant pump "A" circuit low)	CIRCUIT SHORT TO GROUND	The output for the coolant pump has a short circuit to ground. There is a short circuit to ground.

POSSIBLE CAUSE

- Harness or connectors (Coolant pump switchover valve circuit)
- Coolant pump switchover valve

Diagnosis Procedure

INFOID:000000013472267

1. PRECONDITIONING

Set the vehicle to the following conditions.

- Check that the engine coolant is filled enough.
- Air conditioning system is turned OFF.
- Coolant temperature is between 65°C (149°F) and 85°C (185°F).

>> GO TO 2.

2. CHECK COMPONENT FUNCTION

With CONSULT

NOTE:

Perform this procedure at room temperature.

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK COOLANT PUMP SWICHOVER VALVE".
3. Perform the Active Test.
4. Listen to the coolant pump switchover valve operation sound using suitable tool.
5. Check that the coolant pump vacuum actuator linkage moves.

Is the inspection result normal?

YES >> INSPECTION END

NO-1 (coolant pump switchover valve is not activated.)>>GO TO 3.

NO-2 (coolant vacuum actuator linkage is not moved.)>>GO TO 7.

3. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repairing the applicable circuit.

4. CHECK COOLANT PUMP SWICHOVER VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect coolant pump switchover valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between coolant pump switchover valve harness connector and ground.

P2602 COOLANT PUMP

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Voltage
Coolant pump switchover valve			
Connector	Terminal		
F152	1	Ground	Battery voltage

Is the inspection result normal?

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

5. CHECK COOLANT PUMP SWITCHOVER VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.
3. Check the continuity between coolant pump switchover valve harness connector and fuse terminal.

+		-	Continuity
Coolant pump switchover valve			
Connector	Terminal		
F152	1	No. 98 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
- NO >> Repair or replace error-detected parts.

6. CHECK COOLANT PUMP SWITCHOVER VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and coolant pump switchover valve harness connector.

+		-		Continuity
ECM		Coolant pump switchover valve		
Connector	Terminal	Connector	Terminal	
F150	54	F152	2	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Replace coolant pump switchover valve. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).
- NO >> Repair or replace error-detected parts.

7. CHECK VACUUM PRESSURE

1. Turn ignition switch OFF.
2. Disconnect vacuum hose at boost pressure control vacuum transducer.
3. Connect vacuum tester.
4. Start the engine and let it idle.
5. Check that the vacuum pressure is more than -75 kPa (-750 mbar, -0.765 kg/cm², -10.9 psi).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Check vacuum line leakage, or vacuum pump performance.

P2603 COOLANT PUMP

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2603 COOLANT PUMP

DTC Description

INFOID:000000013290632

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2603	COOLANT PUMP A (Coolant pump "A" circuit high)	CIRCUIT SHORT TO BATTERY	The output for the coolant pump has a short circuit to positive. There is a short circuit to positive.

POSSIBLE CAUSE

- Harness or connectors (Coolant pump switchover valve circuit)
- Coolant pump switchover valve

Diagnosis Procedure

INFOID:000000013472268

1. PRECONDITIONING

Set the vehicle to the following conditions.

- Check that the engine coolant is filled enough.
- Air conditioning system is turned OFF.
- Coolant temperature is between 65°C (149°F) and 85°C (185°F).

>> GO TO 2.

2. CHECK COMPONENT FUNCTION

With CONSULT

NOTE:

Perform this procedure at room temperature.

1. Start the engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "ACTIVE TEST" >> "CHECK COOLANT PUMP SWICHOVER VALVE".
3. Perform the Active Test.
4. Listen to the coolant pump switchover valve operation sound using suitable tool.
5. Check that the coolant pump vacuum actuator linkage moves.

Is the inspection result normal?

YES >> INSPECTION END

NO-1 (coolant pump switchover valve is not activated.)>>GO TO 3.

NO-2 (coolant vacuum actuator linkage is not moved.)>>GO TO 7.

3. CHECK FUSE

1. Turn ignition switch OFF.
2. Check that No. 98 (15 A) fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repairing the applicable circuit.

4. CHECK COOLANT PUMP SWICHOVER VALVE POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect coolant pump switchover valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between coolant pump switchover valve harness connector and ground.

P2603 COOLANT PUMP

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
Coolant pump switchover valve			
Connector	Terminal	Ground	Battery voltage
F152	1		

Is the inspection result normal?

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

5. CHECK COOLANT PUMP SWITCHOVER VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 fuse.
3. Check the continuity between coolant pump switchover valve harness connector and fuse terminal.

+		-	Continuity
Coolant pump switchover valve			
Connector	Terminal	No. 98 fuse terminal	Existed
F152	1		

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
- NO >> Repair or replace error-detected parts.

6. CHECK COOLANT PUMP SWITCHOVER VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and coolant pump switchover valve harness connector.

+		-		Continuity
ECM		Coolant pump switchover valve		
Connector	Terminal	Connector	Terminal	Existed
F150	54	F152	2	

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Replace coolant pump switchover valve. Refer to [EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location"](#).
- NO >> Repair or replace error-detected parts.

7. CHECK VACUUM PRESSURE

1. Turn ignition switch OFF.
2. Disconnect vacuum hose at boost pressure control vacuum transducer.
3. Connect vacuum tester.
4. Start the engine and let it idle.
5. Check that the vacuum pressure is more than -75 kPa (-750 mbar, -0.765 kg/cm², -10.9 psi).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Check vacuum line leakage, or vacuum pump performance.

P2610 ENGINE OFF TIME

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2610 ENGINE OFF TIME

DTC Description

INFOID:000000013290634

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2610	ECM/PCM ENGINE OFF TIMER (ECM/PCM engine off timer performance)	BUS SIGNAL/MESSAGE ERROR	The engine off time has an implausible value. There is a signal error or the message is abnormal.
		SIGNAL INVALID	The engine off time has an implausible value. There is an invalid signal.
		SEQUENCE COUNTER INCORRECT	The engine off time has an implausible value. The instruction counter is not updated.
		SIG BELOW ALLOWABLE RANGE	The engine off time has an implausible value. There is a signal below the permissible limit value.
		SIG ABOVE ALLOWABLE RANGE	The engine off time has an implausible value. There is a signal above the permissible limit value.

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POSSIBLE CAUSE

Combination meter

G

Diagnosis Procedure

INFOID:000000013290635

H

1. CHECK "SELF-DIAGNOSTIC RESULT" OF "BCM"

With CONSULT

Check "Self-diagnostic Result" of "METER/M&A".

I

Is any DTC detected?

- YES >> Perform trouble diagnosis for detected DTC. Refer to [MWI-87, "DTC Index"](#).
- NO >> INSPECTION END

J

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P2617 CRANKSHAFT POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2617 CRANKSHAFT POSITION SENSOR

DTC Description

INFOID:000000013290636

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2617	CAMSHAFT POSITION SIGNAL (Crankshaft position signal output circuit/open)	CIRCUIT OPEN	The signal of the position sensor of the crankshaft has an electrical malfunction or an open circuit. There is an open circuit.

POSSIBLE CAUSE

- Harness or connectors
(Crankshaft position sensor circuit)
- Crankshaft position sensor

FAIL-SAFE

Prohibits the stop/start operation.

Diagnosis Procedure

INFOID:000000013476225

1. COMPONENT FUNCTION CHECK

1. Start the engine and let it idle.
2. Check signal between ECM harness connector terminals.

Connector	ECM		Reference value
	+	-	
Terminal			
F150	81	12	

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY-1

1. Turn ignition switch OFF.
2. Disconnect crankshaft position sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between crankshaft position sensor harness connector terminals.

Connector	Crankshaft position sensor		Voltage
	+	-	
Terminal			
F168	1	3	4.8 – 5.3 V

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 3.

P2617 CRANKSHAFT POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY-2

Check the voltage between crankshaft position sensor harness connector and ground.

+		-	Voltage
Crankshaft position sensor			
Connector	Terminal		
F168	1	Ground	4.8 – 5.3 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK CRANKSHAFT POSITION SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	18	F168	1	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

5. CHECK CRANKSHAFT POSITION SENSOR GROUND CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	12	F168	3	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

6. CHECK CRANKSHAFT POSITION SENSOR CIRCUIT

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

+		-		Continuity
ECM		Crankshaft position sensor		
Connector	Terminal	Connector	Terminal	
F150	81	F168	2	Existed

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

Is the inspection result normal?

YES >> Replace crankshaft position sensor. Refer to [EM-86, "Removal and Installation"](#).

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EC4

P2617 CRANKSHAFT POSITION SENSOR

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

7.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-45, "Intermittent Incident"](#).

>> INSPECTION END

P2626 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

P2626 A/F SENSOR

DTC Description

INFOID:0000000013290638

DTC DETECTION LOGIC

A

EC4

DTC No.	CONSULT screen terms		DTC detecting condition
	DTC (Trouble diagnosis content)	Malfunction type	
P2626	O2 SENSOR B1 SENSOR 1 (O2 sensor pumping current trim circuit/open bank 1 sensor 1)	NO SUBTYPE INFORMATION	The trimming resistor connection of A/F sensor (cylinder bank 1) has an electrical malfunction or open circuit.

C

D

POSSIBLE CAUSE

- Harness and connectors (A/F sensor circuit is open or shorted.)
- A/F sensor

E

F

Diagnosis Procedure

INFOID:0000000013476237

1. CHECK A/F SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/F sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between A/F sensor harness connector and ground.

G

H

+		-	Voltage
A/F sensor			
Connector	Terminal		
F184	4	Ground	Battery voltage

I

J

Is the inspection result normal?

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

K

2. CHECK A/F SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Check that #98 fuse is not fusing.
3. Check the continuity between A/F sensor harness connector and fuse terminal.

L

M

+		-	Continuity
A/F sensor			
Connector	Terminal		
F184	4	#98 fuse terminal	Existed

N

O

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

Is the inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit.
NO >> Repair or replace error-detected parts.

P

3. CHECK A/F SENSOR HEATER CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between A/F sensor harness connector and ECM harness connector.

P2626 A/F SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-		Continuity
A/F sensor		ECM		
Connector	Terminal	Connector	Terminal	
F184	1	F150	63	Existed
	2		64	
	3		77	
	5		88	
	6		87	

4. Also check harness for short to ground, short to power, and short to each circuit.

Is the inspection result normal?

YES >> Replace A/F sensor. Refer to [EM-39. "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P2716

Diagnosis Description

INFOID:000000013290640

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

A

EC4

C

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P2725**Diagnosis Description***INFOID:000000013290641*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P2734

Diagnosis Description

INFOID:000000013290642

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

EC4

- A
- C
- D
- E
- F
- G
- H
- I
- J
- K
- L
- M
- N
- O
- P

P2757**Diagnosis Description***INFOID:000000013290643*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P2759

Diagnosis Description

INFOID:000000013290644

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

EC4

- A
- C
- D
- E
- F
- G
- H
- I
- J
- K
- L
- M
- N
- O
- P

P2766**Diagnosis Description***INFOID:000000013290645*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P2767

Diagnosis Description

INFOID:000000013290646

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

EC4

- A
- C
- D
- E
- F
- G
- H
- I
- J
- K
- L
- M
- N
- O
- P

P2768**Diagnosis Description***INFOID:000000013290647*

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

P2810

Diagnosis Description

INFOID:000000013290648

This DTC is displayed but not used. When the DTC is detected, erase the DTC.
When this DTC is detected with other DTCs, perform trouble diagnosis for other DTCs.

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EC4

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CRANKCASE VENTILATION SYSTEM

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

CRANKCASE VENTILATION SYSTEM

Diagnosis Procedure

INFOID:000000013290649

1. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect partial load operation crankcase ventilation valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between partial load operation crankcase ventilation valve harness connector and ground.

+		-	Voltage
Partial load operation crankcase ventilation valve			
Connector	Terminal		
F159	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Pull out No. 98 (15A) fuse.
3. Check that the fuse is not fusing.
4. Check the continuity between partial load operation crankcase ventilation valve harness connector and fuse terminal.

+		-	Continuity
Partial load operation crankcase ventilation valve			
Connector	Terminal		
F159	1	No. 98 fuse terminal	Existed

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

3. CHECK PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between partial load operation crankcase ventilation valve harness connector and ECM harness connector.

+		-		Continuity
Partial load operation crankcase ventilation valve		ECM		
Connector	Terminal	Connector	Terminal	
F159	2	F150	3	Existed

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

Is the inspection result normal?

YES >> Replace partial load operation crankcase ventilation valve. Refer to [EM-31, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

REFRIGERANT PRESSURE SENSOR

Component Function Check

INFOID:0000000013290650

1. CHECK REFRIGERANT PRESSURE SENSOR FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower fan switch ON.
3. Check the voltage between ECM harness connector terminals as per the following.

Connector	ECM		Voltage (V)
	+	-	
	Terminal	Terminal	
E200	143 (Refrigerant pressure sensor signal)	120	1.0 - 4.0

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Proceed to [EC4-951, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000013290651

1. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect refrigerant pressure sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between refrigerant pressure sensor harness connector and ground.

Refrigerant pressure sensor		Ground	Voltage (V)
Connector	Terminal		
E82	3	Ground	Approx. 5 V

Is the inspection result normal?

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

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ECM and refrigerant pressure sensor
- Loose or poor connection for each connector and harness

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

3. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E82	1	E200	120	Existed

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

Is the inspection result normal?

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

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REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ECM and refrigerant pressure sensor
- Loose or poor connection for each connector and harness

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

5. 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.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E82	2	E200	143	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ECM and refrigerant pressure sensor
- Loose or poor connection for each connector and harness

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

7. CHECK INTERMITTENT INCIDENT

Refer to [GI-45, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor. Refer to [HAC-144, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning part.

STOP/START OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

STOP/START OFF SWITCH

Component Function Check

INFOID:0000000013290652

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 "EMCM" using CONSULT.
3. Check "AT STOP START SW" indication as per the following condition.

Monitor item	Condition	Indication
AT STOP START SW	Press the stop/start OFF switch. (Stop/Start system is ON.)	On
	Press the stop/start OFF switch again. (Stop/Start system is OFF.)	Off

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Proceed to [EC4-953, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000013290653

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.)
Connector	Terminal		
M80	9	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 combination meter harness connector.

+		-		Continuity
Connector	Terminal	Connector	Terminal	
M80	11	M57	6	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.

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STOP/START OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

+		-	Voltage (Approx.)
Stop/start OFF switch			
Connector	Terminal		
M80	2	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 EMCM harness connector.
2. Check the continuity between EMCM harness connector and stop/start OFF switch harness connector.

+		-		Continuity
EMCM		Stop/start OFF switch		
Connector	Terminal	Connector	Terminal	
M147	13	M80	2	Existed

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

Is the inspection result normal?

- YES >> Check EMCM power supply and ground circuit. Refer to [EC4-235, "EMCM : Diagnosis Procedure"](#).
- 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		
M80	5	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 [EC4-954, "Component Inspection"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace stop/start OFF switch. Refer to [EC4-972, "Removal and Installation"](#).

Component Inspection

INFOID:000000013290654

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 >

[2.0L TURBO GASOLINE ENGINE]

Stop/start OFF switch		Condition	Continuity	
+	-			
Terminal				
2	5	Stop/start OFF switch	Pressed	Existed
			Released	Not existed

A

EC4

Is the inspection result normal?

C

YES >> INSPECTION END

NO >> Replace stop/start OFF switch. Refer to [EC4-972. "Removal and Installation"](#).

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ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

Component Function Check

INFOID:000000013506392

1.CHECK ORVR FUNCTION

Check whether the following symptoms are present.

- Fuel odor from EVAP canister is strong.
- Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

Are any symptoms present?

YES >> Go to [EC4-956, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000013506393

1.INSPECTION START

Check whether the following symptoms are present.

- A: Fuel odor from EVAP canister is strong.
B: Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

Which symptom is present?

A >> GO TO 2.

B >> GO TO 7.

2.CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.
The weight should be less than 2.5 kg (5.5 lb).

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

3.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

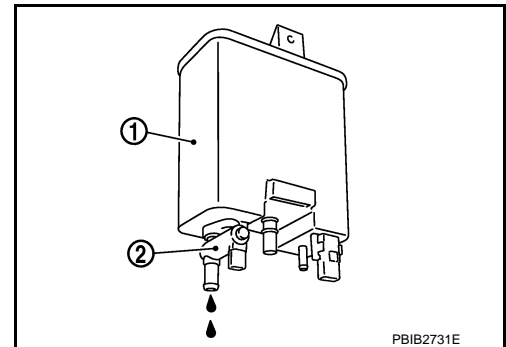
Check if water will drain from EVAP canister ①.

② : EVAP canister vent control valve

Does water drain from the EVAP canister?

YES >> GO TO 4.

NO >> GO TO 6.



4.REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

6.CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC4-958, "Component Inspection"](#).

Is the inspection result normal?

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-39, "Exploded View"](#).

7. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.

The weight should be less than 2.5 kg (5.5 lb).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 9.

8. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

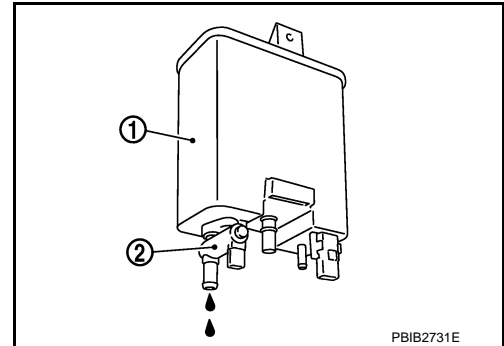
Check if water will drain from EVAP canister ①.

② : EVAP canister vent control valve

Does water drain from the EVAP canister?

YES >> GO TO 9.

NO >> GO TO 11.



9. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

11. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling control valve for clogging, kinks, looseness and improper connection.

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace hoses and tubes.

12. CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace filler neck tube.

13. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC4-958, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 14.

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-39, "Exploded View"](#).

14. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

Is the inspection result normal?

YES >> GO TO 15.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace fuel filler tube. Refer to [FL-36, "Exploded View"](#).

15. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

Is the inspection result normal?

YES >> GO TO 16.

NO >> Repair or replace one-way fuel valve with fuel tank. Refer to [FL-36, "Exploded View"](#).

16. CHECK ONE-WAY FUEL VALVE-II

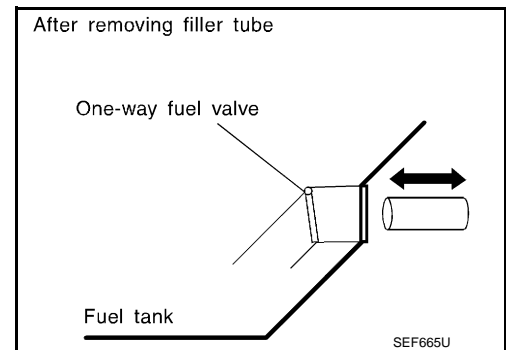
1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.
When a stick is inserted, the valve should open, when removing stick it should close.

Do not drop any material into the tank.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel filler tube or replace one-way fuel valve with fuel tank. Refer to [FL-36, "Exploded View"](#).



INFOID:000000013506394

Component Inspection

1. INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK REFUELING EVAP VAPOR CUT VALVE

Ⓜ With CONSULT

1. Turn ignition switch OFF.
2. Remove fuel tank. Refer to [FL-36, "Removal and Installation"](#).
3. Drain fuel from the tank as follows:
 - Remove fuel feed hose located on the fuel gauge retainer.
 - Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
 - Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT.
4. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
5. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - Connect vacuum pump to hose end.
 - Remove fuel gauge retainer with fuel gauge unit.

Always replace O-ring with new one.

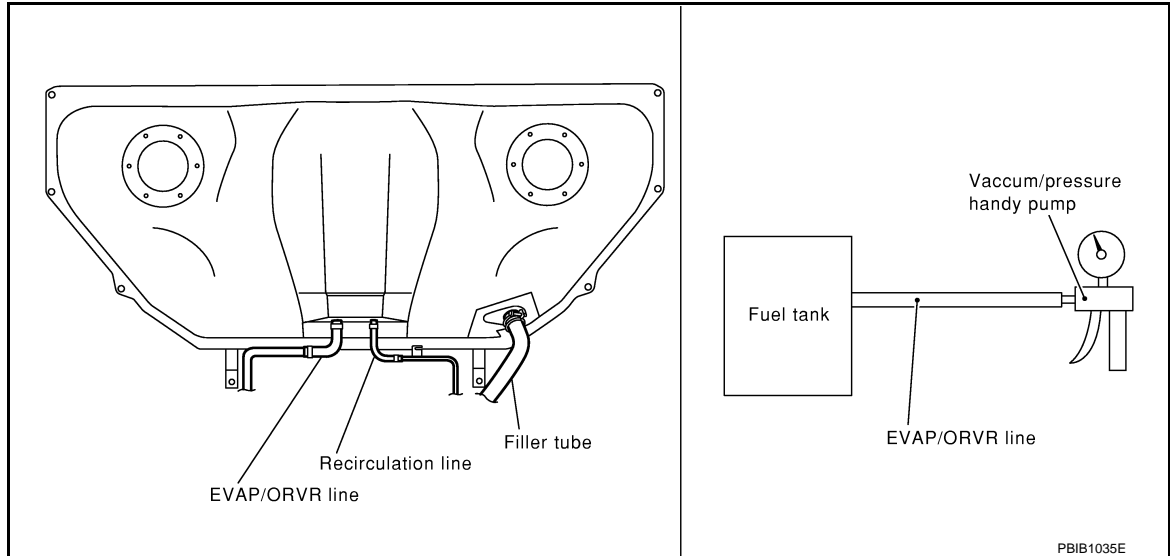
 - Turn fuel tank upside down.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

- Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm³, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.



Is the inspection result normal?

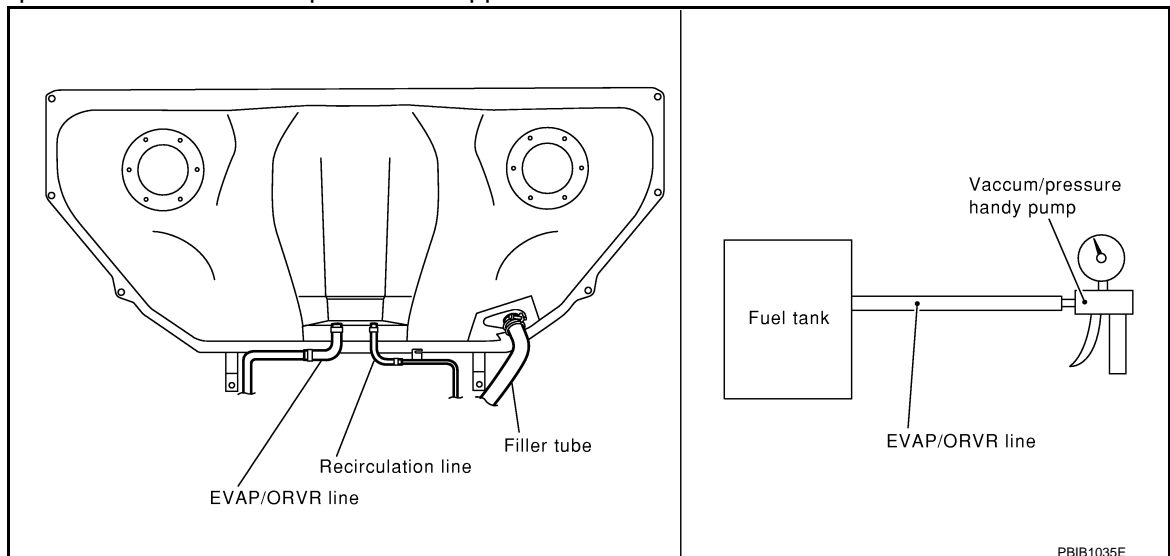
YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank.

3. CHECK REFUELING EVAP VAPOR CUT VALVE

⊗ Without CONSULT

1. Turn ignition switch OFF.
 2. Remove fuel tank. Refer to [FL-36. "Removal and Installation"](#).
 3. Drain fuel from the tank as follows:
 - Remove fuel gauge retainer.
 - Drain fuel from the tank using a handy pump into a fuel container.
 4. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
 5. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - Connect vacuum pump to hose end.
 - Remove fuel gauge retainer with fuel gauge unit.
- Always replace O-ring with new one.**
- Turn fuel tank upside down.
 - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm³, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.



ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-39. "Exploded View"](#).

STOP/START SYSTEM NOT ACTIVATED

< SYMPTOM DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

SYMPTOM DIAGNOSIS

STOP/START SYSTEM NOT ACTIVATED

Diagnosis Procedure

INFOID:0000000013290655

EC4

1. CHECK CHARGE WARNING LAMP STATUS

1. Start the engine.
2. Check that the charge warning lamp turns OFF.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check charging system. Refer to [CHG-14, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-18, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

2. CHECK WARNING/INDICATOR LAMP STATUS

Check the following warning/indicator lamp status.

Warning/Indicator lamp	Status
Stop/Start indicator lamp	Not blinking
Malfunction indicator lamp (MIL)	OFF
ESP warning lamp	
ABS warning lamp	
Brake warning lamp	
Power steering warning lamp	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check "All DTC Reading" and perform trouble diagnosis for detected DTC.

3. CHECK STOP/START ACTIVATION PERMIT CONDITION

With CONSULT

1. Warm the engine up to normal operating temperature.
2. Drive the vehicle at 13 km/h (8 MPH) or more.
3. Stop the vehicle.
4. Shift the selector lever in P range.
5. On CONSULT screen, select "ENGINE" >> "DATA MONITOR".
6. Select the following items.

Item	Condition
S/S INH: ON-BRD ELEC SYS	OK
S/S INH: S/S OFF SWITCH	OK
S/S INH: DRIVER PRESENCE	OK
S/S INH: AIR CONDITIONER	OK
S/S INH: ENGINE	OK
S/S INH: ENGINE HOOD	OK

Is the inspection result normal?

YES >> INSPECTION END

NO-1 ("S/S INH: ENGINE" indicates "NOT OK") >> Check the stop/start activation condition is satisfied. Refer to [EC4-78, "STOP/START SYSTEM : System Description"](#).

NO-2 ("S/S INH: ON-BRD ELEC SYS" indicates "NOT OK") >> GO TO 4.

NO-3 ("S/S INH: AIR CONDITIONER" indicates "NOT OK") >> Check the stop/start permit condition of A/C auto amp. Refer to [HAC-34, "STOP/START SYSTEM : System Description"](#).

NO-4 ("S/S INH: DRIVER PRESENCE" indicates "NOT OK") >> Check that the seat belt (driver side) is fastened, and the front door (driver side) is closed.

STOP/START SYSTEM NOT ACTIVATED

[2.0L TURBO GASOLINE ENGINE]

< SYMPTOM DIAGNOSIS >

- NO-5 ("S/S INH: S/S OFF SWITCH" indicates "NOT OK") >>Check the stop/start OFF switch. Refer to [EC4-953, "Component Function Check"](#).
- NO-6 ("S/S INH: ENGINE HOOD" indicates "NOT OK") >>Check that the engine hood is closed.

4.CHECK BATTERY

With CONSULT

1. Turn ignition switch OFF.
2. Check that the main battery and sub battery are normal condition. Refer to [PG-248, "2.0L TURBO GASOLINE ENGINE : How to Handle Battery"](#).
3. Turn ignition switch ON.
4. On CONSULT screen, select "EMCM" >> "DATA MONITOR" >> "CML B/DCHG CRNT" and "CMLTV S/BAT DISCHG CRNT".
5. Check that the indicated value is within specification value.

Battery	Item	Specification value
Main battery	CML B/DCHG CRNT	Less than 49,200
Sub battery	CMLTV S/BAT DISCHG CRNT	Less than 18,400

Is the inspection result normal?

- YES >> Check the stop/start activation condition is satisfied. Refer to [EC4-78, "STOP/START SYSTEM : System Description"](#).
- NO >> Replace malfunctioning battery. Refer to [PG-261, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

PERIODIC MAINTENANCE

IDLE SPEED

Inspection

INFOID:0000000013290656

A

EC4

1. CHECK IDLE SPEED

With CONSULT

1. Start engine and let it idle.
2. On CONSULT screen, select "ENGINE" >> "DATA MONITOR" >> "ENGINE SPEED".
3. Check the value is within the specification value.

C

D

Engine speed

EC4-973, "Idle Speed"

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>> INSPECTION END

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CRANKCASE VENTILATION SYSTEM

< PERIODIC MAINTENANCE >

[2.0L TURBO GASOLINE ENGINE]

CRANKCASE VENTILATION SYSTEM

Inspection

INFOID:000000013290657

1.CHECK LEAKAGE

Check hoses and hose connections for leakage.

>> INSPECTION END

EVAPORATIVE EMISSION SYSTEM

< PERIODIC MAINTENANCE >

[2.0L TURBO GASOLINE ENGINE]

EVAPORATIVE EMISSION SYSTEM

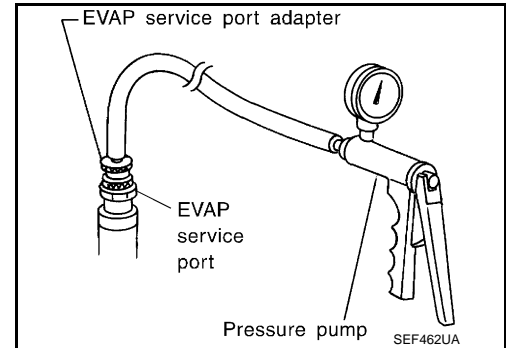
Inspection

INFOID:000000013290658

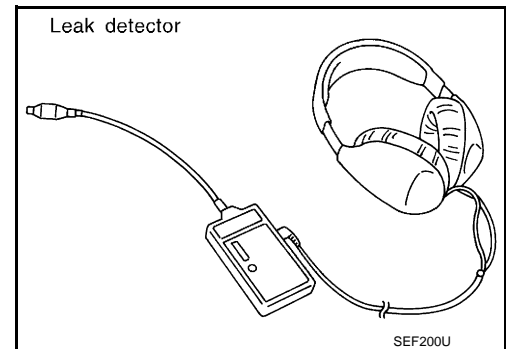
CAUTION:

- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

1. To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port.
2. Apply battery voltage between the terminals of EVAP canister vent control valve to make a closed EVAP system.
3. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm², 0.2 to 0.4 psi).
4. Remove EVAP service port adapter and hose with pressure pump.



5. Locate the leak using a leak detector. Refer to [EC4-76, "EVAPORATIVE EMISSION SYSTEM : System Description"](#).



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VACUUM LINES

< REMOVAL AND INSTALLATION >

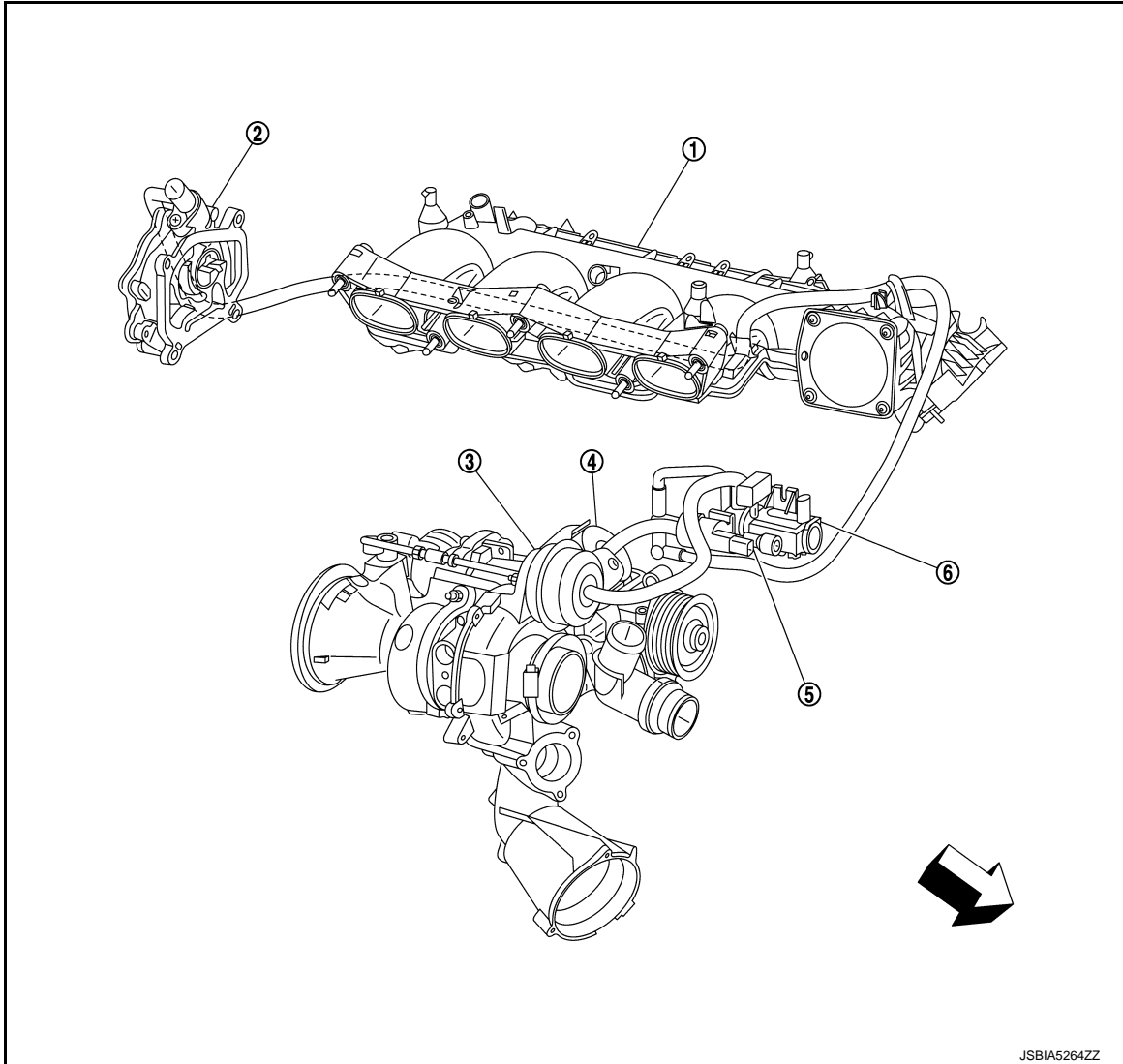
[2.0L TURBO GASOLINE ENGINE]

REMOVAL AND INSTALLATION

VACUUM LINES

Vacuum Line Layout

INFOID:000000013290659



① Intake manifold

② Vacuum pump

③ Boost pressure control flap vacuum actuator

④ Vacuum actuator

⑤ Coolant pump switchover valve

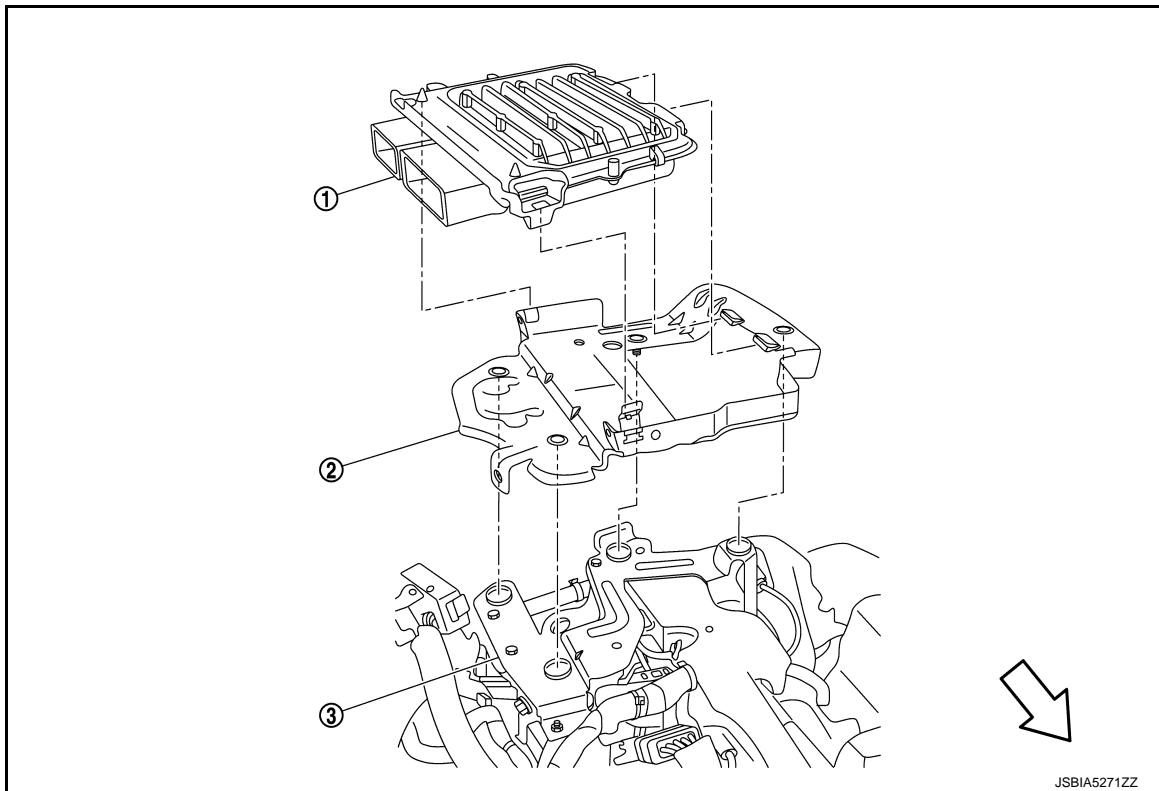
⑥ Boost pressure control vacuum transducer

⇐ : Vehicle front

ECM

Exploded View

INFOID:000000013290660



① ECM

② Bracket 1

③ Bracket 2

⇒ : Vehicle front

Removal and Installation

INFOID:000000013290661

CAUTION:**Must be perform additional service when replacing ECM. Refer to [EC4-207, "Description"](#).**

REMOVAL

1. Disconnect battery negative terminal.
2. Remove engine cover. Refer to [EM-22, "Removal and Installation"](#).
3. Disconnect ECM harness connectors. Refer to HARNESS CONNECTOR (LEVER LOCKING TYPE) in [PG-14, "2.0L TURBO GASOLINE ENGINE : Harness Connector"](#).

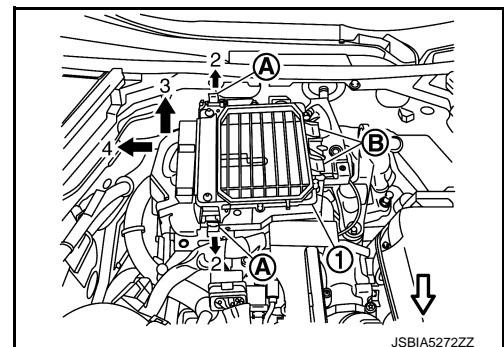
4. Remove ECM from the bracket.

1. Push pawl (A) in the direction shown by arrow (⇒ 2) and move ECM (1) upward (⇒ 3) to unlock.

(B) : Crip

⇒ : Vehicle front

2. Pull out ECM in the direction shown by arrow (⇒ 4).
5. Remove bracket from the engine.
 - Pull out ECM upward.



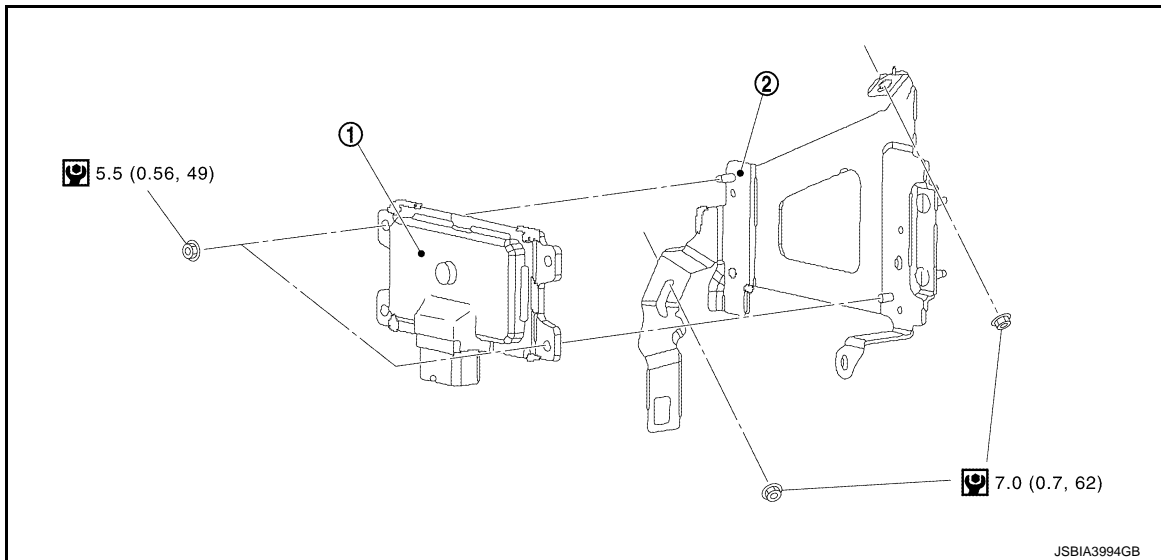
INSTALLATION

Install in the reverse order of removal.

EMCM


Exploded View

INFOID:000000013290662



① EMCM

② EMCM bracket

 : N·m (kg-m, in-lb)

Removal and Installation

INFOID:000000013290663

CAUTION:

Must be perform Special Repair Requirement for EMCM. Refer to [EC4-206, "Special Repair Requirement List"](#).

REMOVAL

1. Disconnect battery negative terminal.
2. Remove the glove box. Refer to [IP-13, "Removal and Installation"](#).
3. Remove the instrument lower panel. Refer to [IP-13, "Removal and Installation"](#).
4. Remove harness clip from EMCM bracket.
5. Remove EMCM bracket with EMCM.
6. Disconnect EMCM harness connector. Refer to HARNESS CONNECTOR (LEVER LOCKING TYPE) in [PG-14, "2.0L TURBO GASOLINE ENGINE : Harness Connector"](#).
7. Remove EMCM mounting nuts from the EMCM bracket.
8. Remove EMCM from EMCM bracket.

INSTALLATION

Install in the reverse order of removal.

FUEL PUMP CONTROL MODULE (FPCM)

< REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]

FUEL PUMP CONTROL MODULE (FPCM)

Removal and Installation

INFOID:000000013290665

CAUTION:

Must be perform CONFIGURATION and ACTIVATION OF FUEL PUMP. Refer to [EC4-209, "Description"](#).

EC4

REMOVAL

1. Remove trunk side finisher (LH). Refer to [INT-53, "TRUNK SIDE FINISHER : Removal and Installation"](#).
2. Disconnect battery negative terminal.
3. Remove trunk room LH stay mounting bolts and nuts.
4. Disconnect FPCM harness connectors.
5. Remove FPCM mounting nuts.
6. Remove FPCM from sub electric oil pump inverter.

INSTALLATION

Install in the reverse order of removal.

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SUB BATTERY RELAY

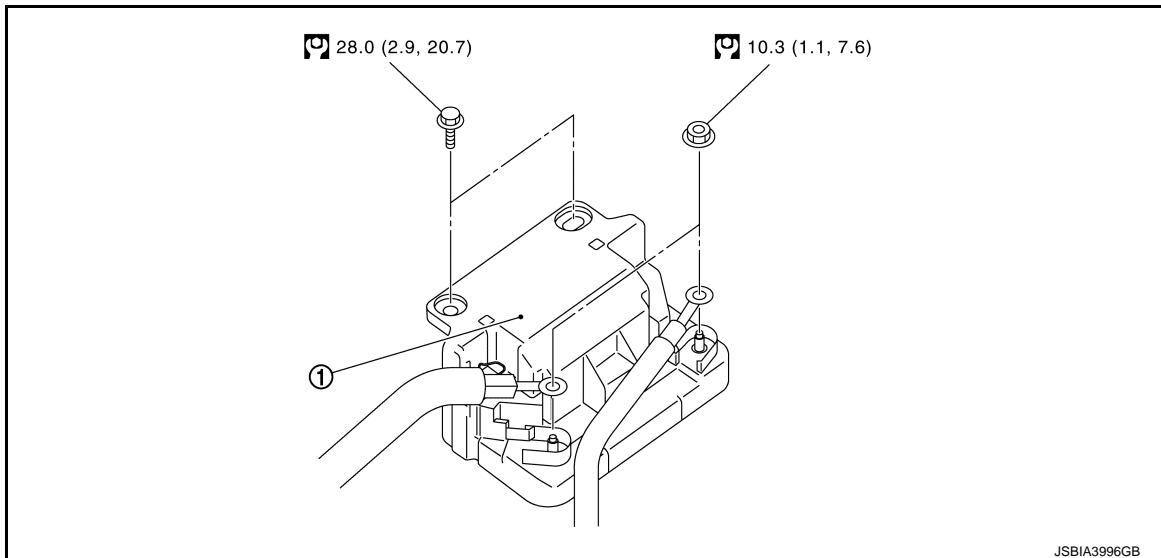
< REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]


SUB BATTERY RELAY

Exploded View

INFOID:000000013290666



① Sub battery relay

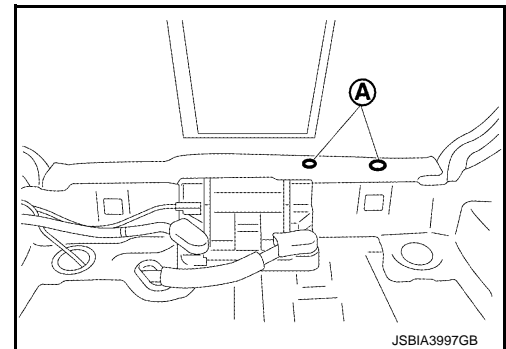
 : N·m (kg-m, ft-lb)

Removal and Installation

INFOID:000000013290667

REMOVAL

1. Disconnect battery negative terminals.
2. Remove trunk floor carpet.
3. Remove trunk front finisher fixing clips **A**.
4. Disconnect sub battery relay connector.
5. Disconnect sub battery relay terminals.
6. Remove sub battery relay mounting bolts.
7. Remove sub battery relay.



INSTALLATION

Install in the reverse order of removal.

ENGINE RESTART BYPASS RELAY

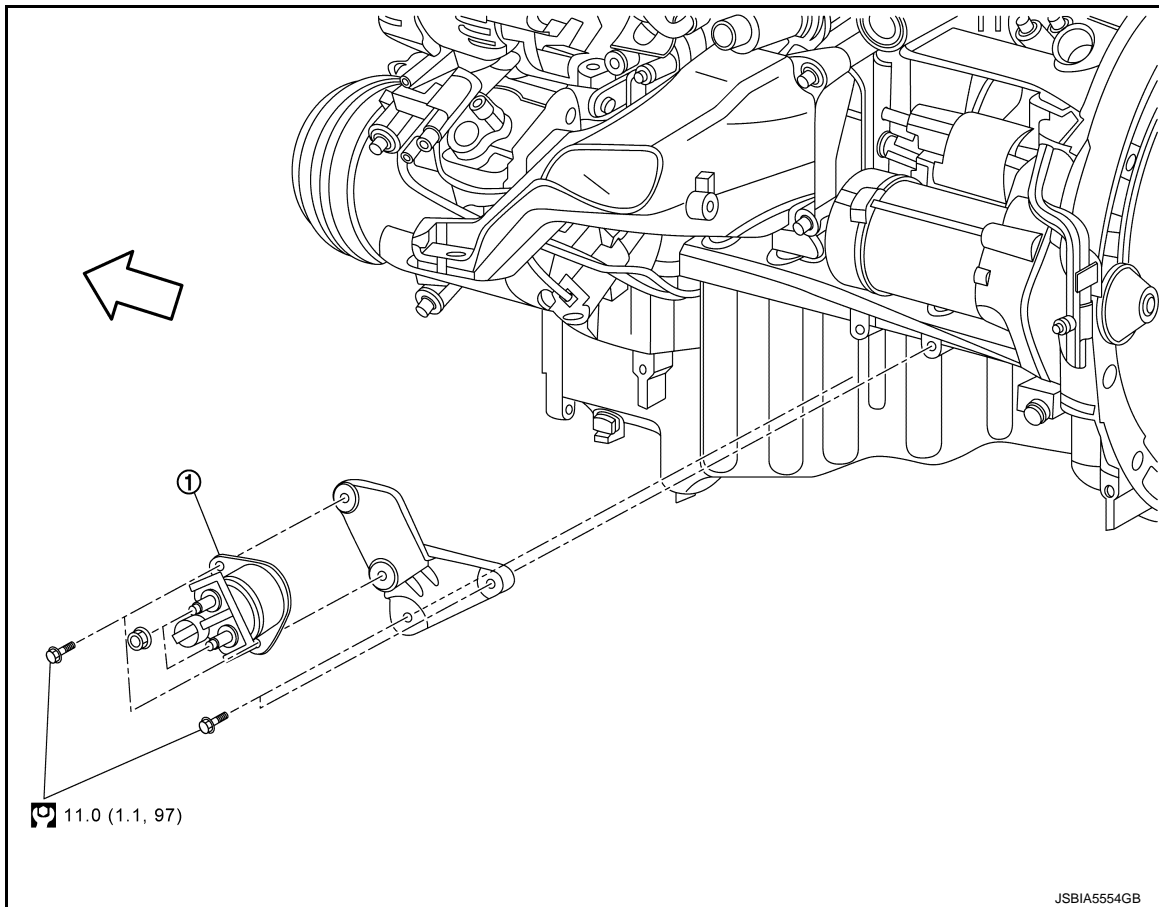
< REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]


ENGINE RESTART BYPASS RELAY

Exploded View

INFOID:000000013290668



① Engine restart bypass relay

 : N·m (kg-m, ft-lb)

 : Vehicle front

Removal and Installation

INFOID:000000013290669

REMOVAL

1. Disconnect battery negative terminals.
2. Remove front under cover. Refer to [EXT-35, "FRONT UNDER COVER : Removal and Installation"](#).
3. Disconnect engine restart bypass relay harness connector.
4. Remove engine restart bypass relay terminal nuts.
5. Disconnect engine restart bypass relay terminals.
6. Remove engine restart bypass relay mounting bolts, and then remove engine restart bypass relay.

INSTALLATION

Install in the reverse order of removal.

STOP/START OFF SWITCH

< REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]

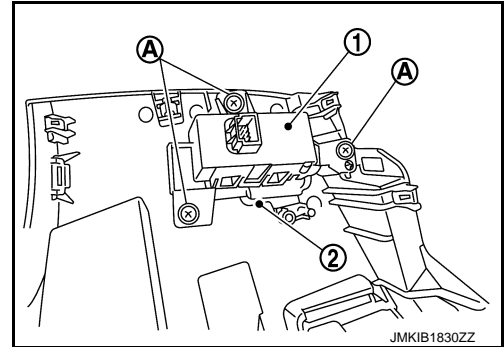
STOP/START OFF SWITCH

Removal and Installation


INFOID:000000013290670

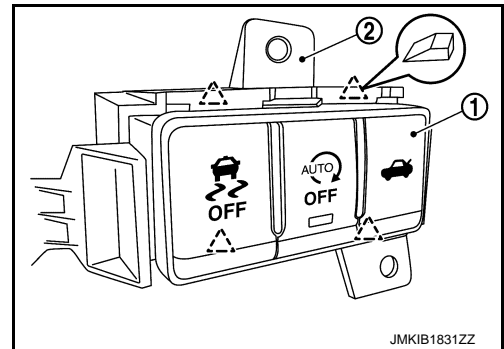
REMOVAL

1. Remove the instrument lower panel LH. Refer to [JP-12. "Exploded View"](#).
2. Remove screws (A) that retain the triple switch bracket (1) to the instrument lower panel LH (2).



3. Remove switch assembly (1) from triple switch bracket (2).

 : Pawl



INSTALLATION

Install in the reverse order of removal.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[2.0L TURBO GASOLINE ENGINE]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

INFOID:0000000013290671

EC4

Item	Type	Condition	Reference value
Target idle speed	A/T	No load* (in P or N position)	750 rpm

*: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Ignition Timing

INFOID:0000000013290672

Condition	Specification
<ul style="list-style-type: none">• No load* (in P or N position)• Engine speed: At idle (750 rpm)	(-15°) – (+20°) BTDC

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position