SECTION ENGINE CONTROL SYSTEM o

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< SERVICE INFORMATION >

SERVICE INFORMATION MODIFICATION NOTICE

Major Modification Item

INFOID:000000003844114

• YD25DDTi (with common rail) engine has newly been added.

< SERVICE INFORMATION >

INDEX FOR DTC

U1000

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INFOID:000000003759277

DTC	×1	Itomo	
CONSULT-III GST* ²	ECM* ³	(CONSULT-III screen item)	Reference page
U1000	1000*4	CAN COMM CIRCUIT	<u>EC-83</u>
: 1st trip DTC No. and 2nd	trip DTC No. are the sa	me as DTC No.	
2: This number is prescribe	d by ISO 15031-6.		
3: In Diagnostic Test Mode	II (Self-diagnostic results	5).	
4: The troubleshooting for the	nis DTC needs CONSUL	.T-111.	
20016 - P0123			INFOID:00000003759278
DTC	¢*1		
CONSULT-III	-		Reference page
GST*2	ECM* ³	(CONSULT-III screen item)	
P0016	0016	CMP/CKP RELATION	<u>EC-85</u>
P0088	0088	HIGH FUEL PRESS	<u>EC-87</u>
P0089	0089	FUEL PUMP	<u>EC-89</u>
P0093	0093	FUEL LEAK	<u>EC-91</u>
P0101	0101	MAF SENSOR	<u>EC-94</u>
P0102	0102	MAF SEN/CIRCUIT	<u>EC-103</u>
P0103	0103	MAF SEN/CIRCUIT	EC-103
P0112	0112	IAT SEN/CIRCUIT	<u>EC-111</u>
P0113	0113	IAT SEN/CIRCUIT	<u>EC-111</u>
P0117	0117	ECT SEN/CIRCUIT	<u>EC-115</u>
P0118	0118	ECT SEN/CIRCUIT	<u>EC-115</u>
P0122	0122	APP SEN 1/CIRCUIT	<u>EC-119</u>
P0123	0123	APP SEN 1/CIRCUIT	EC-119

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.

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

*3: In Diagnostic Test Mode II (Self-diagnostic results).

P0182 - P0217

DT	°C*1	ltomo	Itoms	
CONSULT-III GST ^{*2}	ECM* ³	(CONSULT-III screen item)	Reference page	С
P0182	0182	FUEL TEMP SEN/CIRC	<u>EC-124</u>	
P0183	0183	FUEL TEMP SEN/CIRC	<u>EC-124</u>	F
P0192	0192	FRP SEN/CIRC	EC-128	
P0193	0193	FRP SEN/CIRC	<u>EC-128</u>	
P0200	0200	INJECTOR	<u>EC-132</u>	
P0201	0201	CYL1 INJECTOR	EC-133	
P0202	0202	CYL2 INJECTOR	<u>EC-133</u>	

INFOID:000000003759280

< SERVICE INFORMATION >

DTC*1		Itomo	
CONSULT-III GST* ²	ECM* ³	(CONSULT-III screen item)	Reference page
P0203	0203	CYL3 INJECTOR	<u>EC-133</u>
P0204	0204	CYL4 INJECTOR	<u>EC-133</u>
P0217	0217	ENG OVER TEMP	<u>EC-138</u>

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.

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

*3: In Diagnostic Test Mode II (Self-diagnostic results).

P0222 - P0488

INFOID:000000003759281

DT	⁻ C* ¹	ltomo		
CONSULT-III GST* ²	ECM* ³	(CONSULT-III screen item)	Reference page	
P0222	0222	APP SEN 2/CIRCUIT	<u>EC-147</u>	
P0223	0223	APP SEN 2/CIRCUIT	<u>EC-147</u>	
P0335	0335	CKP SEN/CIRCUIT	<u>EC-152</u>	
P0336	0336	CKP SENSOR	<u>EC-157</u>	
P0340	0340	CMP SEN/CIRCUIT	<u>EC-163</u>	
P0341	0341	CMP SENSOR	<u>EC-168</u>	
P0380	0380	GLOW RELAY	<u>EC-173</u>	
P0403	0403	EGR SYSTEM	<u>EC-177</u>	
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P0406	0406	EGR SENSOR	<u>EC-184</u>	
P0409	0409	EGR SYSTEM	<u>EC-190</u>	
P0488	0488	EGR SYSTEM	<u>EC-196</u>	

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.

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

*3: In Diagnostic Test Mode II (Self-diagnostic results).

P0563 - P0686

INFOID:000000003759284

DT	°C*1	Itomo		
CONSULT-III GST ^{*2}	ECM* ³	(CONSULT-III screen item)	Reference page	
P0563	0563	BATTERY VOLTAGE	<u>EC-201</u>	
P0606	0606	ECM	<u>EC-203</u>	
P0628	0628	FUEL PUMP/CIRC	<u>EC-205</u>	
P0629	0629	FUEL PUMP/CIRC	<u>EC-205</u>	
P0642	0642	SENSOR PWR/CIRC1	<u>EC-210</u>	
P0643	0643	SENSOR PWR/CIRC1	<u>EC-210</u>	
P0652	0652	SENSOR PWR/CIRC2	<u>EC-214</u>	
P0653	0653	SENSOR PWR/CIRC2	<u>EC-214</u>	
P0668	0668	ECM	<u>EC-218</u>	
P0669	0669	ECM	<u>EC-218</u>	
P0686	0686	ECM RELAY	<u>EC-220</u>	

< SERVICE INFORMATION >

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.

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

*3: In Diagnostic Test Mode II (Self-diagnostic results).

DTC*1

P1268 - P1275

- • •		Items		
CONSULT-III GST* ²	ECM* ³	(CONSULT-III screen item)	Reference page	
P1268	1268	INJECTOR 1	<u>EC-227</u>	
P1269	1269	INJECTOR 2	<u>EC-227</u>	
P1270	1270	INJECTOR 3	<u>EC-227</u>	
P1271	1271	INJECTOR 4	<u>EC-227</u>	
P1272	1272	FRP RELIEF VALVE	EC-234	

FUEL PUMP

FUEL PUMP

FUEL PUMP

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.

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

*3: In Diagnostic Test Mode II (Self-diagnostic results).

P1610 - P1616

P1273

P1274

P1275

DT	°C* ¹	Items		
CONSULT-III GST ^{*2}	ECM* ³	(CONSULT-III screen item)	Reference page	
P1610	1610	LOCK MODE	<u>EL-102</u>	
P1611	1611	ID DISCORD, IMM-ECM	<u>EL-103</u>	
P1612	1612	CHAIN OF ECM-IMMU	<u>EL-103</u>	ŀ
P1614	1614	CHAIN OF IMMU-KEY	<u>EL-105</u>	
P1615	1615	DIFFERENCE OF KEY	<u>EL-106</u>	1
P1616	1616	ECM	<u>EL-106</u>	l

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.

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

*3: In Diagnostic Test Mode II (Self-diagnostic results).

P1622 - P2229

DT	DTC*1			
CONSULT-III GST* ²	ECM* ³	(CONSULT-III screen item)	Reference page	C
P1622	1622	INJ ADJ VAL UNRGST	<u>EC-254</u>	-
P1623	1623	INJ ADJ VAL ERROR	<u>EC-255</u>	
P2135	2135	APP SENSOR	<u>EC-257</u>	-
P2146	2146	INJ PWR/CIRC	<u>EC-262</u>	-
P2147	2147	INJECTOR/CIRC	<u>EC-266</u>	-
P2148	2148	INJECTOR/CIRC	<u>EC-266</u>	-
P2149	2149	INJ PWR/CIRC	<u>EC-262</u>	-

EC-239

<u>EC-244</u>

EC-249

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DTC*1		Itoms	
CONSULT-III GST ^{*2}	ECM* ³	(CONSULT-III screen item)	Reference page
P2228	2228	BARO SEN/CIRC	<u>EC-271</u>
P2229	2229	BARO SEN/CIRC	<u>EC-271</u>

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.

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

*3: In Diagnostic Test Mode II (Self-diagnostic results).

PRECAUTIONS

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

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

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the "SUPPLEMENTAL RESTRAINT SYSTEM".
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

Precaution for Procedure without Cowl Top Cover

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

On Board Diagnosis (OBD) System of Engine

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

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



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Precaution

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

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

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

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

- Securely connect ECM harness connectors. A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to IC's.
- Keep engine control system harness at least 10cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of IC's, etc.
- Keep engine control system parts and harness dry.











INFOID:000000003759294

PRECAUTIONS

< SERVICE INFORMATION >

- Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to <u>EC-57</u>, <u>"ECM Terminal and Reference Value"</u>.
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not shock or jar the camshaft position sensor, crankshaft position sensor.
- After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Overall Function Check. The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Overall Function Check should be a good result if the repair is completed.

• When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and

damage the ECM power transistor.

- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.
- Do not disassemble fuel pump. If NG, take proper action.
- Do not disassemble fuel injector. If NG, replace fuel injector.



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PRECAUTIONS

< SERVICE INFORMATION >

Do not depress accelerator pedal when starting.

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



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

PREPARATION

< SERVICE INFORMATION >

PREPARATION

Special Service Tool

INFOID:000000003759295

T . (EC
Tool number Tool name		Description	
EG17650301 Radiator cap tester adapter		Adapting radiator cap tester to radiator cap and ra- diator filler neck a: 28 (1.10) dia.	С
		c: 41.3 (1.626) dia. Unit: mm (in)	D
KV11106030	S-NT564	Fixing fuel pump sprocket	E
Positioning stopper pin	a b	a: 6 mm (0.24 in) dia. b: 80 mm (3.15 in) dia.	F
	NT804		G
KV11106040 TORX wrench		Removing and installing fuel pump sprocket a: T70 b: 26 mm (1.02 in)	F
	b NT805		
KV11106050 Hexagonal wrench	a a	Removing and installing fuel pump sprocket a: 6 mm (0.24 in) (Face to face) b: 42 mm (1.65 in)	J
	b SBIA0224E		K
KV11106060		Holding fuel pump sprocket	
Sprocket holder			N
	SBIA0225E		Ν
		· · · · · · · · · · · · · · · · · · ·	С

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PREPARATION

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Commercial Service Tool

INFOID:000000003759296

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Tool name	Description
Socket wrench	Removing and installing engine coolant tempera- ture sensor

< SERVICE INFORMATION >

ENGINE CONTROL SYSTEM

Schematic

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< SERVICE INFORMATION >

System Chart

[YD25DDTi]

Input (Sensor)	ECM Function	Output (Actuator)
Accelerator pedal position sensorFuel rail pressure sensor	Fuel injection control	Fuel injectorFuel pump
 Fuel pump temperature sensor Engine coolant temperature sensor Mass air flow sensor 	Fuel injection timing control	Fuel injectorFuel pump
 Intake air temperature sensor Crankshaft position sensor Camshaft position sensor Vehicle speed sensor*1 ABS actuator and electric unit (control unit)*1 Ignition switch Stop lamp switch Air conditioner switch*1 Park/neutral position switch Battery voltage EGR volume control valve control position sensor 	Fuel cut control	Fuel injectorFuel pump
	Glow control system	 Glow relay Glow indicator lamp^{*2}
	On board diagnostic system	Malfunction indicator (MI)*2
	EGR volume control	EGR volume control valve
	Cooling fan control	Cooling fan relay

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

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

Fuel Injection Control System

INFOID:000000003759300

SYSTEM DESCRIPTION

Three types of fuel injection control are provided to accommodate engine operating conditions; normal control, idle control and start control. The ECM determines the appropriate fuel injection control. Under each control, the amount of fuel injected is adjusted to improve engine performance.

Pulse signals are sent to fuel injectors according to the input signals to adjust the amount of fuel injected to preset value.

START CONTROL

Input/Output Signal Chart

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

When the ECM receives a start signal from the ignition switch, the ECM adapts the fuel injection system for the start control. The amount of fuel injected at engine starting is a preset program value in the ECM. The program is determined by the engine speed, engine coolant temperature and fuel rail pressure.

For better start ability under cool engine conditions, the lower the coolant temperature becomes, the greater the amount of fuel injected. The ECM ends the start control when the engine speed reaches the specific value, and shifts the control to the normal or idle control.



IDLE CONTROL

Input/Output Signal Chart

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Sensor	Input Signal to ECM	ECM Function	Actuator	А
Engine coolant temperature sensor	Engine coolant temperature			
Crankshaft position sensor	Engine speed			
Battery	Battery voltage	Fuel injection		EC
Accelerator pedal position sensor	Accelerator pedal position	control (Idle	Fuel injector	
Fuel rail pressure sensor	Fuel rail pressure	control)		С
Vehicle speed sensor	Vehicle speed*			
Air conditioner switch	Air conditioner signal*			
*. The input signal is cant to the ECM through	ush CAN communication line	•		D

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

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

NORMAL CONTROL

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM Function	Actuator	G
Crankshaft position sensor	Engine speed	Fuel injection	F 1	
Accelerator pedal position sensor	Accelerator position	control (Normal Fuel Injector	Fuel injector	
Fuel rail pressure sensor	Fuel rail pressure	control)		Н

The amount of fuel injected under normal driving conditions is determined according to sensor signals. The crankshaft position sensor detects engine speed, the accelerator pedal position sensor detects accelerator pedal position and fuel rail pressure sensor detects fuel rail pressure. These sensors send signals to the ECM.

The fuel injection data, predetermined by correlation between various engine speeds, accelerator pedal positions and fuel rail pressure are stored in the ECM memory, forming a map. The ECM determines the optimal amount of fuel to be injected using the sensor signals in comparison with the map.



MAXIMUM AMOUNT CONTROL

Input/Output Signal Chart

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

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

DECELERATION CONTROL

Input/Output Signal Chart

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

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

Fuel Injection Timing Control System

INFOID:000000003759301

DESCRIPTION

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

Air Conditioning Cut Control

INFOID:000000003759302

INPUT / OUTPUT SIGNAL CHART

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

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

SYSTEM DESCRIPTION

This system improves acceleration when the air conditioner is used.

When the accelerator pedal is fully depressed, the air conditioner is turned off for a few seconds.

When engine coolant temperature becomes excessively high, the air conditioner is turned off. This continues until the engine coolant temperature returns to normal.

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

INFOID:000000003759303

INFOID:000000003759304

INPUT/OUTPUT SIGNAL CHART

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

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

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

NOTE:

This function is different from deceleration control listed under <u>EC-18</u>, "Fuel Injection Control System".

Crankcase Ventilation System

DESCRIPTION

< SERVICE INFORMATION >

[YD25DDTi]

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



INSPECTION

Ventilation Hose

- 1. Check hoses and hose connections for leaks.
- Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



CAN Communication

SYSTEM DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to <u>EL-110</u>, "CAN System Specification Chart", about CAN communication for detail.

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< SERVICE INFORMATION > BASIC SERVICE PROCEDURE

Fuel Filter

DESCRIPTION

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

AIR BLEEDING

Pump the priming pump (1) to bleed air.

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

WATER DRAINING

- Remove the fuel filter, filter bracket, protector assembly from the dash panel as follows. 1.
- Remove the air cleaner case (upper), air duct assembly, and vacuum hose for brake booster (between the a. vacuum pump and vacuum pipe). **CAUTION:**

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

- Remove the mounting nuts on the dash panel, then remove the fuel filter, filter bracket, and protector b. assembly from the dash panel.
 - It is not necessary to disconnect the fuel hose.
- 2. Using a tool such as a pliers, loosen the water draining cock at the bottom of the fuel filter.

Loosening drain cock four to five turns causes water to start draining.

Do not remove drain cock by loosening it excessively. If water dose not drain properly, move the priming up and down. CAUTION:

When the water is drained, the fuel is also drained. Use a pan, etc. to avoid fuel adherence to the rubber parts such as the engine mount insulator.

Do not over-tighten the water draining cock. This will damage the cock thread, resulting in water or fuel leak.

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

Procedure After Replacing ECM

When replacing ECM, the following procedure must be performed.

- Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EL-96, "ECM 1. Re-communicating Function".
- 2. Perform EC-22, "Injector Adjustment Value Registration".
- Perform EC-23, "Fuel Pump Learning Value Clearing". 3.
- Perform EC-24, "EGR Volume Control Valve Closed Position Learning Value Clear". 4.
- Perform EC-24, "EGR Volume Control Valve Closed Position Learning". 5.

Injector Adjustment Value Registration

DESCRIPTION





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INFOID:00000003843895

< SERVICE INFORMATION >

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

- The injector adjustment value stored in ECM
- The injector adjustment value of the injector which is installed on the vehicle
- Injector Adjustment Value Registration must be performed after the following cases.
- Injector(s) are replaced.
- ECM is replaced.

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



Example: Injector adjustment value = D121ABCD1A06123400000000000066

OPERATION PROCEDURE

NOTE:

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

- Turn ignition switch ON (engine stopped). 1.
- Select "ENTER INJECTOR CALIB DATA" in "WORK SUPPORT" mode with CONSULT-III. 2.
- 3. Touch "START". NOTE: When touching "START", CONSULT-III reads injector adjustment values stored in ECM. 4. Select the number of the cylinder which needs Injector Adjustment Value Registration.
- 5. Input injector adjustment value, and touch "ENTER". NOTE:

Input injector adjustment value is stored in CONSULT-III.

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

NOTE:

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

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

NOTE:

- In this step, CONSULT-III reads injector adjustment values stored in ECM and displays the values on the CONSULT-III screen. This is for checking if injector adjustment values are written onto ECM memory correctly.
- If DTC is detected, perform DTC Confirmation Procedure for the DTC, and check if the same DTC is detected again.

Fuel Pump Learning Value Clearing

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In order to always keep optimum fuel pressure in fuel rail, the ECM controls fuel pump in high precision with monitoring the signal of fuel rail pressure sensor.

Accordingly, the ECM always learns characteristic value of fuel pump. Fuel Pump Learning Value Clearing is an operation to clear the value of the fuel pump learning.

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

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

OPERATION PROCEDURE

NOTE:

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

(I) With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Select "PUMP LEARNT CLEAR" in "ACTIVE TEST" mode with CONSULT-III.
- 3. Touch "CLEAR" and wait a few seconds.
- 4. Make sure that "CMPLT" is displayed on CONSULT-III screen.

Without CONSULT-III

Fuel pump learning value can be erased from the back up memory in the ECM by the same operation as erasing DTC. In detail, refer to <u>EC-32, "Emission-Related Diagnostic Information"</u>.

EGR Volume Control Valve Closed Position Learning Value Clear

INFOID:000000003759310

EGR volume control valve closed position learning value should be cleared under the following cases.

- EGR volume control valve is removed.
- EGR volume control valve is replaced.

OPERATION PROCEDURE

NOTE:

Always perform the following procedure with engine coolant temperature 0 to 30°C (32 to 86°F).

- 1. Turn ignition switch ON.
- 2. Select "EGR/V LEARN CLR" in "WORK SUPPORT" mode with CONSULT-III.
- 3. Touch "CLEAR" and wait a few seconds.
- 4. Make sure the "CMPLT" is displayed on CONSULT-III screen.

EGR Volume Control Valve Closed Position Learning

INFOID:000000003759311

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

- EGR volume control valve is replaced.
- ECM is replaced.

OPERATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 10 seconds.
- Turn ignition switch OFF and wait at least 10 seconds. Make sure that EGR volume control valve moves during above 10 seconds by confirming the operating sound.

FUEL PUMP

INFOID:000000003844070

Components

< SERVICE INFORMATION >

[YD25DDTi]



Be careful not to spill fuel in the engine component. EC-25

< SERVICE INFORMATION >

- 5. Remove secondary timing chain. Refer to "TIMING CHAIN" in EM section.
- 6. Hold fuel pump sprocket and remove bolt.
- a. Insert the positioning stopper pin [SST (KV11106030)] into the hole 6 mm (0.24 in) in the diameter on the fuel pump sprocket.
- b. Using the TORX wrench [SST (KV11106040)], turn pump shaft little by little to adjust the position of fuel pump sprocket so that the holes align.
- c. Push the positioning stopper pin [SST (KV11106030)] through fuel pump sprocket to fuel pump body to hold fuel pump sprocket.
- Insert the positioning stopper pin until its flange contacts the fuel pump sprocket.

7. Using the hexagonal wrench [SST (KV11106050)] remove tightening bolts of fuel pump sprocket.









[YD25DDTi]

< SERVICE INFORMATION >

- 8. Using the sprocket holder [SST (KV11106060)], hold fuel pump sprocket to prevent falling.
 - Rework sprocket holder [SST (KV11106060)] to use, as shown in the figure.



KV11106060

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- When the sprocket holder is installed, if the positioning stopper pin [SST (KV11106030)] interferes, pull out the positioning stopper pin approximately 10 mm (0.39 in), then install it.
- After the sprocket holder is installed temporarily, tighten the sprocket holder after making extension bar and TORX socket (size: E10) (commercial service tool) insert into the machined bore.
- The length of the sprocket holder mounting bolts should be approximately 15 mm (0.59 in) (M6 thread length).
- · Check that the a- and b-faces of the sprocket holder contact the bottom side of the sprocket (small diameter side). **CAUTION:**

Never remove the sprocket holder [SST (KV11106060)] until fuel pump is installed.

• After the sprocket holder is installed, pull out the positioning stopper pin from fuel pump sprocket.



Using the extension bar and the TORX socket (size: E10) (commercial service tool), remove the tightening bolts. CAUTION:

Never disassemble or adjust fuel pump.



10. Remove the fuel pump toward the rear of engine. CAUTION: For removal, be careful not to drop the seal washer into the engine. NOTE:

The seal washer of the tightening bolts cannot be reused.

- 11. Remove adjusting shim.
- 12. Attach a suitable tool in the M8 bolt hole on coupling.

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- 13. Loosen sprocket nut with (KV11106040)].
- TORX wrench [SST

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[YD25DDTi]

Suitable puller Coupling

14. Remove coupling with a suitable puller.

15. Remove spacer from fuel pump.

16. Remove oil seal from spacer.

INSPECTION AFTER REMOVAL

Timing Chain

Check for cracks and excessive wear at roller links. Replace timing chain if necessary.





INSTALLATION

1. Install new oil seal to spacer.

2. Install spacer to fuel pump.

< SERVICE INFORMATION >

[YD25DDTi]

- 3. Install coupling to fuel pump of spacer.
 - Using the TORX wrench [SST (KV11106040)], tighten the sprocket nut to fix the coupling.



Install adjusting shim. • For shim adjustment, measure dimension L [Distance between

4.

- front surface of coupling and the fuel pump flange (spacer)] at two opposing points near the coupling bolt center. Use the average of these two measurements to select the shim grade that marked on adjusting shim.
- The shim adjustment is required only when the fuel pump is replaced.

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Part No. of adjusting shim Grade number		Measuring dimension L mm (in)	Туре	L
16614 8H800	0.5 t	39.23 - 39.77 (1.5445 - 1.5657)	А	•
16614 8H810	1.0 t	38.76 - 39.23 (1.5260 - 1.5445)	В	
16614 8H860	1.2 t	38.57 - 38.76 (1.5185 - 1.5260)	С	IVI
16614 8H820	1.6 t	38.18 - 38.57 (1.5031 - 1.5185)	D	-
16614 8H800 + 16614 8H860	0.5 t + 1.2 t	38.09 - 38.18 (1.4996 - 1.5031)	A + C	N
16614 8H810 + 16614 8H810	1.0 t + 1.0 t	37.80 - 38.09 (1.4882 - 1.4996)	B + B	-
16614 8H860 + 16614 8H810	1.2 t + 1.0 t	37.60 - 37.80 (1.4803 - 1.4882)	C + B	
16614 8H820 + 16614 8H810	1.6 t + 1.0 t	37.21 - 37.60 (1.4650 - 1.4803)	D + B	0

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#### < SERVICE INFORMATION >

5. Before fuel pump is installed, check that spacer and the 6 mm (0.24 in) dia. hole on coupling are aligned.

 Insert fuel pump to the mounting position from the rear side of the engine, and install the tightening bolts with seal washer.
 CAUTION:

Be careful not to drop the seal washer into engine.

- 7. Using the extension bar and the TORX socket (size: E10) (commercial service tool), tighten the tightening bolts of fuel pump.
- 8. Remove the sprocket holder [SST (KV11106060)].

- 9. Using the TORX wrench [SST (KV11106040)], turn the pump shaft gradually to adjust the position of fuel pump sprocket. Then, insert the positioning stopper pin [SST (KV11106030)] to the 6 mm (0.24 in) dia. hole of the fuel pump sprocket through the pump body.
- 10. Remove the TORX wrench [SST (KV11106040)].
- 11. Using the hexagonal wrench [SST (KV11106050)], tighten the sprocket tightening bolt.
  - When the washer of the fuel pump sprocket is removed, install it with the marking "F" (front) facing the front of the engine.
- 12. Pull out the positioning stopper pin [SST (KV11106030)].













< S	SERVICE INFORMATION >	[YD25DDTi]	
13. 14. a.	<ul> <li>Install secondary timing chain. Refer to "TIMING CHAIN" in EM section.</li> <li>Following steps below, install injection tube center. Refer to <u>EM-8</u>.</li> <li>Pre-set clip and insert rubber to injection tube center.</li> </ul>		А
b. c.	Pre-tight nut of injection tube center to fuel pump and fuel rail by hand. (until seal surface to Adjust clip dimension and tight bolt for clip to intake manifold by tool.	uched)	EC
а. e. 15.	Tight nut of injection tube center to fuel pump by tool. Tight nut of injection tube center to fuel rail by tool. . Connect the harness connector to fuel pump.		С
16. 17.	<ul> <li>Install fuel hoses. Refer to <u>EM-8</u>.</li> <li>Hereafter, install in the reverse order of removal.</li> <li>CAUTION:</li> </ul>		D
	When fuel pump is replaced with new one or another one, perform fuel pump leaning ing before starting engine. Refer to <u>EC-23, "Fuel Pump Learning Value Clearing"</u> .	value clean-	Е
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#### < SERVICE INFORMATION >

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

#### Introduction

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[YD25DDTi]

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	ISO Standard
Diagnostic Trouble Code (DTC)	Service \$03 of ISO 15031-5
Freeze Frame data	Service \$02 of ISO 15031-5
1st/2nd Trip Diagnostic Trouble Code (1st/2nd Trip DTC)	Service \$07 of ISO 15031-5
Calibration ID	Service \$09 of ISO 15031-5

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

×: Applicable —: Not applicable

	DTC	1st trip DTC	2nd trip DTC	Freeze Frame data
CONSULT-III	×	×	×	×
GST	×	×	×	×
ECM	×	×*	×*	—

*: When DTC and 1st/2nd trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other. The malfunction indicator (MI) on the instrument panel lights up when the same malfunction is detected in three consecutive trips (Three trip detection logic).

### Three Trip Detection Logic and One Trip Detection Logic

INFOID:000000003759316

On board diagnosis (OBD) system of this vehicle has "Three Trip Detection Logic" and "One Trip Detection Logic". For which logic each self-diagnosis corresponds with, refer to <u>EC-32</u>, "<u>Emission-Related Diagnostic Information</u>".

"Trip" of "Three Trip Detection Logic" means a driving mode in which the self-diagnosis is performed while driving.

#### THREE TRIP DETECTION LOGIC

When a malfunction is detected for the first time, 1st trip DTC is stored in the ECM memory. MI does not illuminate at this stage. <1st trip>

When the same malfunction is detected again during the next driving, 2nd trip DTC is stored in the ECM memory and 1st trip DTC is cleared from the ECM memory. MI does not illuminate at this stage. <2nd trip>

When the same malfunction is detected again at the third driving, DTC and Freeze Frame Data are stored in the ECM memory and 2nd trip DTC is cleared from the ECM memory. MI illuminates at the same time when DTC is stored. <3rd trip>

In other words, DTC and Freeze Frame Data are stored and MI illuminates when the same malfunction occurs in 3 consecutive trips.

This is called "Three Trip Detection Logic".

#### ONE TRIP DETECTION LOGIC

When a malfunction is detected for the first time, DTC and Freeze Frame Data are stored in the ECM memory and MI lights up. This is called "One Trip Detection Logic". Some self-diagnoses will not illuminate MI when DTC is stored. (Refer to <u>EC-32</u>, "<u>Emission-Related Diagnostic Information</u>".) 1st/2nd trip DTC is not stored for one trip detection logic.

Emission-Related Diagnostic Information

INFOID:000000003759317

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

#### < SERVICE INFORMATION >

X: Applicable —: Not applicable

DTC*1		li su s		MUCHER		Α
CONSULT-III GST* ²	ECM* ³	(CONSULT-III screen item)	Trip	up	Reference page	EC
U1000	1000* ⁴	CAN COMM CIRCUIT	1	_	<u>EC-83</u>	EC
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	_		_	С
P0016	0016	CMP/CKP RELATION	3	×	<u>EC-85</u>	-
P0088	0088	HIGH FUEL PRESS	3	×	<u>EC-87</u>	D
P0089	0089	FUEL PUMP	3	×	<u>EC-89</u>	-
P0093	0093	FUEL LEAK	3	×	<u>EC-91</u>	
P0101	0101	MAF SENSOR	3	×	<u>EC-94</u>	
P0102	0102	MAF SEN/CIRCUIT	3	×	<u>EC-103</u>	-
P0103	0103	MAF SEN/CIRCUIT	3	×	<u>EC-103</u>	F
P0112	0112	IAT SEN/CIRCUIT	3	×	<u>EC-111</u>	-
P0113	0113	IAT SEN/CIRCUIT	3	×	<u>EC-111</u>	-
P0117	0117	ECT SEN/CIRCUIT	3	×	<u>EC-115</u>	G
P0118	0118	ECT SEN/CIRCUIT	3	×	<u>EC-115</u>	-
P0122	0122	APP SEN 1/CIRCUIT	1	—	<u>EC-119</u>	Н
P0123	0123	APP SEN 1/CIRCUIT	1	—	<u>EC-119</u>	-
P0182	0182	FUEL TEMP SEN/CIRC	3	×	<u>EC-124</u>	-
P0183	0183	FUEL TEMP SEN/CIRC	3	×	<u>EC-124</u>	
P0192	0192	FRP SEN/CIRC	3	×	<u>EC-128</u>	-
P0193	0193	FRP SEN/CIRC	3	×	EC-128	
P0200	0200	INJECTOR	3	×	EC-132	0
P0201	0201	CYL1 INJECTOR	3	×	EC-133	-
P0202	0202	CYL2 INJECTOR	3	×	EC-133	K
P0203	0203	CYL3 INJECTOR	3	×	EC-133	-
P0204	0204	CYL4 INJECTOR	3	×	EC-133	
P0217	0217	ENG OVER TEMP	1	_	<u>EC-138</u>	L
P0222	0222	APP SEN 2/CIRCUIT	1	—	<u>EC-147</u>	-
P0223	0223	APP SEN 2/CIRCUIT	1	_	<u>EC-147</u>	M
P0335	0335	CKP SEN/CIRCUIT	3	×	<u>EC-152</u>	-
P0336	0336	CKP SENSOR	3	×	<u>EC-157</u>	
P0340	0340	CMP SEN/CIRCUIT	3	×	<u>EC-163</u>	N
P0341	0341	CMP SENSOR	3	×	<u>EC-168</u>	-
P0380	0380	GLOW RELAY	3	×	<u>EC-173</u>	0
P0403	0403	EGR SYSTEM	3	×	<u>EC-177</u>	-
P0405	0405	EGR SENSOR	3	×	<u>EC-184</u>	-
P0406	0406	EGR SENSOR	3	×	<u>EC-184</u>	Ρ
P0409	0409	EGR SYSTEM	3	×	<u>EC-190</u>	-
P0488	0488	EGR SYSTEM	3	×	<u>EC-196</u>	_
P0563	0563	BATTERY VOLTAGE	1	_	EC-201	_
P0606	0606	ECM	3	×	EC-203	_
P0628	0628	FUEL PUMP/CIRC	3	×	EC-205	_

#### < SERVICE INFORMATION >

#### [YD25DDTi]

DTC*1		14			
CONSULT-III GST* ²	ECM* ³	(CONSULT-III screen item)	Trip	up	Reference page
P0629	0629	FUEL PUMP/CIRC	3	×	<u>EC-205</u>
P0642	0642	SENSOR PWR/CIRC1	3	×	<u>EC-210</u>
P0643	0643	SENSOR PWR/CIRC1	3	×	<u>EC-210</u>
P0652	0652	SENSOR PWR/CIRC2	3	×	<u>EC-214</u>
P0653	0653	SENSOR PWR/CIRC2	3	×	<u>EC-214</u>
P0668	0668	ECM	3	×	<u>EC-218</u>
P0669	0669	ECM	3	×	<u>EC-218</u>
P0686	0686	ECM RELAY	1	—	<u>EC-220</u>
P1268	1268	INJECTOR 1	1	—	<u>EC-227</u>
P1269	1269	INJECTOR 2	1	—	<u>EC-227</u>
P1270	1270	INJECTOR 3	1	—	<u>EC-227</u>
P1271	1271	INJECTOR 4	1	—	<u>EC-227</u>
P1272	1272	FRP RELIEF VALVE	3	×	<u>EC-234</u>
P1273	1273	FUEL PUMP	3	×	<u>EC-234</u>
P1274	1274	FUEL PUMP	1	×	EC-234
P1275	1275	FUEL PUMP	1	×	<u>EC-234</u>
P1610	1610	LOCK MODE	1	—	EL-102
P1611	1611	ID DISCORD, IMM-ECM	1	—	EL-103
P1612	1612	CHAIN OF ECM-IMMU	1	—	<u>EL-103</u>
P1614	1614	CHAIN OF IMMU-KEY	1	—	<u>EL-105</u>
P1615	1615	DIFFERENCE OF KEY	1	—	<u>EL-106</u>
P1616	1616	ECM	1	—	<u>EL-106</u>
P1622	1622	INJ ADJ VAL UNRGST	1	—	<u>EC-254</u>
P1623	1623	INJ ADJ VAL ERROR	1	—	<u>EC-255</u>
P2135	2135	APP SENSOR	1	—	<u>EC-257</u>
P2146	2146	INJ PWR/CIRC	3	×	<u>EC-262</u>
P2147	2147	INJECTOR/CIRC	3	×	<u>EC-266</u>
P2148	2148	INJECTOR/CIRC	3	×	<u>EC-266</u>
P2149	2149	INJ PWR/CIRC	3	×	EC-262
P2228	2228	BARO SEN/CIRC	3	×	<u>EC-271</u>
P2229	2229	BARO SEN/CIRC	3	×	<u>EC-271</u>

*1: 1st trip DTC No. and 2nd trip DTC No. are the same as DTC No.

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

*3: In Diagnostic Test Mode II (Self-diagnostic results).

*4: The troubleshooting for this DTC needs CONSULT-III.

#### DTC AND 1ST/2ND TRIP DTC

The number of 1st/2nd trip DTC is the same as the number of DTC.

When a malfunction is detected during 1st trip, 1st trip DTC is stored in the ECM memory. MI does not illuminate at this time. When the same malfunction is detected in the next trip (2nd trip), 2nd trip DTC is stored in the ECM memory and 1st trip DTC is cleared from the ECM memory. MI does not illuminate at this time. In addition, DTC is stored in the ECM memory and MI lights up when the same malfunction is detected during the following consecutive trip (3rd trip).

The procedure for erasing DTC, 1st trip DTC, and 2nd trip DTC from the ECM memory is described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION".

#### < SERVICE INFORMATION >

For malfunctions in which 1st/2nd trip DTC are displayed, Refer to "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS".

1st/2nd trip DTC is specified in Service \$07 of ISO15031-5. 1st/2nd trip DTC detection occurs without lighting up MI and therefore does not warn the driver of a malfunction.

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

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

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

#### With CONSULT-III

#### (G) With GST

CONSULT-III or GST (Generic Scan Tool): Examples: P0117, P0335, P1268, etc.

These numbers are prescribed by ISO 15031-6.

(CONSULT-III also displays the malfunctioning parts and systems.)

À sample of CONSULT-III display for DTC and 1st/2nd trip DTC is shown in the figure. DTC and 1st/2nd trip DTC are displayed in the "SELF-DIAG RESULTS" mode of CONSULT-III.

"TIME" data shows how many times the vehicle was driven after the last detection of DTC or 1st/2nd trip DTC. When DTC or 1st/2nd trip DTC has been detected currently, "TIME" becomes "0".

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

#### FREEZE FRAME DATA

ECM records driving conditions such as calculated load value, engine coolant temperature, engine speed, ^H vehicle speed, and intake manifold pressure at the moment a malfunction is detected.

The data stored together with DTC is called Freeze Frame Data, and is displayed on CONSULT-III or GST. When 1st/2nd trip DTC is detected, Freeze Frame Data is not recorded.

Only a set of Freeze Frame Data can be stored in the ECM memory. When ECM records Freeze Frame Data, and another Freeze Frame Data is generated after that, the first (original) Freeze Frame Data is not updated in ECM and it remains.

When the DTC is erased from ECM memory, Freeze Frame Data is erased with DTC. The procedure for erasing DTC is described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION".

#### HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC and 1st Trip DTC

# 🕘 WITH CONSULT-III

#### 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.
- 1. Select "ENGINE" with CONSULT-III.
- 2. Select "SELF-DIAG RESULTS".
- 3. Touch "ERASE". (DTC in ECM will be erased.)

#### 🚳 WITH GST

#### 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.

B NO TOOLS 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.
- If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.
- The following data are cleared when the ECM memory is erased.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- 2nd trip diagnostic trouble codes
- Freeze frame data

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#### < SERVICE INFORMATION >

[YD25DDTi]

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

#### NATS (Nissan Anti-Theft System)

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- If the security indicator lights up with the ignition switch in the ON position or "NATS MALFUNC-TION" is displayed on "SELF-DIAG RESULTS" screen, perform self-diagnostic results mode with CONSULT-III using NATS program card. Refer to <u>EL-95</u>.
- Confirm no self-diagnostic results of NATS is displayed before touching "ERASE" in "SELF-DAIG RESULTS" mode with CONSULT-III.
- When replacing ECM, initialization of NATS system and registration of all NATS ignition key IDs must be carried out with CONSULT-III using NATS program card. Therefore, be sure to receive all keys from vehicle owner. Regarding the procedure of NATS initialization and all NATS ignition key ID registration, refer to CONSULT-III operation manual, NATS.

Malfunction Indicator (MI)

#### DESCRIPTION

The MI is located on the instrument panel.

- The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check. If the MI does not light up, refer to <u>EC-296</u>.
- When the engine is started, the MI should go off. If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



#### ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following three functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position	BULB CHECK	This function checks the MI bulb for damage (blown, open circuit, etc.). If the MI does not come on, check MI circuit. (See <u>EC-296</u> .)
	Engine running	MALFUNCTION WARNING	This is a usual driving condition. When ECM detects a mal- function, the MI will light up to inform the driver that a mal- function has been detected.
Mode II	Ignition switch in ON position	SELF-DIAGNOSTIC RESULTS	This function allows DTCs to be read.

HOW TO SWITCH DIAGNOSTIC TEST MODE **NOTE**:
### < SERVICE INFORMATION >

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.

• Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.

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

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



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

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

### DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MI on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to <u>EC-296</u>.

### DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

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

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

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

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### < SERVICE INFORMATION >

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



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

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

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

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See <u>EC-32</u>, "Emission-Related Diagnostic Information".)

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

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to "How to Erase Diagnostic Test Mode II (Self-diagnostic Results)".

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

## OBD System Operation Chart

INFOID:000000003759320

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

- When the malfunction is detected for the first time, 1st trip DTC is stored in the ECM memory.
- When the same malfunction is detected during 2nd consecutive trip, 2nd trip DTC is stored and 1st trip DTC is cleared.
- When the same malfunction is detected during 3rd consecutive trip, DTC and Freeze Frame Data are stored and MI illuminates. Refer to <u>EC-32</u>, "<u>Three Trip Detection Logic and One Trip Detection Logic</u>" for details.1st/2nd trip DTC are cleared from the ECM memory.
- MI will go off after the vehicle is driven 3 consecutive times with no malfunction (driving pattern A).
- 1st/2nd trip DTC, DTC, and Freeze Frame Data will be stored until the vehicle is driven 41 times (driving pattern B) without the same malfunction recurring. "TIME" data displayed in the "SELF-DIAG RESULTS" mode of CONSULT-III shows the number of times the vehicle is driven without the same malfunction recurring.

### SUMMARY CHART

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

Refer to "RELATIONSHIP BETWEEN MI, DTC, 1ST/ 2NDTRIP DTC AND DRIVING PATTERNS" for details of pattern A and B.

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

### < SERVICE INFORMATION >

[YD25DDTi]



- The A counter will be cleared when the same malfunction is detected.
- The A counter will be counted up when the same malfunction is not detected.

**EC-39** 

• The MI will go off when the A counter reaches 3.

<Driving Pattern B>

#### < SERVICE INFORMATION >

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



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

Trouble Diagnosis Introduction

### INTRODUCTION

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

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

A visual check only may not find the cause of the incidents. A road test with CONSULT-III (or GST) or a circuit tester connected should be performed. Follow the "WORK FLOW".

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A Diagnostic Worksheet like the example on "WORK FLOW" should be used.

Start your diagnosis by looking for conventional incidents first. This will help troubleshoot driveability incidents on an electronically controlled engine vehicle.

WORK FLOW







## [YD25DDTi]

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### < SERVICE INFORMATION >

[YD25DDTi]

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CHECK INCIDENT COND	ITIONS.	
r	•	
CHECK DTC AND FREEZ Check and PRINT OUT (w Paste it on repair order sh	<b>E FRAME DATA.</b> rrite down) (1st/2nd trip) DTC and Freeze Frame Data (Pre-ch neet. Then clear. Also check related service bulletins for inform	eck)*1.s nation.
Symptoms collected.	. No symptoms, except MI lights up, or (1st/2nd trip) DTC exists at STEP	
Verify the symptom by driv	ving in the condition the customer described.	} ^{*2} .8
Normal Code (at STEP II)	Malfunction Code (at STEP II)	
	•	<b>↓</b>
INCIDENT CONFIRMATIC	DN	*2.8
Verify the DTC by perform	ing the DTC Confirmation Procedure.	
	ļ	
Choose the appropriate ad	ction.	}* <u>3</u> .e
Malfunction Code (at STE	EP II or IV) Normal Code (at both STEP II and IV)	]
	<b></b>	1
	BASIC INSPECTION	
	SYMPTOM BASIS (at STEP I or III)	
	Perform inspections according to Symptom Matrix Chart.	Г I
		]
	↓	1
TROUBLE DIAGNOSIS FO	DR DTC PXXXX.	]*4
TROUBLE DIAGNOSIS FO	DR DTC PXXXX.	]*4 5
TROUBLE DIAGNOSIS FO	DR DTC PXXXX.	]*4 s
TROUBLE DIAGNOSIS FO	DR DTC PXXXX.	]*4S
	DR DTC PXXXX.	]*4 ]
G G G G G G G G G G G S Confirm that the incident i Confirmation Procedure (c (already fixed) (1st/2nd tri	DR DTC PXXXX. REPAIR/REPLACE s completely fixed by performing BASIC INSPECTION and DT pr OVERALL FUNCTION CHECK). Then, erase the unnecessa p) DTCs in ECM.	]•4s
G FINAL CHECK Confirm that the incident i Confirmation Procedure (c (already fixed) (1st/2nd tri	DR DTC PXXXX. REPAIR/REPLACE s completely fixed by performing BASIC INSPECTION and DT or OVERALL FUNCTION CHECK). Then, erase the unnecessa p) DTCs in ECM. OK	]*4S
G G G G G G G G FINAL CHECK Confirm that the incident i Confirmation Procedure (c (already fixed) (1st/2nd tri	S completely fixed by performing BASIC INSPECTION and DT or OVERALL FUNCTION CHECK). Then, erase the unnecessa p) DTCs in ECM.	]*4S ] C ry

SULTS" is other than "0", perform <u>EC-70</u>.

form <u>EC-70</u>.

n cannot be performed, check main power supply and ground circuit. Refer to <u>EC-71</u>.

*4 If malfunctioning part cannot be detected, perform EC-70.

Description for Work Flow

### < SERVICE INFORMATION >

[YD25DDTi]

STEP	DESCRIPTION	Α
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DI-AGNOSTIC WORK SHEET".	
STEP II	Before confirming the concern, check and write down (print out using CONSULT-III or GST) the (1st/2nd trip) DTC and the freeze frame data (When 1st/2nd trip DTC is detected, Freeze Frame Data is not recorded.), then erase the DTC and the data. (Refer to EC-32, "Emission-Related Diagnostic Information".) The (1st/2nd trip) DTC and the freeze frame data can be used when duplicating the incident at STEP III & IV. If the incident cannot be verified, perform EC-70. Study the relationship between the cause, specified by (1st/2nd trip) DTC, and the symptom described by the customer. (The Symptom Matrix Chart will be useful. See EC-48, "Symptom Matrix Chart".) Also check related service bulletins for information.	C
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The DIAGNOSTIC WORK SHEET and the freeze frame data are useful to verify the incident. Connect CONSULT-III to the vehicle and check real time diagnosis results. If the incident cannot be verified, perform $\underline{EC-70}$ . If the malfunction code is detected, skip STEP IV and perform STEP V.	E
STEP IV	Try to detect the (1st/2nd trip) DTC by driving in (or performing) the DTC Confirmation Procedure. Check and read the (1st/2nd trip) DTC and freeze frame data by using CONSULT-III or GST. If the incident cannot be verified, perform $\underline{\text{EC-70}}$ . In case the DTC Confirmation Procedure is not available, perform the Overall Function Check instead. The (1st/2nd trip) DTC cannot be displayed by this check, however, this simplified check is an effective alternative. The NG result of the Overall Function Check is the same as the (1st/2nd trip) DTC detection.	F
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to <u>EC-45</u> , " <u>Basic Inspection</u> ".) Then per- form inspections according to the Symptom Matrix Chart. (Refer to <u>EC-48</u> , " <u>Symptom Matrix Chart</u> ".)	Н
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) Harness Layouts. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-III. Refer to <u>EC-57</u> , <u>"ECM Terminal and Reference Value"</u> , <u>EC-68</u> , <u>"CONSULT-III Reference Value in Data Monitor Mode"</u> . The Diagnostic Procedure in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to <u>"SERVICE INFORMATION FOR ELECTRICAL INCIDENT"</u> . Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform <u>EC-70</u> .	l J K
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the DTC Confirmation Procedure and confirm the normal code [DTC No. P0000] is detected. If the incident is still detected in the final check, perform STEP VI by using a method different from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st/2nd trip) DTC in ECM. (Refer to EC-32, "Emission-Related Diagnostic Information".)	L

### DIAGNOSTIC WORK SHEET

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate. In general, each customer feels differently about an incident. It is important to fully understand the symptoms or conditions for a cus-

important to fully understand the symptoms or conditions for a customer complaint. Utilize a diagnostic worksheet like the one shown below in order to

organize all the information for troubleshooting.

KEY POINTS	Ν
<ul> <li>WHAT Vehicle &amp; engine model</li> <li>WHEN Date, Frequencies</li> <li>WHERE Road conditions</li> <li>HOW Operating conditions, Weather conditions, Symptoms</li> </ul>	O
SEF907L	

## < SERVICE INFORMATION >

### Worksheet Sample

Customer na	me MR/MS	Model & Year	VIN						
Engine #		Trans.	Mileage						
Incident Date	)	Manuf. Date	In Service Date						
	☐ Startability	Impossible to start	tion  Partial combustion nrottle position is cool ers [ ]						
Symptoms	Idling	☐ No fast idle ☐ Unstable ☐ H ☐ Others [	High idle 🔲 Low idle ]						
	Driveability	Stumble Surge Knock Others [	☐ Lack of power ]						
	Engine stall	At the time of start       While idling         While accelerating       While dece         Just after stopping       While load	g elerating ing						
Incident occurrence		☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime							
Frequency		☐ All the time ☐ Under certain conditions ☐ Sometimes							
Weather con	ditions	□ Not affected							
	Weather	Fine Raining Snowing	Others [ ]						
	Temperature	🗌 Hot 🗌 Warm 🗌 Cool 🗌	] Cold 🔲 Humid °F						
Engine condi	tiono	Cold During warm-up	After warm-up						
		Engine speed            0         2,000	4,000 6,000 8,000 rpm						
Road condition	ons	🗌 🗌 In town 🗌 In suburbs 🗌 Hig	hway 🛛 Off road (up/down)						
Driving conditions		<ul> <li>Not affected</li> <li>At starting</li> <li>While idling</li> <li>While accelerating</li> <li>While cruis</li> <li>While decelerating</li> <li>While turni</li> </ul>	☐ At racing ing ng (RH/LH)						
		Vehicle speed             0         10         20	 30 40 50 60 MPH						
Malfunction in	ndicator	Turned on Not turned on							

## **DTC Inspection Priority Chart**

INFOID:000000003759322

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

### < SERVICE INFORMATION >

Data		
Priority	Detected items (DTC)	А
1	U1000 CAN communication line	
	<ul> <li>P0016 Crankshalt position - camshalt position correlation</li> <li>P0101 P0102 P0103 Mass air flow sensor</li> </ul>	
	P0112 P0113 Intake air temperature sensor	EC
	P0117 P0118 Engine coolant temperature sensor	
	P0122 P0123 P0222 P0223 P2135 Accelerator pedal position sensor     P0182 P0183 Fuel number temperature sensor	0
	P0192 P0193 Fuel rail pressure sensor	C
	P0335 P0336 Crankshaft position sensor	
	P0340 P0341 Camshaft position sensor     P0562 Pottory voltage	D
	<ul> <li>P0606 P0668 P0669 ECM</li> </ul>	D
	P0642 P0643 P0652 P0653 Sensor power supply	
	P1610 - P1616 NATS     P1622 Director of instruction	F
	<ul> <li>Prozz Prozz Prozz Injector adjustment value</li> <li>P2228 P2229 Barometric pressure sensor</li> </ul>	
2	P0089 P0628 P0629 P1272 - P1275 Fuel nump	
-	<ul> <li>P0200 - P0204 P1268 - P1271 P2146 - P2149 Fuel injector</li> </ul>	F
	P0380 Glow relay	
	P0405 P0406 EGR volume control valve control position sensor     P0686 ECM relay	
3	P0088 P0093 Fuel system	G
0	P0217 Engine over temperature (OVERHEAT)	
	P0403 P0409 P0488 EGR function	
Basic Ins	pection	Н
<ul> <li>Perform Ba</li> <li>Headlamp</li> <li>For vobiol</li> </ul>	asic Inspection without electrical or mechanical loads applied. p switch is OFF.	Ι
<ul> <li>Por verificities</li> <li>engine no</li> <li>Apply part</li> <li>Set lightin</li> </ul>	it to illuminate headlamps. king brake a switch to the 1st position	J
Air condi	tioner switch is OFF.	
Rear defo	ogger switch is OFF.	K
<ul> <li>Steering</li> </ul>	wheel is in the straight-ahead position, etc.	
		I
1.INSPEC ⁻	TION START	
1. Checks	service records for any recent repairs that may indicate a related malfunction.	
2. Check t	the current need for scheduled maintenance, especially for fuel filter and air cleaner filter. Refer to	$\mathbb{M}$
<u>MA-3</u> (F	For Europe), <u>MA-8</u> (For Australia).	
3. Open e	ngine hood and check the following:	
	s connectors for improper connections	Ν
- Wiring f	for improper connections, pinches, or cuts	
4. Start er	ngine and warm it up to the normal operating tempera-	
ture.	THE TOWN	0
>>	GO TO 2.	_
		Р
	SEF142I	

2. PREPARATION FOR CHECKING IDLE SPEED

### < SERVICE INFORMATION >

With CONSULT-III
 Connect CONSULT-III to the data link connector.
 Without CONSULT-III
 Install diesel tacho tester to the vehicle.

>> GO TO 3.

3.CHECK IDLE SPEED

### With CONSULT-III

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

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

#### **Without CONSULT-III**

Read idle speed.

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

#### OK or NG

OK >> INSPECTION END

NG >> GO TO 4.

**4.**CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

#### OK or NG

OK >> GO TO 5.

NG >> Repair or replace.

**5.**BLEED AIR FROM FUEL SYSTEM

1. Stop engine.

2. Use priming pump to bleed air from fuel system. Refer to EC-22, "Fuel Filter".

>> GO TO 6.

## 6.CHECK IDLE SPEED AGAIN

## With CONSULT-III

- 1. Start engine and let it idle.
- 2. Select "ČKPS·RPM (TDC)" in "DATA MONITOR" mode with CONSULT-III.
- 3. Read idle speed.

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

Without CONSULT-III Read idle speed.

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

OK or NG

OK >> INSPECTION END

NG >> GO TO 7.

**/**.DRAIN WATER FROM FUEL FILTER

Drain water from fuel filter. Refer to EC-22, "Fuel Filter".

>> GO TO 8. 8.CHECK IDLE SPEED AGAIN

< SERVICE INFORMATION >	[YD25DDTi]
<ol> <li>With CONSULT-III</li> <li>Start engine and let it idle.</li> <li>Select "CKPS-RPM (TDC)" in "DATA MONITOR" mode with CONSULT-III.</li> <li>Read idle speed.</li> </ol>	A
M/T: 750±25 rpm (in Neutral position)	EC
Without CONSULT-III Read idle speed.	С
M/T: 750±25 rpm (in Neutral position)	
OK or NG	D
OK >> INSPECTION END NG >> GO TO 9.	
9. CHECK AIR CLEANER FILTER	E
Check air cleaner filter for clogging or breaks.	
$\frac{OK \text{ or } NG}{OK} >> GO TO 10$	F
NG >> Replace air cleaner filter.	
10.check battery voltage	G
Check battery voltage.	
Voltage: More than 12.13 V	Н
OK or NG	
NG >> GO TO 11.	I
11.CHECK BATTERY	
Refer to <u>EL-12</u> .	J
OK or NG OK >> Check charging system. Refer to "BATTERY" in EL section. NG >> Repair or replace.	K
12. CHECK COMPRESSION PRESSURE	
Check compression pressure. Refer to "MEASUREMENT OF COMPRESSION PRESSURE" i	n EM section.
OK or NG OK >> GO TO 13.	
NG >> Follow the instruction of "CHECKING COMPRESSION PRESSURE".	M
<b>13.</b> CHECK IDLE SPEED AGAIN	
<ul> <li>With CONSULT-III</li> <li>Start engine and let it idle.</li> <li>Select "CKPS·RPM (TDC)" in "DATA MONITOR" mode with CONSULT-III.</li> <li>Read idle speed.</li> </ul>	N
M/T: 750±25 rpm (in Neutral position)	0
Without CONSULT-III	D
Read idle speed.	F
M/T: 750±25 rpm (in Neutral position)	
OK or NG	
OK >> INSPECTION END NG >> 1. Replace fuel injector. 2. GO TO 3.	

## < SERVICE INFORMATION >

## Symptom Matrix Chart

INFOID:000000003759325

	SYMPTOM												age	
		HARD/NO START/RESTART	(EXCP. HA)		ENGINE STALL									Reference p
SYSTEM — Basic engine control system	NO START (with first firing)	NO START (without first firing)	HARD TO START WHEN ENGINE IS COLD	HARD TO START WHEN ENGINE IS HOT	AT IDLE	DURING DRIVING	WHEN DECELERATING	HESITATION/SURGING/FLAT SPOT	KNOCK/DETONATION	ACK OF POWER	POOR ACCELERATION	HI IDLE	LOW IDLE	
Warranty symptom code		A	AA		AB			AC	AD	A	ΝE	A	١F	
Fuel pump	5	5	5	5	5	5	5	5		5	5		5	_
Fuel filter	1	1	1	1						1				<u>EC-22</u>
Fuel injector	3	3	3	3	3	3	3	3	3	4	4	3	3	<u>EC-133</u>
Glow control system	1	1	1	1					1					<u>EC-273</u>
Engine body	3	3	3	3	3	3	3		3	4	4		3	<u>EM-18</u>
EGR system										3	3			<u>EC-177,</u> <u>EC-190,</u> <u>EC-196</u>
Air cleaner and duct										3	3			Refer to Service Manual
Fuel rail pressure relief valve	3	3	3	3	3	3	3	3		3	3		3	<u>EC-91</u>

### < SERVICE INFORMATION >

## [YD25DDTi]

SYSTEM — Basic engine control system	Reference pa	EC
SYSTEM – Basic engine control system	Rei	EC C
SYSTEM — Basic engine control system		С
SYSTEM — Basic engine control system		
		D
a) define is i define is i define is i		E
first firing) out first firing T WHEN EN RGING/FLA RGING/FLA RTION		F
ART (with ART (with TO STAR1 TO STAR1 TO STAR1 ATION/SU ATION/SU ATION/SU ACCELEF E	DLE	G
NO ST HARD HARD DURIN HESIT HESIT HESIT HIDL	LOWI	Н
Warranty symptom code     AA     AB     AC     AD     AE     AI	λF	
Fuel pump circuit         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4	4 <u>EC-2</u>	05
Fuel injector circuit         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1	1 <u>EC-1</u>	<u>33</u>
Fuel injector adjustment value     1     1     1     1	<u>EC-2</u>	<u>22</u>
Mass air flow sensor circuit   1   1   1	<u>EC-9</u> EC-1	<u>14,</u> 03
Engine coolant temperature circuit    1    1    1    1	1 <u>EC-1</u>	<u>15</u>
Vehicle speed signal circuit     1	<u>EL-1</u>	<u>11</u> K
Accelerator pedal position sensor circuit	EC-11 EC-14 EC-23	<u>19,</u> <u>47,</u> <u>57</u> ∟
Q         Fuel rail pressure sensor circuit         1         1         1         1         1	<u>EC-1</u>	28
Crankshaft position sensor circuit     1     1     1     1     1     1     1	<u>EC-1</u> <u>EC-1</u>	<u>52,</u> M <u>57</u>
Camshaft position sensor circuit 3 3 3	<u>EC-16</u> EC-1	<u>63,</u> <u>68</u>
^{III} Start signal circuit         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1 <td><u>EC-2</u></td> <td><u>.93</u></td>	<u>EC-2</u>	<u>.93</u>
Ignition switch circuit     1     1     1     1	<u>EC-7</u>	<u>71</u>
Heat up switch circuit   1	<u>EC-2</u>	<u>.80</u> O
Power supply for ECM circuit   1   1   1   1	<u>EC-7</u>	71
Cooling fan relay circuit	<u>EC-1</u>	38
Glow relay circuit         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1 <th1< th="">         1         <th1< th=""></th1<></th1<>	<u>EC-1</u>	<u>73</u> P
ECM relay (Self-shutoff) circuit   1   1   1   1	<u>EC-2</u>	<u>20</u>
ECM 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 <u>EC-20</u> <u>EC-20</u> <u>EC-20</u>	<u>03,</u> 18, 71
	1 1	

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

## < SERVICE INFORMATION >

(continued on next table)

			age									
SYSTEM — Basic engine control system			IDLE	NE COOLANT TEMPERATURE	SUMPTION	UMPTION		ABNORMAL SMOKE COLOR		ites.	-T-III?	Reference ps
	ROUGH IDLE/HUNTING	SLOW/NO RETURN TO	OVERHEAT/HIGH ENGI	EXCESSIVE FUEL CON	EXCESSIVE OIL CONSI	BLACK SMOKE	WHITE SMOKE	DEAD BATTERY (UNDE	Ifunction indicator illumina	n be detected by CONSUI		
Warranty symptom code	AG	AH	AJ	AK	AL	AM	A	P	HA	Ma	Ca	
Fuel pump	5	5	5		5		5			1	1	_
Fuel filter							1					<u>EC-22</u>
Fuel injector	3	3	3		4		4	4		1	1	EC-133
Glow control system								1				EC-273
Engine body		3	3	3	3	1		3				<u>EM-18</u>
EGR system							3					<u>EC-177,</u> <u>EC-190,</u> <u>EC-196</u>
Air cleaner and duct							3					Refer to Service Manual
Fuel rail pressure relief valve	3	3	3		3		3			1	1	EC-91

### < SERVICE INFORMATION >

## [YD25DDTi]

			SYMPTOM										age	^
SYSTEM — Basic engine control system				ш	COOLANT TEMPERATURE	APTION	NOIL		BINORIMAL SMUCHE COLOR	HARGE)		신	Reference p	EC C
		U			INE	NSU	SUMF	~	₹ 	ERO	ates.	JLT-II		D
		-E/HUNTIN	RATION	RETURN TO	/HIGH ENG	E FUEL COI	E OIL CONS	OKE	OKE	ΓERΥ (UND	cator illumin	d by CONSL		E
		ROUGH IDI	IDLING VIB	SLOW/NO	OVERHEAT	EXCESSIV	EXCESSIV	BLACK SM	WHITE SM	DEAD BAT	alfunction indi	In be detected		F
Warı	anty symptom code	AG	AH	AJ	AK	AL	AM	ŀ	١P	HA	Ř	ပိ		- C
	Fuel pump circuit	4	4	4		4					1	1	<u>EC-239</u>	G
	Fuel injector circuit	1	1	1		1		1	1		1	1	<u>EC-133</u>	-
	Fuel injector adjustment value	1	1			1		1	1			1	<u>EC-22</u>	Н
	Mass air flow sensor circuit							1			1	1	<u>EC-94,</u> <u>EC-103</u>	
	Engine coolant temperature circuit	1	1		1			1			1	1	<u>EC-115</u>	
	Vehicle speed signal circuit										1	1	<u>EL-111</u>	_
	Accelerator pedal position sensor circuit			1							1	1	<u>EC-119,</u> <u>EC-147,</u> <u>EC-257</u>	J
ROL	Fuel rail pressure sensor circuit							1			1	1	<u>EC-128</u>	_
CONT	Crankshaft position sensor circuit	1	1								1	1	<u>EC-152,</u> <u>EC-157</u>	K
NGINE	Camshaft position sensor circuit										1	1	<u>EC-163,</u> <u>EC-168</u>	L
ш	Start signal circuit												<u>EC-293</u>	_
	Ignition switch circuit												<u>EC-71</u>	- 1.4
	Heat up switch circuit												<u>EC-280</u>	IVI
	Power supply for ECM circuit										1	1	<u>EC-71</u>	_
	Cooling fan relay circuit				2								<u>EC-138</u>	N
	Glow relay circuit								1				<u>EC-173</u>	_
	ECM relay (Self-shutoff) circuit											1	<u>EC-220</u>	~
	ECM	2	2	2	2	2	2	2	2	2	2	2	<u>EC-203,</u> <u>EC-218,</u> <u>EC-271</u>	0
NAT	S (Nissan Anti-theft System)											1	<u>EL-95</u>	Ρ

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

### < SERVICE INFORMATION >

Engine Control Component Parts Location

INFOID:000000003759326

[YD25DDTi]





- 1. Fuel pump temperature sensor 2.
- 4. Fuel rail pressure sensor

2. Fuel pump

- 3. Fuel rail pressure relief valve
- EC-52

### < SERVICE INFORMATION >

### [YD25DDTi]

А

EC

С

D

Ε

F

G

Н

J

Κ

L

Μ

Ν

Ο

Ρ



1. Glow relay

2. Engine coolant temperature sensor

: Vehicle front



- 1. Mass air flow sensor
- $\triangleleft$ : Vehicle front

2. Fuel injector



- 1. Glow plug connecting plate
- 2. Glow plug



: Vehicle front



- 1. Camshaft position sensor
- 2. Crankshaft position sensor

 $\triangleleft$ : Vehicle front

EC-53

### < SERVICE INFORMATION >



1. ECM

2. PNP switch

3. PNP switch harness connector

∠ : Vehicle front



- 1. Cooling fan motor connector

- 2. Cooling fan motor
- 3. Heat up switch



1. Accelerator pedal position sensor 2. Stop lamp switch

### < SERVICE INFORMATION >



### < SERVICE INFORMATION >



GEC596A

### < SERVICE INFORMATION >

## ECM Harness Connector Terminal Layout



## ECM Terminal and Reference Value

### PREPARATION

- 1. ECM (1) is located behind the instrument lower panel.
- 2. Remove ECM cover.



- 4. Connect a break-out box and Y-cable adapter between the ECM and ECM harness connector.
  - Use extreme care not to touch 2 pins at one time.
  - Data is for comparison and may not be exact.



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#### ECM INSPECTION TABLE

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

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### < SERVICE INFORMATION >

TERMINAL NO. (Wire color)		Description	Description Condition	
+	_	Signal name		(Applox.)
1 (B) 2 (B) 3 (B)	_	ECM ground	_	_
4 (L)	114	Fuel injector power supply (For cylinder No. 1 and 3)	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 7.5 V ★
5 (P)	(B)	Fuel injector power supply (For cylinder No. 2 and 4)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 8.0 V ★
7 (OR)	114 (B)	EGR volume control valve (Close)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)
8 (Y)	114 (B)	EGR volume control valve (Open)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)

### < SERVICE INFORMATION >

TERMINAL NO. (Wire color)		Description	Condition	Value	А
+	-	Signal name		(Approx.)	
10	114	Fuel pump	[Engine is running] • Warm-up condition • Idle speed	Approximately 5.8 V ★	
(G) (B)	(B)	Fuel pump	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 5.5 V ★	
13	114	Heat up switch	[Ignition switch ON] <ul> <li>Heat up switch: OFF</li> </ul>	Approximately 0 V	3
(BR)	(B)	Heat up switch	<ul><li>[Ignition switch ON]</li><li>Heat up switch: ON</li></ul>	BATTERY VOLTAGE (11 - 14 V)	
21 (Y)		Fuel injector No. 4	[Engine is running] • Warm-up condition	Approximately 7.5 V ★	-
22 (R) 114	Fuel injector No. 4	<ul> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	▶ 10.0 V/Div 20 ms/Div T MBIB1297E	J	
23 (W)	(В)	Fuel injector No. 2		Approximately 8.0 V ★	<
24 (OR)	24 (OR)	Fuel injector No. 2	[Engine is running]• Warm-up condition• Engine speed: 2,000 rpm	▶ 10.0 V/Div 20 ms/Div T MBIB1298E	_
				Approximately 0.3 V ★	/
	114		[Engine is running] • Warm-up condition • Idle speed	→ 1.0 V/D/v 5 ms/D/v MBIB0887E	0
(B)	(B)	Fuel pump	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 0.3 V ★	C

### < SERVICE INFORMATION >

(Wire color)		Description	Condition	Value	
+	-	Signal name		(πρριοχ.)	
37 (L)	114 (B)	Glow relay	Refer to <u>EC-173</u> .		
40 (G)		Fuel injector No. 3	[Engine is running] • Warm-up condition • Idle speed	Approximately 7.5 V ★	
41 (BR)	114 (B)	Fuel injector No. 3	NOTE: The pulse cycle changes depending on rpm at idle	► 10.0 V/Div 20 ms/Div T MBIB1297E	
42 (PU)	В	Fuel injector No. 1		Approximately 8.0 V ★	
43 (SB)		Fuel injector No. 1	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	≥ 10.0 V/D/v 20 ms/D/v T MBIB1298E	
45 (W)	66 (B)	Camshaft position sensor power supply	[Ignition switch ON]	Approximately 5 V	
46	65	Crankshaft position sensor	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 3.5 V ★	
(G)	(Y)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 3.5 V ★	
47	66	Camshaft position sensor	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 4.7 V ★	
(R)	(B)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 4.7 V ★	

# < SERVICE INFORMATION >

TERMI (Wire)	Color)	Description	Condition	Value	А
+	-	Signal name		(Approx.)	
48 (W)	68		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	1.4 - 1.7 V	EC
49 (W)	(B)		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	1.7 - 2.0 V	С
50 (BR)	69 (PU)	Fuel pump temperature sensor	[Engine is running] • Warm-up condition	Approximately 0 - 4.8 V Output voltage varies with fuel pump temperature	D
51 (GY)	70 (LG)	Engine coolant temperature sen- sor	[Engine is running] • Warm-up condition	Approximately 0 - 4.8 V Output voltage varies with engine coolant temperature	E
			[Ignition switch ON]	Approximately 0.4 V	
54	73	Mass air flow sensor	[Engine is running] • Warm-up condition • Idle speed	1.3 - 1.8 V	F
(G) (B)	(B)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine is revving from idle to about 4,000 rpm.</li> </ul>	1.3 - 1.8 V to Approximately 4.0 V (Check for liner voltage rise in re- sponse to engine being increased to about 4,000 rpm)	G
55 (W)	74 (R)	Intake air temperature sensor	[Engine is running] • Warm-up condition	Approximately 0 - 4.8 V Output voltage varies with intake air temperature	Η
63 (R)	68 (B)	Fuel rail pressure sensor power supply	[Ignition switch ON]	Approximately 5 V	I
65 (Y)		Crankshaft position sensor ground	_	_	.1
66 (B)	—	Camshaft position sensor ground	_		0
67 (B)	_	Sensor ground (Sensor shield circuit)	_		Κ
68 (B)		Fuel rail pressure sensor ground	_		I
69 (PU)	_	Fuel pump temperature sensor ground	_		L
70 (LG)		Engine coolant temperature sen- sor ground	_	_	M
73 (B)	_	Mass air flow sensor ground	_		NI
74 (R)	_	Intake air temperature sensor ground	_	_	N
77 (SB)		EGR volume control valve control position sensor ground			0
81 (P)	77 (SB)	EGR volume control valve control position sensor	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	Voltage should fluctuates be- tween 0.5 and 2.5 V, then drop to 0V.	Ρ
82 (W)	84 (R)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V	

# < SERVICE INFORMATION >

## [YD25DDTi]

(Wire color)		Description	Condition	Value (Approx.)	
+	_	Signal name		(Applox.)	
83 (D)	84	Accelerator pedal position sensor	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully released	0.5 - 1.0 V	
(B) (K)		1	<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	3.7 - 4.7 V	
84 (R)	_	Accelerator pedal position sensor 1 ground	_	_	
87 (P)	—	CAN communication line	_	_	
89 (LG)	114 (B)	Data link connector	_	_	
90 (L)	92 (Y)	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5 V	
91	92	Accelerator pedal position sensor	<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully released</li></ul>	0.15 - 0.6 V	
(G)	(Y)	2	<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	1.85 - 2.4 V	
92 (Y)		Accelerator pedal position sensor 2 ground	_	_	
95 (L)		CAN communication line	_	_	
99	114		[Ignition switch ON]	Approximately 0 V	
(R)	(B)	Start signal	[Ignition switch START]	BATTERY VOLTAGE (11 - 14 V)	
100	114	Stop lamp switch	[Ignition switch OFF] <ul> <li>Brake pedal: Fully released</li> </ul>	Approximately 0 V	
(GY)	(B)		[Ignition switch OFF] <ul> <li>Brake pedal: Slightly depressed</li> </ul>	BATTERY VOLTAGE (11 - 14 V)	
105 (G)	114 (B)	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V	
			<ul> <li>[Ignition switch OFF]</li> <li>More than a few seconds after turning ignition switch OFF</li> </ul>	BATTERY VOLTAGE (11 - 14 V)	
107 (L) 108 (L)	114 (В)	Ignition switch	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)	
110	114	Park/neutral position switch	[Ignition switch ON] <ul> <li>Shift lever: Neutral</li> </ul>	Approximately 0 V	
(BR)	(B)		<ul><li>[Ignition switch ON]</li><li>Except the above position</li></ul>	BATTERY VOLTAGE (11 - 14 V)	
113 (G)	114 (B)	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V	
	(D)	(B) (B)	<ul> <li>[Ignition switch OFF]</li> <li>More than a few seconds after turning ignition switch OFF</li> </ul>	BATTERY VOLTAGE (11 - 14 V)	

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### < SERVICE INFORMATION >

[YD25DDTi]

TERMII (Wire	NAL NO. color)	Description	Description		А
+	-	Signal name		(друюл.)	
114 (B)		ECM ground	_	_	EC
119 (R) 120 (OR)	114 (B)	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)	С
121 (L)	114 (B)	Power supply for ECM (Back-up)	[Ignition switch OFF]	BATTERY VOLTAGE (11 - 14 V)	D

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

## CONSULT-III Function (ENGINE)

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## FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the in- dications on the CONSULT-III unit.
Self-Diagnostic Results	Self-diagnostic results such as 1st/2nd trip DTC, DTC and freeze frame data can be read and erased quickly.*
Data Monitor	Input/Output data in the ECM can be read.
Active Test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function Test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECM Part Number	ECM part number can be read.

• 1st/2nd trip diagnostic trouble codes

Freeze frame data

### ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

### < SERVICE INFORMATION >

	Item			DIAGNOSTIC TEST MODE				
			SELF-DIA	G RESULTS				
			DTC*	FREEZE FRAME DATA	DATA MONITOR	ACTIVE TEST		
		Crankshaft position sensor	×	×	×			
		Camshaft position sensor	×					
		Engine coolant temperature sensor	×	×	×	×		
S		Vehicle speed sensor	×	×	×			
ART		Fuel pump temperature sensor	×		×	×		
ΤP		Accelerator pedal position sensor 1	×		×			
NEN		Accelerator pedal position sensor 2	×		×			
TROL COMPON		Fuel rail pressure sensor	×		×			
		Mass air flow sensor	×	×	×			
	INPUT	Intake air temperature sensor	×	×				
		Battery voltage	×		×			
Ő		Park/neutral position (PNP) switch	×		×			
Ш		EGR volume control valve control position sensor	×		×			
IDN.		Stop lamp switch	×		×			
ш		Heat up switch			×			
		Ignition switch (Start signal)			×			
		Air conditioner switch signal			×			
		Barometric pressure sensor (built-into ECM)	×		×			
		Fuel pump	×		×	×		
		Fuel injector	×		×	×		
	OUTPUT	Glow relay	×		×	×		
		Cooling fan relay	×		×	×		
		EGR volume control valve	×		×	×		

X: Applicable

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

#### WORK SUPPORT MODE

#### Work Item

WORK ITEM	DESCRIPTION	USAGE
ENTER INJCTR CALIB DATA	<ul> <li>Injector adjustment value is written onto ECM memory.</li> </ul>	When performing Injector Adjust- ment Value Registration.
EGR/V LEARN CLR	<ul> <li>EGR volume control valve learning value stored in ECM is cleared.</li> </ul>	<ul> <li>EGR volume control valve closed position learning value should be cleared under the following cases.</li> <li>EGR volume control valve is removed.</li> <li>EGR volume control valve is replaced.</li> </ul>
INJ ADJ VAL CLR	<ul> <li>Injector adjustment value stored in ECM is initialized.</li> </ul>	Before changing injector adjust- ment value stored in ECM, it is recommended to perform this work item.

### < SERVICE INFORMATION >

## [YD25DDTi]

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## Regarding items of DTC and 1st/2nd trip DTC, refer to <u>EC-32, "Emission-Related Diagnostic Information"</u>. Freeze Frame Data

Self Diagnostic Item

Freeze frame data item	Description	EC
DIAG TROUBLE CODE [PXXXX]	<ul> <li>The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to <u>EC-32</u>, "Emission-Related Diagnostic Information".)</li> </ul>	
CAL/LD VALUE [%]	The calculated load value at the moment a malfunction is detected is displayed.	С
COOLANT TEMP [°C] or [°F]	The engine coolant temperature at the moment a malfunction is detected is displayed.	
ENGINE SPEED [rpm]	The engine speed at the moment a malfunction is detected is displayed.	D
VEHICL SPEED [km/h] or [mph]	The vehicle speed at the moment a malfunction is detected is displayed.	
INT/A TEMP SE [°C] or [°F]	The intake air temperature at the moment a malfunction is detected is displayed.	Е
FUEL/R PRESS [kPa]	The fuel rail pressure at the moment a malfunction is detected is displayed.	
MASS AIRFLOW [g/s]	The mass air flow at the moment a malfunction is detected is displayed.	
		F

### DATA MONITOR MODE

Monitored item	Unit	Description	Remarks
CKPS-RPM (TDC)	[rpm]	• The engine speed computed from the crank- shaft position sensor signal is displayed.	
COOLAN TEMP/S	[°C] or [°F]	<ul> <li>The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.</li> </ul>	When the engine coolant tempera- ture circuit is open or short, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
VHCL SPEED SE	[km/h] or [mph]	• The vehicle speed computed form the vehicle speed sensor signal is displayed.	
FUEL TEMP SEN	[°C] or [°F]	• The fuel temperature (determined by the sig- nal voltage of the fuel pump temperature sen- sor) is displayed.	
ACCEL POS SEN	[V]	<ul> <li>The accelerator pedal position sensor 1 signal voltage is displayed.</li> </ul>	þ
ACCEL SEN 2	[V]	• The accelerator pedal position sensor 2 signal voltage is displayed.	
ACT CR PRESS	[MPa]	• The Fuel rail pressure (determined by the sig- nal voltage of the fuel rail pressure sensor) is displayed.	
BATTERY VOLT	[V]	<ul> <li>The power supply voltage of ECM is dis- played.</li> </ul>	N
P/N POSI SW	[ON/OFF]	<ul> <li>Indicates [ON/OFF] condition from the park/ neutral position switch signal.</li> </ul>	Ν
START SIGNAL	[ON/OFF]	<ul> <li>indicates [ON/OFF] condition from the starter signal.</li> </ul>	
AIR COND SIG	[ON/OFF]	<ul> <li>Indicates [ON/OFF] condition of the air condi- tioner switch as determined by the air condi- tioner signal.</li> </ul>	(
BRAKE SW	[ON/OFF]	<ul> <li>indicates [ON/OFF] condition from the stop lamp switch signal.</li> </ul>	F
IGN SW	[ON/OFF]	<ul> <li>Indicates [ON/OFF] condition from ignition switch signal.</li> </ul>	
WARM UP SW	[ON/OFF]	<ul> <li>Indicates [ON/OFF] condition from heat up switch signal.</li> </ul>	

## EC-65

### < SERVICE INFORMATION >

### [YD25DDTi]

Monitored item	Unit	Description	Remarks
MAS AIR/FL SE	[V]	• The signal voltage of the mass air flow sensor is displayed.	
MAIN INJ WID	[msec]	<ul> <li>Indicates the actual main fuel injection pulse width compensated by ECM according to the input signals.</li> </ul>	
PUMP CURRENT	[mA]	<ul> <li>Indicates the fuel pump power supply current from the ECM.</li> </ul>	
GLOW RLY	[ON/OFF]	<ul> <li>The glow relay control condition (determined by ECM according to the input signal) is dis- played.</li> </ul>	
COOLING FAN*	[LOW/HI/OFF]	<ul> <li>Indicates the control condition of the cooling fans (determined by ECM according to the in- put signal).</li> <li>LOW: Operates at low speed.</li> <li>HI: Operates at high speed.</li> <li>OFF: Stopped</li> </ul>	
INT/A VOLUME	[mg/]	• The intake air volume computed from the mass air flow sensor signal is displayed.	
BARO SEN	[kPa]	• The barometric pressure (determined by the signal voltage from the absolute pressure sensor built into the ECM) is displayed.	
CYL COUNT	[1/2/3/4]	<ul> <li>The cylinder being injected is displayed.</li> <li>1: Cylinder No.1 is injected.</li> <li>2: Cylinder No.2 is injected.</li> <li>3: Cylinder No.3 is injected.</li> <li>4: Cylinder No.4 is injected.</li> </ul>	
TRVL AFTER MIL	[km] or [mile]	Distance traveled while MI is activated.	
EGR/V ANGLE	[°]	<ul> <li>The opening angle of EGR volume control value is displayed.</li> <li>The opening becomes larger as the value increases.</li> </ul>	
EGR V/POS SEN	[mV]	• The EGR volume control valve control posi- tion sensor signal voltage is displayed.	

#### NOTE:

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

*: The cooling fan rotation has two stages (OFF and ON) although the display of CONSULT-III has three stages (OFF,LOW and HI).

## ACTIVE TEST MODE

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
POWER BAL- ANCE	<ul> <li>Engine: After warming up, idle the engine.</li> <li>A/C switch: OFF</li> <li>Shift lever: Neutral position</li> <li>Cut off each injector signal one at a time using CONSULT-III.</li> </ul>	Engine runs rough or dies.	<ul><li>Harness and connectors</li><li>Compression</li><li>Fuel injector</li></ul>
ENG COOLANT TEMP	<ul> <li>Engine: Return to the original trouble condition</li> <li>Change the engine coolant temperature using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul> <li>Harness and connectors</li> <li>Engine coolant temperature sensor</li> <li>Fuel injector</li> </ul>
GLOW RLY	<ul> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn the glow relay ON and OFF using CONSULT-III and listen to operating sound.</li> </ul>	Glow relay makes the operating sound.	<ul><li>Harness and connectors</li><li>Glow relay</li></ul>

### < SERVICE INFORMATION >

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)	٨
FUEL/T TEMP SEN	<ul> <li>Engine: Return to the original trouble condition</li> <li>Change the fuel tank temperature using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul> <li>Harness and connectors</li> <li>Fuel tank temperature sensor</li> <li>Fuel injector</li> </ul>	EC
PRES REGULA- TOR	<ul> <li>Ignition switch: ON</li> <li>Change fuel rail pressure using CONSULT-III.</li> </ul>	Fuel leaks.	<ul><li>Fuel line</li><li>Fuel pressure relief valve</li></ul>	C
PUMP LEANT CLEAR	This mode is used for performing Fuel Pump Learning Value Clearing. Refer to <u>EC-23</u> , "Fuel Pump Learning <u>Value Clearing"</u> .			
TRG EGR/V AN- GLE	<ul> <li>Ignition switch: ON</li> <li>Change EGR volume control valve opening angle (within the range of 0 - 70°) using CONSULT- III.</li> </ul>	EGR volume control valve makes an operating sound.	<ul><li>Harness and connectors</li><li>EGR volume control valve</li></ul>	D

## Generic Scan Tool (GST) Function

### DESCRIPTION

Generic Scan Tool (OBD II scan tool) complying with ISO 15031-4 has 7 different functions explained below.

ISO9141 is used as the protocol.

The name "GST" or "Generic Scan Tool" is used in this service manual.



### FUNCTION

Diagnostic test mode		Function
Service \$01	READINESS TESTS	This diagnostic service gains access to current emission-related data values, including an- alog inputs and outputs, digital inputs and outputs, and system status information.
Service \$02	(FREEZE DATA)	This diagnostic service gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-32, "Emission-Related Diagnostic Information".
Service \$03	DTCs	This diagnostic service gains access to emission-related power train trouble codes which were stored by ECM.
Service \$04	CLEAR DIAG INFO	<ul> <li>This diagnostic service can clear all emission-related diagnostic information. This includes:</li> <li>Clear number of diagnostic trouble codes (Service \$01)</li> <li>Clear diagnostic trouble codes (Service \$03)</li> <li>Clear trouble code for freeze frame data (Service \$01)</li> <li>Clear freeze frame data (Service \$02)</li> <li>Reset status of system monitoring test (Service \$01)</li> <li>Clear on board monitoring test results (Service \$07)</li> </ul>
Service \$06	(ON BOARD TESTS)	This diagnostic service is not applicable on this vehicle.
Service \$07	(ON BOARD TESTS)	This diagnostic service enables the off board test drive to obtain test results for emission- related powertrain components/systems that are continuously monitored during normal driving conditions.
Service \$09	(CALIBRATION ID)	This diagnostic service enables the off-board test device to request specific vehicle infor- mation such as Vehicle Identification Number (VIN) and Calibration IDs.

## INSPECTION PROCEDURE

1. Turn ignition switch OFF.

## EC-67

### [YD25DDTi]

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### < SERVICE INFORMATION >

- 2. Connect "GST" to data link connector (1), which is located under drivers side dash panel.
- 3. Turn ignition switch ON.



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

(*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.

For further information, see the GST Operation Manual of the tool maker.



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## CONSULT-III Reference Value in Data Monitor Mode

Remarks:

1 Specification data are reference values.

1 Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

MONITOR ITEM	CONDITION		SPECIFICATION
CKPS-RPM (TDC)	Run engine and compare CONSULT-III value with the tachometer in- dication.		Almost the same speed as the ta- chometer indication
COOLAN TEMP/S	Engine: After warming up		More than 70°C (158°F)
VHCL SPEED SE	Turn drive wheels and compare CONSULT-III value with the speed- ometer indication		Almost the same speed as the speed- ometer indication
FUEL TEMP SEN	Engine: After warming up		More than 40°C (104°F)
	<ul> <li>Ignition switch: ON (Engine stopped)</li> </ul>	Accelerator pedal: Fully released	0.5 - 1.0 V
ACCEL POS SEN		Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*1	Ignition switch: ON     (Engine stopped)	Accelerator pedal: Fully released	0.3 - 1.2 V
		Accelerator pedal: Fully depressed	3.7 - 4.8 V
ACT CR PRESS	<ul> <li>Engine: After warming up</li> <li>Air conditioner switch: OFF</li> <li>Shift lever: Neutral</li> <li>No load</li> </ul>	Idle	25 - 35 MPa
		2,000 rpm	50 - 60 MPa



#### < SERVICE INFORMATION >

[YD25DDTi]

MONITOR ITEM	CONDITION		SPECIFICATION	
BATTERY VOLT	Ignition switch: ON (Engine stopped)		11 - 14 V	А
	• Ignition quitable ON	Shift lever: Neutral	ON	
P/IN POSI 5W	• Ignition switch: ON	Except above	OFF	EC
START SIGNAL	• Ignition switch: $ON \rightarrow START \rightarrow ON$		$OFF \rightarrow ON \rightarrow OFF$	
	- Engine: After warming up idle	Air conditioner switch: OFF	OFF	
AIR COND SIG	the engine	Air conditioner switch: ON (Compressor operates.)	ON	С
DDAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF	
DIARE SW	• Ignition switch. ON	Brake pedal: Slightly depressed	ON	D
IGN SW	• Ignition switch: $ON \rightarrow OFF$	-	$ON \rightarrow OFF$	
	• Ignition switch: ON	Heat up switch: OFF	OFF	Е
WARIN UP SW	• Ignition switch. ON	Heat up switch: ON	ON	
		Ignition switch: ON (Engine stopped)	Approximately 0.4 V	F
	<ul> <li>Engine: After warming up</li> <li>Air conditioner switch: OFF</li> </ul>	ldle	1.3 - 1.8 V	
MAS AIR/FL SE* ¹	<ul> <li>All conditioner switch. OFF</li> <li>Shift lever: Neutral</li> <li>No load</li> </ul>	Engine is revving from idle to about 4,000 rpm.	1.3 - 1.8 V to Approximately 4.0 V (Check for liner voltage rise in re- sponse to engine being increased to about 4,000 rpm)	G
	<ul> <li>Engine: After warming up</li> <li>Shift lever: Neutral</li> <li>Idle speed</li> </ul>	No load	0.50 - 0.70 msec	Н
MAIN INJ WID		Blower fan switch: ON	0.50 - 0.80 msec	
	Engine: After warming up	Idle	1,600 - 2,000 mA	
PUMP CURRENT	<ul><li>Air conditioner switch: OFF</li><li>Shift lever: Neutral</li><li>No load</li></ul>	2,000 rpm	1,500 - 1,900 mA	I
GLOW RLY	Refer to EC-273.			J
	When cooling fan is stopped.		OFF	
COOLING FAN*2	When cooling fans operate at low speed.		LOW	1Z
	When cooling fans operate at high speed.		н	I.
INT/A VOLUME	Engine: After warming up, idle t	he engine	150 - 450 mg/	
BARO SEN	• Ignition switch: ON		Altitude Approx. 0m: Approx. 100.62 kPa (1.0062 bar, 1.026 kg/cm ² , 14.59 psi) Approx. 1,000 m: Approx. 88.95 kPa (0.8895 bar, 0.907 kg/cm ² , 12.90 psi) Approx. 1,500 m: Approx. 83.16 kPa (0.8316 bar, 0.848 kg/cm ² , 12.06 psi) Approx. 2,000 m: Approx. 78.36 kPa	L M N
			(0.7836 bar, 0.799 kg/cm ² , 11.36 psi)	
CYL COUNT	Engine is running		$1 \rightarrow 3 \rightarrow 4 \rightarrow 2$	0
TRVL AFTER MIL	Ignition switch: ON	Vehicle has traveled after MI has turned ON.	0 - 65,535 km (0 - 40,723 mile)	0
EGR/V ANGLE	Ignition switch: ON (Engine stop	oped)	Approx. 0°	D
EGR V/POS SEN	Ignition switch: ON (Engine stopped)		1,050 - 1,350 mV	Г

#### NOTE:

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

*1: This signal is converted by ECM internally. Thus, this differs from ECM terminals voltage.

*2: The cooling fan rotation has two stages (OFF and ON) although the display of CONSULT-III has three stages (OFF,LOW and HI).

## TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

### < SERVICE INFORMATION >

## TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

## Description

INFOID:000000003759334

INFOID:00000003759335

[YD25DDTi]

Intermittent incidents may occur. In many cases, the incident resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on (1st/2nd trip) DTC visits. Realize also that the most frequent cause of intermittent incidents occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

### COMMON INTERMITTENT INCIDENTS REPORT SITUATIONS

STEP in Work Flow	Situation
II	The CONSULT-III is used. The SELF-DIAG RESULTS screen shows time data other than "0".
III	The symptom described by the customer does not recur.
IV	(1st/2nd trip) DTC does not appear during the DTC Confirmation Procedure.
VI	The Diagnostic Procedure for XXXX does not indicate the malfunctioning area.

## **Diagnosis Procedure**

**1.**INSPECTION START

Erase (1st/2nd trip) DTCs. Refer to EC-32, "Emission-Related Diagnostic Information".

>> GO TO 2.

2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection. Refer to <u>EC-81</u>, "Ground Inspection".

<u>OK or NG</u>

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

**3.** SEARCH FOR ELECTRICAL INCIDENT

Perform "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT" in GI section, "INCIDENT SIMULATION TESTS".

OK or NG

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

## < SERVICE INFORMATION >

## POWER SUPPLY AND GROUND CIRCUIT

## Wiring Diagram

## LHD MODELS





Refer to last page (Foldout page). M5, E101 Ν 119 120 121 (M10) 123 456 W12, E102 W 135 624 98 99 (M20) (M33) 117 118 90 91 94 95 96 97 В 116 114 115 7 88 89 Ο 12 (M241) B (E55) L Ρ

GEC597A

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

## -----

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EC-71

## POWER SUPPLY AND GROUND CIRCUIT

### < SERVICE INFORMATION >

TERMINAL NO. (Wire color)		Description	Condition	Value (Approx.)
+	-	Signal name		(//pp/0x.)
105 114 (G) (B)	114 (B)	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V
	(D)		<ul><li>[Ignition switch OFF]</li><li>More than a few seconds after turning ignition switch OFF</li></ul>	BATTERY VOLTAGE (11 - 14 V)
107 (L) 108 (L)	114 (В)	Ignition switch	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)
113 114 (G) (B)	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V	
	(В)	(6)	<ul><li>[Ignition switch OFF]</li><li>More than a few seconds after turning ignition switch OFF</li></ul>	BATTERY VOLTAGE (11 - 14 V)
119 (R) 120 (OR)	114 (В)	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)
121 (L)	114 (B)	Power supply for ECM (Back-up)	[Ignition switch OFF]	BATTERY VOLTAGE (11 - 14 V)
#### < SERVICE INFORMATION > LHD MODELS

#### EC-MAIN-02



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

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#### < SERVICE INFORMATION >

TERMINAL NO. (Wire color)		Description	Condition	Value	
+	-	Signal name		(дрргох.)	
1 (B) 2 (B) 3 (B)		ECM ground	_	_	
114 (B)		ECM ground	_	_	

< SERVICE INFORMATION >

RHD MODELS



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

#### < SERVICE INFORMATION >

TERMII (Wire	NAL NO. color)	Description	Condition	Value (Approx.)
+	-	Signal name		(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
105 (G)	114 (B)	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V
(0)	(D)		<ul><li>[Ignition switch OFF]</li><li>More than a few seconds after turning ignition switch OFF</li></ul>	BATTERY VOLTAGE (11 - 14 V)
107 (L) 108 (L)	114 (В)	Ignition switch	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)
113	114 (P)	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V
(6)	(В)		<ul><li>[Ignition switch OFF]</li><li>More than a few seconds after turning ignition switch OFF</li></ul>	BATTERY VOLTAGE (11 - 14 V)
119 (R) 120 (OR)	114 (B)	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)
121 (L)	114 (B)	Power supply for ECM (Back-up)	[Ignition switch OFF]	BATTERY VOLTAGE (11 - 14 V)

EC-MAIN-04

# < SERVICE INFORMATION >

**RHD MODELS** 



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

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#### < SERVICE INFORMATION >

TERMINAL NO.

Condition	Value

IERMI (Wire	Wire color)		Condition	Value
+	_	Signal name		(дрргох.)
1 (B) 2 (B) 3 (B)		ECM ground		_
114 (B)		ECM ground	_	_

# **Diagnosis Procedure**

# 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to EC-82, "Ground Inspection".
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

#### OK or NG

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



# 2. Check ECM ground circuit for open and short

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

E	СМ	Ground	Continuity	
Connector Terminal		Ground	Continuity	
	1			
M32	2	Ground	Existed	
	3	Ground		
M33	114			

3. Also check harness for short to power.

#### <u>OK or NG</u>

OK >> GO TO 3.

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

3.CHECK ECM POWER SUPPLY CIRCUIT-I

1. Reconnect ECM harness connector.

- 2. Turn ignition switch ON.
- 3. Check voltage between ECM connector terminal as follows.

**EC-78** 

[YD25DDTi

#### < SERVICE INFORMATION >

		ECM			
	+		-	Voltage	-
Connector	Terminal	Connector	r Termin	nal	
			1		
	107	M32	2		
	107		3		
M33		M33	114	Battery volta	ace
			1		-3-
	108	M32	2		
			3		
		M33	114		
OK >> GO NG >> GO 4.DETECT M Check the follo 10A fuse (No 40A fusible li Harness con Fuse block h Ignition switc Ignition switc Harness for	O TO 5. O TO 4. IALFUNCTIONI owing. o.21) ink (letter f) inectors E101, I parness connect ch ch harness conrect ch open or short be	NG PART M5 tor M12 nector M20 etween ECM and	d fusible link	power in harness o	or connectors
<b>D</b> .CHECK EC	OM POWER SU	PPLY CIRCUIT-I			
2. Check the	voltage betwee	en ECM connecte	or terminal as f	ollows.	
<ol> <li>Check the</li> </ol>	voltage betwee	en ECM connecto	or terminal as f	ollows.	
<ol> <li>Check the</li> </ol>	voltage betwee	en ECM connecto	or terminal as f	ollows. Voltage	
<ol> <li>Cneck the</li> <li>Connector</li> </ol>	<ul> <li>voltage betwee</li> <li>EC</li> <li>+</li> <li>Terminal</li> </ul>	en ECM connecto CM Connector	or terminal as f	ollows. Voltage	
Z. Check the Connector	+ Terminal	en ECM connecto	Terminal as f	ollows. Voltage	
Z. Check the Connector	+ Terminal	ECM connector	Terminal as f	Ollows. Voltage Battery voltage	
Z. UNECK the Connector           Connector           M33	+ Terminal 121	ECM connector CM Connector M32	Terminal as f	Ollows. Voltage Battery voltage	
Connector  M33	+ Terminal 121	en ECM connecto CM Connector M32 M33	Terminal as f	ollows. Voltage Battery voltage	
2. Check the Connector M33 OK or NG OK >> GO NG >> GO 6.DETECT M Check the follo	o voltage betwee	en ECM connecto CM Connector M32 M33 NG PART	Terminal as f	ollows. Voltage Battery voltage	
2. Check the Connector M33 OK or NG OK >> GO NG >> GO OLETECT M Check the follo • 20A fuse (No • Harness con • Harness for o	e voltage betwee EC + Terminal 121 0 TO 7. 0 TO 7. 0 TO 6. IALFUNCTIONI Dwing. 0.36) inectors E102, I open or short be	en ECM connecto CM Connector M32 M33 NG PART M13 etween Battery a	Terminal as f	ollows. Voltage Battery voltage	
2. CRECK the Connector M33 OK or NG OK >> GO OK >> GO OK >> GO OK >> GO OK >> GO Check the follo • 20A fuse (No • Harness con • Harness for O >> Re 7.CHECK EC	e voltage betwee EC + Terminal 121 0 TO 7. 0 TO 7. 0 TO 6. IALFUNCTIONI Dwing. 0.36) inectors E102, I open or short be epair open circu CM POWER SU	en ECM connecto CM Connector M32 M33 NG PART V13 etween Battery a it or short to grou PPLY CIRCUIT-I	Terminal as f	ollows. Voltage Battery voltage	or connectors.

#### < SERVICE INFORMATION >

- 2. Turn ignition switch ON and then turn OFF.
- 3. Check the voltage between ECM harness connector.

	E	СМ		
	+		_	Voltage
Connector	Terminal	Connector	Terminal	
			1	
	119	M32	2	_
			3	
Maa		M33	114	After turning ignition switch OFF, battery voltage will
IVISS	100	M32	1	exist for a few seconds, then drop approximately 0 V.
			2	_
	120		3	_
	-	M33	114	_

OK or NG

OK >> GO TO 16. NG >> GO TO 8.

# **8.**CHECK ECM POWER SUPPLY CIRCUIT-IV

Check the voltage between ECM relay harness connector and ground.

ECM	relay	Ground	Voltage	
Connector	Terminal	Ground	voltage	
E55	2	Ground	Battery voltage	
233	3	Ground	Dattery voltage	

OK or NG

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

9. DETECT MALFUNCTIONING PART

Check the following.

20A fuse (No.36)

Harness for open or short between Battery and ECM relay

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

# 10. CHECK ECM POWER SUPPLY CIRCUIT-V

Check the voltage between ECM harness connector.

+		-	-	Voltage
Connector	Terminal	Connector	Terminal	*
			1	
	105 133 113	M32	2	Battery voltage
			3	
Maa		M33	114	
IVISS			1	
		M32	2	
		-	3	
		M33	114	



< SERVICE INF	ORMATION >				[YD25DDTi]	
OK or NG						
OK >> GO	TO 13.					А
			1		-	
	M POWER SUP	PLY CIRCUIT-V				EC
<ol> <li>Disconnect</li> <li>Disconnect</li> </ol>	ECM harness co	onnector.				
3. Check the c	continuity betwee	n ECM harness	connector and	ECM relay harn	ess connector.	
					_	С
Ε	CM	ECM	relay	Continuity		
Connector	Terminal	Connector	Terminal	,	_	D
M33	105	E55	1	Existed		
	113				_	F
4. Also check	harness for shor	t to ground and s	short to power.			
	TO 12					
NG >> GO	TO 12.					F
12.DETECT N	ALFUNCTIONI	NG PART				
Check the follow	vina.					G
Harness conn	ectors E102, M1	3				0
<ul> <li>Harness for op</li> </ul>	pen or short betw	een ECM and E	CM relay			
>> Por	air anan aircuit a	or short to group	d or short to po	vor in hornoss (	or connectors	Н
			a of short to pov	wer in namess (	or connectors.	
			/11			I
<ol> <li>Disconnect</li> <li>Disconnect</li> </ol>	ECM harness co	ess connector.				
3. Check the c	continuity betwee	n ECM harness	connector and	ECM relay harn	ess connector.	
					_	J
E	CM	ECM	relay	Continuity		
Connector	Terminal	Connector	Terminal		_	Κ
M33	119	E55	5	Existed		
	120				_	
4. Also check	harness for shor	t to ground and s	short to power.			L
OK or NG	TO 45					
NG >> GO	TO 15. TO 14.					M
14.DETECT N		NG PART				
Check the follow	vina					
<ul> <li>Harness conn</li> </ul>	ectors E91, M24	1 (LHD models)				Ν
Harness conn	ectors E102, M1	3 (RHD models)				
• Harness for op	ben of short betw	een ECM and E	Civi relay			0
OK >> Rer	air open circuit o	or short to around	d or short to po	ver in harness o	or connectors	
15. СНЕСК ЕС						P
Refer to EC 82						۲
Neier to <u>LO-02</u>						

OK >> GO TO 16. NG >> Replace ECM relay.

 $16. {\sf check intermittent incident}$ 

Refer to EC-70.

>> INSPECTION END

#### **Component Inspection**

#### ECM RELAY

- 1. Disconnect ECM relay.
- 2. Check continuity between ECM relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
5 410 5	No current supply	Not existed

If NG, replace cooling fan relay.



# **Ground Inspection**

INFOID:000000003759338

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

Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.

When inspecting a ground connection follow these rules:

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

For detailed ground distribution information, refer to GROUND DISTRIBUTION in EL section.



## **DTC U1000 CAN COMMUNICATION LINE**

#### < SERVICE INFORMATION >

# DTC U1000 CAN COMMUNICATION LINE

# Description

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

# On Board Diagnosis Logic

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000 1000	CAN communication line	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) for 2 seconds or more.	<ul> <li>Harness or connectors (CAN communication line is open or shorted)</li> </ul>

# **DTC Confirmation Procedure**

- Turn ignition switch ON and wait at least 3 seconds. 1.
- 2. Check DTC.
- 3. If DTC is detected, go to EC-84, "Diagnosis Procedure".

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# **DTC U1000 CAN COMMUNICATION LINE**

< SERVICE INFORMATION >

# Wiring Diagram

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EC-CAN-01





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**Diagnosis Procedure** 

INFOID:000000003759343

Go to EL-110, "CAN System Specification Chart".

# **DTC P0016 CKP - CMP CORRELATION**

#### < SERVICE INFORMATION >

# DTC P0016 CKP - CMP CORRELATION

On Board Diagnosis Logic

**6.**CHECK INTERMITTENT INCIDENT

#### NOTE:

If DTC P0016 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0016 0016	Crankshaft position - camshaft position cor- relation	The correlation between crankshaft position sen- sor signal and camshaft position sensor signal is out of the normal range.	<ul> <li>Camshaft position sensor</li> <li>Crankshaft position sensor</li> <li>Timing chain</li> <li>Signal plate</li> </ul>
DTC Cor	firmation Proce	dure	INFOID:00000003759345
NOTE: If DTC Cor least 10 set 1. Start et 2. Check 3. If 1st tr Diagnosi	firmation Procedure conds before conduc ngine and let it idle fo 1st trip DTC. ip DTC is detected, s <b>Procedure</b>	e has been previously conducted, always cting the next test. or at least 5 seconds. go to <u>EC-85. "Diagnosis Procedure"</u> .	turn ignition switch OFF and wait at
1 снеск	CAMSHAFT POSIT	ION SENSOR	INF-CIE/00000003739346
Refer to FC	C-166 "Component I	nspection"	
OK or NG			
OK >>	GO TO 2.		
NG >> 2 autors	Replace camshaft	position sensor.	
	SPROCKET		
Visually che	eck for chipping sign	al plate gear tooth.	
OK OF NG OK >> NG >>	GO TO 3. Remove debris and	d clean the signal plate or replace sprocke	ət.
<b>3.</b> CHECK	CRANKSHAFT PO	SITION SENSOR	
Refer to EC	C-156, "Component I	nspection"	
OK OF NG			
NG >>	Replace crankshaft	t position sensor.	
4.CHECK	GEAR TOOTH		
Visually che	eck for chipping sign	al plate gear tooth.	
OK or NG	00 T0 F		
OK >> NG >>	<ul> <li>GO TO 5.</li> <li>Replace the signal</li> </ul>	plate.	
5.снеск	TIMING CHAIN		
Refer to EN	<u>1-5</u> .		
OK or NG			
OK >>	GO TO 6.	in	
110 >>	r Neplace uning Cha		

INFOID:000000003759344

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< SERVICE INFORMATION >

Refer to EC-70.

>> INSPECTION END

# DTC P0088 FUEL SYSTEM

On Board Diagnosis Logic

#### NOTE:

If DTC P0088 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0088 0088	Fuel rail pressure too high	Fuel pressure is too much higher than the speci- fied value.	<ul><li>Fuel pump</li><li>Fuel injector</li><li>Fuel rail pressure sensor</li></ul>
DTC Cor	nfirmation Procedur	е	INFOID:00000003759356
NOTE: If DTC Cor least 10 se 1. Start e 2. Keep e 3. Check 4. If 1st tr Diagnosi <b>1.</b> CHECK	nfirmation Procedure has conds before conducting ngine and warm it up to r engine speed more than 1st trip DTC. ip DTC is detected, go to <b>s Procedure</b> FUEL RAIL PRESSURE	s been previously conducted, always turn the next test. normal operating temperature. 2,000 rpm for at least 20 seconds. D <u>EC-87. "Diagnosis Procedure"</u> .	ignition switch OFF and wait at
Refer to <u>E(</u> OK or NG OK >> NG >> <b>2.</b> CHECK	-131, "Component Insp GO TO 2. Replace fuel rail. FUEL INJECTOR	ection".	
Refer to EC OK or NG OK >> NG >> <b>3.</b> REPLAC	-137. "Component Insp - GO TO 4. - GO TO 3. CE FUEL INJECOR	<u>ection"</u> .	
<ol> <li>Replace</li> <li>Perform</li> </ol>	e fuel injector of malfund m Injector Adjustment Va	ctioning cylinder. Iue Registration. Refer to <u>EC-22, "Injector</u>	Adjustment Value Registration".
>> <b>4.</b> снеск	• INSPECTION END FUEL PUMP		
Refer to EC OK or NG OK >> NG >> 5.REPLAC	C-208. "Component Insp GO TO 6. GO TO 5. CE FUEL PUMP	ection".	
<ol> <li>Replace</li> <li>Perform</li> </ol>	e fuel pump. n Fuel Pump Learning V	alue Clearing. Refer to <u>EC-23, "Fuel Pum</u>	p Learning Value Clearing".

#### >> INSPECTION END

**6.**CHECK INTERMITTENT INCIDENT

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< SERVICE INFORMATION >

Refer to EC-70.

#### >> INSPECTION END

Removal and Installation

FUEL INJECTOR Refer to <u>EM-8</u>. FUEL PUMP Refer to <u>EC-24</u>.

# DTC P0089 FUEL PUMP

Trouble diagnosis name

Fuel pump performance

Perform EC-205, "DTC Confirmation Procedure".

On Board Diagnosis Logic

#### NOTE:

If DTC P0089 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC detecting condition

Fuel pressure is too much higher than the target value.

			Fuel rail pressure sensor
DTC Con	firmation Procedu	re	INFOID:00000003759360
NOTE: If DTC Con least 10 sec	firmation Procedure ha	s been previously conducted, always turn igr the next test.	nition switch OFF and wait at
<ol> <li>Start er</li> <li>Let eng</li> <li>Check</li> </ol>	ngine and warm it up to gine idle for at least 30 s 1st trip DTC.	normal operating temperature. econds.	
4. If 1st tri	ip DTC is detected, go t	o <u>EC-89, "Diagnosis Procedure"</u> .	
Diagnosi	s Procedure		INFOID:00000003759361
1.PERFOR	RM FUEL PUMP LEAR	NING VALUE CLEARING	
NOTE: If the DTC i performing With CC 1. Turn ign	is detected because of following procedure. <b>DNSULT-III</b> nition switch ON.	air mixed with fuel (i.e.: caused by lack of fu	el), it may become normal by
<ol> <li>Perforn</li> <li>Start er</li> <li>Select '</li> <li>Touch "</li> <li>Perforn</li> </ol>	n Fuel Pump Learning \ ngine and let it idle for a "SELF-DIAG RESULT" 'ERASE". n <u>EC-89, "DTC Confirm</u>	alue Clearing. Refer to <u>EC-23, "Fuel Pump L</u> t least 60 seconds. mode with CONSULT-III. ation Procedure", again.	<u>earning Value Clearing</u> ".
(a) With GS	ST		
<ol> <li>Turn igi</li> <li>Perforn</li> <li>Start er</li> <li>Select 3</li> </ol>	nition switch ON. n Fuel Pump Learning \ ngine and let it idle for a Service \$04 with GST.	alue Clearing. Refer to <u>EC-23, "Fuel Pump L</u> t t least 60 seconds.	earning Value Clearing".
5. Perform	n <u>EC-89, "DTC Confirm</u> rin DTC detected again?	a <u>tion Procedure"</u> , again.	
Yes or No			
Yes >>	GO TO 2.		
2.снеск	FUEL RAIL PRESSUR	ESENSOR	
Refer to EC	-131, "Component Insp	ection".	
OK or NG			
OK >> NG >>	GO TO 3. Replace fuel rail		
3.CHECK	FUEL PUMP		

DTC No.

P0089

0089

EC

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INFOID:000000003759359

Possible cause

• Fuel pump

· Lack of fuel

· Air mixed with fuel

< SERVICE INFORMATION >

<u>OK or NG</u> OK >> GO TO 5. NG >> GO TO 4.

**4.**REPLACE FUEL PUMP

1. Replace Fuel pump.

2. Perform Fuel Pump Learning Value Clearing. Refer to EC-23, "Fuel Pump Learning Value Clearing".

#### >> INSPECTION END

5. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

#### >> INSPECTION END

**Removal and Installation** 

INFOID:000000003759362

FUEL PUMP Refer to <u>EC-24</u>. If DTC P0093 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or

< SERVICE INFORMATION >

# DTC P0093 FUEL SYSTEM

On Board Diagnosis Logic

NOTE:

[YD25DDTi]

INFOID:000000003759363

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0093 0093	Fuel system leak	ECM detects a fuel system leak. (The relation between the output voltage to the fuel pump and input voltage from the fuel rail pressure sensor is out of the normal range.)	<ul> <li>Fuel pump</li> <li>Fuel rail</li> <li>Fuel pipe</li> <li>Fuel rail pressure relief valve</li> <li>Air mixed with fuel</li> <li>Lack of fuel</li> </ul>
Overall	Function Check		INFOID:00000003759364
Use this p be confirm NOTE: • Make st • Before	rocedure to check the or ned. ure that there is no fire performing the followin	verall function of the fuel system. During t hazard near the vehicle. ng procedure, cool down engine.	his check, a 1st trip DTC might not
	CONSULT-III		
<ol> <li>Open If ther If ther</li> </ol>	engine hood and check e are any signs, go to $\underline{E}$ e is no signs, go to next	if there are any signs of fuel leakage or r <u>C-92, "Diagnosis Procedure"</u> . step.	not.
2. Checl If oil le If oil le	<ul> <li>c oil level.</li> <li>evel is above the proper</li> <li>evel is within the proper</li> </ul>	range, go to <u>EC-92, "Diagnosis Procedur</u> range, go to next step.	r <u>e"</u> .
3. Start e If fuel If fuel	engine and check fuel le leakage is found, go to leakage is not found, go	akage in the engine room. EC-92, "Diagnosis Procedure". to next step.	
4. Selec	t "DATA MONITOR" mod	de with CONSULT-III.	
5. Checl	k the fuel rail pressure at	the idle speed.	
Fu	el rail pressure: 25 - 3	5 MPa	
6. If NG,	go to EC-92, "Diagnosis	<u>s Procedure"</u> .	
🗃 WITH	GST		
<ol> <li>Open If ther If ther</li> </ol>	engine hood and check e are any signs, go to <u>E</u> e is no signs, go to next	if there are any signs of fuel leakage or r <u>C-92, "Diagnosis Procedure"</u> . step.	not.
2. Checl If oil le If oil le	<ul> <li>c oil level.</li> <li>evel is above the proper</li> <li>evel is within the proper</li> </ul>	range, go to <u>EC-92, "Diagnosis Procedur</u> range, go to next step.	<u>re"</u> .
<ol> <li>Start e</li> <li>If fuel</li> <li>If fuel</li> </ol>	engine and check fuel le leakage is found, go to leakage is not found, go	akage in the engine room. <u>EC-92, "Diagnosis Procedure"</u> . to next step.	
4. Selec 5. Checl	t Service \$1 mode with ( < the fuel rail pressure a	GST. the idle speed.	

#### Fuel rail pressure: 25 - 35 MPa

6. If NG, go to EC-92, "Diagnosis Procedure".

# **EC-91**

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## < SERVICE INFORMATION >

# Diagnosis Procedure

[YD25DDTi]

INFOID:000000003759365

#### **1.**PERFORM FUEL PUMP LEARNING VALUE CLEARING

#### NOTE:

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

#### With CONSULT-III

- Turn ignition switch ON.
- 2. Perform Fuel Pump Learning Value Clearing. Refer to EC-23. "Fuel Pump Learning Value Clearing".
- 3. Start engine and let it idle for at least 60 seconds.
- 4. Select "SELF-DIAG RESULT" mode with CONSULT-III.
- 5. Touch "ERASE".
- 6. Perform EC-91, "Overall Function Check", again.
- 7. Is the result NG again?

#### With GST

- 1. Turn ignition switch ON.
- 2. Perform Fuel Pump Learning Value Clearing. Refer to EC-23. "Fuel Pump Learning Value Clearing".
- 3. Start engine and let it idle for at least 60 seconds.
- 4. Select Service \$04 with GST.
- 5. Perform <u>EC-91, "Overall Function Check"</u>, again.
- 6. Is the result NG again?

#### <u>Yes or No</u>

Yes >> GO TO 2.

#### No >> INSPECTION END

2.CHECK FUEL LINE FOR LEAK

#### 1. Start engine.

- 2. Visually check the following for fuel leak.
- Fuel tube from fuel pump to fuel rail
- Fuel rail
- Fuel tube from fuel rail to fuel injector
- 3. Also check for improper connection or pinches.

#### OK or NG

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

**3.**CHECK FUEL RAIL PRESSURE RELIEF VALVE

Refer to EC-92, "Component Inspection".

OK or NG

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

4. CHECK INTERMITTENT INCIDENT

#### Refer to EC-70.

#### <u>OK or NG</u>

OK >> GO TO 5.

NG >> Repair or replace.

**5.**REPLACE FUEL PUMP

1. Replace fuel pump.

2. Perform Fuel Pump Learning Value Clearing. Refer to EC-23, "Fuel Pump Learning Value Clearing".

#### >> INSPECTION END

Component Inspection

FUEL RAIL PRESSURE RELIEF VALVE

# DTC P0093 FUEL SYSTEM

#### < SERVICE INFORMATION >

#### (P) With CONSULT-III

#### WARNING:

- Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out.
- 1. Turn ignition switch OFF.
- 2. Remove fuel hose from fuel rail pressure relief valve (1).

⟨□ : Vehicle front

- Fuel rail pressure sensor (2)
- 3. Attach a blind cap or plug to removed hose.
- 4. Turn ignition switch ON.
- 5. Select "PRES REGULATOR" in "ACTIVE TEST" with CON-SULT-III.
- 6. Start engine and keep engine speed 2,000 rpm.
- 7. Raise fuel pressure to 180 MPa with touching "UP" or "Qu" on the CONSULT-III screen.
- 8. Confirm that the fuel does not come out from the fuel rail pressure relief valve.

#### WARNING:

• Be careful not to allow leaked fuel to contaminate engine compartment. Especially, ensure to keep engine mount insulator clear of fuel.

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• If the fuel comes out, stop the engine immediately.

#### **Without CONSULT-III**

#### WARNING:

- Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out.
- 1. Turn ignition switch OFF.
- 2. Remove fuel hose from fuel rail pressure relief valve (1).

- Fuel rail pressure sensor (2)
- 3. Attach a blind cap or plug to removed hose.
- 4. Start engine and keep engine speed more than 4,000 rpm for at least 5 seconds.
- 5. Confirm that the fuel does not come out from the fuel rail pressure relief valve.

#### WARNING:

- Be careful not to allow leaked fuel to contaminate engine
- If the fuel comes out, stop the engine immediately.

#### Removal and Installation

FUEL RAIL Refer to EM-8.

FUEL PUMP

Refer to EC-24.





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# Component Description

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

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
		Ignition switch: ON (Engine stopped)	Approximately 0.4 V
	<ul> <li>Engine: After warming up</li> <li>Air conditioner switch: OFF</li> <li>Shift lever: Neutral position</li> <li>No load</li> </ul>	Idle	1.3 - 1.8 V
MAS AIR/FL SE*		Engine is revving from idle to about 4,000 rpm.	1.3 - 1.8 V to Approximately 4.0 V (Check for liner voltage rise in re- sponse to engine being increased to about 4,000 rpm)

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

### On Board Diagnosis Logic

INFOID:000000003759370

If DTC P0101 is displayed with DTC P0403, first perform trouble diagnosis for DTC P0403. Refer to <u>EC-177</u>. If DTC P0101 is displayed with DTC P0409, first perform trouble diagnosis for DTC P0409. Refer to <u>EC-190</u>.

If DTC P0101 is displayed with DTC P0488, first perform trouble diagnosis for DTC P0488. Refer to <u>EC-196</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0101 0101	Mass air flow sensor cir- cuit range/performance	Improper voltage from the sensor is sent to ECM compared with the driving condition.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Mass air flow sensor</li> <li>Intake air leaks</li> <li>Air cleaner</li> <li>Intake air temperature sensor</li> <li>EGR volume control valve</li> </ul>

# **DTC Confirmation Procedure**

# CAUTION:

# Always drive vehicle at a safe speed. NOTE:

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

# WITH CONSULT-III

- 1. Turn ignition switch ON.
- 2. Select "DATA MONITOR" mode with CONSULT-III.

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#### < SERVICE INFORMATION >

<ol> <li>Start engine and let</li> <li>Drive vehicle under</li> </ol>	t it idle for at least 40 seconds. r the following condition.	
CKPS·RPM	Approx, 2800 rpm	
VHCL SPEED SE	70 - 100 km/h (43 - 62 MPH)	
Shift lever	4th position	
<ol> <li>Release accelerate Do not depress bra</li> <li>Check 1st trip DTC</li> <li>If 1st trip DTC is depression</li> </ol>	or pedal for at least 10 seconds. Ike pedal during this procedure. etected, go to <u>EC-99, "Diagnosis Procedure"</u> .	
WITH GST     Follow the procedure "V	WITH CONSULT-III" above.	

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# < SERVICE INFORMATION >

# Wiring Diagram

#### INFOID:000000003759372

[YD25DDTi]

#### LHD MODELS



GEC602A

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

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#### < SERVICE INFORMATION >

#### [YD25DDTi]

TERMINAL NO. (Wire color)		Description	Condition	Value	
+	-	Signal name		(Approx.)	
			[Ignition switch ON]	Approximately 0.4 V	EC
54	73	Mass air flow sensor	[Engine is running] <ul> <li>Warm-up condition</li> <li>Idle speed</li> </ul>	1.3 - 1.8 V	С
(G)	(B)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine is revving from idle to about 4,000 rpm.</li> </ul>	1.3 - 1.8 V to Approximately 4.0 V (Check for liner voltage rise in re- sponse to engine being increased to about 4,000 rpm)	D
67 (B)	_	Sensor ground (Sensor shield circuit)	-	_	_
73 (B)	—	Mass air flow sensor ground	-	_	E
105 (G)	114 (P)	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V	F
(G)	(В)		<ul><li>[Ignition switch OFF]</li><li>More than a few seconds after turning ignition switch OFF</li></ul>	BATTERY VOLTAGE (11 - 14 V)	G
119 (R) 120 (OR)	114 (B)	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)	Η

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

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#### < SERVICE INFORMATION >

# RHD MODELS



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

#### < SERVICE INFORMATION >

#### [YD25DDTi]

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TERMINAL NO. (Wire color) Description		Description	Condition	Value	
+	-	Signal name		(Approx.)	
			[Ignition switch ON]	Approximately 0.4 V	EC
54	73	Mass air flow sensor	[Engine is running] <ul> <li>Warm-up condition</li> <li>Idle speed</li> </ul>	1.3 - 1.7 V	С
(G)	(B)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine is revving from idle to about 4,000 rpm.</li> </ul>	1.3 - 1.7 V to Approximately 4.0 V (Check for liner voltage rise in re- sponse to engine being increased to about 4,000 rpm)	D
67 (B)		Sensor ground (Sensor shield circuit)	-	_	_
73 (B)	_	Mass air flow sensor ground	_	_	E
105 (G)	114 (P)	ECM relay (self shut-off)	[Ignition switch ON] [Ignition switch OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V	F
(G)	(В)		<ul><li>[Ignition switch OFF]</li><li>More than a few seconds after turning ignition switch OFF</li></ul>	BATTERY VOLTAGE (11 - 14 V)	G
119 (R) 120 (OR)	114 (B)	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)	H

 $\star$ : Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

### Diagnosis Procedure

# 1.CHECK INTAKE SYSTEM

- 1. Check air cleaner for clogging.
- 2. Check the following for connection and cracks.
- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

#### OK or NG

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

# 2. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

#### <u>OK or NG</u>

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



**3.**CHECK MAF SENSOR POWER SUPPLY CIRCUIT

#### < SERVICE INFORMATION >

1. Disconnect mass air flow sensor (1) harness connector.

2. Turn ignition switch ON.



3. Check voltage between mass air flow sensor terminal 2 and ground with CONSULT-III or tester.

#### Voltage: Battery voltage

OK or NG

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



# 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between mass air flow sensor and ECM relay
- Harness for open or short between mass air flow sensor and ECM
- Harness connectors E91,M241 (LHD models)
- Harness connectors E102,M13 (RHD models)

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

# **5.**CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check harness continuity between mass air flow sensor terminal 3 and ECM terminal 73. Refer to Wiring Diagram.

#### Continuity should exist.

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

OK or NG

OK >> GO TO 7. NG >> GO TO 6. **6.**DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E101,M5
- Harness for open or short between mass air flow sensor and ECM

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

- 7.CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
- 1. Check harness continuity between mass air flow sensor terminal 4 and ECM terminal 54. Refer to Wiring Diagram.

Continuity should exist.

< SERVICE INFORMATION >		[YD25DDTi]	
2. Also check harness for short	to ground and short to power.		
<u>OK or NG</u>		A	ł
OK >> GO TO 9. NG >> GO TO 8.			
8. DETECT MALFUNCTIONING	PART	EC	C
Check the following.			
<ul> <li>Harness connectors E101,M5</li> <li>Harness for open or short between</li> </ul>	een mass air flow sensor and ECM	C	)
>> Repair open circuit o	r short to around or short to nower in barness or connectors		
9 CHECK INTAKE AIR TEMPER		D	)
OK or NG	spection.	E	-
$OK \rightarrow GO TO 10$			
NG >> Replace mass sir flow	w sensor (with intake air temperature sensor).		
10. CHECK MASS AIR FLOW S	SENSOR	F	
Refer to EC-101, "Component Ins	spection".		
OK or NG		G	3
OK >> GO TO 11.			
NG >> Replace mass air flow	w sensor.		
<b>11.</b> CHECK INTERMITTENT IN	CIDENT	-	1
Refer to EC-70.			
<u>OK or NG</u>			
OK >> GO TO 12.			
12 DEDLACE FOR VOLUME C			
		J	
Replace the EGR volume col     Perform EC-24 "EGR Volum	ntrol valve. e Control Valve Closed Position Learning Value Clear"		
3. Perform <u>EC-24, "EGR Volum</u>	e Control Valve Closed Position Learning".	K	$\langle$
>> INSPECTION END			
Component Inspection		INFOID:000000003759374	-
MASS AIR FLOW SENSOR		Ν	Л
With CONSULT-III		ΙV	
1 Reconnect all barness conne	ectors disconnected		
2. Start engine and warm it up t	o normal operating temperature.	Ν	1
3. Connect CONSULT-III and se	elect "DATA MONITOR" mode.		
4. Select "MAS AIR/FL SE" and	check indication under the following conditions.	C	2
Condition	MAS AIR/FL SE (V)		
Ignition switch ON (Engine stopped.)	Approx. 0.4	P	)
Idle (Engine is warmed-up to normal	1.3 - 1.8		

 Idle to about 4,000 rpm
 1.3 - 1.8 to Approx. 4.0*

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

5. If the voltage is out of specification, proceed the following.

operating temperature.)

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

#### < SERVICE INFORMATION >

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- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts
- b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again. If OK, go to next step.
- 6. Turn ignition switch OFF.
- 7. Disconnect mass air flow sensor harness connector and reconnect it again.
- 8. Perform step 2 to 4 again.
- 9. If NG, clean or replace mass air flow sensor.

**Without CONSULT-III** 

- 1. Reconnect all harness connectors disconnected.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Check voltage between ECM harness connectors as follows.

ECM					
Connector	+ –		Condition	Voltage	
Connector	Terminal	Terminal			
M32	54 73 (MAF sensor signal) (Sensor ground)		Ignition switch ON (Engine stopped.)	Approx. 0.4 V	
		73 (Sensor ground)	Idle (Engine is warmed-up to normal operating temperature.)	1.3 - 1.8 V	
(		, J,	Idle to about 4,000 rpm	1.3 - 1.8 V to Ap- prox. 4.0 V*	

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

4. If the voltage is out of specification, proceed the following.

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

Removal and Installation

MASS AIR FLOW SENSOR Refer to <u>EM-6</u>.

# EC-103

### < SERVICE INFORMATION >

# DTC P0102, P0103 MAF SENSOR

# **Component Description**

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

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
	<ul> <li>Engine: After warming up</li> <li>Air conditioner switch: OFF</li> </ul>	Ignition switch: ON (Engine stopped)	Approximately 0.4 V
		Idle	1.3 - 1.8 V
MAS AIR/FL SE*	<ul><li>Shift lever: Neutral position</li><li>No load</li></ul>	Engine is revving from idle to about 4,000 rpm.	1.3 - 1.8 V to Approximately 4.0 V (Check for liner voltage rise in re- sponse to engine being increased to about 4,000 rpm)

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

# On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The sensor circuit is open or short-
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	ed.) • Mass air flow sensor

# **DTC Confirmation Procedure**

#### NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check 1st trip DTC.
- 4. If 1st trip DTC is detected, go to EC-107, "Diagnosis Procedure".

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#### < SERVICE INFORMATION >

# Wiring Diagram

#### LHD MODELS





GEC602A

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

# EC-104

[YD25DDTi]

# DTC P0102, P0103 MAF SENSOR

#### < SERVICE INFORMATION >

# [YD25DDTi]

NAL NO. e color)	Description	Condition	Value (Approx.)	А
-	Signal name			
	Mass air flow sensor	[Ignition switch ON]	Approximately 0.4 V	EC
73		[Engine is running] <ul> <li>Warm-up condition</li> <li>Idle speed</li> </ul>	1.3 - 1.8 V	С
(B)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine is revving from idle to about 4,000 rpm.</li> </ul>	1.3 - 1.8 V to Approximately 4.0 V (Check for liner voltage rise in re- sponse to engine being increased to about 4,000 rpm)	D
	Sensor ground (Sensor shield circuit)	-	-	_
_	Mass air flow sensor ground	_	_	E
114 (P)	ECM relay (self shut-off)	[Ignition switch ON] [Ignition switch OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V	F
(B)		<ul><li>[Ignition switch OFF]</li><li>More than a few seconds after turning ignition switch OFF</li></ul>	BATTERY VOLTAGE (11 - 14 V)	G
114 (B)	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)	Η
	NAL NO. ⇒ color) - 73 (B) - 114 (B) 114 (B)	NAL NO. e color)       Description         -       Signal name         73 (B)       Mass air flow sensor         -       Sensor ground (Sensor shield circuit)         -       Mass air flow sensor ground         114 (B)       ECM relay (self shut-off)         114 (B)       Power supply for ECM	NAL NO. a color)DescriptionCondition-Signal nameCondition73 (B)Mass air flow sensor[Ignition switch ON] [Engine is running] • Warm-up condition • Idle speed73 (B)Mass air flow sensor[Engine is running] • Warm-up condition • Idle speedSensor ground (Sensor shield circuit)Mass air flow sensor ground (Sensor shield circuit)<	NAL NO. a color)         Description         Condition         Value (Approx.)           -         Signal name         [Ignition switch ON]         Approximately 0.4 V           73 (B)         Mass air flow sensor         [Ignition switch ON]         Approximately 0.4 V           [Engine is running]         • Warm-up condition         1.3 - 1.8 V           · Udle speed         1.3 - 1.8 V         1.3 - 1.8 V           -         Sensor ground (Sensor shield circuit)         -         1.3 - 1.8 V to Approximately 4.0 V (Check for liner voltage rise in re- sponse to engine being increased to about 4,000 rpm)           -         Sensor ground (Sensor shield circuit)         -         -           -         Mass air flow sensor ground (Sensor shield circuit)         -         -           -         Mass air flow sensor ground (Sensor shield circuit)         -         -           -         Mass air flow sensor ground         -         -           (B)         ECM relay (self shut-off)         [Ignition switch OFF] • For a few seconds after turning ignition switch OFF         0 - 1.0 V           114 (B)         Power supply for ECM         [Ignition switch OFF] • More than a few seconds after turning ignition switch OFF         BATTERY VOLTAGE (11 - 14 V)

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#### < SERVICE INFORMATION >

### RHD MODELS



GEC603A



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

# DTC P0102, P0103 MAF SENSOR

#### < SERVICE INFORMATION >

#### [YD25DDTi]

TERMINAL NO. (Wire color)		Description	Condition	Value	А
+	-	Signal name	7	(Applox.)	
54 73 (G) (B)		Mass air flow sensor	[Ignition switch ON]	Approximately 0.4 V	EC
	73 (B)		[Engine is running] • Warm-up condition • Idle speed	1.3 - 1.8 V	С
			<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine is revving from idle to about 4,000 rpm.</li> </ul>	1.3 - 1.8 V to Approximately 4.0 V (Check for liner voltage rise in re- sponse to engine being increased to about 4,000 rpm)	D
67 (B)		Sensor ground (Sensor shield circuit)	_	_	_
73 (B)	_	Mass air flow sensor ground	_	_	E
105 (G) 114	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V	F	
113 (BR)	(В)		<ul> <li>[Ignition switch OFF]</li> <li>More than a few seconds after turning ignition switch OFF</li> </ul>	BATTERY VOLTAGE (11 - 14 V)	G
119 (R) 120 (OR)	114 (B)	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)	H

**EC-107** 

# **Diagnosis Procedure**

# 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to EC-81, "Ground Inspection".
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

#### OK or NG

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



1. Disconnect mass air flow sensor (1) harness connector.

> : Vehicle front  $\triangleleft$

2. Turn ignition switch ON.





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# DTC P0102, P0103 MAF SENSOR

#### < SERVICE INFORMATION >

 Check voltage between mass air flow sensor terminal 2 and ground with CONSULT-III or tester.

#### Voltage: Battery voltage

#### OK or NG

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



[YD25DDTi]

# **3.** DETECT MALFUNCTIONING PART

#### Check the following.

- · Harness for open or short between mass air flow sensor and ECM relay
- Harness for open or short between mass air flow sensor and ECM
- Harness connectors E91,M241 (LHD models)
- Harness connectors E102,M13 (RHD models)

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

#### **4.**CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check harness continuity between mass air flow sensor terminal 3 and ECM terminal 73. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

**5.**DETECT MALFUNCTIONING PART

#### Check the following.

- Harness connectors E101,M5
- Harness for open or short between mass air flow sensor and ECM

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

#### ${f 6}.$ CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between mass air flow sensor terminal 4 and ECM terminal 54. Refer to Wiring Diagram.

#### Continuity should exist.

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

OK or NG

OK >> GO TO 8. NG >> GO TO 7. **7.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E101,M5

• Harness for open or short between mass air flow sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.
# DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >		[YD25DDTi]
8. CHECK MASS AIR FLOW SE	ENSOR	
Refer to EC-109, "Component In	spection".	
<u>OK or NG</u>		
OK >> GO TO 9.	wy sensor	
9 CHECK INTERMITTENT INC		-
Refer to EC-70		
>> INSPECTION END		
Component Inspection		INFOID:000000003759382
MASS AIR FLOW SENSOR		
With CONSULT-III		
1. Reconnect all harness conn	ectors disconnected.	
2. Start engine and warm it up	to normal operating temperature.	
3. Connect CONSULT-III and s	elect "DATA MONITOR" mode.	
4: Select MAS AIR/FE SE and		
Condition	MAS AIR/FL SE (V)	
Ignition switch ON (Engine stopped.)	Approx. 0.4	
Idle (Engine is warmed-up to normal operating temperature.)	1.3 - 1.8	
Idle to about 4,000 rpm	1.3 - 1.8 to Approx. 4.0*	
*: Check for linear voltage rise in re	esponse to engine being increased to about 4,000 rpm.	
5. If the voltage is out of specif	ication, proceed the following.	
<ul> <li>Check for the cause of unev</li> <li>Crushed air ducts</li> </ul>	en air flow through mass air flow sensor. Refer to following.	
<ul> <li>Malfunctioning seal of air of</li> </ul>	cleaner element	
<ul> <li>Uneven dirt of air cleaner (</li> <li>Improper specification of ii)</li> </ul>	element htake air system parts	
b. If NG, repair or replace malfu	unctioning part and perform step 2 to 4 again.	
If OK, go to next step.		
6. Turn ignition switch OFF.		
7. Disconnect mass air flow se	nsor harness connector and reconnect it again.	
<ol> <li>Periori Step 2 to 4 again.</li> <li>If NG clean or replace mass</li> </ol>	air flow sensor	
Reconnect all harness conn	ectors disconnected	
2. Start engine and warm it up	to normal operating temperature.	
3. Check voltage between ECM	A harness connectors as follows.	
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# DTC P0102, P0103 MAF SENSOR

### < SERVICE INFORMATION >

[YD25DDTi]
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ECM					
Connector	+	_	Condition	Voltage	
Connector	Terminal	Terminal			
M32	54 73 (MAF sensor signal) (Sensor ground)	Ignition switch ON (Engine stopped.)	Approx. 0.4 V		
		Idle (Engine is warmed-up to normal operating temperature.)	1.3 - 1.8 V		
		Idle to about 4,000 rpm	1.3 - 1.8 V to Ap- prox. 4.0 V*		

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

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

Removal and Installation

MASS AIR FLOW SENSOR Refer to <u>EM-6</u>. INFOID:000000003759383

# DTC P0112, P0113 IAT SENSOR

# **Component Description**

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

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

# PBIA9559.J

### <Reference data>

Intake air temperature [°C (°F)]	Voltage* (V)	Resistance (k $\Omega$ )
25 (77)	2.4	1.800 - 2.200
80 (176)	0.8	0.283 - 0.359

*: This data is reference values and is measured between ECM terminal 55 (Intake air temperature sensor) and 74 (sensor ground).



INFOID:000000003759385

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0112 0112	Intake air temperature sen- sor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The sensor circuit is open or short-	
P0113 0113	Intake air temperature sen- sor circuit high input	An excessively high voltage from the sensor is sent to ECM.	ed.) <ul> <li>Intake air temperature sensor</li> </ul>	

# **DTC Confirmation Procedure**

**On Board Diagnosis Logic** 

### NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check 1st trip DTC.
- If 1st trip DTC is detected, go to EC-112, "Diagnosis Procedure". 4.

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# Wiring Diagram

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INFOID:000000003759388

[YD25DDTi]







1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

# DTC P0112, P0113 IAT SENSOR

# < SERVICE INFORMATION >

- Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

# OK or NG

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



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2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

 Disconnect mass air flow sensor (intake air temperature sensor is built-into) (1) harness connector.

2. Turn ignition switch ON.

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

### Voltage: Approximately 5 V

### <u>OK or NG</u>

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





# 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E101,M5
- Harness for open or short between mass air flow sensor (with intake air temperature sensor) and ECM

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

<b>4.</b> CHECK INTAKE AIR TEMPERATURE SENSOR	BROUND CIRCUIT FOR OPEN AND SHORT	Ν
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect ECM barness connector</li> </ol>		
<ol> <li>Check harness continuity between mass air flow Refer to Wiring Diagram.</li> </ol>	sensor terminal 6 and ECM terminal 74.	0
Continuity should exist.		P
4. Also check harness for short to ground and short	to power.	
OK or NG		
OK >> GO TO 6.		
NG >> GO TO 5.		

5. DETECT MALFUNCTIONING PART

Check the following.

# DTC P0112, P0113 IAT SENSOR

### < SERVICE INFORMATION >

[YD25DDTi]

INFOID:000000003759389

Harness connectors E101,M5

• Harness for open or short between mass air flow sensor (with intake air temperature sensor) and ECM

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

# 6. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-114, "Component Inspection".

### <u>OK or NG</u>

OK >> GO TO 7.

NG >> Replace mass air flow sensor (with intake air temperature sensor).

7. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

### >> INSPECTION END

**Component Inspection** 

# INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (k $\Omega$ )
25 (77)	1.800 - 2.200

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





# Removal and Installation

MASS AIR FLOW SENSOR Refer to <u>EM-6</u>.

EC-114

INFOID:000000003759390

# DTC P0117, P0118 ECT SENSOR

# Description

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

# Sensor Gasket SEF594K

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10 6 4

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### <Reference data>

Engine coolant tempera- ture [°C (°F)]	Voltage* (V)	Resistance (k $\Omega$ )
-10 (14)	4.7	7.0 - 11.4
20 (68)	3.8	2.1 - 2.9
50 (122)	2.6	0.68 - 1.00
90 (194)	1.3	0.236 - 0.260

*: This data is reference values and is measured between ECM terminal 51 (Engine coolant temperature sensor) and 70 (sensor ground).

# On Board Diagnosis Logic

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DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0117 0117	Engine coolant temperature sen- sor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The sensor circuit is open or short-	
P0118 0118	Engine coolant temperature sen- sor circuit high input	An excessively high voltage from the sensor is sent to ECM.	ed.) • Engine coolant temperature sensor	

# **DTC Confirmation Procedure**

### NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check 1st trip DTC.
- 4. If 1st trip DTC is detected, go to EC-116, "Diagnosis Procedure".

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# Wiring Diagram

[YD25DDTi] INFOID:000000003759394



: Detectable line for DTC Non-detectable line for DTC





GEC605A

Diagnosis Procedure

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1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

# DTC P0117, P0118 ECT SENSOR

### < SERVICE INFORMATION >

- Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

# OK or NG

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



2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor (1) harness connector.

2. Turn ignition switch ON.



### Voltage: Approximately 5 V

### <u>OK or NG</u>

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



# 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E351,E255
- Harness connectors E237,M279
- Harness for open or short between ECT sensor and ECM

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

4	CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1.	Turn ignition switch OFF.
2.	Disconnect ECM harness connector.

3. Check harness continuity between ECT sensor terminal 2 and ECM terminal 70. Refer to Wiring Diagram.

### Continuity should exist.

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

### OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

**5.**DETECT MALFUNCTIONING PART

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# DTC P0117, P0118 ECT SENSOR

### < SERVICE INFORMATION >

Check the following.

- Harness connectors E351,E255
- Harness connectors E237,M279
- Harness for open or short between ECT sensor and ECM

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

**6.**CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-118, "Component Inspection".

### OK or NG

OK >> GO TO 7.

>> Replace engine coolant temperature sensor. NG

7. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

### >> INSPECTION END

# **Component Inspection**

# ENGINE COOLANT TEMPERATURE SENSOR

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





# **Removal and Installation**

Engine coolant temperature [°C (°F)]

20 (68)

50 (122)

90 (194)

2.

ENGINE COOLANT TEMPERATURE SENSOR Refer to "CYLINDER HEAD" in EM section.

If NG, replace engine coolant temperature sensor.

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Resistance (kΩ)

2.1 - 2.9

0.68 - 1.00

0.236 - 0.260

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# DTC P0122, P0123 APP SENSOR

# Description

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION	
ACCEL POS SEN*	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0 V	(
	(Engine stopped)	Accelerator pedal: Fully depressed	4.0 - 4.8 V	
ACCEL SEN 2*	Ignition switch: ON	Accelerator pedal: Fully released	0.3 - 1.2 V	
	(Engine stopped)	Accelerator pedal: Fully depressed	3.7 - 4.8 V	l

*: This signal is converted by ECM internally. Thus, this differs from ECM terminals voltage.

# On Board Diagnosis Logic

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

If DTC P0122 or P0123 is displayed with DTC P0642 or P0643, first perform trouble diagnosis for DTC P0642 or P0643. Refer to <u>EC-210</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0122 0122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	Harness or connectors     (The APP sensor 1 circuit is open or	L
P0123 0123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	<ul> <li>shorted.)</li> <li>Accelerator pedal position sensor (Accelerator pedal position sensor 1)</li> </ul>	М

# DTC Confirmation Procedure

# NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check DTC.
- 4. If DTC is detected, go to EC-121, "Diagnosis Procedure".





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# Wiring Diagram

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# EC-APPS1-01



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

# DTC P0122, P0123 APP SENSOR

### < SERVICE INFORMATION >

# [YD25DDTi]

TERMI (Wire	NAL NO. e color)	Description	Condition	Value	А
+	-	Signal name		(Αρριολ.)	
67 (B)	_	Sensor ground (Sensor shield circuit)	—	_	EC
82 (W)	84 (R)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V	С
83	84	Accelerator pedal position sensor	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully released	0.5 - 1.0 V	D
(B)	(R)	1	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully depressed	3.7 - 4.7 V	E
84 (R)	_	Accelerator pedal position sensor 1 ground	_	_	F
90 (L)	92 (Y)	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5 V	G
91	92	Accelerator pedal position sensor	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully released	0.15 - 0.6 V	
(G)	(Y)	2	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully depressed	1.85 - 2.4 V	— H
92 (Y)	-	Accelerator pedal position sensor 2 ground	_	—	

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

# **Diagnosis Procedure**

# 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

# <u>OK or NG</u>

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



# 2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

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# DTC P0122, P0123 APP SENSOR

# < SERVICE INFORMATION >

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



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3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

### Voltage: Approximately 5 V

### OK or NG

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



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

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check harness continuity between APP sensor terminal 1 and ECM terminal 84. Refer to Wiring Diagram.

### Continuity should exist.

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

OK or NG

OK >> GO TO 4.

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

 ${f 4.}$ CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between APP sensor terminal 5 and ECM terminal 83. Refer to Wiring Diagram.

### Continuity should exist.

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

### OK or NG

OK >> GO TO 5.

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

**5.**CHECK APP SENSOR

Refer to EC-123, "Component Inspection".

<u>OK or NG</u>

OK >> GO TO 6.

NG >> Replace accelerator pedal assembly.

**6.**CHECK INTERMITTENT INCIDENT

Refer to EC-70.

>> INSPECTION END

# DTC P0122, P0123 APP SENSOR

# < SERVICE INFORMATION >

# **Component Inspection**

# ACCELERATOR PEDAL POSITION SENSOR

- 1. Reconnect all harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Check voltage between ECM harness connector terminal as follows.

	ECM					
+ –			Condition		Voltage	
Connector	Terminal	Terminal				
M33	83	84	Accelerator pedal	Fully released	0.5 - 1.0 V	
	(APP sensor 1 signal)	(Sensor ground)	Accelerator pedar	Fully depressed	3.7 - 4.7 V	
	91	92		Fully released	0.15 - 0.6 V	
	(APP sensor 2 signal)	(Sensor ground)	Fully depressed	1.85 - 2.4 V		

4. If NG, replace accelerator pedal assembly.

# Removal and Installation

ACCELERATOR PEDAL Refer to "ACCELERATOR CONTROL SYSTEM" in FE section.

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# DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

# < SERVICE INFORMATION >

# DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

# Description

Fuel pump temperature sensor (1) is built in the fuel pump (2). The sensor detects the fuel temperature in the fuel pump and calibrates the fuel injection amount change by fuel temperature.

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

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

# **On Board Diagnosis Logic**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel pump temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The sensor circuit is open or short-
P0183 0183	Fuel pump temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	ed.) <ul> <li>Fuel pump temperature sensor</li> </ul>

# **DTC Confirmation Procedure**

### NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check 1st trip DTC.
- If 1st trip DTC is detected, go to EC-125, "Diagnosis Procedure". 4.

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Diagnosis Procedure 1.check ground connections

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75 74 73 72 71 70 69 68 67 66 65 64 63

9 48 47 46 45 44

PU 69 THF RTN

(M32) B ECM

1 2 3 4 5 6 7 8 9 10 GY

21 (247)

GEC608A

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1. Turn ignition switch OFF.

4 5

З

2 8

81 80 79 78 77 76

# DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

# < SERVICE INFORMATION >

- Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

### <u>OK or NG</u>

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



[YD25DDTi]

2. CHECK FUEL PUMP TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- Disconnect fuel pump temperature sensor (1) harness connector.
- Fuel pump (2)
- 2. Turn ignition switch ON.



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

### Voltage: Approximately 5V

### <u>OK or NG</u>

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



# **3.**DETECT MALFUNCTIONING PART

Check the following

- Harness connectors E237, M279
- Harness for open or short between fuel pump temperature sensor and ECM

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

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

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check harness continuity between fuel pump temperature sensor terminal 2 and ECM terminal 69. Refer to Wiring Diagram.

### Continuity should exist.

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

OK or NG

OK >> GO TO 6. NG >> GO TO 5. 5.DETECT MALFUNCTIONING PART

Check the following

# DTC P0182, P0183 FUEL PUMP TEMPERATURE SENSOR

< SERVICE INFORMATION > [YD25DD11]	
<ul> <li>Harness connectors E237, M279</li> <li>Harness for open or short between fuel pump temperature sensor and ECM</li> </ul>	А
>> Repair open circuit or short to ground or short to power in harness or connectors. <b>6.</b> CHECK INTERMITTENT INCIDENT	EC
Refer to EC-70.	
OK or NG	С
OK >> GO TO 7. NG >> Repair or replace.	
7. REPLACE FUEL PUMP	D
<ol> <li>Replace fuel pump.</li> <li>Perform Fuel Pump Learning Value Clearing. Refer to <u>EC-23. "Fuel Pump Learning Value Clearing"</u>.</li> </ol>	Е
>> INSPECTION END	
Removal and Installation	F
Refer to EC-24. "FUEL PUMP".	G
	0
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	L
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# DTC P0192, P0193 FRP SENSOR

# Description

The fuel rail pressure (FRP) sensor (2) is placed to the fuel rail. It measures the fuel pressure in the fuel rail. The sensor sends voltage signal to the ECM. As the pressure increases, the voltage rises. The ECM controls the fuel pressure in the fuel rail by the inlet throt-tling device. The ECM uses the signal from fuel rail pressure sensor as a feedback signal.

<□ : Vehicle front

• Fuel rail pressure relief valve (1)

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR	CONDITION		SPECIFICATION
	Engine: After warming up	ldle	25 - 35 MPa
ACT CR PRESS	<ul> <li>Air conditioner switch: OFF</li> <li>Shift lever: Neutral</li> <li>No load</li> </ul>	2,000 rpm	40 - 50 MPa

# On Board Diagnosis Logic

INFOID:000000003759452

INFOID:000000003759451

### NOTE:

# If DTC P0192 or P0193 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0192 0192	Fuel rail pressure sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The sensor circuit is open or short-
P0193 0193	Fuel rail temperature sen- sor circuit high input	An excessively high voltage from the sensor is sent to ECM.	ed.) <ul> <li>Fuel rail temperature sensor</li> </ul>

# **DTC Confirmation Procedure**

### NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check 1st trip DTC.
- 4. If 1st trip DTC is detected, go to EC-130, "Diagnosis Procedure".

INFOID:000000003759450



INFOID:000000003759453



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

# DTC P0192, P0193 FRP SENSOR

### < SERVICE INFORMATION >

# [YD25DDTi]

INFOID:000000003759455

TERMINAL NO. (Wire color)		Description	Condition	Value	
+	-	Signal name		(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
48 (W) 68		Fuel rail pressure sensor	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	1.4 - 1.7 V	
49 (E (W)	(B)		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	1.7 - 2.0 V	
63 (R)	68 (B)	Fuel rail pressure sensor power supply	[Ignition switch ON]	Approximately 5 V	
67 (B)	_	Sensor ground (Sensor shield circuit)		_	
68 (B)	_	Fuel rail pressure sensor ground	_	_	

# **Diagnosis** Procedure

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF. 1.
- Loosen and retighten ground screws on the body. 2. Refer to <u>EC-81, "Ground Inspection"</u>. Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

### OK or NG

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



# 2. CHECK FUEL RAIL PRESSURE SENSOR POWER SUPPLY CIRCUIT

Disconnect fuel rail pressure sensor (2) harness connector. 1.

<□ : Vehicle front

Fuel rail pressure relief valve (1)

2. Turn ignition switch ON.



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

### Voltage: Approximately 5 V

### OK or NG

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



# DTC P0192, P0193 FRP SENSOR

< SERVICE INF	ORMATION >				[YD25DDTi]	
3.CHECK FUE	L RAIL PRESSU	JRE SENSOR (	GROUND CIRCUIT	FOR OPEN AND SHORT		
<ol> <li>Turn ignition</li> <li>Disconnect</li> <li>Check harn Refer to With</li> </ol>	n switch OFF. ECM harness co ess continuity be ing Diagram.	onnector. etween fuel rail	pressure sensor ter	minal 3 and ECM terminal	68.	E
Continu	ity should exist	<b>.</b>				
4. Also check	harness for shor	t to ground and	short to power.			(
<u>OK or NG</u>	TO 4					
NG >> Rep	air open circuit o	or short to grour	nd or short to power	r in harness or connectors		
4.CHECK FUE	L RAIL PRESSU	JRE SENSOR I	NPUT SIGNAL CIR	CUIT FOR OPEN AND S	HORT	
1. Check harn Refer to Wir	ess continuity be ing Diagram.	etween ECM ter	minals 48, 49 and f	uel rail pressure sensor te	rminal 2.	l
Continu	ity should exist	t.				
2. Also check	harness for shor	t to ground and	short to power.			
<u>DK or NG</u>	TO 5					(
NG >> Rep	air open circuit o	or short to grour	nd or short to power	r in harness connectors.		
<b>D.</b> CHECK FUE	L RAIL PRESSU	JRE SENSOR				
Refer to <u>EC-131</u>	, "Component Ir	spection".				
<u>OK or NG</u>						
OK >> GO NG >> Rec	TO 6. lace fuel rail.					
6.CHECK INTE	RMITTENT INC	IDENT				
Refer to <u>EC-70</u> .						
~~ INS						
Component	nepoction					
Jomponent	nspection				INFOID:000000003759456	
UEL RAIL PR	ESSURE SEN	ISOR				
1. Reconnect	narness connect	or disconnected	d.			
<ol> <li>Start engine</li> <li>Check volta</li> </ol>	and warm it up	to normal opera	ating temperature.	ollows		
	ge between Eor					
	ECM				-	
	+	_	Condition	Voltage		
Connector	Terminal	Terminal			_	(
M32	48 49	68		1.4 - 1.7 V 1.7-20 V	_	
4. If the voltag	e is out of specif repeat above cl	ication, disconn	ect fuel rail pressur	e sensor harness connect	or and connect it	
5. If NG, replace	ce fuel rail.					

FUEL RAIL Refer to EM-8.

# DTC P0200 FUEL INJECTOR

# < SERVICE INFORMATION >

# DTC P0200 FUEL INJECTOR

# On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0200 0200	Fuel injector power supply circuit	ECM detects a voltage of power source for the fuel injector is excessively high or low.	• ECM

# DTC Confirmation Procedure

# NOTE:

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

- 1. Start engine and let it idle for at least 5 seconds.
- 2. Check 1st trip DTC.
- 3. If 1st trip DTC is detected, go to EC-132, "Diagnosis Procedure".

# Diagnosis Procedure

**1.**INSPECTION START

# With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Select "SELF DIAG RESULTS" mode with CONSULT-III.
- 3. Touch "ERASE".
- 4. Perform EC-132, "DTC Confirmation Procedure", again.
- 5. Is 1st trip DTC P0200 displayed again?

### With GST

- 1. Turn ignition switch ON.
- 2. Select Service \$04 with GST.
- 3. Perform EC-132, "DTC Confirmation Procedure", again.
- 4. Is 1st trip DTC P0200 displayed again?

### Yes or No

Yes >> GO TO 2.

### No >> INSPECTION END

- 2. REPLACE ECM
- 1. Replace ECM.
- Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to <u>EL-96. "ECM</u> <u>Re-communicating Function"</u>.
- 3. Perform Injector Adjustment Value Registration. Refer to EC-22, "Injector Adjustment Value Registration".
- 4. Perform Fuel Pump Learning Value Clearing. Refer to EC-23. "Fuel Pump Learning Value Clearing".
- 5. Perform EGR Volume Control Valve Closed Position Learning Value Clear. Refer to <u>EC-24. "EGR Volume</u> <u>Control Valve Closed Position Learning Value Clear"</u>.
- 6. Perform EGR Volume Control Valve Closed Position Learning. Refer to <u>EC-24</u>, "EGR Volume Control Valve Closed Position Learning".

### >> INSPECTION END

[YD25DDTi]

INFOID:000000003759458

INFOID:000000003759459

INFOID:000000003759460

# DTC P0201 - P0204 FUEL INJECTOR

# **Component Description**

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION	
MAIN INJ WID	Engine: After warming up	No load	0.68 - 0.78 msec	(
	<ul><li>Shift lever: Neutral position</li><li>Idle speed</li></ul>	Blower fan switch: ON	0.78 - 0.88 msec	

# On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	-
P0201 0201	No. 1 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 1 cylinder fuel injector.		_
P0202 0202	No. 2 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 2 cylinder fuel injector.	Harness or connectors     (The fuel injector circuit is even.)	
P0203 0203	No. 3 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 3 cylinder fuel injector.	Fuel injector	
P0204 0204	No. 4 cylinder fuel injector circuit open	An improper voltage signal is sent to ECM through No. 4 cylinder fuel injector.		

# **DTC Confirmation Procedure**

# NOTE:

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

# **TESTING CONDITION**

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

- Start engine and let it idle for at least 5 seconds. 1.
- 2. Check 1st trip DTC.
- 3. If 1st trip DTC is detected, go to EC-136, "Diagnosis Procedure".

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# [YD25DDTi]

# <SERVICE INFORMATION > Wiring Diagram

INFOID:000000003759465

# EC-INJECT-01



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

# DTC P0201 - P0204 FUEL INJECTOR

# < SERVICE INFORMATION >

# [YD25DDTi]

TERMINAL NO. (Wire color)		Description	Condition	Value (Approx.)	1
+	_	Signal name		(, + F )	
4 (L)	) 114 (B)	Fuel injector power supply (For cylinder No. 1 and 3)	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 7.5 V ★	
5 (P)		Fuel injector power supply (For cylinder No. 2 and 4)	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	Approximately 8.0 V ★	
21		Fuel injector No. 4		Approximately 7.5 V ★	3
(Y) 22 (R)	114	Fuel injector No. 4	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	→ 10.0 V/Div 20 ms/Div T MBIB1297E	-
23	(D)	Fuel injector No. 2		Approximately 8.0 V ★	
(W) 24 (OR)		Fuel injector No. 2	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	MBIB1298E	J
40		Fuel iniector No. 3		Approximately 7.5 V ★	-
(G) 41 (BR)	114 (R)	Fuel injector No. 3	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	MBIB1297E	1
42		Fuel injector No. 1		Approximately 8.0 V ★	)
(PU) 43 (SB)		Fuel injector No. 1	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	MBIB1298E	2

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

# DTC P0201 - P0204 FUEL INJECTOR

# < SERVICE INFORMATION >

# Diagnosis Procedure

# 1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT FOR OPEN

- 1. Turn ignition switch OFF.
- 2. Disconnect fuel injector (1) harness connector.

- 3. Disconnect ECM harness connector.
- Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.

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

# Continuity should exist.

### OK or NG

OK >> GO TO 2.

NG >> Repair open circuit in harness or connectors.

2.CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN

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

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

### Continuity should exist.

### OK or NG

OK >> GO TO 3.

NG >> Repair open circuit in harness or connectors.

3.CHECK FUEL INJECTOR-I

Refer to EC-137, "Component Inspection".

OK or NG

OK >> GO TO 4.

NG >> GO TO 5.

**4.**CHECK FUEL INJECTOR-II

### (B) With CONSULT-III

1. Remove two fuel injectors.

NOTE:

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



INFOID:000000003759467

# DTC P0201 - P0204 FUEL INJECTOR

< SERVICE INFORMATION >	[YD25DDTi]	
2. Swap the two fuel injectors to the other cylinder.		
3. Reconnect ECM harness connector and fuel injector harness co	onnectors.	А
<ol> <li>I urn ignition switch UN.</li> <li>Perform Injector Adjustment Value Registration Refer to EC-22.</li> </ol>	"Injector Adjustment Value Registration"	
<ol> <li>Select "SELF DIAG RESULTS" mode with CONSULT-III.</li> </ol>		
7. Touch "ERASE".		EC
8. Perform <u>EC-133, "DTC Confirmation Procedure"</u> .		
9. Is DTC displayed for the other cylinder?		0
With GSI     Demove two fuel injectors		C
NOTE:		
One is from malfunctioning cylinder and the other is from any cy	linder other than the malfunctioning cylin-	D
der.		D
2. Swap the two fuel injectors to the other cylinder.		
Reconnect ECM namess connector and fuel injector namess co     Turn ignition switch ON	onnector.	Е
<ol> <li>Perform Injector Adjustment Value Registration. Refer to EC-22.</li> </ol>	"Injector Adjustment Value Registration".	
6. Select Service \$04 with GST.		
7. Perform <u>EC-133, "DTC Confirmation Procedure"</u> .		F
8. Is DIC displayed for the other cylinder?		
Yes or No		
Yes >> GO TO 5.		G
<b>5</b>		
<b>J.</b> REPLACE FUEL INJECTOR		
1. Replace fuel injector of malfunctioning cylinder.		
2. Perform Injector Adjustment Value Registration. Refer to <u>EC-22</u> ,	, "Injector Adjustment Value Registration".	
		I
Refer to <u>EC-70</u> .		J
>> INSPECTION END		
Component Inspection	INFOID:00000003759468	K
FUEL INJECTOR		L
1. Disconnect fuel injector harness connector.		_
2. Check resistance between terminals as shown in the figure.		
, and the second se		M
Resistance: 0.2 - 0.8 Ω [at 10 - 60°C (50 - 140°F)]		
3. If NG replace fuel injector.		
		Ν
		-
		0
	MBIB1735E	Þ
Removal and Installation	INFOID:00000003759469	Γ

FUEL INJECTOR

### < SERVICE INFORMATION >

# DTC P0217 ENGINE OVER TEMPERATURE

# Description

[YD25DDTi]

### SYSTEM DESCRIPTION NOTE: If DTC P0217 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to EC-83.

Cooling Fan Control

Sensor	Input Signal to ECM	ECM function	Actuator
Wheel sensor	Vehicle speed*		
Engine coolant temperature sensor	Engine coolant temperature	cooling fan	Cooling fan relay
Air conditioner switch	Air conditioner ON signal*		

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

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, and air conditioner ON signal. The control system has 2-step control [ON/OFF].

### **Cooling Fan Operation**



# CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000003759471

### Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
	Engine: After warming up idle the	Air conditioner switch: OFF	OFF
AIR COND SIG	engine	Air conditioner switch: ON (Compressor operates)	ON
	When cooling fan is stopped		OFF
COOLING FAN*	When cooling fan operate low speed		LOW
	When cooling fan operate low speed		Н

*: The cooling fan rotation has two stages (OFF and ON) although the display of CONSULT-III has three stages (OFF,LOW and HI).

# On Board Diagnosis Logic

INFOID:000000003759472

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

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.

### < SERVICE INFORMATION >

[YD25DDTi]

INFOID:000000003759473

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	A
P0217 0217	Engine over temperature (Overheat)	<ul> <li>Cooling fan does not operate properly (Overheat).</li> <li>Cooling fan system does not operate properly (Overheat).</li> <li>Engine coolant was not added to the system using the proper filling method.</li> <li>Engine coolant is not within the specified range.</li> </ul>	<ul> <li>Harness or connectors (The cooling fan circuit is open or shorted.)</li> <li>Cooling fan</li> <li>Cooling fan (Crankshaft driven)</li> <li>Radiator hose</li> <li>Radiator</li> <li>Radiator cap</li> <li>Reservoir tank</li> <li>Water pump</li> <li>Thermostat</li> <li>For more information, refer to EC-145.</li> <li>"Main 12 Causes of Overheating".</li> </ul>	C

### **CAUTION:**

When a malfunction is indicated, be sure to replace the coolant. Refer to "ENGINE MAINTENANCE" in MA section. Also, replace the engine oil. Refer to "ENGINE MAINTENANCE" in MA section.

- 1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to "RECOMMENDE FLUIDS AND LUBRICANTS" in MA section.
- 2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

### Overall Function Check

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

### WARNING:

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

### WITH CONSULT-III

- Check the coolant level in the reservoir tank and radiator. Allow engine to cool before checking coolant level. If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to <u>EC-141</u>. <u>"Diagnosis Procedure"</u>.
- Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to <u>EC-141</u>. <u>"Diagnosis Procedure"</u>.
- Start engine and make sure that cooling fan (crankshaft driven) operates normally.
   If NG, refer to "ENGINE COOLING SYSTEM" in LC section.
   If OK, go to the following step.
   Be careful not to overheat engine.
- Stop engine and turn ignition switch ON.
- 5. Select "COOLANT TEMP" in "ACTIVE TEST" mode with CONSULT-III.
- 6. Set "ENG COOLANT TEMP" to 100°C (212°F) by touching "Qu" and "UP" on CONSULT-III screen.
- Make sure that cooling fan operates. If the results are NG, go to <u>EC-141, "Diagnosis Procedure"</u>.
- **WITHOUT CONSULT-III**



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### < SERVICE INFORMATION >

- Check the coolant level in the reservoir tank and radiator. Allow engine to cool before checking coolant level. If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to <u>EC-141</u>, <u>"Diagnosis Procedure"</u>.
- 2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to <u>EC-141</u>. <u>"Diagnosis Procedure"</u>.
- Start engine and make sure that cooling fan (crankshaft driven) operates normally. If NG, refer to "ENGINE COOLING SYSTEM" in LC section. If OK, go to the following step. Be careful not to overheat engine.
- 4. Turn ignition switch OFF.
- 5. Disconnect engine coolant temperature sensor harness connector.
- 6. Connect 150  $\Omega$  resistor to engine coolant temperature sensor harness connector.
- 7. Start engine and make sure that cooling fan operates. **Be careful not to overheat engine.**
- 8. If NG, go to EC-141, "Diagnosis Procedure".



[YD25DDTi]

### < SERVICE INFORMATION >

# [YD25DDTi]



1.CHECK COOLING FAN (CRANKSHAFT DRIVEN) OPERATION

1. Start engine and let it idle.

2. Make sure that cooling fan (crankshaft driven) operates normally.

OK or NG

< SERVICE INFORMATION >

[YD25DDTi]

OK (With CONSULT-III)>>GO TO 2. OK (Without CONSULT-III)>>GO TO 3.

NG >> Check cooling fan (crankshaft driven). Refer to "ENGINE COOLING SYSTEM" in LC section.

2. CHECK COOLING FAN OPERATION

# With CONSULT-III

- 1. Start engine and let it idle.
- 2. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode with CONSULT-III.
- 3. Set "ENG COOLANT TEMP" to 95°C (203°by "Qu" and "UP" on CONSULT-III screen.
- 4. Make sure that cooling fan operate.

### OK or NG

OK >> GO TO 4.

NG >> Check cooling fan control circuit. (Go to "PROCEDURE A".)

3.CHECK COOLING FAN OPERATION

### **Without CONSULT-III**

- 1. Turn ignition switch OFF
- 2. Disconnect engine coolant temperature sensor harness connector.
- 3. Connect 150  $\Omega$  resistor to engine coolant temperature sensor harness connector.
- 4. Start engine and make sure that cooling fan operates.

### OK or NG

- OK >> GO TO 4.
- NG >> Check cooling fan control circuit. (Go to "PROCEDURE A".)

**4.**CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops. Refer to "ENGINE COOL-ING SYSTEM" in LC section.

### CAUTION:

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

### OK or NG

- OK >> GO TO 5.
- NG >> Check the following for leak. Refer to "ENGINE COOLING SYSTEM" in LC section.
  - Hose
  - Radiator
  - Radiator cap
  - Water pump
  - Reservoir tank

# **5.**CHECK COMPONENT PARTS

Check the following.

- Thermostat. Refer to "ENGINE COOLING SYSTEM" in LC section.
- Engine coolant temperature sensor. Refer to EC-118, "Component Inspection".

### <u>OK or NG</u>

- OK >> GO TO 6.
- NG >> Replace malfunctioning component.

### **6.**CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to EC-145. "Main 12 Causes of Overheating".

### >> INSPECTION END

# PROCEDURE A

1. CHECK COOLING FAN POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect cooling fan relay E51.
- 3. Turn ignition switch ON.

# < SERVICE INFORMATION >

4. Check voltage between cooling fan relay terminals 1, 5 and ground with CONSULT-III or tester.

### Voltage: Battery voltage

### OK or NG

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



# 2. DETECT MALFUNCTIONING PART

### Check the following.

- 10A fuse (No.13)
- 30A fusible link (letter d)
- Harness connectors M5, E101
- · Harness for open or short between cooling fan relay and fuse
- Harness for open or short between cooling fan relay and battery

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

# ${f 3.}$ CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT

1. Disconnect cooling fan motor (1) harness connector (2).

- : Vehicle front  $\langle \Box \rangle$
- 2. Check harness continuity between the following. cooling fan relay terminal 3 and cooling fan motor terminal 1. cooling fan motor terminal 2 and ground. Refer to Wiring Diagram.

### Continuity should exist.

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

### OK or NG

OK >> GO TO 4.

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

# ${f 4}.$ CHECK COOLING FAN MOTOR SIGNAL CIRCUIT FOR OPEN OR SHORT

- 1. Disconnect triple-pressure switch harness connector.
- 2. Check harness continuity between cooling fan relay terminal 2 and triple-pressure switch terminal 2. Check harness continuity between triple-pressure switch terminal 3 and ground. Refer to Wiring Diagram.

### Continuity should exist.

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

### OK or NG

OK >> GO TO 5.

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

# ${f 5.}$ CHECK COOLING FAN MOTOR SIGNAL CIRCUIT FOR OPEN OR SHORT-II

- 1. Disconnect combination meter harness connector.
- 2. Check harness continuity between cooling fan relay terminal 2 and combination meter terminal 73. Check harness continuity between triple-pressure switch terminal 2 and combination meter terminal 73. Refer to Wiring Diagram.

### Continuity should exist.

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

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OK or NG

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

6.DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E101, M5

Harness connectors M6, N1

• Harness for open or short between cooling fan relay and combination meter

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

**7.**CHECK COOLING FAN MOTOR SIGNAL CIRCUIT FOR OPEN OR SHORT-III

Check harness continuity between Combination Meter and ECM. Refer to EL-117, "Main Line Between ECM and Combination Meter".

OK or NG

OK >> GO TO 8.

NG >> Repair the main line between the ECM and combination meter.

**8.**CHECK COOLING FAN RELAY

Refer to EC-145, "Component Inspection".

<u>OK or NG</u>

OK >> GO TO 9.

NG >> Replace cooling fan relay.

**9.**CHECK TRIPLE-PRESSURE SWITCH

Refer to "Electrical Components Inspection" in HA section.

OK or NG

OK >> GO TO 10.

NG >> Replace cooling fan relay.

**10.**CHECK COOLING FAN MOTOR

Refer to EC-145. "Component Inspection".

### <u>OK or NG</u>

OK >> GO TO 11.

NG >> Replace cooling fan motors.

11.CHECK COMBINATION METER

Refer to EL-54, "Self-Diagnosis Mode of Combination meter".

<u>OK or NG</u>

OK >> GO TO 12.

NG >> Replace cooling fan motors.

12. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

>> INSPECTION END
# DTC P0217 ENGINE OVER TEMPERATURE

### < SERVICE INFORMATION >

# Main 12 Causes of Overheating

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Engine	Step	Inspection item	Equipment	Standard	Reference page	
OFF	1	<ul> <li>Blocked radiator</li> <li>Blocked condenser</li> <li>Blocked radiator grille</li> <li>Blocked bumper</li> </ul>	• Visual	No blocking	_	EC
	2	Coolant mixture	Coolant tester	50 - 50% coolant mixture	See "RECOMMENDED AND LUBRICANTS" in MA section.	
	3	Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See "ENGINE MAINTE- NANCE" in MA section.	D
	4	Radiator cap	Pressure tester	See "ENGINE COOLING S	SYSTEM" in LC section.	E
ON* ²	5	Coolant leaks	Visual	No leaks	See "ENGINE COOLING SYSTEM" in LC section.	
ON* ²	6	Thermostat	<ul> <li>Touch the upper and lower radiator hoses</li> </ul>	Both hoses should be hot	See "ENGINE COOLING SYSTEM" in LC section.	F
ON* ¹	7	Cooling fan	CONSULT-III	Operating	See trouble diagnosis for DTC P0217 (EC-138).	G
ON* ²	7	Cooling fan (Crankshaft driven)	• Visual	Operating	See "ENGINE COOLING SYSTEM" in LC section.	
OFF	8	Combustion gas leak	Color checker chemical tester 4 Gas analyzer	Negative	_	Η
ON* ³	9	Coolant temperature     gauge	Visual	Gauge less than 3/4 when driving	_	
		Coolant overflow to res- ervoir tank	Visual	No overflow during driving and idling	See "ENGINE MAINTE- NANCE" in MA section.	
OFF*4	10	Coolant return from res- ervoir tank to radiator	Visual	Should be initial level in reservoir tank	See "ENGINE MAINTE- NANCE" in MA section.	J
OFF	11	Cylinder head	Straight gauge feeler gauge	0.1 mm (0.004 in) Maxi- mum distortion (warping)	See "CYLINDER HEAD" in EM section.	K
	12	Cylinder block and pis- tons	Visual	No scuffing on cylinder walls or piston	See "CYLINDER BLOCK" in EM section.	

EC-145

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to "OVERHEATING ANALYSIS" in LC section.

# **Component Inspection**

### COOLING FAN RELAY

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

Terminals	Conditions	Continuity
3 and 5	$12\ V$ direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed

If NG, replace cooling fan relay.



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# DTC P0217 ENGINE OVER TEMPERATURE

### < SERVICE INFORMATION >

### COOLING FAN MOTOR

_

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

	term	ninals
Cooling fan motor	+	_
	1	2

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



# DTC P0222, P0223 APP SENSOR

# Description

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CON	DITION	SPECIFICATION	-
ACCEL POS SEN*	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0 V	(
ACCEL TOO SER	(Engine stopped)	Accelerator pedal: Fully depressed	4.0 - 4.8 V	_
	Ignition switch: ON	Accelerator pedal: Fully released	0.3 - 1.2 V	-
ACCEL SEN 2	(Engine stopped)	Accelerator pedal: Fully depressed	3.7 - 4.8 V	-

*: This signal is converted by ECM internally. Thus, this differs from ECM terminals voltage.

# On Board Diagnosis Logic

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

### NOTE:

If DTC P0222 or P0223 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to EC-214.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0222 0222	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	Harness or connectors (The APP sensor 2 circuit is open or	L
P0223 0223	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	<ul> <li>Accelerator pedal position sensor (Accelerator pedal position sensor 2)</li> </ul>	M

# **DTC Confirmation Procedure**

### NOTE:

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

- Turn ignition switch ON. 1.
- Wait at least 5 seconds. 2.
- Check DTC. 3.
- If DTC is detected, go to EC-149, "Diagnosis Procedure". 4.

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# Wiring Diagram

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# EC-APPS2-01



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

# DTC P0222, P0223 APP SENSOR

### < SERVICE INFORMATION >

# [YD25DDTi]

TERMII (Wire	NAL NO. color)	Description	Condition	Value (Approx.)	A
+	_	Signal name		(//pp/0x.)	
67 (B)	_	Sensor ground (Sensor shield circuit)	_	_	EC
82 (W)	84 (R)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V	С
83	84	Accelerator pedal position sensor	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully released	0.5 - 1.0 V	- D
(B) (R)	(R)	1	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully depressed	3.7 - 4.7 V	E
84 (R)	_	Accelerator pedal position sensor 1 ground	_	_	F
90 (L)	92 (Y)	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5 V	G
91	92	Accelerator pedal position sensor	<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully released</li></ul>	0.15 - 0.6 V	
(G) (Y)	2	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully depressed	1.85 - 2.4 V	- 1	
92 (Y)		Accelerator pedal position sensor 2 ground	_	_	

# **Diagnosis Procedure**

# 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

### OK or NG

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

# 2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

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





# EC-149

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3. Check voltage between APP sensor terminal 6 and ground with CONSULT-III or tester.

### Voltage: Approximately 5 V

### <u>OK or NG</u>

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



 $\mathbf{3}$ . Check App Sensor 2 ground circuit for open and short

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check harness continuity between APP sensor terminal 3 and ECM terminal 92. Refer to Wiring Diagram.

### Continuity should exist.

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

### OK or NG

OK >> GO TO 4.

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

4.CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 91 and APP sensor terminal 2. Refer to Wiring Diagram.

### Continuity should exist.

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

<u>OK or NG</u>

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

**5.**CHECK APP SENSOR

Refer to EC-150, "Component Inspection".

### <u>OK or NG</u>

OK >> GO TO 6.

NG >> Replace accelerator pedal assembly.

**6.**CHECK INTERMITTENT INCIDENT

Refer to EC-70.

### >> INSPECTION END

### **Component Inspection**

### ACCELERATOR PEDAL POSITION SENSOR

- 1. Reconnect all harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Check voltage between ECM harness connector terminals as follows.

# DTC P0222, P0223 APP SENSOR

### < SERVICE INFORMATION >

[YD25DDTi]

	ECM					
	+	_	Con	dition	Voltage	
Connector	Terminal	Terminal		1		
	83	84	Accelerator pedal	Fully released	0.5 - 1.0 V	
M33	(APP sensor 1 signal)	(Sensor ground)	•	Fully depressed	3.7 - 4.7 V	
	91	92 (Sanaar ground)	Accelerator pedal	Fully released	0.15 - 0.6 V	
	(APP sensor 2 signal)	(Sensor ground)		Fully depressed	1.85 - 2.4 V	
4. If NG, r	eplace accelerator	pedal assembly.				
Removal	and Installation	ו			INFOID:0000000	003759485
	ATOR PEDAL					
Refer to "A	CCELERATOR CON	NTROL SYSTEM	1" in FE section.			

# Description

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

The sensor consists of a permanent magnet and Hall IC.

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
CKPS-RPM (TDC)	<ul> <li>Run engine and compare CONSULT-III value with the tachometer in- dication.</li> </ul>	Almost the same speed as the ta- chometer indication

# On Board Diagnosis Logic

### NOTE:

If DTC P0335 is displayed with DTC P0642 or P0643, first perform trouble diagnosis for DTC P0642 or P0643. Refer to <u>EC-210</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor circuit	Crankshaft position sensor signal is not detect by the ECM when engine is running.	<ul> <li>Harness or connectors (The sensor circuit is open or short- ed.)</li> <li>Crankshaft position sensor</li> </ul>

# DTC Confirmation Procedure

### NOTE:

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

- 1. Start engine and let it idle for at least 5 seconds. If engine could not start, keep ignition switch at START position for 5 seconds.
- 2. Check 1st trip DTC.
- 3. If 1st trip DTC is detected, go to EC-154, "Diagnosis Procedure".

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# [YD25DDTi]



# Wiring Diagram





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

### < SERVICE INFORMATION >

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TERMINAL NO. (Wire color)		Description	Condition	Value (Approx.)
+	-	Signal name		(
46 65		Crankshaft position sensor	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 3.5 V ★
(G) (	(Y)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 3.5 V ★
65 (Y)	_	Crankshaft position sensor ground	_	_
67 (B)	_	Sensor ground (Sensor shield circuit)	_	_
82 (W)	65 (Y)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V

# **Diagnosis Procedure**

# 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>. Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

### OK or NG

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

# 2. CHECK CKP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position (CKP) sensor (1) harness connector.

Turn ignition switch ON. 2.





### < SERVICE INFORMATION >

# [YD25DDTi]

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

### Voltage: Approximately 5 V

### OK or NG

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



# **3.** DETECT MALFUNCTIONING PART

### Check the following.

- Harness connectors E237, M279
- Harness for open or short between CKP sensor and ECM
  - >> Repair open circuit or short to ground or short to power in harness or connectors.

# 4.CHECK CKP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

 Turn ignition switch OFF.
 Disconnect ECM harness connector.
 Check harness continuity between ECM terminal 65 and CKP sensor terminal 2. Refer to Wiring Diagram.
 Continuity should exist.
 Also check harness for short to ground and short to power.

### OK or NG

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

**5.**DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E237, M279
- Harness for open or short between CKP sensor and ECM

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

# 6. CHECK CKP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

Check harness continuity between ECM terminal 46 and CKP sensor terminal 1.
 Refer to Wiring Diagram.
 Continuity should exist.
 Also check harness for short to ground and short to power.
 OK or NG

7.DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E237, M279

Harness for open or short between CKP sensor and ECM

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

# 8.CHECK CRANKSHAFT POSITION SENSOR

< SERVICE INFORMATION >

Refer to EC-156, "Component Inspection".

<u>OK or NG</u>

OK >> GO TO 9.

NG >> Replace crankshaft position sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

### >> INSPECTION END

### **Component Inspection**

### CRANKSHAFT POSITION SENSOR

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



5. Check resistance as shown in the figure.

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

6. If NG, replace crankshaft position sensor.

# Removal and Installation

CRANKSHAFT POSITION SENSOR Refer to <u>MT-3</u>.

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# Description

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

The sensor consists of a permanent magnet and Hall IC.

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION	
CKPS-RPM (TDC)	<ul> <li>Tachometer: Connect</li> <li>Run engine and compare CONSULT-III value with the tachometer indication.</li> </ul>	Almost the same speed as the ta- chometer indication.	(

# On Board Diagnosis Logic

### NOTE:

### If DTC P0336 is displayed with DTC P0642 or P0643, first perform trouble diagnosis for DTC P0642 or P0643. Refer to EC-210.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0336 0336	Crankshaft position sensor circuit range/performance	Crankshaft position sensor signal is not in the normal pattern when engine is running.	<ul> <li>Harness or connectors (The sensor circuit is open or short- ed.)</li> <li>Crankshaft position sensor</li> <li>Signal plate</li> </ul>	k

# **DTC Confirmation Procedure**

### NOTE:

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

- Start engine and let it idle for at least 5 seconds. 1. If engine could not start, keep ignition switch at START position for 5 seconds.
- 2. Check 1st trip DTC.
- 3 If 1st trip DTC is detected, go to EC-159, "Diagnosis Procedure".

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# Wiring Diagram

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EC-CKPS-01



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

### < SERVICE INFORMATION >

# [YD25DDTi]

TERMII (Wire	NAL NO. color)	Description	Condition	Value (Approx.)	А
+	-	Signal name		(лррюх.)	
			<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 3.5 V ★	EC C
46	65			≥ 2.0 V/Div 2 ms/Div MBIB0879E	D
(G)	(Y)	Crankshaft position sensor	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 3.5 V ★	E
65 (Y)	_	Crankshaft position sensor ground	_	_	G
67 (B)	_	Sensor ground (Sensor shield circuit)	_	_	Н
82 (W)	65 (Y)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V	

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

# **Diagnosis Procedure**

- 1. CHECK GROUND CONNECTIONS
- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>. Body ground M97 (1)
- Body ground M99 (2)
- ECM (3) _

### OK or NG

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



2. CHECK CKP SENSOR POWER SUPPLY CIRCUIT

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### < SERVICE INFORMATION >

- 1. Disconnect crankshaft position (CKP) sensor (1) harness connector.
- 2. Turn ignition switch ON.



[YD25DDTi]

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

### Voltage: Approximately 5 V

OK or NG

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



# 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E237, M279
- Harness for open or short between CKP sensor and ECM

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

# 4. CHECK CKP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

### Continuity should exist.

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

### OK or NG

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

**5.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E237, M279

Harness for open or short between CKP sensor and ECM

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

### **6.**CHECK CKP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

### Continuity should exist.

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

<u>OK or NG</u>

< SERVICE INFORMATION	>	[YD25DDTi]
OK >> GO TO 8.		Δ
7.DETECT MALFUNCTION	NG PART	,
Check the following. • Harness connectors E237, I • Harness for open or short b	M279 etween CKP sensor and ECM	EC
>> Repair open circu 8.CHECK CRANKSHAFT P	iit or short to ground or short to pov OSITION SENSOR	ver in harness or connectors.
Refer to EC-161, "Componen	t Inspection".	C
OK or NG OK >> GO TO 9. NG >> Replace cranksh: <b>9.</b> CHECK GEAR TOOTH	aft position sensor.	E
Visually check for chipping sig	gnal plate gear tooth.	F
OK or NG OK >> GO TO 10. NG >> Replace the signa 10.CHECK INTERMITTEN	al plate. F INCIDENT	G
Refer to <u>EC-70</u> .		
>> INSPECTION EN	ID	INFOID:00000003759516
CRANKSHAFT POSITION 1. Loosen the fixing bolt of t 2. Disconnect crankshaft po	SENSOR he sensor. sition sensor harness connector.	J
<ol> <li>Remove the sensor.</li> <li>Visually check the sensor</li> </ol>	r for chipping	k
	tor employed.	
		MBIB0647E
5. Check resistance as show	wn in the figure.	
Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]	
1 (+) - 2 (-) 1 (+) - 3 (-)	Except 0 or ∞	
2 (+) - 3 (-)		
ס. וד שאו, replace crankshaft	position sensor.	MBIB1662E

Removal and Installation

[YD25DDTi]

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CRANKSHAFT POSITION SENSOR Refer to MT-3.

# Description

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

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

The sensor consists of a permanent magnet and Hall IC.

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

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

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

# On Board Diagnosis Logic

### NOTE:

If DTC P0340 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0340 0340	Camshaft position sensor circuit	Camshaft position sensor signal is not detect by the ECM when engine is running.	<ul> <li>Harness or connectors (The sensor circuit is open or short- ed.)</li> <li>Camshaft position sensor</li> </ul>	

# **DTC Confirmation Procedure**

# NOTE:

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

- Start engine and let it idle for at least 5 seconds. If engine could not start, keep ignition switch at START position for 5 seconds.
- 2. Check 1st trip DTC.
- 3. If 1st trip DTC is detected, go to EC-165. "Diagnosis Procedure".

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# Wiring Diagram

[YD25DDTi] INFOID:000000003759521

EC-CMPS-01



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

### < SERVICE INFORMATION >

# [YD25DDTi]

TERMII (Wire	NAL NO. color)	Description	Condition	Value	А
+	1	Signal name		(лррюх.)	
45 (W)	66 (B)	Camshaft position sensor power supply	[Ignition switch ON]	Approximately 5 V	EC
			<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 4.7 V ★	C
47 66 (R) (B)	66 (B)	Camshaft position sensor		Approximately 4.7 V ★	Е
		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>		F	
				≥ 2.0 V/Div 20 ms/Div MBIB0878E	G
66 (B)		Camshaft position sensor ground	_	_	Н
67 (B)	_	Sensor ground (Sensor shield circuit)	_	_	

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

# **Diagnosis Procedure**

# 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- Loosen and retighten ground screws on the body. 2. Refer to <u>EC-81, "Ground Inspection"</u>. Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

### OK or NG

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



# 2. CHECK CMP SENSOR POWER SUPPLY CIRCUIT

Disconnect camshaft position (CMP) sensor (1) harness con-1. nector.

**EC-165** 

2. Turn ignition switch ON.



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### < SERVICE INFORMATION >

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

### Voltage: Approximately 5 V

### OK or NG

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



[YD25DDTi]

 ${f 3.}$  CHECK CMP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

### Continuity should exist.

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

### OK or NG

OK >> GO TO 4.

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

 ${f 4.}$ CHECK CMP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

### Continuity should exist.

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

### OK or NG

OK >> GO TO 5.

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

### 5.CHECK CAMSHAFT POSITION SENSOR

Refer to EC-166, "Component Inspection".

### <u>OK or NG</u>

OK >> GO TO 6.

NG >> Replace camshaft position sensor.

**6.**CHECK INTERMITTENT INCIDENT

Refer to EC-70.

### >> INSPECTION END

### **Component Inspection**

### CAMSHAFT POSITION SENSOR

- 1. Loosen the fixing bolt of the sensor.
- 2. Disconnect camshaft position sensor harness connector.
- 3. Remove the sensor.

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### < SERVICE INFORMATION >

4. Visually check the sensor for chipping.

# [YD25DDTi]



5. Check resistance as shown in the figure.

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

6. If NG, replace camshaft position sensor.

Removal and Installation

CAMSHAFT POSITION SENSOR Refer to "CYLINDER HEAD" in EM section. INFOID:000000003759525

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# Description

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

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

The sensor consists of a permanent magnet and Hall IC.

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

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

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

### On Board Diagnosis Logic

### NOTE:

If DTC P0341 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0341	Camshaft position sensor	Camshaft position sensor signal is not in the nor-	<ul> <li>Harness connectors</li></ul>
0341	circuit range/performance	mal pattern when engine is running.	(The sensor circuit is opener shorted.) <li>Camshaft position sensor</li> <li>Starter motor</li> <li>Starting system circuit</li> <li>Signal plate</li>

# **DTC Confirmation Procedure**

### NOTE:

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

**EC-168** 

- 1. Start engine and let it idle for at least 5 seconds. If engine could not start, keep ignition switch at START position for 5 seconds.
- 2. Check 1st trip DTC.
- 3. If 1st trip DTC is detected, go to EC-170, "Diagnosis Procedure".

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# Wiring Diagram

< SERVICE INFORMATION >

INFOID:000000003759529





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: Detectable line for DTC EC : Non-detectable line for DTC CAMSHAFT POSITION SENSOR С (M243) 2 3 D Ŵ B R 2 Ε F Н +-4 J R В w 67 45 47 66 A-VCC4 G+ G-S-GND Κ ECM (M32) L 14 13 12 11 10 9 8 4 5 321 M243 B Μ M32 B 3 0 49 48 47 46 45 44 6 2 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 ╶──┌ Ν Ο

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

### < SERVICE INFORMATION >

TERMI (Wire	NAL NO. color)	Description	Condition	Value
+	-	Signal name		(дррюх.)
45 (W)	66 (B)	Camshaft position sensor power supply	[Ignition switch ON]	Approximately 5 V
47	66	Camshaft position sensor	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 4.7 V ★
(K)	(B)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 4.7 V ★
66 (B)	_	Camshaft position sensor ground	_	-
67 (B)	_	Sensor ground (Sensor shield circuit)	_	_

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

# **Diagnosis Procedure**

INFOID:000000003759531

# **1.**CHECK STARTING SYSTEM

Turn ignition switch to START position.

# Does the engine turn over? Does the starter motor operate?

### Yes or No

Yes >> GO TO 2.

No >> Check starting system. (Refer to "STARTING SYSTEM in EL section.)

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

- Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)

- ECM (3)

OK or NG

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



3.CHECK CMP SENSOR POWER SUPPLY CIRCUIT

### < SERVICE INFORMATION >

- Disconnect camshaft position (CMP) sensor (1) harness con-1. nector.
  - $\triangleleft$ : Vehicle front
- 2. Turn ignition switch ON.

- T JMBIA1273ZZ
- 3. Check voltage between CMP sensor terminal 3 and ground with CONSULT-III or tester.

### Voltage: Approximately 5 V

### OK or NG

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



4. CHECK CMP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	н
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect ECM harness connector.</li> <li>Check harness continuity between ECM terminal 66 and CMP sensor terminal 2.</li> </ol>	
Continuity should exist.	
<ol> <li>Also check harness for short to ground and short to power.</li> <li>OK or NG</li> <li>OK</li> </ol>	J
NG >> Repair open circuit or short to ground or short to power in harness or connectors.	K
5. CHECK CMP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<ol> <li>Check harness continuity between ECM terminal 47 and CMP sensor terminal 1. Refer to Wiring Diagram.</li> </ol>	L
Continuity should exist.	
2. Also check harness for short to ground and short to power.	M
OK or NG	
OK >> GO TO 6.	Ν
6.CHECK CAMSHAFT POSITION SENSOR	
Refer to EC-172, "Component Inspection".	0
OK or NG	
OK >> GO TO 7.	D
$\mathbf{N}_{\mathbf{G}} >> \mathbf{K}_{\mathbf{G}}$ Replace canonal position sensor.	F

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### < SERVICE INFORMATION >

### Check the following.

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

### OK or NG

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



# 8. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

### >> INSPECTION END

### **Component Inspection**

### CAMSHAFT POSITION SENSOR

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



5. Check resistance as shown in the figure.

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

6. If NG, replace camshaft position sensor.

**Removal and Installation** 

CAMSHAFT POSITION SENSOR Refer to "CYLINDER HEAD" in EM section.



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# [YD25DDTi]

# **DTC P0380 GLOW RELAY**

# < SERVICE INFORMATION >

# DTC P0380 GLOW RELAY

# On Board Diagnosis Logic

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INFOID:000000003759535

[YD25DDTi]

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DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0380 0380	Glow relay circuit	An excessively low voltage is sent to ECM through glow relay.	<ul> <li>Harness or connectors (The glow relay circuit is open or shorted.)</li> <li>Glow relay</li> </ul>	С
		An excessively high voltage is sent to ECM through glow relay.	<ul> <li>Harness or connectors (The glow relay circuit is short- ed.)</li> <li>Glow relay</li> </ul>	D
DTC Confirma	tion Procedure			E

# **DTC Confirmation Procedure**

### NOTE:

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

- 1. Turn ignition switch ON. Wait at least 5 seconds. 2.
  - Check 1st trip DTC.
- 3.
- 4. If 1st trip DTC is detected, go to EC-174, "Diagnosis Procedure".

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# Wiring Diagram





1.CHECK GLOW RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect glow relay (1).

 $\triangleleft$ : Vehicle front

>> GO TO 3.

>> GO TO 2.

Check the following.

OK or NG

OK

NG

1.

OK or NG OK

NG

>> GO TO 5.

>> GO TO 4.

Check the following.



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5. CHECK GLOW RELAY Refer to EC-176, "Component Inspection". OK or NG OK >> GO TO 6. NG >> Replace glow relay. **6.**CHECK INTERMITTENT INCIDENT

Refer to EC-70.

>> INSPECTION END

# Component Inspection

# GLOW RELAY

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

Conditions	Continuity
12V direct current supply between termi- nals 1 and 2	Yes
No current supply	No

Operation takes less than 1 second.



DTC P0403 EGR SYSTEM

# Description

# SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator	
Crankshaft position sensor	Engine speed			С
Engine coolant temperature sensor	Engine coolant temperature			
Mass air flow sensor	Amount of intake air			
Accelerator pedal position sensor	Accelerator pedal position			D
Vehicle speed sensor	Vehicle speed*		ECP volume control	
Ignition switch	Start signal	EGR volume control	valve	E
Air conditioner switch	Air conditioner operation*			
Intake air temperature sensor	Intake air temperature			_
Barometric pressure sensor	Barometric pressure			F
EGR volume control valve control position sensor	EGR volume control valve control po- sition			G

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

This system controls the flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR passage in the EGR volume control valve changes to control the EGR flow rate. A built-in DC motor moves the valve continuously corresponding to the ECM output signal. The EGR volume control valve control position sensor detects the valve position and sends the voltage signals to the ECM. The ECM judges the current opening angle of the valve from this signals and the ECM controls the DC motor to make the valve opening angle properly.

The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions.

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

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



### COMPONENT DESCRIPTION

EGR Volume Control Valve

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# DTC P0403 EGR SYSTEM

### < SERVICE INFORMATION >

The EGR volume control valve consists of valve, actuator and position sensor, etc. The valve is installed in EGR passage, and operated by the actuator according to the output signal of the ECM. The actuator used DC motor and it opens or closes the valve to change the EGR flow rate.

The EGR volume control valve control position sensor consists of a permanent magnet and Hall IC. It senses the valve shaft movement and feeds the voltage signals to the ECM.The ECM judges the current opening angle of the valve from this signals, and controls the DC motor to make the valve opening angle in response to driving conditions.

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EGR/V ANGLE	Ignition switch: ON (Engine stopped)	Approx. 0°
EGR V/POS SEN	Ignition switch: ON (Engine stopped)	1,050 - 1,350 mV

# On Board Diagnosis Logic

### NOTE: If DTC P0403 is displayed with DTC P0642 or P0643, first perform trouble diagnosis for DTC P0642 or P0643. Refer to <u>EC-210</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0403 0403	EGR volume control valve stuck	Excessively high duty voltage signal is sent to the valve for the specified time.	<ul> <li>Harness or connectors (The EGR volume control valve circuit is open or shorted.)</li> <li>EGR volume control valve stuck closed</li> <li>EGR passage clogged</li> </ul>

# **DTC Confirmation Procedure**

### NOTE:

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

- 1. Start engine and warm it up to normal operating temperature.
- 2. Stop engine and wait at least 10 seconds.
- 3. Restart engine and let it idle for 5 seconds.
- 4. Check 1st trip DTC.
- 5. If 1st trip DTC is detected, go to EC-180. "Diagnosis Procedure".

# MBIB1780E

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[YD25DDTi]

# DTC P0403 EGR SYSTEM

# [YD25DDTi]



Wiring Diagram

### INFOID:000000003759543



: Detectable line for DTC : Non-detectable line for DTC



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

# DTC P0403 EGR SYSTEM

### < SERVICE INFORMATION >

# [YD25DDTi]

TERMIN (Wire	NAL NO. color)	Description	Condition	Value
+	-	Signal name		(Αρριολ.)
7 (OR)	114 (B)	EGR volume control valve (Close)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)
8 (Y)	114 (B)	EGR volume control valve (Open)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)
77 (SB)	_	EGR volume control valve control position sensor ground	_	_
81 (P)	77 (SB)	EGR volume control valve control position sensor	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	Voltage should fluctuates be- tween 0.5 and 2.5 V, then drop to 0 V.
82 (W)	77 (SB)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V

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

# **Diagnosis Procedure**

INFOID:000000003759544

# 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

OK or NG

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



 $2. {\sf CHECK} \ {\sf EGR} \ {\sf VOLUME} \ {\sf CONTROL} \ {\sf VALVE} \ {\sf CONTROL} \ {\sf POSITION} \ {\sf SENSOR} \ {\sf POWER} \ {\sf SUPPLY} \ {\sf CIRCUIT}$ 

1. Turn ignition switch OFF.
#### < SERVICE INFORMATION >

2. Disconnect EGR volume control valve (1) harness connector.

3. Turn ignition switch ON.



4. Check voltage between EGR volume control valve terminal 3 and ground with CONSULT-III or tester.

#### Voltage: Approximately 5 V

OK or NG

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



#### < SERVICE INFORMATION >

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

#### OK or NG

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

7. DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors E254, M285

Harness for open or short between EGR volume control valve and ECM

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

 ${f 8}.$ CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

 Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to Wiring Diagram.

ECM terminal	EGR volume control valve terminal
7	2
8	1

#### Continuity should exist.

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

<u>OK or NG</u>

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

**9.** DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E254, M285
- Harness for open or short between EGR volume control valve and ECM

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

#### **10.**CHECK EGR PASSAGE

Check the following for clogging and cracks.

- EGR tube
- EGR hose
- EGR cooler

<u>OK or NG</u>

OK >> GO TO 11.

NG >> Repair or replace EGR passage.

**11.**CHECK INTERMITTENT INCIDENT

#### Refer to EC-70.

<u>OK or NG</u>

OK >> GO TO 12.

NG >> Repair or replace.

12.REPLACE EGR VOLUME CONTROL VALVE

1. Replace the EGR volume control valve.

- 2. Perform EC-24, "EGR Volume Control Valve Closed Position Learning Value Clear".
- 3. Perform EC-24, "EGR Volume Control Valve Closed Position Learning".

#### >> INSPECTION END

### EC-182

### Removal and Installation

EGR VOLUME CONTROL VALVE Refer to <u>EM-6</u>.

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### DTC P0405, P0406 EGR SENSOR

### Description

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[YD25DDTi]

#### SYSTEM DESCRIPTION

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

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

This system controls the flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR passage in the EGR volume control valve changes to control the EGR flow rate. A built-in DC motor moves the valve continuously corresponding to the ECM output signal. The EGR volume control valve control position sensor detects the valve position and sends the voltage signals to the ECM. The ECM judges the current opening angle of the valve from this signals and the ECM controls the DC motor to make the valve opening angle properly.

The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions.

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

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



#### COMPONENT DESCRIPTION

EGR Volume Control Valve

### **DTC Confirmation Procedure**

#### NOTE:

NOTE:

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

- 1. Start engine and warm it up to normal operating temperature.
- 2. Stop engine and wait at least 10 seconds.
- 3. Restart engine and let it idle for 5 seconds.
- Check 1st trip DTC. 4.
- 5. If 1st trip DTC is detected, go to EC-187, "Diagnosis Procedure".

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

The EGR volume control valve consists of valve, actuator and position sensor, etc. The valve is installed in EGR passage, and oper-

ated by the actuator according to the output signal of the ECM. The actuator used DC motor and it opens or closes the valve to change

The EGR volume control valve control position sensor consists of a permanent magnet and Hall IC. It senses the valve shaft movement and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the valve from this signals, and controls the

Specification data are reference values.

< SERVICE INFORMATION >

the EGR flow rate.

conditions.

MONITOR ITEM	CONDITION	SPECIFICATION
EGR/V ANGLE	Ignition switch: ON (Engine stopped)	Approx. 0°
EGR V/POS SEN	Ignition switch: ON (Engine stopped)	1,050 - 1,350 mV

### On Board Diagnosis Logic

#### If DTC P0405, P0406 is displayed with DTC P0642 or P0643, first perform trouble diagnosis for DTC P0642 or P0643. Refer to EC-210.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0405 0405	EGR volume control valve control position sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The sensor circuit is open or short-	
P0406 0406	EGR volume control valve control position sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul> <li>EGR volume control valve control po- sition sensor</li> </ul>	,

# DC motor to make the valve opening angle in response to driving



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Wiring Diagram

### [YD25DDTi]

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

#### < SERVICE INFORMATION >

#### [YD25DDTi]

TERMIN (Wire	VAL NO. color)	Description	Condition	Value (Approx.)	А
+	-	Signal name			
7 (OR)	114 (B)	EGR volume control valve (Close)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)	EC C D
				≫ 5.0 V/Div 2 ms/Div T MBIB1783E	E
8 (Y)	114 (B)	EGR volume control valve (Open)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)	F G
77 (SB)	-	EGR volume control valve control position sensor ground	_	_	
81 (P)	77 (SB)	EGR volume control valve control position sensor	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	Voltage should fluctuates be- tween 0.5 and 2.5 V, then drop to 0 V.	J
82 (W)	77 (SB)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V	K

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

#### **Diagnosis** Procedure

### 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

OK or NG

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



2. Check EGR volume control valve control position sensor power supply circuit

1. Turn ignition switch OFF.

### EC-187

- INFOID:000000003759551
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#### < SERVICE INFORMATION >

2. Disconnect EGR volume control valve (1) harness connector.

3. Turn ignition switch ON.



4. Check voltage between EGR volume control valve terminal 3 and ground with CONSULT-III or tester.

#### Voltage: Approximately 5 V

OK or NG

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



### 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E254, M285
- Harness for open or short between EGR volume control valve and ECM
  - >> Repair open circuit or short to ground or short to power in harness or connectors.

**4.**CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check harness continuity between ECM terminal 77 and EGR volume control valve terminal 4. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

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

#### **5.**DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E254, M285
- Harness for open or short between EGR volume control valve and ECM

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

 $\mathbf{O}$ . CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 81 and EGR volume control valve terminal 5. Refer to Wiring Diagram.

#### Continuity should exist.

### EC-188

#### [YD25DDTi]

< SERVICE INFORMATION >	[YD25DDTi]	
2. Also check harness for short to ground and short to power.		
OK or NG		А
NG >> GO TO 7.		
7. DETECT MALFUNCTIONING PART		EC
Check the following.		
<ul> <li>Harness connectors E254, M285</li> <li>Harness for open or short between EGR volume control valve and ECM</li> </ul>		С
>> Repair open circuit or short to ground or short to power in harness or connectors.		D
Refer to <u>EC-70</u> .		F
OK  or  NG		
NG >> Repair or replace.		
9. REPLACE EGR VOLUME CONTROL VALVE		F
1. Replace the EGR volume control valve.		
<ol> <li>Perform <u>EC-24, "EGR Volume Control Valve Closed Position Learning Value Clear"</u>.</li> <li>Perform EC-24, "EGR Volume Control Valve Closed Position Learning".</li> </ol>		G
>> INSPECTION END		Н
Removal and Installation	INFOID:000000003759552	
		I
Refer to $EM-6$ .		
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### DTC P0409 EGR SYSTEM

### Description

INFOID:000000003759553

#### SYSTEM DESCRIPTION

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

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

This system controls the flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR passage in the EGR volume control valve changes to control the EGR flow rate. A built-in DC motor moves the valve continuously corresponding to the ECM output signal. The EGR volume control valve control position sensor detects the valve position and sends the voltage signals to the ECM. The ECM judges the current opening angle of the valve from this signals and the ECM controls the DC motor to make the valve opening angle properly.

The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions.

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

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



#### COMPONENT DESCRIPTION

EGR Volume Control Valve

#### < SERVICE INFORMATION >

The EGR volume control valve consists of valve, actuator and position sensor, etc. The valve is installed in EGR passage, and operated by the actuator according to the output signal of the ECM. The actuator used DC motor and it opens or closes the valve to change the EGR flow rate.

The EGR volume control valve control position sensor consists of a permanent magnet and Hall IC. It senses the valve shaft movement and feeds the voltage signals to the ECM.The ECM judges the current opening angle of the valve from this signals, and controls the DC motor to make the valve opening angle in response to driving conditions.

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

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EGR/V ANGLE	Ignition switch: ON (Engine stopped)	Approx. 0°
EGR V/POS SEN	Ignition switch: ON (Engine stopped)	1,050 - 1,350 mV

#### On Board Diagnosis Logic

#### NOTE: If DTC P0409 is displayed with DTC P0642 or P0643, first perform trouble diagnosis for DTC P0642 or P0643. Refer to <u>EC-210</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0409 0409	EGR volume control valve does not operate properly.	The characteristic of EGR volume con- trol valve is not in the specified range.	<ul> <li>Harness or connectors (EGR volume control valve circuit is open or shorted.)</li> <li>EGR volume control valve</li> </ul>

### **DTC Confirmation Procedure**

#### NOTE:

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

#### WITH CONSULT-III

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "DATA MONITOR" mode with CONSULT-III.
- 3. Confirm that engine coolant temperature is more than 81°C (178°F).
- 4. Stop engine and wait at least 10 seconds.
- 5. Restart engine and let it idle for 5 seconds.
- 6. Check 1st trip DTC.
- 7. If 1st trip DTC is detected, go to EC-193, "Diagnosis Procedure".

#### WITH GST

Follow the procedure "WITH CONSULT-III" above.



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#### [YD25DDTi]

EC-19	<b>)1</b>
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#### < SERVICE INFORMATION >

To EC-APPS1, APPS2, APPS3

Wiring Diagram

### [YD25DDTi]

INFOID:000000003759557

EC-EGRC1-01

: Detectable line for DTC - : Non-detectable line for DTC EGR VOLUME CONTROL VALVE EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR ſMЪ DC MOTOR (E225) 2 3 5 1 OR GΥ Ρ SB SB 1 G١ 3 2 5 GY SB G١ w OR SB 77 8 82 81 EGR LIFT RTN EGR EGR+ EGR-A-VCC ECM (M32), (M33)



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

### EC-192

#### < SERVICE INFORMATION >

#### [YD25DDTi]

TERMII (Wire	NAL NO. color)	Description	Condition	Value	A
+	-	Signal name		(дрргох.)	
7 (OR)	114 (B)	EGR volume control valve (Close)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)	EC C D
8 (Y)	114 (B)	EGR volume control valve (Open)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)	F G
77 (SB)	_	EGR volume control valve control position sensor ground	_	_	
81 (P)	77 (SB)	EGR volume control valve control position sensor	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	Voltage should fluctuates be- tween 0.5 and 2.5 V, then drop to 0 V.	J
82 (W)	77 (SB)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V	K

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

#### **Diagnosis Procedure**

### 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

OK or NG

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



2. Check EGR volume control valve control position sensor power supply circuit

1. Turn ignition switch OFF.

### EC-193

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#### < SERVICE INFORMATION >

2. Disconnect EGR volume control valve (1) harness connector.

3. Turn ignition switch ON.



4. Check voltage between EGR volume control valve terminal 3 and ground with CONSULT-III or tester.

#### Voltage: Approximately 5 V

OK or NG

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



### 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E254, M285
- Harness for open or short between EGR volume control valve and ECM
  - >> Repair open circuit or short to ground or short to power in harness or connectors.

**4.**CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check harness continuity between ECM terminal 77 and EGR volume control valve terminal 4. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

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

#### **5.**DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E254, M285
- Harness for open or short between EGR volume control valve and ECM

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

 $\mathbf{O}$ . CHECK EGR VOLUME CONTROL VALVE CONTROL POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

 Check harness continuity between ECM terminal 81 and EGR volume control valve terminal 5. Refer to Wiring Diagram.

#### Continuity should exist.

### EC-194

#### [YD25DDTi]

< SERVICE INFORMATION >		[YD25DDTi]
2. Also check harness for short to	o ground and short to power.	
<u>OK or NG</u>		A
OK >> GO TO 8.		
7 DETECT MALEUNICTIONING		EC
I DETECT MALFUNCTIONING F		
Check the following.     Harness connectors E254_M285	S.	
Harness for open or short between	en EGR volume control valve and ECM	C
>> Repair open circuit or	short to ground or short to power in harnes	s or connectors.
8.CHECK EGR VOLUME CONTR	ROL VALVE OUTPUT SIGNAL CIRCUIT FO	OR OPEN AND SHORT
1. Check harness continuity betw	veen ECM terminals and EGR volume cont	rol valve terminals as follows.
Refer to Wiring Diagram.		E
FOM to reside	FOD volume control volue terminal	
		F
8	2	
0	'	
Continuity should exist.		G
2. Also check harness for short to	o ground and short to power.	
<u>OK or NG</u>		Н
OK >> GO TO 10.		
NG $>>$ GO TO 9.		
<b>9.</b> DETECT MALFUNCTIONING F	PART	1
Check the following.		
<ul> <li>Harness for open or short between</li> </ul>	, en EGR volume control valve and ECM	J
·		
>> Repair open circuit or	short to ground or short to power in harnes	s or connectors.
10. CHECK INTERMITTENT INC	IDENT	
Refer to <u>EC-70</u> .		
<u>OK or NG</u>		L
OK >> GO TO 11.		
NG >> Repair or replace.		N
TT.REPLACE EGR VOLUME CO		
1. Replace the EGR volume cont 2. Perform EC-24. "EGR Volume	rol valve. Control Valve Closed Position Learning Vs	alue Clear"
3. Perform <u>EC-24</u> , <u>EGR Volume</u>	<u>Control Valve Closed Position Learning Va</u>	N
	-	
>> INSPECTION END		C
Removal and Installation		INFOID:00000003759559
		_
EGR VOLUME CONTROL VAL	VE	P
keier to <u>EIVI-b</u> .		

### DTC P0488 EGR SYSTEM

### Description

INFOID:000000003759601

#### SYSTEM DESCRIPTION

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

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

This system controls the flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR passage in the EGR volume control valve changes to control the EGR flow rate. A built-in DC motor moves the valve continuously corresponding to the ECM output signal. The EGR volume control valve control position sensor detects the valve position and sends the voltage signals to the ECM. The ECM judges the current opening angle of the valve from this signals and the ECM controls the DC motor to make the valve opening angle properly.

The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions.

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

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



#### COMPONENT DESCRIPTION

EGR Volume Control Valve

### DTC P0488 EGR SYSTEM

#### < SERVICE INFORMATION >

The EGR volume control valve consists of valve, actuator and position sensor, etc. The valve is installed in EGR passage, and operated by the actuator according to the output signal of the ECM. The actuator used DC motor and it opens or closes the valve to change the EGR flow rate.

The EGR volume control valve control position sensor consists of a permanent magnet and Hall IC. It senses the valve shaft movement and feeds the voltage signals to the ECM.The ECM judges the current opening angle of the valve from this signals, and controls the DC motor to make the valve opening angle in response to driving conditions.

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

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR/V ANGLE	Ignition switch: ON (Engine stopped)		Approx. 0°
EGR V/POS SEN	Ignition switch: ON (Engine stopped)		1,050 - 1,350 mV

#### On Board Diagnosis Logic

#### NOTE: If DTC P0488 is displayed with DTC P0642 or P0643, first perform trouble diagnosis for DTC P0642 or P0643. Refer to <u>EC-210</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0488 0488	EGR driving circuit does not function properly.	The ECM internal circuit for driving the EGR volume control valve does not function properly due to high tempera- ture or excessive current.	<ul> <li>Harness or connectors (The EGR volume control valve circuit is shorted.)</li> <li>EGR volume control valve</li> <li>ECM</li> </ul>

#### **DTC Confirmation Procedure**

#### NOTE:

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

- 1. Start engine and warm it up to normal operating temperature.
- 2. Stop engine and wait at least 10 seconds.
- 3. Restart engine and let it idle for 5 seconds.
- 4. Check 1st trip DTC.
- 5. If 1st trip DTC is detected, go to EC-199, "Diagnosis Procedure".



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Wiring Diagram

### [YD25DDTi]

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

#### EC-198

### DTC P0488 EGR SYSTEM

#### < SERVICE INFORMATION >

#### [YD25DDTi]

TERMINAL NO. (Wire color)		Description	Condition	Value	А
+	-	Signal name		(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
7 (OR)	114 (B)	EGR volume control valve (Close)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)	C D
				≫ 5.0 V/Div 2 ms/Div T MBIB1783E	Е
8 (Y)	114 (B)	EGR volume control valve (Open)	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	1.0 - 2.0 V★ ↑↓ (Periodically changes) BATTERY VOLTAGE (11 - 14 V)	F G H
77 (SB)	_	EGR volume control valve control position sensor ground	_	_	
81 (P)	77 (SB)	EGR volume control valve control position sensor	<ul> <li>[Ignition switch OFF]</li> <li>Warm-up condition</li> <li>For a few seconds after turning ignition switch OFF.</li> </ul>	Voltage should fluctuates be- tween 0.5 and 2.5 V, then drop to 0 V.	J
82 (W)	77 (SB)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V	K

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

#### **Diagnosis Procedure**

### 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

OK or NG

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



2. Check EGR volume control valve output signal circuit for open and short

#### EC-199

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### DTC P0488 EGR SYSTEM

#### < SERVICE INFORMATION >

1. Disconnect EGR volume control valve (1) harness connector.

- 2. Disconnect ECM harness connector.
- Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to Wiring Diagram.



[YD25DDTi]

ECM terminal	EGR volume control valve terminal
7	2
8	1

#### Continuity should exist.

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

OK or NG

OK >> GO TO 3.

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

**3.**CHECK INTERMITTENT INCIDENT

Refer to EC-70.

#### <u>OK or NG</u>

OK >> GO TO 4.

NG >> Repair or replace.

**4.**REPLACE EGR VOLUME CONTROL VALVE

1. Replace the EGR volume control valve.

2. Perform EC-24, "EGR Volume Control Valve Closed Position Learning Value Clear".

3. Perform EC-24, "EGR Volume Control Valve Closed Position Learning".

#### >> INSPECTION END

Removal and Installation

INFOID:000000003759607

EGR VOLUME CONTROL VALVE Refer to <u>EM-6</u>.

### DTC P0563 BATTERY VOLTAGE

#### < SERVICE INFORMATION >

### DTC P0563 BATTERY VOLTAGE

### On Board Diagnosis Logic

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	(	
P0563 0563	Battery voltage high	An excessively high voltage from the battery is sent to ECM.	<ul> <li>Battery</li> <li>Battery terminal</li> <li>Alternator</li> <li>Incorrect jump starting</li> </ul>	[	
DTC Confirmation Procedure					
<b>NOTE:</b> If DTC Co	IOTE: DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at				

least 10 seconds before conducting the next test. F 1. Start engine and let it idle for at least 35 seconds. 2. Check DTC. 3. If DTC is detected, go to EC-201, "Diagnosis Procedure". **Diagnosis** Procedure INFOID:000000003759629 **1.**INSPECTION START Н Are jumper cables connected for the jump starting? Yes or No Yes >> GO TO 3. >> GO TO 2. No

2. CHECK BATTERY AND ALTERNATOR

Check that the proper type of battery and type of alternator are installed. Refer to "BATTERY" and "CHARGING SYSTEM" in EL section.

#### OK or NG

OK >> GO TO 5.

NG >> Replace with a proper one.

**3.**CHECK JUMPER CABLES INSTALLATION

Check that the jumper cables are connected in the correct sequence.



OK or NG

OK >> GO TO 4.

NG >> Reconnect jumper cables properly.

**4.**CHECK BATTERY FOR BOOSTER

Check that the battery for the booster is a 12 V battery.

#### OK or NG

OK >> GO TO 5.

### EC-201

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### DTC P0563 BATTERY VOLTAGE

< SERVICE INFORMATION >

NG >> Change the vehicle for booster.

**5.**PERFORM DTC CONFIRMATION PROCEDURE AGAIN

#### With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Select "SELF DIAG RESULTS" mode with CONSULT-III.
- Touch "ERASE".
- 4. Perform EC-201, "DTC Confirmation Procedure", again.
- 5. Is DTC P0563 displayed again?

#### With GST

- 1. Turn ignition switch ON.
- 2. Select Service \$04 with GST.
- 3. Perform EC-201, "DTC Confirmation Procedure", again.
- 4. Is DTC P0563 displayed again?

#### Yes or No

Yes >> GO TO 6.

No >> GO TO 7.

**6.**REPLACE ECM

- 1. Replace ECM.
- Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to <u>EL-96, "ECM</u> <u>Re-communicating Function"</u>.
- 3. Perform Injector Adjustment Value Registration. Refer to EC-22. "Injector Adjustment Value Registration".
- 4. Perform Fuel Pump Learning Value Clearing. Refer to <u>EC-23, "Fuel Pump Learning Value Clearing"</u>.
- 5. Perform EGR Volume Control Valve Closed Position Learning Value Clear. Refer to <u>EC-24, "EGR Volume</u> <u>Control Valve Closed Position Learning Value Clear"</u>.
- Perform EGR Volume Control Valve Closed Position Learning. Refer to <u>EC-24</u>, "<u>EGR Volume Control</u> <u>Valve Closed Position Learning</u>".

#### >> INSPECTION END

### 7. CHECK ELECTRICAL PARTS DAMAGE

Check the following for damage.

- Wiring harness and harness connectors for burn
- Fuses for short

OK or NG

#### OK >> INSPECTION END

NG >> Repair or replace malfunctioning part.

### **DTC P0606 ECM**

### Description

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

### On Board Diagnosis Logic

(Processor)

DTC No. Trouble diagnosis name DTC detecting condition Engine control module ECM ECM calculation function is malfunctioning.

### **DTC Confirmation Procedure**

#### NOTE:

P0606

0606

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

- Turn ignition switch ON. 1.
- Wait at least 5 seconds. 2.
- 3. Check 1st trip DTC.
- If 1st trip DTC is detected, go to EC-203. "Diagnosis Procedure". 4.

#### Diagnosis Procedure

### **1.**INSPECTION START

With CONSULT-III	
1. Turn ignition switch ON.	L
2. Select "SELF DIAG RESULTS" mode with CONSULT-III.	
3. Touch "ERASE".	
<ol> <li>Perform <u>EC-203, "DTC Confirmation Procedure"</u>, again.</li> </ol>	M
5. Is 1st trip DTC P0606 displayed again?	
og With GST	
1. Turn ignition switch ON.	N
2. Select Service \$04 with GST.	IN
<ol><li>Perform <u>EC-203, "DTC Confirmation Procedure"</u>, again.</li></ol>	
<ol><li>Is 1st trip DTC P0606 displayed again?</li></ol>	
<u>Yes or No</u>	0
Yes >> GO TO 2	
No >> INSPECTION END	
	Р

1. Replace ECM.

- 2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EL-96, "ECM Re-communicating Function".
- Perform Injector Adjustment Value Registration. Refer to EC-22, "Injector Adjustment Value Registration". 3.
- Perform Fuel Pump Learning Value Clearing. Refer to EC-23, "Fuel Pump Learning Value Clearing". 4.

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Possible cause

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- 5. Perform EGR Volume Control Valve Closed Position Learning Value Clear. Refer to <u>EC-24</u>, "EGR Volume Control Valve Closed Position Learning Value Clear".
- 6. Perform EGR Volume Control Valve Closed Position Learning. Refer to <u>EC-24</u>, "<u>EGR Volume Control</u> <u>Valve Closed Position Learning</u>".

>> INSPECTION END

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

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
	Engine: After warming up	Idle	1,600 - 2,000 mA
PUMP CURRENT	<ul> <li>Air conditioner switch: OFF</li> <li>Shift lever: Neutral</li> <li>No load</li> </ul>	2,000 rpm	1,500 - 1,900 mA

#### On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	(
P0628 0628	Fuel pump control circuit low input	ECM detects a control circuit for the fuel pump is open or short to ground.	Harness or connectors     (The fuel pump circuit is open or	
P0629 0629	Fuel pump control circuit high input	ECM detects a control circuit for the fuel pump is short to power.	shorted.) • Fuel pump	ŀ

### **DTC Confirmation Procedure**

#### NOTE:

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

- Start engine and warm it up to normal operating temperature. 1.
- Let engine idle for at least 5 seconds. 2.
- 3. Check 1st trip DTC.
- 4. If 1st trip DTC is detected, go to EC-207, "Diagnosis Procedure".

## Description

< SERVICE INFORMATION >

DTC P0628, P0629 FUEL PUMP

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel increases, the fuel pump raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to the fuel pump to raise the injection pressure.

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### Wiring Diagram



INFOID:000000003759652





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

#### EC-206

### DTC P0628, P0629 FUEL PUMP

#### < SERVICE INFORMATION >

#### [YD25DDTi]

TERMI (Wire	NAL NO. color)	Description	Condition	Value (Approx.)	А
+	_	Signal name		(//pprox.)	
10 114 (G) (B)	Fuller	[Engine is running] • Warm-up condition • Idle speed	Approximately 5.8 V ★	C D	
	(B)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 5.5 V ★	E
29	114	Fuel numn	[Engine is running] • Warm-up condition • Idle speed	Approximately 0.3 V ★	G
(B)	(B)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 0.3 V ★	J

### **Diagnosis Procedure**

### 1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect fuel pump (2) harness connector.
- Fuel pump temperature sensor (1)
- 3. Disconnect ECM harness connector.
- Check harness continuity between ECM terminal 10 and fuel pump terminal 1. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

- OK >> GO TO 3. NG >> GO TO 2.
- 2. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E237, M279



INFOID:000000003759653

### EC-207

### DTC P0628, P0629 FUEL PUMP

#### < SERVICE INFORMATION >

· Harness for open or short between fuel pump and ECM

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

### $\mathbf{3}$ . Check fuel pump ground circuit for open and short

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### <u>OK or NG</u>

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

**4.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E237, M279

• Harness for open or short between fuel pump and ECM

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

5.CHECK FUEL PUMP

Refer to EC-208, "Component Inspection".

#### <u>OK or NG</u>

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

**6.**REPLACE FUEL PUMP

1. Replace fuel pump.

2. Perform Fuel Pump Learning Value Clearing. Refer to EC-23, "Fuel Pump Learning Value Clearing".

#### >> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

#### >> INSPECTION END

**Component Inspection** 

#### FUEL PUMP

- 1. Disconnect fuel pump harness connector.
- 2. Check resistance between fuel pump terminals 1 and 2.

#### **Resistance:** 1.5 - 3.0 Ω [at 10 - 60°C (50 - 140°F)]

3. If NG, replace fuel pump.

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### DTC P0628, P0629 FUEL PUMP

< SERVICE INFORMATION >

Removal and Installation

FUEL PUMP Refer to EC-24.

EC-209

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#### DTC P0642, P0643 SENSOR POWER SUPPLY

#### < SERVICE INFORMATION >

### DTC P0642, P0643 SENSOR POWER SUPPLY

### On Board Diagnosis Logic

INFOID:000000003759660

INFOID:000000003759661

[YD25DDTi]

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0642 0642	Sensor power supply cir- cuit low	ECM detects a voltage of power source for sen- sor is excessively low.	Harness or connectors     (The APP sensor 1 power supply cir-
P0643 0643	Sensor power supply cir- cuit high	ECM detects a voltage of power source for Sensor is excessively high.	<ul> <li>cuit is shorted.) (Crankshaft position sensor circuit is shorted.) (EGR volume control valve control position sensor circuit is shorted.)</li> <li>Accelerator pedal position sensor (Accelerator pedal position sensor 1)</li> <li>Crankshaft position sensor</li> <li>EGR volume control valve control po- sition sensor</li> </ul>

#### **DTC Confirmation Procedure**

#### NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check 1st trip DTC.
- 4. If 1st trip DTC is detected, go to EC-212, "Diagnosis Procedure".



GEC622A Specification data are reference values and are measured between each terminal and ground.

### DTC P0642, P0643 SENSOR POWER SUPPLY

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### DTC P0642, P0643 SENSOR POWER SUPPLY

#### < SERVICE INFORMATION >

[YD25DDTi]

INFOID:000000003759663

TERMINAL NO. (Wire color)		Description	Condition	Value (Approx.)
+	_	Signal name		(Approx.)
67 (B)		Sensor ground (Sensor shield circuit)	_	_
82 (W)	84 (R)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V
83 84 (B) (R)	84	Accelerator pedal position sensor 1	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully released	0.5 - 1.0 V
	(R)		[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
84 (R)		Accelerator pedal position sensor 1 ground	_	_
90 (L)	92 (Y)	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5 V
91 (G)	92	Accelerator pedal position sensor 2	<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully released</li></ul>	0.15 - 0.6 V
	(Y)		<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	1.85 - 2.4 V
92 (Y)	_	Accelerator pedal position sensor 2 ground	_	

### **Diagnosis Procedure**

### 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

#### OK or NG

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

2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

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





#### [YD25DDTi]

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3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

#### Voltage: Approximately 5 V

OK >> GO TO 5. NG >> GO TO 3.



## 3. CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram	
	APP sensor terminal 4	EC-211	-
82	Crankshaft position sensor terminal 3	EC-153	Г
	EGR volume control valve terminal 3	<u>EC-186</u>	
OK or NG			G
OK >> GO TO 4	4.		
NG >> Repair s	hort to ground or short to power in harr	ness or connectors.	Ц
4.CHECK CRANKS	HAFT POSITION SENSOR		Π
Refer to EC-156, "Co	omponent Inspection".		
<u>OK or NG</u>			
OK >> GO TO 5	5.		
NG >> Replace	cranksnaft position sensor.		
<b>J.</b> CHECK APP SEN	ISOR		J
Refer to EC-123, "Co	omponent Inspection".		
<u>OK or NG</u>			K
OK >> GO TO 6	S.		
6 OUFOKINTERM			
			L
Refer to $EC-70$ .			
OK or NG	_		M
NG >> GO IO /	r replace		141
			N
<ol> <li>Replace the EGI</li> <li>Perform EC-24</li> </ol>	K volume control valve. "EGR Volume Control Valve Closed Po	sition Learning Value Clear"	
3. Perform <u>EC-24</u> ,	"EGR Volume Control Valve Closed Po	sition Learning".	~
			0
>> INSPEC	TION END		
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### DTC P0652, P0653 SENSOR POWER SUPPLY

#### < SERVICE INFORMATION >

### DTC P0652, P0653 SENSOR POWER SUPPLY

### On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0652 0652	Sensor power supply cir- cuit low	ECM detects a voltage of power source for sensor is excessively low.	<ul> <li>Harness or connectors (APP sensor 2 power supply circuit is shorted.) (Camshaft position sensor circuit is shorted.) (Fuel rail pressure sensor circuit is shorted.)</li> <li>Accelerator pedal position sensor (Accelerator pedal position sensor 2)</li> <li>Camshaft position sensor</li> <li>Fuel rail pressure sensor</li> </ul>
P0653 0653	Sensor power supply cir- cuit high	ECM detects a voltage of power source for Sensor is excessively high.	

### **DTC Confirmation Procedure**

INFOID:000000003759665

#### NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check 1st trip DTC.
- 4. If 1st trip DTC is detected, go to EC-216, "Diagnosis Procedure".

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#### DTC P0652, P0653 SENSOR POWER SUPPLY

#### [YD25DDTi]

Wiring Diagram

< SERVICE INFORMATION >

INFOID:000000003759666





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: Detectable line for DTC EC : Non-detectable line for DTC ECM С (M32), (M33) APS1 GND APS2 GND S-GND APS A-VCC A-VCC2 APS2 A-VCC A-VCC 45 67 63 82 83 90 91 92 D w R Ŵ Ē To EC-CMPS Ε To EC-FRPS F Н W B 5 6 3 J ACCELERATOR PEDAL POSITION SENSOR ACCELERATOR PEDAL POSITION SENSOR 1 ACCELERATOR PEDAL POSITION SENSOR 2 (M85) Κ L 24 23 5 14 13 12 11 10 9 8 7 6 9 110 111 112 113 19 18 17 16 1 106 119 120 4 5 121 Μ 43 42 41 40 39 38 37 36 35 34 33 32 3 30 29 28 27 26 25 98 99 100 101 102 103 104 105 (M32) 117 118 (M33) 3 49 48 47 4 44 H.S. В В 2 114 115 116 Ш Ŀ Ш Ν 123 456 GY Ο

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

### DTC P0652, P0653 SENSOR POWER SUPPLY

#### < SERVICE INFORMATION >

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TERMINAL NO. (Wire color)		Description	Condition	Value
+	-	Signal name		(Applox.)
45 (W)	66 (B)	Camshaft position sensor power supply	[Ignition switch ON]	Approximately 5 V
63 (R)	68 (B)	Fuel rail pressure sensor power supply	[Ignition switch ON]	Approximately 5 V
67 (B)		Sensor ground (Sensor shield circuit)	_	_
82 (W)	84 (R)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V
83 84 (B) (R)	84	Accelerator pedal position sensor 1	<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully released</li></ul>	0.5 - 1.0 V
	(R)		<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	3.7 - 4.7 V
84 (R)		Accelerator pedal position sensor 1 ground	_	_
90 (L)	92 (Y)	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5 V
91 (G)	92	Accelerator pedal position sensor 2	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully released	0.15 - 0.6 V
	(Y)		<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	1.85 - 2.4
92 (Y)		Accelerator pedal position sensor 2 ground	_	_

### **Diagnosis Procedure**

## 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

#### OK or NG

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



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2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT
# DTC P0652, P0653 SENSOR POWER SUPPLY

#### < SERVICE INFORMATION >

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



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3. Check voltage between APP sensor terminal 6 and ground with CONSULT-III or tester.

#### Voltage: Approximately 5 V

#### OK or NG

OK >> GO TO 5. NG >> GO TO 3.



# **3.**CHECK SENSOR POWER SUPPLY CIRCUITS

#### Check the following.

Harness for short to power and short to ground, between the following terminals.

ECM terminal       Sensor terminal       Reference Wiring Diagram         90       APP sensor terminal 6       EC-215         45       Camshaft position sensor terminal 3       EC-164         63       Fuel rail pressure sensor terminal 1       EC-129         OK or NG       OK >> GO TO 4.       NG >> Repair short to ground or short to power in harness or connectors.         4.CHECK COMPONENTS       Check the following.       •         • Camshaft position sensor (Refer to EC-166, "Component Inspection".)       •         • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".)       •         • K >> GO TO 5.       NG         NG >> Replace malfunctioning component.       5         5.CHECK APP SENSOR       •         Refer to EC-150. "Component Inspection".       •         OK or NG       •         OK >> GO TO 6.       NG         NG >> Replace accelerator pedal assembly.       •         6.CHECK INTERMITTENT INCIDENT       •				
90       APP sensor terminal 6       EC-215         45       Camshaft position sensor terminal 3       EC-164         63       Fuel rail pressure sensor terminal 1       EC-129         OK or NG       OK       >> GO TO 4.         NG       >> Repair short to ground or short to power in harness or connectors. <b>4</b> .CHECK COMPONENTS         Check the following.         • Camshaft position sensor (Refer to EC-166, "Component Inspection".)         • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".)         • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".)         OK >> GO TO 5.         NG >> Replace malfunctioning component. <b>5</b> .CHECK APP SENSOR         Refer to EC-150. "Component Inspection".         OK >> GO TO 6.         NG >> Replace accelerator pedal assembly. <b>6</b> .CHECK INTERMITTENT INCIDENT	ECM terminal	Sensor terminal	Reference Wiring Diagram	
45       Camshaft position sensor terminal 3       EC-164         63       Fuel rail pressure sensor terminal 1       EC-129         OK or NG       OK >> GO TO 4.       NG >> Repair short to ground or short to power in harness or connectors.         4.CHECK COMPONENTS       Check the following.       •         • Camshaft position sensor (Refer to EC-166, "Component Inspection".)       •         • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".)       •         OK or NG       OK >> GO TO 5.         NG >> Replace malfunctioning component.       S.CHECK APP SENSOR         Refer to EC-150, "Component Inspection".       OK or NG         OK or NG       OK or NG         OK or NG       OK >> GO TO 6.         NG >> Replace accelerator pedal assembly.       6.CHECK INTERMITTENT INCIDENT	90	APP sensor terminal 6	<u>EC-215</u>	
63       Fuel rail pressure sensor terminal 1       EC-129         OK or NG       OK >> GO TO 4.       NG >> Repair short to ground or short to power in harness or connectors.         4.CHECK COMPONENTS       Check the following.       •         • Camshaft position sensor (Refer to EC-166. "Component Inspection".)       •         • Fuel rail pressure sensor (Refer to EC-131. "Component Inspection".)       •         • Fuel rail pressure sensor (Refer to EC-131. "Component Inspection".)       •         OK or NG       OK       >> GO TO 5.         NG       >> Replace malfunctioning component.         5.CHECK APP SENSOR       Fer to EC-150. "Component Inspection".         OK or NG       OK         OK       >> GO TO 6.         NG       >> Replace accelerator pedal assembly.         6.CHECK INTERMITTENT INCIDENT	45	Camshaft position sensor terminal 3	<u>EC-164</u>	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	63	Fuel rail pressure sensor terminal 1	<u>EC-129</u>	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	OK or NG			ł
4. CHECK COMPONENTS         Check the following.         • Camshaft position sensor (Refer to EC-166, "Component Inspection".)         • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".)         • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".)         • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".)         • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".)         • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".)         • So or NG         • CHECK APP SENSOR         Refer to EC-150, "Component Inspection".         • OK or NG         • OK >> GO TO 6.         • NG >> Replace accelerator pedal assembly.         • CHECK INTERMITTENT INCIDENT	OK >> GO TO	) 4. short to ground or short to power in ha	rness or connectors	
Check the following. • Camshaft position sensor (Refer to EC-166, "Component Inspection".) • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".) OK or NG OK $>>$ GO TO 5. NG $>>$ Replace malfunctioning component. 5. CHECK APP SENSOR Refer to EC-150, "Component Inspection". OK $>>$ GO TO 6. NG $>>$ Replace accelerator pedal assembly. 6. CHECK INTERMITTENT INCIDENT			mess of connectors.	
Check the following. • Camshaft position sensor (Refer to EC-166, "Component Inspection".) • Fuel rail pressure sensor (Refer to EC-131, "Component Inspection".) OK or NG OK >> GO TO 5. NG >> Replace malfunctioning component. 5. CHECK APP SENSOR Refer to EC-150, "Component Inspection". OK or NG OK >> GO TO 6. NG >> Replace accelerator pedal assembly. 6. CHECK INTERMITTENT INCIDENT	4.CHECK COMPO	JNENIS		l
OK or NG         OK       >> GO TO 5.         NG       >> Replace malfunctioning component. <b>5.</b> CHECK APP SENSOR         Refer to EC-150. "Component Inspection".         OK or NG         OK       >> GO TO 6.         NG       >> Replace accelerator pedal assembly. <b>6.</b> CHECK INTERMITTENT INCIDENT	<ul> <li>Check the following</li> <li>Camshaft position</li> <li>Fuel rail pressure</li> </ul>	g. n sensor (Refer to <u>EC-166, "Componen</u> e sensor (Refer to <u>EC-131, "Component</u>	<u>t Inspection"</u> .) t Inspection".)	7
5.CHECK APP SENSOR Refer to EC-150, "Component Inspection". OK or NG OK >> GO TO 6. NG >> Replace accelerator pedal assembly. 6.CHECK INTERMITTENT INCIDENT	OK or NG OK >> GO TC NG >> Replac	) 5. ce malfunctioning component.		r
Refer to EC-150. "Component Inspection".         OK or NG         OK >> GO TO 6.         NG >> Replace accelerator pedal assembly.         6.CHECK INTERMITTENT INCIDENT	5.CHECK APP SE	ENSOR		
<u>OK or NG</u> OK >> GO TO 6. NG >> Replace accelerator pedal assembly. <b>6.</b> CHECK INTERMITTENT INCIDENT	Refer to EC-150, "	Component Inspection".		
OK >> GO TO 6. NG >> Replace accelerator pedal assembly. 6.CHECK INTERMITTENT INCIDENT	<u>OK or NG</u>			
6. CHECK INTERMITTENT INCIDENT	OK >> GO TO NG >> Replac	0 6. ce accelerator pedal assembly.		1
	6.CHECK INTERI			

Refer to EC-70.

>> INSPECTION END

# DTC P0668, P0669 ECM

# Description

DTC No.

P0668

0668

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

# On Board Diagnosis Logic

Trouble diagnosis name

ECM internal temperature

sensor circuit low input

 

 P0669 0669
 ECM internal temperature sensor circuit high input
 An excessively high voltage from the sensor is sent to ECM.

 DTC Confirmation Procedure
 INFOID:00000003759670

 NOTE:

DTC detecting condition

An excessively low voltage from the sensor is

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check 1st trip DTC.
- 4. If 1st trip DTC is detected, go to EC-218, "Diagnosis Procedure".

sent to ECM.

# **Diagnosis Procedure**

# **1.**INSPECTION START

#### With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Select "SELF DIAG RESULTS" mode with CONSULT-III.
- 3. Touch "ERASE".
- 4. Perform EC-218, "DTC Confirmation Procedure", again.
- 5. Is 1st trip DTC P0668 or P0669 displayed again?

#### With GST

- 1. Turn ignition switch ON.
- 2. Select Service \$04 with GST.
- 3. Perform EC-218. "DTC Confirmation Procedure", again.
- 4. Is 1st trip DTC P0668 or P0669 displayed again?

#### Yes or No

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

# 2.REPLACE ECM

- 1. Replace ECM.
- 2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to <u>EL-96. "ECM</u> <u>Re-communicating Function"</u>.
- 3. Perform Injector Adjustment Value Registration. Refer to EC-22, "Injector Adjustment Value Registration".



Possible cause

ECM

[YD25DDTi]

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INFOID:000000003759668

INFOID:000000003759669

# DTC P0668, P0669 ECM

DTC P0668, P0669 ECM	
< SERVICE INFORMATION > [YD25DD]	Fi]
<ol> <li>Perform Fuel Pump Learning Value Clearing. Refer to <u>EC-23, "Fuel Pump Learning Value Clearing"</u>.</li> <li>Perform EGR Volume Control Valve Closed Position Learning Value Clear. Refer to <u>EC-24, "EGR Volum Control Valve Closed Position Learning Value Clear"</u></li> </ol>	ne A
<ol> <li>Perform EGR Volume Control Valve Closed Position Learning. Refer to <u>EC-24, "EGR Volume Control Valve Closed Position Learning"</u>.</li> </ol>	EC
>> INSPECTION END	0
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On Board Diagnosis Logic

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0686	ECM relay circuit	ECM detects ECM relay is stuck closed even if ig-	<ul><li>Harness or connectors</li></ul>
0686		nition switch OFF.	(The ECM relay circuit is shorted.) <li>ECM relay</li>

# **DTC Confirmation Procedure**

#### NOTE:

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

- 1. Turn ignition switch ON and then turn OFF.
- 2. Wait at least 30 seconds.
- 3. Turn ignition switch ON.
- 4. Check DTC.
- 5. If DTC is detected, go to EC-224, "Diagnosis Procedure".

INFOID:000000003759672

INFOID:000000003759673

# Wiring Diagram

INFOID:000000003759674

[YD25DDTi]

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#### LHD MODELS



GEC624A

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

#### < SERVICE INFORMATION >

# [YD25DDTi]

TERMII (Wire	NAL NO. color)	Description	Condition	Value
+	-	Signal name		(//pp/0x.)
105 (G)	114 (B)	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V
113 (G)	(В)		<ul> <li>[Ignition switch OFF]</li> <li>More than a few seconds after turning ignition switch OFF</li> </ul>	BATTERY VOLTAGE (11 - 14 V)
107 (L) 108 (L)	114 (B)	Ignition switch	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)
119 (R) 120 (OR)	114 (B)	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)

**RHD MODELS** 



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

#### < SERVICE INFORMATION >

# [YD25DDTi]

TERMI (Wire	NAL NO. color)	Description	Condition	Value
+	-	Signal name		(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
105 (G)	114 (B)	ECM relay (self shut-off)	<ul> <li>[Ignition switch ON]</li> <li>[Ignition switch OFF]</li> <li>For a few seconds after turning ignition switch OFF</li> </ul>	0 - 1.0 V
113 (G)	(U)		<ul> <li>[Ignition switch OFF]</li> <li>More than a few seconds after turning ignition switch OFF</li> </ul>	BATTERY VOLTAGE (11 - 14 V)
107 (L) 108 (L)	114 (В)	Ignition switch	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)
119 (R) 120 (OR)	114 (B)	Power supply for ECM	[Ignition switch ON]	BATTERY VOLTAGE (11 - 14 V)

# Diagnosis Procedure

INFOID:000000003759675

# 1. CHECK ECM RELAY INPUT SIGNAL CIRCUIT

- 1. Turn ignition switch ON and then OFF.
- 2. Check voltage between ECM harness connector terminals as follows.

ECM				
	+		-	Voltage
Connector	Terminal	Connector	Terminal	
			1	
	119	M32	2	
			3	
M22		M33	114	After turning ignition switch OFF, battery voltage will
10133	120		1	exist for a few seconds, then drop approximately 0 V.
		120 M32	2	-
			3	
		M33	114	1

# OK or NG

OK >> GO TO 10. NG >> GO TO 2.

 $2. {\sf CHECK} \ {\sf ECM} \ {\sf RELAY} \ {\sf SIGNAL} \ {\sf CIRCUIT} \ {\sf FOR} \ {\sf SHORT} \ {\sf TO} \ {\sf GROUND}$ 

Check the voltage between ECM relay harness connector and ground.

ECM relay		Ground	Voltago
Connector	Terminal	Ground	voltage
E55	2	Ground	Battery voltage
E00	3	Ground	Dattery Voltage

OK or NG

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

3. DETECT MALFUNCTIONING PART

# < SERVICE INFORMATION >

[YD25DDTi]

Check the follo • 20A fuse (No • Harness for c	wing. 0.36) open or short b	etween Battery a	and ECM relay		A
>> Re <b>4.</b> CHECK EC	epair open circu M RELAY OUT	iit or short to gro PUT SIGNAL C	und or short to	power in harness or connecto	rs. EC
<ol> <li>Turn ignitic</li> <li>Check volt</li> </ol>	on switch OFF, age between E	and wait at leas CM harness cor	t 10 seconds. nnector termin	als as follows.	С
	E	СМ			D
	+	-		Voltage	
Connector	Terminal	Connector	Terminal		
			1		E
	105	M32	2		
	105		3		
MOO		M33	114	Detter weltere	Г
10133			1	Ballery vollage	
	440	M32	2		G
	113		3		
		M33	114		
5.CHECK EC 1. Disconnec 2. Disconnec 3. Check the	M RELAY OUT t ECM harness t ECM relay ha continuity betw	PUT SIGNAL C connector. rness connector veen ECM harne	IRCUIT FOR S	SHORT TO GROUND	J
	ECM	F	CM relay		K
Connector	Terminal	Connector	Termina	Continuity	IX
	105				
M33	113	E55	1	Existed	L
4. Also check <u>OK or NG</u> OK >> GC NG >> GC <b>6.</b> DETECT M	A harness for sh D TO 7. D TO 6. ALFUNCTIONI	nort to ground ar	nd short to pow	/er.	M
Check the follo • Harness cont • Harness for c	wing. nectors E102, I open or short b	M13 etween ECM an	d ECM relay		0
>> Re <b>7.</b> CHECK EC	epair open circu M RELAY INPU	uit or short to gro	ound or short to	power in harness or connecto EN AND SHORT	rs. P

1. Check the continuity between ECM harness connector and ECM relay harness connector.

### < SERVICE INFORMATION >

E	CM	ECM	relay	Continuity
Connector	Terminal	Connector	Terminal	Continuity
M33	119	ESS	Б	Existed
M33	120	L33	5	LAISted

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

#### <u>OK or NG</u>

OK >> GO TO 9.

NG >> GO TO 8.

# 8. DETECT MALFUNCTIONING PART

#### Check the following.

- Harness connectors E91, M241 (LHD models)
- Harness connectors E102, M13 (RHD models)
- Harness for open or short between ECM and ECM relay

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

# 9. CHECK ECM RELAY

#### Refer to EC-81

OK >> GO TO 10.

NG >> Replace ECM relay.

10. CHECK INTERMITTENT INCIDENT

#### Refer to EC-70.

#### OK or NG

- OK >> Replace ECM relay.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### **Component Inspection**

#### ECM RELAY

- 1. Disconnect ECM relay.
- 2. Check continuity between ECM 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

If NG, replace cooling fan relay.



INFOID:000000003855862

# DTC P1268 - P1271 FUEL INJECTOR

# **Component Description**

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN INJ WID  • Engine: After warming up • Shift lever: Neutral • Idle speed	Engine: After warming up	No load	0.50 - 0.70 msec
	<ul><li>Shift lever: Neutral</li><li>Idle speed</li></ul>	Blower fan switch: ON	0.50 - 0.80 msec

# On Board Diagnosis Logic

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P1268 1268	No. 1 cylinder fuel injector	The valve built into No. 1 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.		J
P1269 1269	No. 2 cylinder fuel injector	The valve built into No. 2 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	Harness or connectors     (The fuel pump circuit is open or     shorted )	K
P1270 1270	No. 3 cylinder fuel injector	The valve built into No. 3 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.	<ul><li>Fuel injector</li><li>Injector adjustment value</li></ul>	L
P1271 1271	No. 4 cylinder fuel injector	The valve built into No. 4 cylinder fuel injector is not closed properly (stuck open) when the injector is not energized.		N

# **DTC Confirmation Procedure**

#### **CAUTION:**

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

#### NOTE:

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

#### WITH CONSULT-III

- 1. Start engine and let it idle for about 15 minutes.
- 2. Check DTC.
- If DTC is detected, go to EC-231, "Diagnosis Procedure". 3. If DTC is not detected, go to next step.
- 4. Drive vehicle and maintain the following conditions for at least 60 seconds.

# EC-227

# [YD25DDTi]

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#### < SERVICE INFORMATION >

CKPS-RPM	700 - 2,000 rpm (A constant rotation is maintained)
COOLAN TEMP/S	Less than 75°C (167°F)
Shift lever	Suitable position
Accelerator pedal	Hold the accelerator pedal as steady as possible.

5. Check DTC.

6. If DTC is detected, go to EC-231, "Diagnosis Procedure".

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Wiring Diagram

# [YD25DDTi]

INFOID:000000003759688

# EC-INJ/PW-01



GEC627A

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

# EC-229

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#### < SERVICE INFORMATION >

# [YD25DDTi]

TERMII (Wire)	NAL NO. color)	Description	Condition	Value
+	-	Signal name		(Appiox.)
4 (L)	114	Fuel injector power supply (For cylinder No. 1 and 3)	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 7.5 V ★
5 (P)	(B)	Fuel injector power supply (For cylinder No. 2 and 4)	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0 V ★
21 (X)		Fuel injector No. 4		Approximately 7.5 V ★
(T) 22 (R)	114 (B)	Fuel injector No. 4	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	≥ 10.0 V/D/v 20 ms/D/v T MBIB1297E
23	(D)	Fuel injector No. 2		Approximately 8.0 V ★
24 (OR)		Fuel injector No. 2	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	≥ 10.0 V/D/v 20 ms/D/v T MBIB1298E
40		Fuel injector No. 3		Approximately 7.5 V ★
(G) 41 (BR)	114 (B)	Fuel injector No. 3	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	≥ 10.0 V/D/v 20 ms/D/v T MBIB1297E
42 (PU)		Fuel injector No. 1		Approximately 8.0 V ★
43 (SB)		Fuel injector No. 1	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	≥ 10.0 V/D/v 20 ms/D/v T MBIB1298E

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

# < SERVICE INFORMATION >

# Diagnosis Procedure

[YD25DDTi]

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# 1.CHECK INJECTOR ADJUSTMENT VALUE

- 1. Turn ignition switch ON.
- 2. Select "ENTER INJCTR CALIB DATA" in "WORK SUPPORT" mode with CONSULT-III.
- 3. Check injector adjustment values displayed on CONSULT-III screen.

#### The value displayed on CONSULT-III screen should be same as injector adjustment value printed on each fuel injector.

#### OK or NG

- OK >> GO TO 2.
- NG >> Perform Injector Adjustment Value Registration. Refer to <u>EC-22. "Injector Adjustment Value Reg</u>istration".

# 2.CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect fuel injector (1) harness connector.

- 3. Disconnect ECM harness connector.
- Check harness continuity between the following terminals corresponding to the malfunctioning cylinder. Refer to Wiring Diagram.

DTC	Terr	Cylinder	
ыс	ECM	Fuel injector	Cymraer
P1268	4	1	No.1
P1269	5	1	No.2
P1270	4	1	No.3
P1271	5	1	No.4

#### Continuity should exist.

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

#### OK or NG

OK >> GO TO 3.

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

# ${f 3.}$ CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

DTC	Terr	Cylinder		
DIC	ECM	Fuel injector	Cymider	
P1268	42, 43	2	No.1	
P1269	23, 24	2	No.2	
P1270	40, 41	2	No.3	
P1271	21, 22	2	No.4	

### Continuity should exist.

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

<u>OK or NG</u>



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< SERVICE INFORMATION >

OK >> GO TO 4.

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

# **4.**CHECK FUEL INJECTOR-I

Refer to EC-232, "Component Inspection".

#### OK or NG

OK >> GO TO 5.

NG >> GO TO 6.

**5.**CHECK FUEL INJECTOR-II

#### (B) With CONSULT-III

1. Remove two fuel injectors.

NOTE:

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

- 2. Swap the two fuel injectors to the other cylinder.
- 3. Reconnect ECM harness connector and fuel injector harness connector.
- 4. Turn ignition switch ON.
- 5. Perform Injector Adjustment Value Registration. Refer to EC-22, "Injector Adjustment Value Registration".
- 6. Select "SELF DIAG RESULTS" mode with CONSULT-III.
- 7. Touch "ERASE".
- 8. Perform EC-227, "DTC Confirmation Procedure".
- 9. Is DTC displayed for the other cylinder?

#### With GST

1. Remove two fuel injectors.

NOTE:

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

- 2. Swap the two fuel injectors to the other cylinder.
- 3. Reconnect ECM harness connector and fuel injector harness connector.
- 4. Turn ignition switch ON.
- 5. Perform Injector Adjustment Value Registration. Refer to EC-22, "Injector Adjustment Value Registration".
- 6. Select Service \$04 with GST.
- 7. Perform EC-227, "DTC Confirmation Procedure".
- 8. Is DTC displayed for the other cylinder?

#### <u>Yes or No</u>

Yes >> GO TO 6.

No >> GO TO 7.

**6.**REPLACE FUEL INJECTOR

1. Replace fuel injector of malfunctioning cylinder.

2. Perform Injector Adjustment Value Registration. Refer to EC-22, "Injector Adjustment Value Registration".

#### >> INSPECTION END

### **7.**CHECK INTERMITTENT INCIDENT

Refer to EC-70.

#### >> INSPECTION END

#### **Component Inspection**

#### FUEL INJECTOR

1. Disconnect fuel injector harness connector.

INFOID:000000003759691

#### < SERVICE INFORMATION >

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

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

3. If NG, replace fuel injector.



Removal and Installation

FUEL INJECTOR Refer to <u>EM-8</u>. INFOID:000000003759692

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# DTC P1272 FUEL PUMP

# Description

When the fuel pressure in fuel rail increases to excessively high, fuel pressure relief valve (1) opens to carry excess fuel to the return hose.

• Fuel rail pressure sensor (2)



# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
	Engine: After warming up	Idle	1,600 - 2,000 mA
PUMP CURRENT	<ul> <li>Air conditioner switch: OFF</li> <li>Shift lever: Neutral</li> <li>No load</li> </ul>	2,000 rpm	1,500 - 1,900 mA

# On Board Diagnosis Logic

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#### NOTE:

# If DTC P1272 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1272 1272	Fuel rail pressure relief valve open	Fuel rail pressure relief valve is open be- cause of fuel pressure control system mal- function.	<ul> <li>Harness or connectors (Fuel pump circuit is open or shorted.)</li> <li>Fuel pump</li> <li>Fuel rail pressure sensor</li> <li>Air mixed with fuel</li> <li>Lack of fuel</li> </ul>

# **DTC Confirmation Procedure**

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# NOTE:

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

- 1. Start engine and keep engine speed more than 4,000 rpm for at least 5 seconds, then release the accelerator pedal.
- 2. Check 1st trip DTC.
- 3. If 1st trip DTC is detected, go to EC-236, "Diagnosis Procedure".

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[YD25DDTi]

# Wiring Diagram

INFOID:000000003759697





GEC621A

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

#### < SERVICE INFORMATION >

# [YD25DDTi]

TERMII (Wire	NAL NO. color)	Description	Condition	Value
+	-	Signal name		(/(pp/ox.)
10 114		Fuel pump	[Engine is running] • Warm-up condition • Idle speed → 5.0 V/Div 5 ms/t	Approximately 5.8 V ★
(G)	(B)	Fuel pump [Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 5.5 V ★	
29	114	Fuel numn	[Engine is running] • Warm-up condition • Idle speed	Approximately 0.3 V ★
(B)	(B)	Fuel pump	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 0.3 V ★

 $\star$ : Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

# **Diagnosis Procedure**

INFOID:000000003759698

# 1.PERFORM FUEL PUMP LEARNING VALUE CLEARING

### NOTE:

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

#### (B) With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Perform Fuel Pump Learning Value Clearing. Refer to EC-23, "Fuel Pump Learning Value Clearing".
- 3. Start engine and let it idle for at least 60 seconds.
- 4. Select "SELF-DIAG RESULT" mode with CONSULT-III.
- 5. Touch "ERASE".
- 6. Perform EC-234, "DTC Confirmation Procedure", again.
- 7. Is 1st trip DTC detected again?

#### With GST

- 1. Turn ignition switch ON.
- 2. Perform Fuel Pump Learning Value Clearing. Refer to EC-23. "Fuel Pump Learning Value Clearing".
- 3. Start engine and let it idle for at least 60 seconds.
- 4. Select Service \$04 with GST.
- 5. Perform EC-234, "DTC Confirmation Procedure", again.

< SERVICE INFORMATION >	[YD25DDTi]
6. Is 1st trip DTC detected again?	
Yes or No	A
Yes >> GO TO 2. No >> <b>INSPECTION END</b>	_
2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT FOR OPEN AND SHORT	EC
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect ECM harness connector and fuel pump (2) harness connector.</li> <li>Fuel pump temperature sensor (1)</li> <li>Check harness continuity between ECM terminal 10 and fuel pump terminal 1. Refer to Wiring Diagram.</li> <li>Continuity should exist.</li> <li>Also check harness for short to ground and short to power.</li> <li>OK or NG</li> <li>OK &gt;&gt; GO TO 4. NG &gt;&gt; GO TO 3.</li> <li>DETECT MALFUNCTIONING PART</li> </ol>	MBIB1751E
<ul> <li>Check the following.</li> <li>Harness connectors E237, M279</li> <li>Harness for open or short between fuel pump temperature sensor and ECM</li> <li>&gt;&gt; Repair open circuit or short to ground or short to power in harness or connectors.</li> </ul>	Н
4.CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT	
<ol> <li>Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.</li> </ol>	J
Continuity should exist.	
<ul> <li>Also check harness for short to ground and short to power.</li> <li>OK or NG</li> <li>OK &gt;&gt; GO TO 6.</li> </ul>	K
NG $>>$ GO 10.5. 5 DETECT MALEUNICTIONING DART	L
<ul> <li>Check the following.</li> <li>Harness connectors E237, M279</li> <li>Harness for open or short between fuel pump temperature sensor and ECM</li> </ul>	M
>> Repair open circuit or short to ground or short to power in harness or connectors. <b>6.</b> CHECK FUEL PUMP	Ν
Refer to EC-238, "Component Inspection".	0
<u>OK or NG</u> OK >> GO TO 8. NG >> GO TO 7.	P
<b>/</b> .REPLACE FUEL PUMP	

1. Replace fuel pump.

2. Perform Fuel Pump Learning Value Clearing. Refer to <u>EC-23. "Fuel Pump Learning Value Clearing"</u>.

#### < SERVICE INFORMATION >

[YD25DDTi]

INFOID:000000003759699

8.CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-131, "Component Inspection".

#### OK or NG

OK >> GO TO 9. NG >> Replace fuel rail.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

#### >> INSPECTION END

#### **Component Inspection**

#### FUEL PUMP

- 1. Disconnect fuel pump harness connector.
- 2. Check resistance between fuel pump terminals 1 and 2.

#### Resistance: 1.5 - 3.0 Ω [at 10 - 60°C (50 - 140°F)]

3. If NG, replace fuel pump.



INFOID:000000003759700

# Removal and Installation

FUEL RAIL Refer to <u>EM-8</u>. FUEL PUMP Refer to <u>EC-24</u>.

#### < SERVICE INFORMATION >

# DTC P1273 FUEL PUMP

# Description

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel pump increases, the fuel raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to the fuel pump to raise the injection pressure.

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
	• Engine: After warming up	Idle	1,600 - 2,000 mA
PUMP CURRENT	<ul> <li>Air conditioner switch: OFF</li> <li>Shift lever: Neutral</li> <li>No load</li> </ul>	2,000 rpm	1,500 - 1,900 mA

# On Board Diagnosis Logic

NOTE:

• If DTC P1273 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to EC-214.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	$\vdash$
P1273 1273	Fuel pump insufficient flow	ECM detects the abnormal pulse of fuel pressure.	<ul> <li>Harness or connectors (The fuel pump circuit is open or shorted.)</li> <li>Fuel pump</li> <li>Injector adjustment value</li> <li>Air mixed with fuel</li> <li>Lack of fuel</li> </ul>	

# **DTC Confirmation Procedure**

### NOTE:

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

- 1. Start engine and warm it up to normal operating temperature.
- 2. Keep engine speed more than 2,000 rpm for at least 10 seconds.
- 3. Check 1st trip DTC.
- If 1st trip DTC is detected, go to EC-241, "Diagnosis Procedure". 4.

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[YD25DDTi]

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# Wiring Diagram

INFOID:000000003759705





GEC621A

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

#### < SERVICE INFORMATION >

performing following procedure.

# [YD25DDTi]

TERMII (Wire	TERMINAL NO. (Wire color)     Description       Condition		Value	А		
+	-	Signal name		(/\ppiox.)		
10 114			[Engine is running] • Warm-up condition • Idle speed	Approximately 5.8 V ★	C D	
(G)	(B)			Approximately 5.5 V ★		
			<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	5.0 V/Div 5 ms/Div T	E F	
				Approximately 0.3 V ★	G	
		<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	≥ 1.0 V/Div 5 ms/Div	Н		
29 (B)	114 (B)	Fuel pump		Approximately 0.3 V *	I	
			<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	MBIB0888E	J	
★: Avera	ge voltag	e for pulse signal (Actual pulse signa	al can be confirmed by oscilloscope.)		L	
Diagn	osis P	rocedure		INFOID:00000003759706		
1.CHE		ECTOR ADJUSTMENT VALL	IF		М	
1. Tur 2. Sel 3. Che	n ignitic ect "EN eck inje	on switch ON. TER INJCTR CALIB DATA" ir ctor adjustment values display	n "WORK SUPPORT" mode with CO yed on CONSULT-III screen.	NSULT-III.	Ν	
The value displayed on CONSULT-III screen shouldbe same as injector adjustment value printed onOeach fuel injector.O						
OK or NG       P         OK >> GO TO 2.       P         NG >> Perform Injector Adjustment Value Registration. Refer to EC-22. "Injector Adjustment Value Registration".						
2.per	FORM	FUEL PUMP LEARNING VAL				
NOTE: If the D	<b>NOTE:</b> If the DTC is detected because of air mixed with fuel (i.e.: caused by lack of fuel), it may become normal by					

#### < SERVICE INFORMATION >

#### (P) With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Perform Fuel Pump Learning Value Clearing. Refer to EC-23, "Fuel Pump Learning Value Clearing".
- 3. Start engine and let it idle for at least 60 seconds.
- 4. Select "ŠELF-DIAG RESULT" mode with CONSULT-III.
- 5. Touch "ERASE".
- 6. Perform EC-239, "DTC Confirmation Procedure", again.
- 7. Is 1st trip DTC detected again?

#### With GST

- 1. Turn ignition switch ON.
- 2. Perform Fuel Pump Learning Value Clearing. Refer to EC-23. "Fuel Pump Learning Value Clearing".
- 3. Start engine and let it idle for at least 60 seconds.
- 4. Select Service \$04 with GST.
- 5. Perform EC-239, "DTC Confirmation Procedure", again.
- 6. Is 1st trip DTC detected again?

#### <u>Yes or No</u>

Yes >> GO TO 3.

No >> INSPECTION END

# ${\it 3.}$ CHECK FUEL PUMP POWER SUPPLY CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector and fuel pump (2) harness connector.
- Fuel pump temperature sensor (1)
- Check harness continuity between ECM terminal 10 and fuel pump terminal 1. Refer to Wiring Diagram.

#### Continuity should exist.

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

OK or NG

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

**4.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E237, M279

Harness for open or short between fuel pump temperature sensor and ECM

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

# 5. CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT

 Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

#### Continuity should exist.

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

<u>OK or NG</u>

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

6. DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors E237, M279

• Harness for open or short between fuel pump temperature sensor and ECM

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



Ρ

# < SERVICE INFORMATION > 7.CHECK FUEL PUMP А Refer to EC-243, "Component Inspection". OK or NG OK >> GO TO 9. EC NG >> GO TO 8. 8.REPLACE FUEL PUMP 1. Replace fuel pump. Perform Fuel Pump Learning Valve Clearing. Refer to EC-23, "Fuel Pump Learning Value Clearing". 2. D >> INSPECTION END 9. CHECK INTERMITTENT INCIDENT Ε Refer to EC-70. >> INSPECTION END F **Component Inspection** INFOID:000000003759707 FUEL PUMP 1. Disconnect fuel pump harness connector. 2. Check resistance between fuel pump terminals 1 and 2. Ĩ<u>ts</u> €Ð (©) Н Resistance: 1.5 - 3.0 Ω [at 10 - 60°C (50 - 140°F)] 3. If NG, replace fuel pump. JMBIA1445Z Κ **Removal and Installation** INFOID:000000003759708 FUEL PUMP L Refer to EC-24. Μ Ν

# DTC P1274 FUEL PUMP

# Description

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel increases, the fuel pump raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to the fuel pump to raise the injection pressure.

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
	Engine: After warming up	Idle	1,600 - 2,000 mA
PUMP CURRENT	<ul> <li>Air conditioner switch: OFF</li> <li>Shift lever: Neutral</li> <li>No load</li> </ul>	2,000 rpm	1,500 - 1,900 mA

#### On Board Diagnosis Logic

INFOID:000000003759711

INFOID:000000003759712

# This self-diagnosis has the one trip detection logic. NOTE:

# If DTC P1274 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1274 1274	Fuel pump protection	Fuel pressure is too much higher than the target value.	<ul> <li>Harness or connectors (The fuel pump circuit is open or shorted.)</li> <li>Fuel pump</li> <li>Fuel rail pressure sensor</li> </ul>

# **DTC Confirmation Procedure**

#### NOTE:

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

- 1. Tuning ignition switch ON.
- 2. Start engine and let idle for at least 5 seconds.
- 3. Check DTC.
- 4. If DTC is detected, go to EC-246. "Diagnosis Procedure".

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INFOID:000000003759710

# Wiring Diagram

# [YD25DDTi]

INFOID:000000003759713





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

#### < SERVICE INFORMATION >

[YD25DDTi]
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TERMI (Wire	VAL NO. color)	Description	Condition	Value
+	-	Signal name		(дриол.)
10	114	Fuel pump	[Engine is running] • Warm-up condition • Idle speed	Approximately 5.8 V ★
(G) (B	(B)		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 5.5 V ★
29	114	Fuel nump	[Engine is running] • Warm-up condition • Idle speed	Approximately 0.3 V ★
(B)	(B)	(B) Fuel pump	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 0.3 V ★

 $\star$ : Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

# **Diagnosis Procedure**

INFOID:000000003759714

# 1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector and fuel pump (2) harness connector.
- Fuel pump temperature sensor (1)
- Check harness continuity between ECM terminal 10 and fuel pump terminal 1. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

Check the following.



< SERVICE INFORMATION >	[YD25DDTi]	
Harness connectors E237, M279	<u> </u>	
<ul> <li>Harness for open or short between fuel pump temperature sensor and ECM</li> </ul>		А
>> Repair open circuit or short to ground or short to power in harness or connectors.		FC
<b>3.</b> CHECK FUEL PUMP GROUND CIRCUIT FOR OPEN AND SHORT		LU
1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2.		
Relef to winng Diagram.		С
Continuity should exist.		
2. Also check harness for short to ground and short to power.		D
<u>OK or NG</u>		
OK >> GO TO 5.		_
$\frac{1}{2} P_{\text{A}} = \frac{1}{2} P_{$		E
Check the following.     Harness connectors E237_M279		F
Harness for open or short between fuel pump temperature sensor and ECM		
>> Repair open circuit or short to ground or short to power in harness or connectors.		G
5. CHECK FUEL RAIL PRESSURE SENSOR		
Refer to EC-131, "Component Inspection".		Н
OK or NG		
OK >> GO TO 6.		
NG >> Replace fuel rall.		I
Refer to <u>EC-247, "Component Inspection"</u> .		J
NG >> GO TO 7.		LZ.
7.REPLACE FUEL PUMP		K
1 Replace fuel nump		
<ol> <li>Perform Fuel Pump Learning Valve Clearing. Refer to <u>EC-23, "Fuel Pump Learning Value (</u></li> </ol>	<u>Clearing"</u> .	L
>> INSPECTION END		NЛ
8. CHECK INTERMITTENT INCIDENT		IVI
Refer to EC-70.		
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Component Inspection	INFOID:000000003759715	0
<ol> <li>Disconnect fuel pump harness connector.</li> </ol>		

#### < SERVICE INFORMATION >

2. Check resistance between fuel pump terminals 1 and 2.

# Resistance: 1.5 - 3.0 Ω [at 10 - 60°C (50 - 140°F)]

3. If NG, replace fuel pump.



Removal and Installation

INFOID:000000003759716

FUEL PUMP Refer to <u>EC-24</u>.

#### < SERVICE INFORMATION >

# DTC P1275 FUEL PUMP

# Description

To control the amount of the fuel inhalation of the fuel pump, a plunger is built into the fuel pump. When the amount of the fuel inhalation of fuel increases, the fuel pump raises the fuel exhalation pressure. As a result, the fuel injection pressure is raised. When the load of the engine increases, the ECM sends a signal to fuel pump to raise the injection pressure.

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITIO	NC	SPECIFICATION	
	• Engine: After warming up	Idle	1,600 - 2,000 mA	Е
PUMP CURRENT	<ul> <li>Air conditioner switch: OFF</li> <li>Shift lever: Neutral</li> <li>No load</li> </ul>	2,000 rpm	1,500 - 1,900 mA	

### On Board Diagnosis Logic

This self-diagnosis has the one trip detection logic. NOTE:

# If DTC P1275 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	Н
P1275 1275	Fuel pump exchange	Fuel pressure is too much higher than the target value.	<ul> <li>Harness or connectors (The fuel pump circuit is open or shorted.)</li> <li>Fuel pump</li> <li>Fuel rail pressure sensor</li> </ul>	I

# **DTC Confirmation Procedure**

### NOTE:

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

EC-249

- 1. Start engine and warm it up to normal operating temperature.
- 2. Keep engine speed more than 2,000 rpm for at least 60 seconds.
- 3. Check DTC.
- 4. If DTC is detected, go to EC-251. "Diagnosis Procedure".

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INFOID:000000003759719

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# Wiring Diagram

INFOID:000000003759721





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

#### < SERVICE INFORMATION >

# [YD25DDTi]

TERMINAL (Wire co	L NO. olor)	Description	Condition	Value
+	_	Signal name		(Approx.)
10	114	Fuel nump	[Engine is running] • Warm-up condition • Idle speed	Approximately 5.8 V ★
(G) (B)	(B)	Fuel pump	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 5.5 V ★
29	114		[Engine is running] • Warm-up condition • Idle speed	Approximately 0.3 V ★
(B) (B	(B)	Fuel pump	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 0.3 V ★

# Diagnosis Procedure

# 1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector and fuel pump (2) harness connector.
- Fuel pump temperature sensor (1)
- Check harness continuity between ECM terminal 10 and fuel pump terminal 1. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

Check the following.



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INFOID:000000003759723

- Harness connectors E237, M279
- Harness for open or short between fuel pump temperature sensor and ECM

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

# ${\it 3.}$ check fuel pump ground circuit for open and short

1. Check harness continuity between ECM terminal 29 and fuel pump terminal 2. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

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

4. DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors E237, M279

• Harness for open or short between fuel pump temperature sensor and ECM

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

#### **5.**CHECK FUEL RAIL PRESSURE SENSOR

Refer to EC-131, "Component Inspection".

#### OK or NG

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

6.CHECK FUEL PUMP

Refer to EC-252, "Component Inspection".

<u>OK or NG</u>

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

**7.**REPLACE FUEL PUMP

1. Replace fuel pump.

2. Perform Fuel Pump Learning Valve Clearing. Refer to EC-23, "Fuel Pump Learning Value Clearing".

#### >> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

#### >> INSPECTION END

#### Component Inspection

#### FUEL PUMP

1. Disconnect fuel pump harness connector.
# DTC P1275 FUEL PUMP

#### < SERVICE INFORMATION >

2. Check resistance between fuel pump terminals 1 and 2.

#### **Resistance:** 1.5 - 3.0 Ω [at 10 - 60°C (50 - 140°F)]

3. If NG, replace fuel pump.



**Removal and Installation** 

FUEL PUMP Refer to EC-24.



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# DTC P1622 INJECTOR ADJUSTMENT VALUE

#### < SERVICE INFORMATION >

# DTC P1622 INJECTOR ADJUSTMENT VALUE

# Description

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INFOID:000000003759735

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

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



Example: Injector adjustment value = D121ABCD1A0612340000000000E6

# On Board Diagnosis Logic

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1622 1622	Injector adjustment value data uninput	Injector adjustment value is not stored in ECM.	<ul> <li>Injector adjustment value (Injector adjustment value has not been written onto ECM memory yet, or the value has been initialized.)</li> </ul>

# **DTC Confirmation Procedure**

NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check DTC.
- 4. If DTC is detected, go to EC-254, "Diagnosis Procedure".

#### **Diagnosis** Procedure

INFOID:000000003759736

## **1.**PERFORM INJECTOR ADJUSTMENT VALUE REGISTRATION

Perform Injector Adjustment Value Registration. Refer to EC-22. "Injector Adjustment Value Registration".

#### >> INSPECTION END

EC-254

#### [YD25DDTi]

# DTC P1623 INJECTOR ADJUSTMENT VALUE

#### < SERVICE INFORMATION >

# DTC P1623 INJECTOR ADJUSTMENT VALUE

# Description

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

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



Example: Injector adjustment value = D121ABCD1A061234000000000000E6

# On Board Diagnosis Logic

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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P1623 1623	Injector adjustment value data error	ECM detects the abnormal value of injector adjustment value.	<ul> <li>CONSULT-III communication status (The status of CONSULT-III communica- tion becomes improper during Injector Adjustment Value Registration.)</li> <li>ECM</li> </ul>	U,

#### NOTE:

This DTC is not detected when injector adjustment value (not correct but existent) is stored in ECM.

# **DTC Confirmation Procedure**

#### NOTE:

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

- Turn ignition switch ON. 1.
- 2. Wait at least 5 seconds.
- 3. Check DTC.
- 4. If DTC is detected, go to EC-255, "Diagnosis Procedure".

# Diagnosis Procedure

# 1.CHECK INJECTOR ADJUSTMENT VALUE

- 1. Turn ignition switch ON.
- Select "ENTER INJCTR CALIB DATA" in "WORK SUPPORT" mode with CONSULT-III. 2.
- 3. Check injector adjustment values displayed on CONSULT-III screen.

The value displayed on CONSULT-III screen should be same as injector adjustment value printed on each fuel injector.

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# DTC P1623 INJECTOR ADJUSTMENT VALUE

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#### OK or NG

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

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2.PERFORM INJECTOR ADJUSTMENT VALUE REGISTRATION

Perform Injector Adjustment Value Registration. Refer to EC-22. "Injector Adjustment Value Registration". NOTE:

When two or more injector adjustment value are improper, it is useful to perform "INJ ADJ VAL CLR" in "WORK SUPPORT" mode with CONSULT-III. And then perform Injector Adjustment Value Registration.

#### >> GO TO 3.

**3.**PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- 1. Select "SELF DIAG RESULTS" mode with CONSULT-III.
- 2. Touch "ERASE".
- 3. Perform EC-255, "DTC Confirmation Procedure", again.
- 4. Is DTC P1623 displayed again?

#### With GST

- 1. Select Service \$04 with GST.
- 2. Perform EC-255, "DTC Confirmation Procedure", again.
- 3. Is DTC P1623 displayed again?

#### Yes or No

Yes >> GO TO 4.

No >> INSPECTION END

#### **4.**REPLACE ECM

- 1. Replace ECM.
- 2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to <u>EL-96, "ECM</u> <u>Re-communicating Function"</u>.
- 3. Perform Injector Adjustment Value Registration. Refer to EC-22, "Injector Adjustment Value Registration".
- 4. Perform Fuel Pump Learning Value Clearing. Refer to EC-23, "Fuel Pump Learning Value Clearing".
- 5. Perform EGR Volume Control Valve Closed Position Learning Value Clear. Refer to <u>EC-24, "EGR Volume</u> <u>Control Valve Closed Position Learning Value Clear"</u>.
- 6. Perform EGR Volume Control Valve Closed Position Learning. Refer to <u>EC-24</u>, "EGR Volume Control <u>Valve Closed Position Learning</u>".

#### >> INSPECTION END

#### < SERVICE INFORMATION >

# DTC P2135 APP SENSOR

# Description

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

	001	DITION		
MONITOR ITEM	CON	DITION	SPECIFICATION	
ACCEL POS SEN*	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0 V	(
ACCEL TOO SER	(Engine stopped)	Accelerator pedal: Fully depressed	4.0 - 4.8 V	
	Ignition switch: ON	Accelerator pedal: Fully released	0.3 - 1.2 V	L
AUGEL GEN Z	(Engine stopped)	Accelerator pedal: Fully depressed	3.7 - 4.8 V	Г

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

# On Board Diagnosis Logic

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

- If DTC P2135 is displayed with DTC P0642 or P0643, first perform trouble diagnosis for DTC P0642 or P0643. Refer to <u>EC-210</u>.
- If DTC P2135 is displayed with DTC P0652 or P0653, first perform trouble diagnosis for DTC P0652 or P0653. Refer to <u>EC-214</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	L
P2135 2135	Accelerator pedal position sensor 1, 2 signal correlation	The correlation between APP sensor 1 signal and APP sensor 2 signal is out of the normal range.	<ul> <li>Harness or connectors (The APP sensor circuit is open or shorted.)</li> <li>Accelerator pedal position sensor (APP sensor 1 and 2)</li> </ul>	Μ

# **DTC Confirmation Procedure**

#### NOTE:

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

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Depress accelerator pedal slowly spending 5 seconds, and then release it slowly spending 5 seconds.
- 4. Check DTC.
- 5. If DTC is detected, go to EC-259, "Diagnosis Procedure".





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# Wiring Diagram

[YD25DDTi] INFOID:000000003759763

# EC-APPS3-01





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

# DTC P2135 APP SENSOR

#### < SERVICE INFORMATION >

#### [YD25DDTi]

TERMI (Wire	NAL NO. e color)	Description	Condition	Value	А
+	-	Signal name		(πρριολ.)	
67 (B)	_	Sensor ground (Sensor shield circuit)	_	_	EC
82 (W)	84 (R)	Sensor power supply (Accelerator pedal position sensor 1 / Crankshaft position sensor / EGR volume control valve control position sensor)	[Ignition switch ON]	Approximately 5 V	С
83	84	Accelerator pedal position sensor	<ul><li>[Ignition switch ON]</li><li>Engine: Stopped</li><li>Accelerator pedal: Fully released</li></ul>	0.5 - 1.0 V	D
(B)	(R)	1	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully depressed	3.7 - 4.7 V	E
84 (R)	_	Accelerator pedal position sensor 1 ground	_	_	F
90 (L)	92 (Y)	Accelerator pedal position sensor 2 power supply	[Ignition switch ON]	Approximately 5 V	G
91	92	Accelerator pedal position sensor	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully released	0.15 - 0.6 V	
(G)	(Y)	2	[Ignition switch ON] • Engine: Stopped • Accelerator pedal: Fully depressed	1.85 - 2.4 V	— П
92 (Y)	_	Accelerator pedal position sensor 2 ground	_	_	

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

# **Diagnosis Procedure**

# 1. CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Loosen and retighten ground screws on the body. Refer to <u>EC-81, "Ground Inspection"</u>.
- Body ground M97 (1)
- Body ground M99 (2)
- ECM (3)

# <u>OK or NG</u>

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



# 2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

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# DTC P2135 APP SENSOR

#### < SERVICE INFORMATION >

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



3. Check voltage between APP sensor terminals 4, 6 and ground with CONSULT-III or tester.

#### Voltage: Approximately 5 V

#### OK or NG

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



**3.**CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check harness continuity between APP sensor terminals 1 and ECM terminal 84, APP sensor terminal 3 and ECM terminal 92. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

OK >> GO TO 4.

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

**4.**CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

 Check harness continuity between ECM terminal 83 and APP sensor terminal 5, ECM terminal 91 and APP sensor terminal 2. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### <u>OK or NG</u>

OK >> GO TO 5.

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

**5.**CHECK APP SENSOR

Refer to EC-261, "Component Inspection".

<u>OK or NG</u>

- OK >> GO TO 6.
- NG >> Replace accelerator pedal assembly.

**6.**CHECK INTERMITTENT INCIDENT

Refer to EC-70.



#### < SERVICE INFORMATION >

#### >> INSPECTION END

# Component Inspection

#### ACCELERATOR PEDAL POSITION SENSOR

- 1. Reconnect all harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Check voltage between ECM harness connector terminal as follows.

	ECM					
+ –		Condition		Voltage	D	
Connector	Terminal	Terminal				
	83	84	Accelerator podel	Fully released	0.5 - 1.0 V	F
Moo	(APP sensor 1 signal)	(Sensor ground)	Accelerator pedar	Fully depressed	3.7 - 4.7 V	
INI33	91	92	Appelorator padal	Fully released	0.15 - 0.6 V	-
	(APP sensor 2 signal) (Sensor ground)	Accelerator pedar	Fully depressed	1.85 - 2.4 V	F	

4. If NG, replace accelerator pedal assembly.

# Removal and Installation

ACCELERATOR PEDAL Refer to "ACCELERATOR CONTROL SYSTEM" in FE section.

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#### < SERVICE INFORMATION >

# DTC P2146, P2149 FUEL INJECTOR POWER SUPPLY

## Component Description

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
	Engine: After warming up	No load	0.50 - 0.70 msec
MAIN INJ WID	<ul><li>Shift lever: Neutral position</li><li>Idle speed</li></ul>	Blower fan switch: ON	0.50 - 0.80 msec

# On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2146 2146	No. 1 and 4 cylinder fuel injec- tor power supply circuit open	An improper voltage signal is sent to ECM through No. 1 and 3 cylinder fuel injector.	Harness or connectors
P2149 2149	No. 2 and 3 cylinder fuel injec- tor power supply circuit open	An improper voltage signal is sent to ECM through No. 2 and 4 cylinder fuel injector.	(The fuel injector circuit is open.)

## **DTC Confirmation Procedure**

#### NOTE:

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

#### **TESTING CONDITION**

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

- 1. Start engine and let it idle for at least 5 seconds.
- 2. Check 1st trip DTC.
- 3. If 1st trip DTC is detected, go to EC-265, "Diagnosis Procedure".

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[YD25DDTi]

INFOID:00000003759767

INFOID:000000003759769

INFOID:000000003759770

# [YD25DDTi]

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< SERVICE INFORMATION > Wiring Diagram

# EC-INJ/PW-01



GEC627A

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

#### < SERVICE INFORMATION >

[YD25DDTi]

TERMIN (Wire	NAL NO. color)	Description	Condition	Value
+	1	Signal name		(//pp/0x.)
4 (L)	114	Fuel injector power supply (For cylinder No. 1 and 3)	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 7.5 V ★
5 (P)	(B)	Fuel injector power supply (For cylinder No. 2 and 4)	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0 V ★
21		Fuel injector No. 4		Approximately 7.5 V ★
(Y) 22 (R)	114 (B)	Fuel injector No. 4	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	► 10.0 V/Div 20 ms/Div T MBIB1297E
23	(2)	Fuel injector No. 2		Approximately 8.0 V ★
24 (OR)		Fuel injector No. 2	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	► 10.0 V/D/v 20 ms/D/v T MBIB1298E
40 (C)		Fuel injector No. 3		Approximately 7.5 V ★
41 (BR)	114 (B)	Fuel injector No. 3	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	► 10.0 V/Div 20 ms/Div T MBIB1297E
42 (PU)		Fuel injector No. 1		Approximately 8.0 V ★
43 (SB)		Fuel injector No. 1	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	DIO VIDIV 20 ms/Div T

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

# < SERVICE INFORMATION >

# **Diagnosis Procedure**

# [YD25DDTi]

INFOID:000000003759773

# 1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT FOR OPEN

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

Terr	Cylinder	
ECM Fuel injector		Cylinder
4	1	No.1
5	1	No.2
4	1	No.3
5	1	No.4



#### Continuity should exist.

#### OK or NG

OK	>> GO TO 2.
----	-------------

NG >> Repair open circuit in harness or connectors.

2. CHECK INTERMITTENT INCIDENT

# Refer to EC-70.

#### >> INSPECTION END

EC-265

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#### < SERVICE INFORMATION >

# DTC P2147, P2148 FUEL INJECTOR CIRCUIT

### Component Description

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

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
	Engine: After warming up	No load	0.50 - 0.70 msec
MAIN INJ WID	<ul><li>Shift lever: Neutral</li><li>Idle speed</li></ul>	Blower fan switch: ON	0.50 - 0.80 msec

# On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2147 2147	Fuel injector circuit low in- put	ECM detects the fuel injector circuit is shorted to ground.	Harness or connectors
P2148 2148	Fuel injector circuit high in- put	ECM detects the fuel injector circuit is shorted to power.	(The fuel injector circuit is shorted.)

## **DTC Confirmation Procedure**

#### NOTE:

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

- 1. Start engine and let it idle for at least 5 seconds.
- 2. Check 1st trip DTC.
- 3. If 1st trip DTC is detected, go to EC-269. "Diagnosis Procedure".

PBIB0465E

INFOID:000000003759775

INFOID:000000003759777

INFOID:000000003759776

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[YD25DDTi]

INFOID:000000003759774

## < SERVICE INFORMATION >

# Wiring Diagram

#### INFOID:000000003759778

[YD25DDTi]

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# EC-INJECT-01



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

#### < SERVICE INFORMATION >

#### [YD25DDTi]

TERMIN (Wire	NAL NO. color)	Description	Condition	Value
+	-	Signal name		(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
4 (L)	114	Fuel injector power supply (For cylinder No. 1 and 3)	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	Approximately 7.5 V ★
5 (P)	(B)	Fuel injector power supply (For cylinder No. 2 and 4)	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	Approximately 8.0 V ★
21 (X)		Fuel injector No. 4		Approximately 7.5 V ★
(1) 22 (R)	114 (B)	Fuel injector No. 4	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	► 10.0 V/D/V 20 ms/D/V T MBIB1297E
23 (W)	(D)	Fuel injector No. 2		Approximately 8.0 V ★
24 (OR)		Fuel injector No. 2	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	→ 10.0 V/D/v 20 ms/D/v T MBIB1298E
40 (G)		Fuel injector No. 3		Approximately 7.5 V ★
41 (BR)	114 (B)	Fuel injector No. 3	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	→ 10.0 V/D/v 20 ms/D/v T MBIB1297E
42 (PU)		Fuel injector No. 1		Approximately 8.0 V ★
43 (SB)		Fuel injector No. 1	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Engine speed: 2,000 rpm</li> </ul>	► 10.0 V/Div 20 ms/Div T MBIB1298E

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

# < SERVICE INFORMATION >

#### **Diagnosis** Procedure

# [YD25DDTi

INFOID:000000003759780

# 1. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Disconnect fuel injector (1) harness connector.

> $\triangleleft$ : Vehicle front

- Disconnect ECM harness connector. 2.
- Check harness continuity between the following terminals corre-3. sponding to the malfunctioning cylinder. Refer to Wiring Diagram.

Culinder	Terminal		Continuity
Cylinder	Fuel injector	ECM	Continuity
	1	42, 43	Should not exist
No 1		4	Should exist
110.1	2	42, 43	Should exist
	2	4	Should not exist
	1	23, 24	Should not exist
No 2	I	5	Should exist
110.2	2	23, 24	Should exist
		5	Should not exist
	1	40, 41	Should not exist
No 3		4	Should exist
110.5	2	40, 41	Should exist
		4	Should not exist
	1	21, 22	Should not exist
No 4		5	Should exist
110.4	2	21, 22	Should exist
		5	Should not exist



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4.	Also check harness for sh	ort to ground and sl	nort to power.
----	---------------------------	----------------------	----------------

#### OK or NG

OK >> GO TO 2. NG >> Repair open circuit or short to ground or short to power in harness or connectors. 2. CHECK FUEL INJECTOR Μ Refer to EC-270, "Removal and Installation". OK or NG

Ν OK >> GO TO 4. NG >> GO TO 3. **3.**REPLACE FUEL INJECTOR Replace fuel injector of malfunctioning cylinder. 1. Perform Injector Adjustment Value Registration. Refer to EC-22, "Injector Adjustment Value Registration". 2.

#### >> INSPECTION END

**4.**CHECK INTERMITTENT INCIDENT

Refer to EC-70.

>> INSPECTION END

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< SERVICE INFORMATION >

# **Component Inspection**

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[YD25DDTi]

#### FUEL INJECTOR

- 1. Disconnect fuel injector harness connector.
- 2. Check resistance between terminals as shown in the figure.

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

3. If NG, replace fuel injector.



Removal and Installation

FUEL INJECTOR Refer to <u>EM-8</u>.

DTC P2228, P2229 BARO SENSOR

#### < SERVICE INFORMATION >

# DTC P2228, P2229 BARO SENSOR

#### Description

DTC No.

P2228

P2229

2229

2228

The barometric pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the microcomputer.

#### On Board Diagnosis Logic

Trouble diagnosis name

Barometric pressure sen-

Barometric pressure sen-

sor circuit low input

sor circuit high input

**DTC Confirmation Procedure** 

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

DTC detecting condition

An excessively low voltage from the barometric

pressure sensor (built-into ECM) is sent to ECM.

An excessively high voltage from the barometric

pressure sensor (built-into ECM) is sent to ECM.

- 1. Turn ignition switch ON.
- 2. Wait at least 5 seconds.
- 3. Check 1st trip DTC.
- If 1st trip DTC is detected, go to <u>EC-271, "Diagnosis Procedure"</u>.

#### **Diagnosis** Procedure

# **1.**INSPECTION START

#### With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Select "SELF DIAG RESULTS" mode with CONSULT-III.
- 3. Touch "ERASE".
- 4. Perform <u>EC-271, "DTC Confirmation Procedure"</u>, again.
- 5. Is 1st trip DTC P2228 or P2229 displayed again?

#### With GST

- 1. Turn ignition switch ON.
- 2. Select Service \$04 with GST.
- 3. Perform <u>EC-271, "DTC Confirmation Procedure"</u>, again.
- 4. Is 1st trip DTC P2228 or P2229 displayed again?

#### Yes or No

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

# 2.REPLACE ECM

- 1. Replace ECM.
- Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to <u>EL-96, "ECM</u> <u>Re-communicating Function"</u>.
- 3. Perform Injector Adjustment Value Registration. Refer to <u>EC-22, "Injector Adjustment Value Registration"</u>.

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Possible cause

ECM

#### < SERVICE INFORMATION >

- 4. Perform Fuel Pump Learning Value Clearing. Refer to <u>EC-23</u>, "Fuel Pump Learning Value Clearing".
- 5. Perform EGR Volume Control Valve Closed Position Learning Value Clear. Refer to <u>EC-24</u>, "EGR Volume Control Valve Closed Position Learning Value Clear".
- 6. Perform EGR Volume Control Valve Closed Position Learning. Refer to <u>EC-24</u>, "EGR Volume Control Valve Closed Position Learning".

>> INSPECTION END

#### < SERVICE INFORMATION >

# GLOW CONTROL SYSTEM

## Description

#### SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor	Engine speed		Glow lamp
Engine coolant temperature sensor	Engine coolant temperature	Glow control	Glow relay Glow plugs

When engine coolant temperature is more than approximately 80°C (176°F), the glow relay turns off. When coolant temperature is lower than approximately 80°C (176°F):

#### Ignition switch ON

After ignition switch has turned to ON, the glow relay turns ON for a certain period of time in relation to engine coolant temperature, allowing current to flow through glow plug.

Cranking

The glow relay turns ON, allowing current to flow through glow plug.

Starting

After engine has started, current continues to flow through glow plug (after-glow mode) for a certain period in relation to engine coolant temperature.

The glow indicator lamp turns ON for a certain period of time in relation to engine coolant temperature at the G time glow relay is turned ON.

#### COMPONENT DESCRIPTION

Glow Plug

The glow plug is provided with a ceramic heating element to obtain a high-temperature resistance. It glows in response to a signal sent from the ECM, allowing current to flow through the glow plug via the glow relay.



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#### < SERVICE INFORMATION >

# Wiring Diagram





GEC628A

# **Diagnosis** Procedure

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# **1.**INSPECTION START

Check fuel level, fuel supplying system, starter motor, etc. OK or NG

< SERVICE INFORMATION >

[YD25DDTi]

OK >> GO TO NG >> Correc	) 2. xt.		А		
2.CHECK INSTAL	LATION				
Check that glow pl nuts are installed p	lug nut (1) and all glow plug conne properly.	cting plate (2)	EC		
<⊐ ∶ Vehicle <u>OK or NG</u>	front		С		
OK >> GO TC NG >> Install	) 3. properly.	<ul> <li>○</li> <li>○</li></ul>	D		
3.CHECK GLOW	INDICATOR LAMP OPERATION		E		
<ul> <li>With CONSUL</li> <li>Turn ignition sv</li> <li>Select "COOL</li> </ul>	<b>T-III</b> witch ON. AN TEMP/S" in "DATA MONITOR" r	node with CONSULT-III.	F		
<ol> <li>Confirm that "o down engine.</li> <li>Turn ignition sy 5. Make sure that</li> </ol>	COOLAN TEMP/S" indicates below witch OFF, wait at least 5 seconds a t glow indicator lamp is turned ON fu	80°C (176°F). If it indicates above 80°C (176°F), cool and then turn ON. or 1.5 seconds or more after turning ignition switch ON,	G		
and then glow Without CONS 1. Check voltage	indicator lamp turned OFF. ULT-III between ECM harness connector to	erminals as follows.	Н		
	ECM				
	+				
Connector	Terminal	Terminal	J		
M32	51 (Engine coolant temperature sensor)	70 (Sensor ground)			
<ol> <li>Confirm that th</li> <li>Turn ignition sv</li> <li>Make sure that</li> </ol>	ie voltage indicates above 1.23 V. If witch OFF, wait at least 5 seconds a t glow indicator lamp is turned ON fe	it indicates below 1.23 V, cool down engine. Ind then turn ON. or 1.5 seconds or more after turning ignition switch ON,	K		
and then glow indicator lamp turned OFF.					
OK or NG OK >> GO TC NG >> GO TC	) 4. ) 5		M		
4. CHECK GLOW CONTROL SYSTEM OVERALL FUNCTION					
<ul> <li>With CONSULT-III</li> <li>Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.</li> <li>Confirm that "COOLAN TEMP/S" indicates approximately 25°C (77°F). If NG, cool down engine.</li> </ul>					
<ol> <li>Set voltmeter p</li> <li>Turn ignition sv</li> </ol>	<ol> <li>Turn ignition switch OFF.</li> <li>Set voltmeter probe between glow plug and engine body.</li> <li>Turn ignition switch ON.</li> </ol>				
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#### < SERVICE INFORMATION >

6. Check the voltage between glow plug and engine body under the following conditions.

#### 

Conditions	Voltage
For 20 seconds after turning ignition switch ON	Battery voltage
More than 20 seconds after turning ignition switch ON	Approx. 0 V

#### **Without CONSULT-III**

T. Check voltage between ECM harness connector terminals as follows.

ECM			
Connector	+	-	
Connector	Terminal	Terminal	
M32	51 (Engine coolant temperature sensor)	70 (Sensor ground)	

2. Confirm that the voltage indicates approximately 3.59 V. If NG, cool down engine.

3. Turn ignition switch OFF.

4. Set voltmeter probe between glow plug and engine body.

5. Turn ignition switch ON.

6. Check the voltage between glow plug and engine body under the following conditions.

 $\triangleleft$  : Vehicle front



Conditions	Voltage
For 20 seconds after turning ignition switch ON	Battery voltage
More than 20 seconds after turning ignition switch ON	Approx. 0 V

#### <u>OK or NG</u>

OK >> INSPECTION END

NG >> GO TO 7.

5.CHECK DTC

Check that DTC U1000 is not displayed.

#### <u>Yes or No</u>

Yes >> Perform trouble diagnoses for DTC U1000, refer to <u>EC-83</u>.

No >> GO TO 6.

**6.**CHECK COMBINATON METER OPERATION

Does combination meter operate normally?

#### <u>Yes or No</u>

Yes >> GO TO 15.

No >> Check combination meter circuit. Refer to <u>EL-51</u>.

**1.**CHECK GLOW RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

# EC-276

#### [YD25DDTi]

#### < SERVICE INFORMATION >

2. Disconnect glow relay (1) harness connector.

: Vehicle front

with CONSULT-III or tester.

>> GO TO 9.

>> GO TO 8.

Refer to Wiring Diagram.

>> GO TO 11.

>> GO TO 10.

Harness connectors E101, M5

Check the following.

Continuity should exist.

Check the following. • 60 A fusible link (letter b)

OK or NG

OK

NG

1.

OK or NG OK

NG

SHORT

Voltage: Battery voltage



Disconnect glow plug harness connector. 1.

Check harness continuity between glow relay terminal 5 and glow plug harness connector. 2. Refer to Wiring Diagram.

#### Continuity should exist.

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

[YD25DDTi]

< SERVICE INFORMATION >

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OK or NG

OK >> GO TO 13. NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E72, E232

• Harness for open or short between glow relay and glow plug

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

# **13.**CHECK GLOW RELAY

Refer to EC-278, "Component Inspection".

#### <u>OK or NG</u>

OK >> GO TO 14.

NG >> Replace glow relay.

14.CHECK GLOW PLUG

Refer to EC-278, "Component Inspection".

#### OK or NG

OK >> GO TO 15. NG >> Replace glow plug.

15. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

#### >> INSPECTION END

#### **Component Inspection**

#### GLOW RELAY

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

Conditions	Continuity
12 V direct current supply between ter- minals (1) and (2)	Yes
No current supply	No



Operation takes less than 1 second.

#### **GLOW PLUG**

1. Remove glow plug connecting plate (1).

<□ : Vehicle front

- Glow plug (2)
- 2. Check glow plug resistance.

#### **Resistance:** Approximately 0.8 $\Omega$ [at 25°C (77°F)]

#### NOTE:

- Do not bump glow plug heating element. If it is bumped, replace glow plug with a new one.
- If glow plug is dropped from a height of 10 cm (3.94 in) or higher, replace with a new one.



#### [YD25DDTi]

- If glow plug installation hole is contaminated with carbon, remove it with a reamer or suitable tool.
- Hand-tighten glow plug by turning it two or three times, then tighten using a tool to specified torque.

O: 20.1 N-m (2.1 kg-m, 15 ft-lb)

Removal and Installation

< SERVICE INFORMATION >

**GLOW PLUG** 

Refer to "CYLINDER HEAD" in EM section.

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# < SERVICE INFORMATION >

# HEAT UP SWITCH

# Description

The heat up switch (1) is located on the lower side of the instrument panel. This switch is used to speed up the heater's operation when the engine is cold. When the ECM received the heat up switch ON signal, the ECM increases the engine idle speed to 1,400 rpm to warm up engine quickly.

This system works when all conditions listed below are met.

Heat up switch	ON
Shift lever	Neutral
Accelerator pedal	Fully released

# CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
WARMLIPSW	Ignition switch: ON	Heat up switch: OFF	OFF
VARM OF SW Grightion Switch. ON		Heat up switch: ON	ON



# [YD25DDTi]

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#### < SERVICE INFORMATION >



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

#### < SERVICE INFORMATION >

TERMIN (Wire	NAL NO. color)	Description	Condition	Value	
+	-	Signal name		(Αρριοχ.)	
13	114	Heat up switch	<ul><li>[Ignition switch ON]</li><li>Heat up switch: OFF</li></ul>	Approximately 0 V	
(BR)	(B)		[Ignition switch ON] • Heat up switch: ON	BATTERY VOLTAGE (11 - 14V)	

### **Diagnosis Procedure**

INFOID:000000003759814

# 1.CHECK OVERALL FUNCTION-I

# With CONSULT-III

1. Turn ignition switch ON.

2. Check "WARM UP SW" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

CONDITION	WARM UP SW
Heat up switch: OFF	OFF
Heat up switch: ON	ON

#### **Without CONSULT-III**

1. Turn ignition switch ON.

2. Check voltage between ECM harness connector terminals as follows.

ECM									
	+	-		Condition		Voltage			
Connector	Terminal	Connector	Terminal						
			1			Potton voltago			
Maa	10	M32	2	Heat up switch	Heat up switch	Heat up switch	Hoat up switch		Dattery voltage
IVIJZ	15		3				OFF		
		M33	114		OFF	Αρριόχ. Ο ν			

#### OK or NG

OK >> GO TO 2.

NG >> GO TO 3.

# 2. CHECK OVERALL FUNCTION-II

Check indicator in the heat up switch under the following condition.

CONDITION	INDICATION
Heat up switch: OFF	OFF
Heat up switch: ON	ON

#### OK or NG

#### OK >> INSPECTION END

NG >> GO TO 7.

**3.**CHECK HEAT UP SWITCH POWER SUPPLY CIRCUIT

1. Turn heat up switch OFF.

2. Turn ignition switch OFF.

#### < SERVICE INFORMATION >

- 3. Disconnect heat up switch (1) harness connector.
- 4. Turn ignition switch ON.



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5. Check voltage between heat up switch terminal 6 and ground with CONSULT-III or tester.

#### Voltage: Battery voltage

OK or NG

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



# **4.**DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse (No. 11)
- Harness connectors M7, N2
- Harness for open or short between heat up switch and fuse

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

<b>D.</b> CHECK HEAT UP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT	
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect ECM harness connector.</li> <li>Check harness continuity between ECM terminal 13 and heat up switch terminal 5. Refer to Wiring Diagram.</li> </ol>	K
Continuity should exist.	L
<ul> <li>4. Also check harness for short to ground and short to power.</li> <li>OK or NG</li> <li>OK &gt;&gt; GO TO 8.</li> <li>NG &gt;&gt; GO TO 6.</li> </ul>	Μ
6.DETECT MALFUNCTIONING PART	Ν
<ul><li>Check the following.</li><li>Harness connectors N2, M7</li><li>Harness for open or short between ECM and heat up switch</li></ul>	0
>> Repair open circuit or short to ground or short to power in harness or connectors. <b>7.</b> CHECK HEAT UP SWITCH INDICATOR GROUND CIRCUIT FOR OPEN AND SHORT	Ρ
1. Check harness continuity between heat up switch terminal 4 and ground.	

Refer to Wiring Diagram.

#### Continuity should exist.

2. Also check harness for short to power.

#### < SERVICE INFORMATION >

[YD25DDTi]

INFOID:000000003759815

#### OK or NG

OK >> GO TO 8.

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

8. CHECK HEAT UP SWITCH

Refer to EC-284, "Component Inspection".

#### <u>OK or NG</u>

OK >> GO TO 9.

NG >> Replace heat up switch.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

#### >> INSPECTION END

#### Component Inspection

#### HEAT UP SWITCH

Heat up switch: OFF

Heat up switch: ON

4.

1. Turn ignition switch OFF.

CONDITION

If NG, replace heat up switch.

under the following conditions.

If OK, go to following step.

- 2. Disconnect heat up switch harness connector.
- 3. Check continuity between heat up switch terminals 5 and 6 under the following conditions.

CONTINUITY

Should not exist

Should exist

- 5. Check continuity between heat up switch terminals 4 and 6
- CONDITIONCONTINUITYHeat up switch: OFFShould not existHeat up switch: ONShould exist

6. If NG, replace heat up switch.



# < SERVICE INFORMATION >

# **BRAKE SWITCH**

# Description

## STOP LAMP SWITCH

The stop lamp switch (1) is installed to brake pedal bracket. The switch senses brake pedal position and sends an ON-OFF signal to the ECM. The ECM uses the signal to control the fuel injection control system.

# £ 0 //BIA142877

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Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW	<ul> <li>Ignition switch: ON</li> </ul>	Brake pedal: Fully released	OFF
(Stop lamp switch)		Brake pedal: Slightly depressed	ON

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# Wiring Diagram

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[YD25DDTi]



: Detectable line for DTC : Non-detectable line for DTC





GEC620A

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

# **BRAKE SWITCH**

#### < SERVICE INFORMATION >

#### [YD25DDTi]

INFOID:000000003759828

TERMII (Wire)	VAL NO. color)	Description	Condition	Value	
+	-	Signal name		(Αρριολ.)	
100	114	Stop Jomp quitch	[Ignition switch OFF] • Brake pedal: Fully released	Approximately 0 V	EC
(GY)	(B)	Stop lamp switch	[Ignition switch OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)	С

# **Diagnosis Procedure**

# 1.CHECK OVERALL FUNCTION

# With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Select "BRAKE SW" in "DATA MONITOR" mode with CONSULT-III.
- 3. Check "BRAKE SW" indication under the following conditions.

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

#### **Without CONSULT-III**

Check voltage between ECM harness connector terminals as follows.

+		-		Condition		Voltage
Connector	Terminal	Connector	Terminal	Condition		voltage
M33	100	M32	1	Brake pedal	Slightly de- pressed	Battery voltage
			2			
			3		Fully released	Approx. 0 V
		M33	114			

<u>OK or NG</u>

OK >> INSPECTION END

NG >> GO TO 2.

**2.**CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect stop lamp switch (2) harness connector.



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# **BRAKE SWITCH**

#### < SERVICE INFORMATION >

## [YD25DDTi]

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

#### Voltage: Battery voltage

#### OK or NG

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



# **3.** DETECT MALFUNCTIONING PART

Check the following.

10 A fuse (No. 2)

· Harness for open or short between stop lamp switch and battery

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

#### 4.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check harness continuity between ECM terminal 100 and stop lamp switch terminal 2. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

OK >> GO TO 5.

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

#### 5. CHECK STOP LAMP SWITCH

Refer to EC-288, "Component Inspection".

#### <u>OK or NG</u>

OK >> GO TO 6.

NG >> Replace stop lamp switch.

**6.**CHECK INTERMITTENT INCIDENT

Refer to EC-70.

#### >> INSPECTION END

#### Component Inspection

#### STOP LAMP SWITCH

- 1. Disconnect stop lamp switch harness connector.
- 2. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.

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

If NG, adjust stop lamp switch installation, refer to "BREAKE PEDAL AND BRACKET" in BR section, and perform step 2 again.



# EC-288

INFOID:000000003759829
### < SERVICE INFORMATION > PNP SWITCH

# Description

When the gear position is in Neutral, park/neutral position is ON. ECM detects the position because the continuity of the line (the "ON" signal) exists.

## CONSULT-III Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION	D
P/N POSI SW	<ul> <li>Ignition quitch: ON</li> </ul>	Shift lever: Neutral position	ON	
	• Ignition switch. ON	Shift lever: Except above	OFF	
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INFOID:000000003759830

INFOID:000000003759831

# Wiring Diagram

INFOID:000000003759832

[YD25DDTi]



GEC630A

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

### EC-290

# **PNP SWITCH**

### < SERVICE INFORMATION >

**3.** DETECT MALFUNCTIONING PART

### [YD25DDTi]

TERMIN	NAL NO.	Docor	intion				
(Wire	color)	Desci	plion	C	Condition		Value (Approx.)
+	-	Signal	name	[Ignition switch	ON]	Approximately 0 V	
110 (BR)	114 (B)	Park/neutral posit	ion switch	Shift lever: Neutral      [Ignition switch ON]     Except the above position      (11 - 14 V)      [Ignition switch ON]		VOLTAGE	
Diagno	osis P	rocedure					INFOID:000000003759833
1.сне	CK OVI	ERALL FUNCT	ON				
<ul> <li>With</li> <li>1. Turn</li> <li>2. Selet</li> <li>3. Cheet</li> </ul>	n CONS n ignitio ect "P/N eck "P/N	<b>SULT-III</b> n switch ON. I POSI SW" in " I POSI SW" sig	DATA MONI nal under the	TOR" mode with e following conditi	CONSULT-III. ions.		
	Shift le	ever position		P/N POSI SW			
Neutral	position			ON			
Except t	he above	position		OFF			
Conn	ector	- Terminal	Connector	- Terminal	Con	dition	Voltage
Ma	33	110	M32	1 2 3	Shift lever	Neutral Except above	Approx. 0 V BATTERY VOLTAGE
OK or N OK NG <b>2.</b> CHE	<u>IG</u> >> <b>IN</b> >> GC CK PNI	SPECTION END TO 2. SWITCH GRO		UIT FOR OPEN A	AND SHORT		
<ol> <li>Turi</li> <li>Disconstruction</li> </ol>	n ignitio connect tor (2).	n switch OFF. park/neutral po	osition (PNP	) switch (1) harne	ess con-		
<		Vehicle front					
3. Che groi Ref	eck han und. er to W	ness continuity iring Diagram.	between PN	NP switch termina	al 2 and		
(	Continu	uity should exi	st.		$\left \widetilde{\mathcal{N}}\right $		
4. Also	o check	harness for she	ort to power.		<u>ال</u>	LIFE	JMBIA1285ZZ
<u>OK or N</u>	<u>IG</u>	_					
	>> GC	) TO 4. ) TO 3					

# **PNP SWITCH**

#### < SERVICE INFORMATION >

Check the following.

- Harness connectors E249, E88
- Harness for open or short between PNP switch and ground

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

4. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check harness continuity between ECM terminal 110 and PNP switch terminal 1. Refer to Wiring Diagram.

#### Continuity should exist.

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

<u>OK or NG</u>

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

**5.**DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors M285, E254

• Harness for open or short between PNP switch and ECM

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

#### **6.**CHECK PARK/NEUTRAL POSITION SWITCH

Refer to "ON-VEHICLE SERVICE" in MT section.

OK or NG

OK >> GO TO 7.

NG >> Replace park/neutral position switch.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-70.

>> INSPECTION END

### < SERVICE INFORMATION >

# START SIGNAL

Wiring Diagram



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# **START SIGNAL**

### < SERVICE INFORMATION >

### [YD25DDTi]

TERMII (Wire	NAL NO. color)	Description	Condition	Value	
+	-	Signal name		(πρριοχ.)	
90	114		[Ignition switch ON]	Approximately 0 V	
(R)	(B)	Start signal	[Ignition switch START]	BATTERY VOLTAGE (11 - 14 V)	

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

### **Diagnosis Procedure**

INFOID:000000003759835

# 1. CHECK START SIGNAL OVERALL FUNCTION

#### With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	START SIGNAL
Ignition switch: ON	OFF
Ignition switch: START	ON

### **Without CONSULT-III**

Check voltage between ECM harness connector terminals as follows.

ECM							
+		-		Condition		Voltage	
Connector	Terminal	Connector	Terminal				
M33	99		1		ON		
		M32	M32	2	Ignition switch	ON	
			3	STADT	Detter undtage		
		M33	114	•	START	Ballery vollage	

<u>OK or NG</u>

#### OK >> INSPECTION END

NG >> GO TO 2.

2. CHECK START SIGNAL INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector and ignition switch harness connector.

3. Check harness continuity between ECM terminal 99 and ignition switch terminal 6. Refer to Wiring Diagram.

#### Continuity should exist.

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

#### OK or NG

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

**3.** DETECT MALFUNCTIONING PART

#### Check the following.

- 10 A fuse (No. 20)
- 40 A fusible link (letter f)
- Harness connectors E101, M5
- Fuse block (J/B) connectors M12
- Ignition switch harness connector M20

# **START SIGNAL**

START SIGNAL		
< SERVICE INFORMATION >	[YD25DDTi]	
<ul> <li>Harness for open or short between ECM and fusible link</li> </ul>		
		А
>> Repair open circuit or short to ground or short to power in harness or connectors.		
4.CHECK INTERMITTENT INCIDENT		
Refer to EC-70		EC
	-	
>> INSPECTION END		С
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		Н
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		J
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		M
		Ν
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		Р

< SERVICE INFORMATION >

# **MI & DATA LINK CONNECTORS**

# Wiring Diagram

INFOID:000000003759842

[YD25DDTi]





GEC632A

### **MI & DATA LINK CONNECTORS**

#### < SERVICE INFORMATION >

#### [YD25DDTi]

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GEC633A

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## SERVICE DATA AND SPECIFICATIONS (SDS)

#### < SERVICE INFORMATION >

# SERVICE DATA AND SPECIFICATIONS (SDS)

## **General Specification**

INFOID:000000003759845

[YD25DDTi]

Target idle speed	No load* (in Neutral position)	$750\pm25$ rpm
Air conditioner: ON	In Neutral position	800 rpm or more
Maximum engine speed		4,900 rpm
*: Under the following conditions:		

Heat up switch: OFF

- Air conditioner switch: OFF
- Electric load: OFF (Lights & heater fan)
- Steering wheel: Kept in straight-ahead position

### Mass Air Flow Sensor

INFOID:000000003759846

Supply voltage	Battery voltage (11 - 14 V)
Ignition switch ON (Engine stopped.)	Approx. 0.4 V (CONSULT-III DATA MONITOR) Approx. 0.7 V (ECM terminal 54 and ground)
Idle (Engine is warmed up to normal operating temperature.)	1.3 - 1.8 V* (CONSULT-III DATA MONITOR) 1.7 - 2.1 V* (ECM terminal 54 and ground)

*: Engine is warmed up to normal operating temperature and running under no load.

## Intake Air Temperature Sensor

Temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200
80 (176)	0.283 - 0.359

### **Engine Coolant Temperature Sensor**

 Temperature [°C (°F)]
 Resistance (kΩ)

 20 (68)
 2.1 - 2.9

 50 (122)
 0.68 - 1.00

 90 (194)
 0.236 - 0.260

### Fuel Rail Pressure Sensor

INFOID:000000003759850

Supply voltage	Approximately 5 V
Idle (Engine is warmed up to normal operating temperature.)	1.7 - 2.0 V
2,000 rpm (Engine is warmed up to normal operating tempera- ture.)	2.0 - 2.3 V

### **Fuel Injector**

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

## Crankshaft Position Sensor

Refer to EC-156, "Component Inspection".

## EC-298

INFOID:000000003759851

INFOID:000000003759848

INFOID:000000003759847

INFOID:000000003759852

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >	[YD25DL	ווכ
Camshaft Position Sensor	INF0ID:00000000	)3759853
Refer to EC-166, "Component Inspection".		$\cap$
Glow Plug	INFOID:00000000	)3759854 EC
Resistance [at 25°C (77°F)]	Approximately 0.8 Ω	
Fuel Pump	INFOID:00000000	)3759857
Resistance [at 10 - 60°C (50 - 140°F)]	1.5 - 3.0 Ω	D

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