GROUP 13A

MULTIPORT FUEL INJECTION (MFI)

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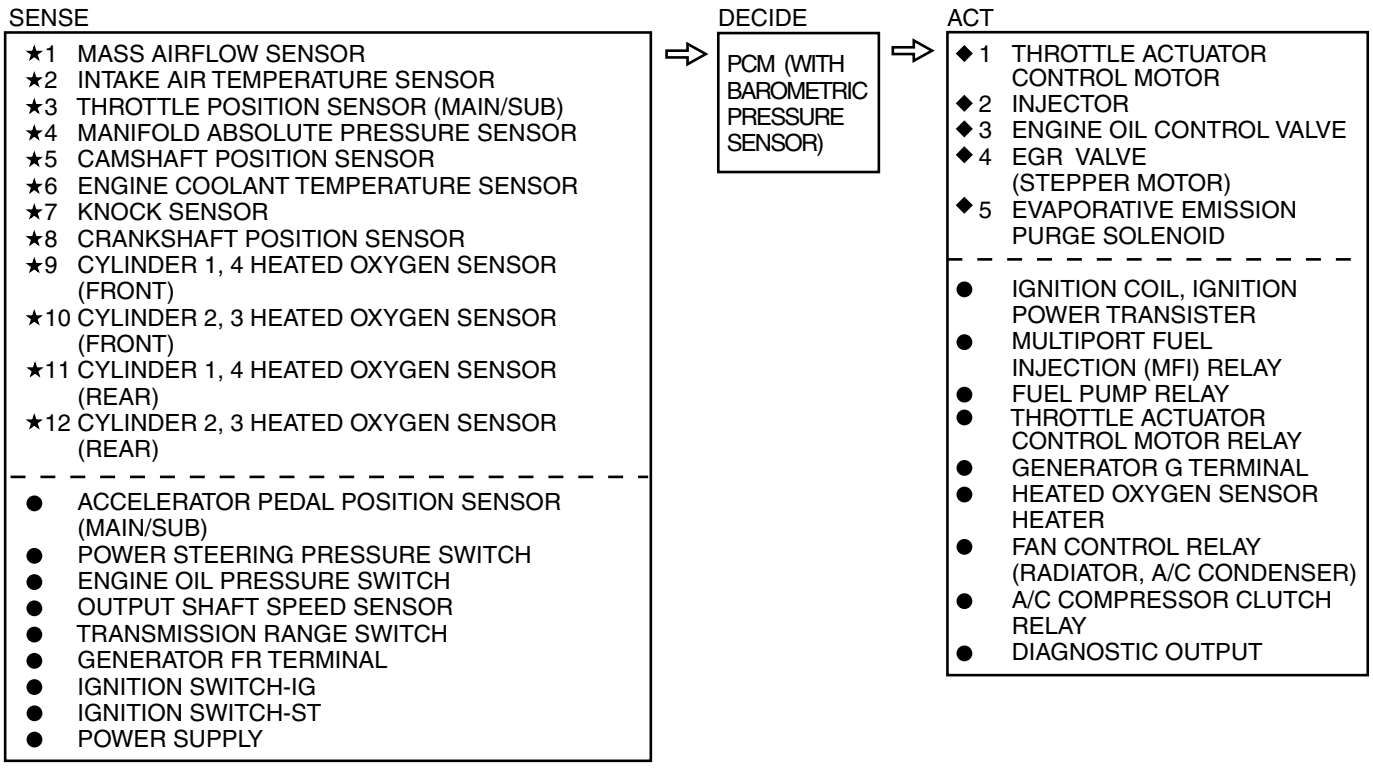
GENERAL DESCRIPTION

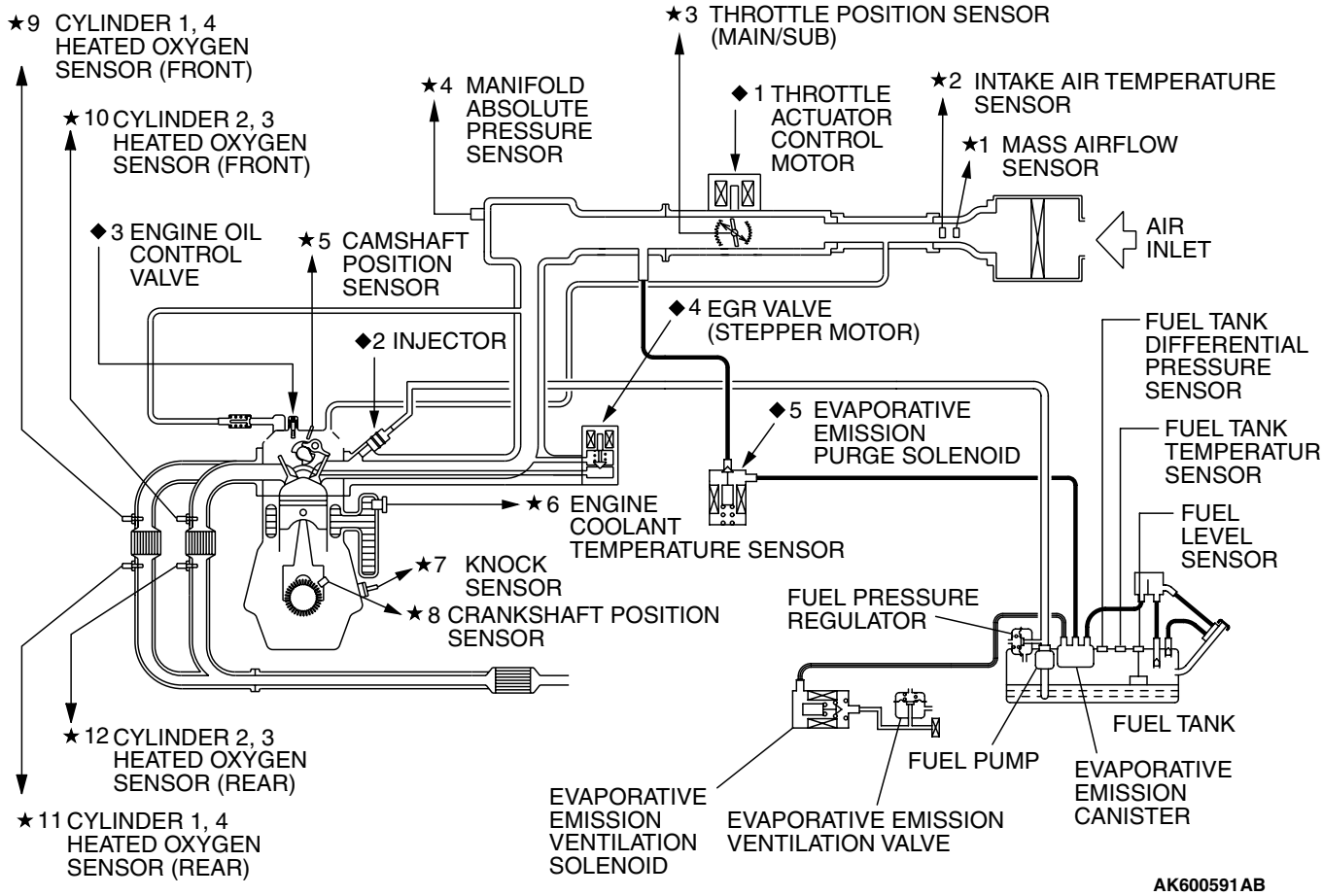
M1131000102730

OUTLINE OF CHANGE

The specification of 4G69 engine mounted on this vehicle omits the portion of the OBD-II functions in the specification of the US Federal vehicle. The different information from the service procedures for the US Federal vehicle is shown below. See GALANT service manual (Pub No. MSSP-009B-2007) for the other procedures.

MULTIPORT FUEL INJECTION (MFI) SYSTEM DIAGRAM





NOTE: For the vacuum hose routing, refer to GROUP 17, Vacuum Hoses.

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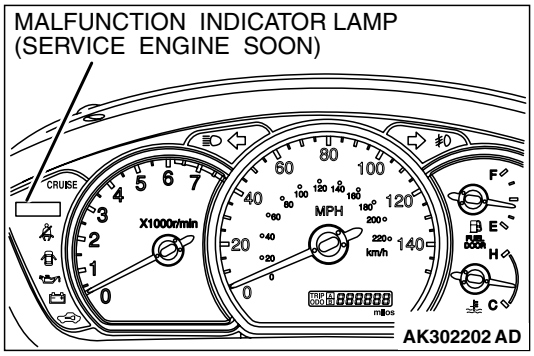
NOTE: The EVAPORATIVE EMISSION VENTILATION SOLENOID, FUEL TANK DIFFERENTIAL PRESSURE SENSOR, FUEL TANK TEMPERATURE SENSOR and FUEL LEVEL SENSOR are not used for engine control.

MULTIPORT FUEL INJECTION (MFI) DIAGNOSIS

DIAGNOSTIC FUNCTION

M1131155501839



MALFUNCTION INDICATOR LAMP (SERVICE ENGINE SOON)

Among the on-board diagnostic items, Malfunction Indicator Lamp (SERVICE ENGINE SOON) illuminates to notify the driver of an emission control malfunction.
However, when an irregular signal returns to normal and the powertrain control module judges that it has returned to normal, the Malfunction Indicator Lamp (SERVICE ENGINE SOON) will switch off.
Immediately after the ignition switch is turned on, the Malfunction Indicator Lamp (SERVICE ENGINE SOON) is lit for 20 seconds to indicate that the Malfunction Indicator Lamp (SERVICE ENGINE SOON) operates normally.

Items Indicated by the Malfunction Indicator Lamp (SERVICE ENGINE SOON)

DTC	ITEM
–	Powertrain control module (PCM) malfunction
P0031	Cylinder 1, 4 heated oxygen sensor heater (front) control circuit low
P0032	Cylinder 1, 4 heated oxygen sensor heater (front) control circuit high
P0037	Cylinder 1, 4 heated oxygen sensor heater (rear) control circuit low
P0038	Cylinder 1, 4 heated oxygen sensor heater (rear) control circuit high
P0051	Cylinder 2, 3 heated oxygen sensor heater (front) control circuit low
P0052	Cylinder 2, 3 heated oxygen sensor heater (front) control circuit high
P0057	Cylinder 2, 3 heated oxygen sensor heater (rear) control circuit low
P0058	Cylinder 2, 3 heated oxygen sensor heater (rear) control circuit high
P0102*	Mass airflow circuit low input
P0103*	Mass airflow circuit high input
P0107	Manifold absolute pressure circuit low input
P0108	Manifold absolute pressure circuit high input
P0112*	Intake air temperature circuit low input
P0113*	Intake air temperature circuit high input
P0117*	Engine coolant temperature circuit low input
P0118*	Engine coolant temperature circuit high input
P0122*	Throttle position sensor (main) circuit low input
P0123*	Throttle position sensor (main) circuit high input
P0131	Cylinder 1, 4 heated oxygen sensor (front) circuit low voltage
P0132	Cylinder 1, 4 heated oxygen sensor (front) circuit high voltage

DTC	ITEM
P0133	Cylinder 1, 4 heated oxygen sensor (front) circuit slow response
P0134*	Cylinder 1, 4 heated oxygen sensor (front) circuit no activity detected
P0137	Cylinder 1, 4 heated oxygen sensor (rear) circuit low voltage
P0138	Cylinder 1, 4 heated oxygen sensor (rear) circuit high voltage
P0151	Cylinder 2, 3 heated oxygen sensor (front) circuit low voltage
P0152	Cylinder 2, 3 heated oxygen sensor (front) circuit high voltage
P0153	Cylinder 2, 3 heated oxygen sensor (front) circuit slow response
P0154*	Cylinder 2, 3 heated oxygen sensor (front) circuit no activity detected
P0157	Cylinder 2, 3 heated oxygen sensor (rear) circuit low voltage
P0158	Cylinder 2, 3 heated oxygen sensor (rear) circuit high voltage
P0171	System too lean (cylinder 1, 4)
P0172	System too rich (cylinder 1, 4)
P0174	System too lean (cylinder 2, 3)
P0175	System too rich (cylinder 2, 3)
P0201	Injector circuit-cylinder 1
P0202	Injector circuit-cylinder 2
P0203	Injector circuit-cylinder 3
P0204	Injector circuit-cylinder 4
P0222*	Throttle position sensor (sub) circuit low input
P0223*	Throttle position sensor (sub) circuit high input
P0300	Random/multiple cylinder misfire detected
P0301	Cylinder 1 misfire detected
P0302	Cylinder 2 misfire detected
P0303	Cylinder 3 misfire detected
P0304	Cylinder 4 misfire detected
P0335*	Crankshaft position sensor circuit
P0340*	Camshaft position sensor circuit
P0403	Exhaust gas recirculation control circuit
P0421	Warm up catalyst efficiency below threshold (cylinder 1, 4)
P0431	Warm up catalyst efficiency below threshold (cylinder 2, 3)
P0443	Evaporative emission control system purge control valve circuit
P0603*	EEPROM malfunction
P0606*	Powertrain control module main processor malfunction
P0630*	VIN malfunction
P0638*	Throttle actuator control motor circuit range/performance
P0642*	Throttle position sensor power supply
P0657*	Throttle actuator control motor relay circuit malfunction
P0705	Transmission range switch circuit malfunction (RPNDL input)
P0712*	Transmission fluid temperature sensor circuit low input
P0713*	Transmission fluid temperature sensor circuit high input

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DTC	ITEM
P0715*	Input/Turbine speed sensor circuit
P0720*	Output speed sensor circuit
P0731*	Gear 1 incorrect ratio
P0732*	Gear 2 incorrect ratio
P0733*	Gear 3 incorrect ratio
P0734*	Gear 4 incorrect ratio
P0736*	Gear R incorrect ratio
P0741	Torque converter clutch circuit performance or stuck off
P0742	Torque converter clutch circuit stuck on
P0743*	Torque converter clutch circuit electrical
P0753*	Shift solenoid "A" electrical
P0758*	Shift solenoid "B" electrical
P0763*	Shift solenoid "C" electrical
P0768*	Shift solenoid "D" electrical
P1021	Engine oil control valve circuit
P1602*	Communication malfunction (between PCM main processor and system LSI)
P1603*	Battery backup line malfunction
P2100*	Throttle actuator control motor circuit (open)
P2101*	Throttle actuator control motor magneto malfunction
P2122*	Accelerator pedal position sensor (main) circuit low input
P2123*	Accelerator pedal position sensor (main) circuit high input
P2127*	Accelerator pedal position sensor (sub) circuit low input
P2128*	Accelerator pedal position sensor (sub) circuit high input
P2135*	Throttle position sensor (main and sub) range/performance problem
P2138*	Accelerator pedal position sensor (main and sub) range/performance problem
P2228*	Barometric pressure circuit low input
P2229*	Barometric pressure circuit high input
P2252	Heated oxygen sensor offset circuit low voltage
P2253	Heated oxygen sensor offset circuit high voltage
U1108*	Combination meter time-out

NOTE: If the Malfunction Indicator Lamp (SERVICE ENGINE SOON) illuminates because of a malfunction of the powertrain control module (PCM), communication between the scan tool MB991958 (M.U.T.-III sub assembly) and the PCM is impossible. In this case, the diagnostic trouble code cannot be read.

NOTE: After the PCM has detected a malfunction, the Malfunction Indicator Lamp (SERVICE ENGINE SOON) illuminates when the engine is next turned on and the same malfunction is re-detected. However, for items marked with a "" in the DTC NO. column, the Malfunction Indicator Lamp (SERVICE ENGINE SOON) illuminates only on the first detection of the malfunction.*

NOTE: After the Malfunction Indicator Lamp (SERVICE ENGINE SOON) illuminates, it will be switched off under the following conditions.

- *When the PCM monitored the powertrain malfunction three times* and met set condition requirements, it detected no malfunction. *: In this case, "one time" indicates from engine start to next engine start.*

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- *For misfiring or a fuel trim malfunction, when driving conditions (engine speed, engine coolant temperature, etc.) are similar to those when the malfunction was first recorded.*

NOTE: Sensor 1 indicates the sensor mounted at a position closest to the engine, and sensor 2 indicates the sensor mounted at the position second closest to the engine.

PROVISIONAL DTCs [OBD-II Test Mode - Results (Mode 7)]

The description in this section is not used for the vehicle for Russia.

MODE 6 REFERENCE TABLE

The description in this section is not used for the vehicle for Russia.

ON-BOARD DIAGNOSTICS

The powertrain control module (PCM) monitors the input/output signals (some signals all the time and others under specified conditions) of the PCM. When a malfunction continues for a specified time or longer after the irregular signal is initially monitored, the PCM judges that a malfunction has occurred. After the PCM first detects a malfunction, a diagnostic trouble code is recorded when the engine is restarted and the same malfunction is re-detected. However, for items marked with a "*", a diagnostic trouble code is recorded on the first detection of the malfunction. There are 99 diagnostic items. The diagnostic results can be read out with a scan tool. Since memorization of the diagnostic trouble codes is backed up directly by the battery, the diagnostic results are memorized even if the ignition key is turned off. The diagnostic trouble codes will, however, be erased when the battery terminal or the PCM connector is disconnected. In addition, the diagnostic trouble code can also be erased by turning the ignition switch to ON and sending the diagnostic trouble code erase signal from scan tool MB991958 to the PCM.

NOTE: If the sensor connector is disconnected with the ignition switch turned on, the diagnostic trouble code is memorized. In this case, send the diagnostic trouble code erase signal to the PCM in order to erase the diagnostic memory. The 99 diagnostic items are all indicated sequentially from the smallest code number. The PCM records the engine operating condition when the diagnostic trouble code is set. This data is called "Freeze-frame" data. This data can be read by using the scan tool, and can then be used in simulation tests for troubleshooting. Data items are as follows:

NOTE: If the PCM detects multiple malfunctions, the PCM stores the "Freeze-frame" data for only the first item that was detected. However, if the PCM detects a misfire or a fuel system malfunction, the PCM stores the data by giving priority to the misfire or fuel system malfunction, regardless of the order in which the malfunction was detected.

NOTE: As for Diagnostic trouble code P1603, "Freeze frame" data is not memorized.

Freeze Frame Data for M.U.T.-III

ITEM NO.	M.U.T.-III SCAN TOOL DISPLAY	DATA ITEM	UNIT or STATE
AA	Airflow sensor	Airflow sensor	g/s
AB	TP sensor (main)	Throttle position sensor (main)	%
BA	Target EGR step motor	Target EGR steppper motor	%
BB	Barometric pressure sensor	Barometric pressure sensor	kPa or inHg

ITEM NO.	M.U.T.-III SCAN TOOL DISPLAY	DATA ITEM	UNIT or STATE
C0	Fuel system status (bank1)	Fuel system status (bank1)	• Open loop
			• Closed loop
			• Open loop-drive condition
			• Open loop-DTC set
			• Closed loop-O2 (rear) failed
C1	Fuel system status (bank2)	Fuel system status (bank2)	• Open loop
			• Closed loop
			• Open loop-drive condition
			• Open loop-DTC set
			• Closed loop-O2 (rear) failed
C2	Calculated load value	Calculated load value	%
C3	ECT sensor	Engine coolant temperature sensor	°C or °F
C4	Short term fuel trim (bank1)	Short term fuel trim (bank1)	%
C6	Long term fuel trim (bank1)	Long term fuel trim (bank1)	%
C8	Short term fuel trim (bank2)	Short term fuel trim (bank2)	%
CA	Long term fuel trim (bank2)	Long term fuel trim (bank2)	%
CC	MAP sensor	Manifold absolute pressure sensor	kPa or inHg
CD	Crankshaft position sensor	Crankshaft position sensor	r/m
CE	Vehicle speed	Vehicle speed	km/h or mph
CF	Spark advance	Spark advance	deg
D0	Intake air temperature sensor	Intake air temperature sensor	°C or °F
D1	Time since engine running	Time since engine running	sec
D6	EVAP. emission purge SOL. duty	Evaporative emission purge control solenoid duty	%

OBD- II DRIVE CYCLE

All kinds of diagnostic trouble codes (DTCs) can be monitored by carrying out a short drive according to the following 24 drive cycle patterns. In other words, doing such a drive regenerates any kind of trouble which involves illuminating the Malfunction Indicator Lamp (SERVICE ENGINE SOON) and verifies the repair procedure has eliminated [the trouble the Malfunction Indicator Lamp (SERVICE ENGINE SOON) is no longer illuminated].

⚠ CAUTION

Two technicians should always be in the vehicle when carrying out a test.

NOTE: Check that the diagnosis trouble code (DTC) is not output before driving the OBD-II drive cycle. Erase the DTC if it has been output.

NOTE: Drive cycle patterns are not established for Power steering pressure switch monitor (P0551). Please reference the M.U.T. data list to judge whether these monitor items are normal.

NOTE: Refer to the appropriate pattern No. in GALANT service manual (Pub No. MSSP-009B-2007) for the DRIVE CYCLE PATTERN.

DRIVE CYCLE PATTERN LIST

MONITOR ITEM	DIAGNOSTIC TROUBLE CODE (DTC)	PATTERN
Heated oxygen sensor (front) monitor	P0133, P0153	1
Heated oxygen sensor heater monitor	P0031, P0032, P0037, P0038, P0051, P0052, P0057, P0058	2
Catalytic converter monitor	P0421, P0431	4
Manifold absolute pressure (MAP) sensor monitor	P0107	7
Air fuel ratio feedback monitor	P0134, P0154	12
Misfire monitor	P0300, P0301, P0302, P0303, P0304	15
Fuel trim monitor	P0171, P0172, P0174, P0175	22
Heated oxygen sensor monitor	P0131, P0137, P0151, P0157	23
Airflow sensor monitor	P0102, P0103	24
Manifold absolute pressure (MAP) sensor monitor	P0108	
Intake air temperature sensor monitor	P0112, P0113	
Engine coolant temperature sensor monitor	P0117, P0118	
Heated oxygen sensor monitor	P0132, P0138, P0152, P0158, P2252, P2253	
Injector monitor	P0201, P0202, P0203, P0204	
Crankshaft position sensor monitor	P0335	
Camshaft position sensor monitor	P0340	
Exhaust gas recirculation (EGR) valve (stepper motor) monitor	P0403	
Evaporative emission purge solenoid monitor	P0443	
Engine oil control valve monitor	P1021	
Barometric pressure sensor monitor	P2228, P2229	

SYSTEM READINESS TEST STATUS

The description in this section is not used for the vehicle for Russia.

DIAGNOSTIC TROUBLE CODE CHART

M1131151002404

⚠ CAUTION

During diagnosis, a DTC associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for DTCs. If DTCs are set, erase them all.

NOTE: Refer to GALANT service manual (Pub No. MSSP-009B-2007) for the troubleshooting procedure for each DTC.

DTC	DIAGNOSTIC ITEM
P0031	Cylinder 1, 4 heated oxygen sensor heater (front) control circuit low
P0032	Cylinder 1, 4 heated oxygen sensor heater (front) control circuit high
P0037	Cylinder 1, 4 heated oxygen sensor heater (rear) control circuit low
P0038	Cylinder 1, 4 heated oxygen sensor heater (rear) control circuit high
P0051	Cylinder 2, 3 heated oxygen sensor heater (front) control circuit low
P0052	Cylinder 2, 3 heated oxygen sensor heater (front) control circuit high
P0057	Cylinder 2, 3 heated oxygen sensor heater (rear) control circuit low
P0058	Cylinder 2, 3 heated oxygen sensor heater (rear) control circuit high
P0102*	Mass airflow circuit low input
P0103*	Mass airflow circuit high input
P0107	Manifold absolute pressure circuit low input
P0108	Manifold absolute pressure circuit high input
P0112*	Intake air temperature circuit low input
P0113*	Intake air temperature circuit high input
P0117*	Engine coolant temperature circuit low input
P0118*	Engine coolant temperature circuit high input
P0122*	Throttle position sensor (main) circuit low input
P0123*	Throttle position sensor (main) circuit high input
P0131	Cylinder 1, 4 heated oxygen sensor (front) circuit low voltage
P0132	Cylinder 1, 4 heated oxygen sensor (front) circuit high voltage
P0133	Cylinder 1, 4 heated oxygen sensor (front) circuit slow response
P0134*	Cylinder 1, 4 heated oxygen sensor (front) circuit no activity detected
P0137	Cylinder 1, 4 heated oxygen sensor (rear) circuit low voltage
P0138	Cylinder 1, 4 heated oxygen sensor (rear) circuit high voltage
P0151	Cylinder 2, 3 heated oxygen sensor (front) circuit low voltage
P0152	Cylinder 2, 3 heated oxygen sensor (front) circuit high voltage
P0153	Cylinder 2, 3 heated oxygen sensor (front) circuit slow response
P0154*	Cylinder 2, 3 heated oxygen sensor (front) circuit no activity detected
P0157	Cylinder 2, 3 heated oxygen sensor (rear) circuit low voltage
P0158	Cylinder 2, 3 heated oxygen sensor (rear) circuit high voltage
P0171	System too lean (cylinder 1, 4)
P0172	System too rich (cylinder 1, 4)

DTC	DIAGNOSTIC ITEM	
P0174	System too lean (cylinder 2, 3)	
P0175	System too rich (cylinder 2, 3)	
P0201	Injector circuit-cylinder 1	
P0202	Injector circuit-cylinder 2	
P0203	Injector circuit-cylinder 3	
P0204	Injector circuit-cylinder 4	
P0222*	Throttle position sensor (sub) circuit low input	
P0223*	Throttle position sensor (sub) circuit high input	
P0300	Random/multiple cylinder misfire detected	
P0301	Cylinder 1 misfire detected	
P0302	Cylinder 2 misfire detected	
P0303	Cylinder 3 misfire detected	
P0304	Cylinder 4 misfire detected	
P0325	Knock sensor circuit	
P0335*	Crankshaft position sensor circuit	
P0340*	Camshaft position sensor circuit	
P0403	Exhaust gas recirculation control circuit	
P0421	Warm up catalyst efficiency below threshold (cylinder 1, 4)	
P0431	Warm up catalyst efficiency below threshold (cylinder 2, 3)	
P0443	Evaporative emission control system purge control valve circuit	
P0513	Immobilizer malfunction	
P0551	Power steering pressure switch circuit range/performance	
P0603*	EEPROM malfunction	
P0606*	Powertrain control module main processor malfunction	
P0622	Generator FR terminal circuit malfunction	
P0630*	VIN malfunction	
P0638*	Throttle actuator control motor circuit range/performance	
P0642*	Throttle position sensor power supply	
P0657*	Throttle actuator control motor relay circuit malfunction	
P0705	Transmission range switch circuit malfunction (PRNDL input)	• A/T DTC No. P1770 (Transmission range switch system: Open circuit) • A/T DTC No. P1771 (Transmission range switch system: Short circuit)
P0712*	Transmission fluid temperature sensor low input	• A/T DTC No. P1764 (Transmission fluid temperature sensor system: Short circuit)
P0713*	Transmission fluid temperature sensor high input	• A/T DTC No. P1763 (Transmission fluid temperature sensor system: Open circuit)
P0715*	Input/turbine speed sensor circuit	• A/T DTC No. P1766 (Input shaft speed sensor system: Short circuit/Open circuit)
P0720*	Output speed sensor circuit	• A/T DTC No. P1767 (Output shaft speed sensor system: Short circuit/Open circuit)
P0731*	Gear 1 incorrect ratio	• A/T DTC No. P1779 (1st gear incorrect ratio)

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DTC	DIAGNOSTIC ITEM	
P0732*	Gear 2 incorrect ratio	• A/T DTC No. P1780 (2nd gear incorrect ratio)
P0733*	Gear 3 incorrect ratio	• A/T DTC No. P1781 (3rd gear incorrect ratio)
P0734*	Gear 4 incorrect ratio	• A/T DTC No. P1782 (4th gear incorrect ratio)
P0736*	Gear R incorrect ratio	• A/T DTC No. P1784 (Reverse gear incorrect ratio)
P0741	Torque converter clutch circuit performance or stuck off	• A/T DTC No. P1786 (Torque converter clutch solenoid system: Defective system)
P0742	Torque converter clutch circuit stuck on	• A/T DTC No. P1787 (Torque converter clutch solenoid system: Lock-up stuck on)
P0743*	Torque converter clutch circuit electrical	• A/T DTC No. P1778 (Torque converter clutch solenoid system: Short circuit/Open circuit)
P0753*	Shift solenoid "A" electrical	• A/T DTC No. P1773 (Low and reverse solenoid valve system: Short circuit/Open circuit)
P0758*	Shift solenoid "B" electrical	• A/T DTC No. P1774 (Underdrive solenoid valve system: Short circuit/Open circuit)
P0763*	Shift solenoid "C" electrical	• A/T DTC No. P1775 (Second solenoid valve system: Short circuit/Open circuit)
P0768*	Shift solenoid "D" electrical	• A/T DTC No. P1776 (Overdrive solenoid valve system: Short circuit/Open circuit)
P1021	Engine oil control valve circuit	
P1602*	Communication malfunction (between PCM main processor and system LSI)	
P1603*	Battery backup line malfunction	
P2100*	Throttle actuator control motor circuit (open)	
P2101*	Throttle actuator control motor magneto malfunction	
P2122*	Accelerator pedal position sensor (main) circuit low input	
P2123*	Accelerator pedal position sensor (main) circuit high input	
P2127*	Accelerator pedal position sensor (sub) circuit low input	
P2128*	Accelerator pedal position sensor (sub) circuit high input	
P2135*	Throttle position sensor (main and sub) range/performance problem	
P2138*	Accelerator pedal position sensor (main and sub) range/performance problem	
P2228*	Barometric pressure circuit low input	
P2229*	Barometric pressure circuit high input	
P2252	Heated oxygen sensor offset circuit low voltage	
P2253	Heated oxygen sensor offset circuit high voltage	
U1073	Bus off	
U1102	ABS-ECU time–out	
U1108*	Combination meter time-out	
U1109	ETACS-ECU time-out	
U1110	A/C-ECU time-out	
U1117	Immobilizer-ECU time-out	

NOTE: Do not replace the powertrain control module (PCM) until a through terminal check reveals there are no short/open circuits.

NOTE: Check that the PCM ground circuit is normal before checking for the cause of the problem.

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NOTE: After the PCM detects a malfunction, a diagnostic trouble code is recorded the next time the engine is started and the same malfunction is re-detected. However, for items marked with a "", the diagnostic trouble code is recorded on the first detection of the malfunction.*

SYMPTOM CHART

M1131151501934

⚠ CAUTION

During diagnosis, a DTC associated with other systems may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for DTCs. If DTCs are set, erase them all.

⚠ CAUTION

Disconnecting the battery cables or removing the combination meter will erase the learned value of the fuel gauge. To recover the learned value, input a vehicle speed (by actually driving the vehicle or inputting a simulated vehicle speed), and stop the vehicle. This will complete the learning process.

NOTE: Refer to GALANT service manual (Pub No. MSSP-009B-2007) for the troubleshooting procedure for each INSPECTION PROCEDURE No.

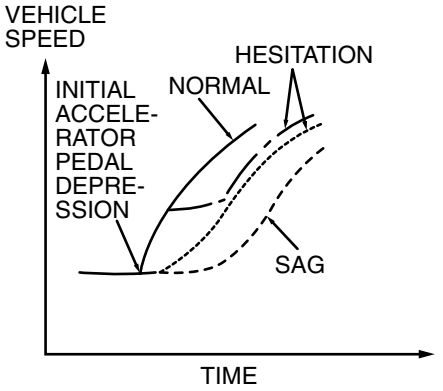
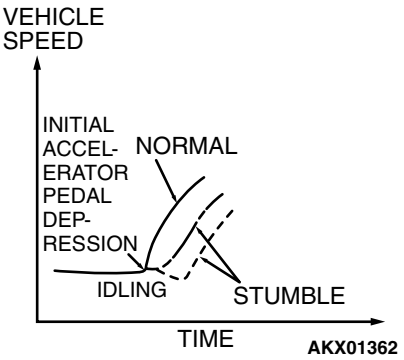
NOTE: Check that the PCM ground circuit is normal before checking for the cause of the problem.

TROUBLE SYMPTOMS		INSPECTION PROCEDURE
Communication with scan tool is impossible	Communication with all systems is not possible	1
	Communication with PCM only is not possible	2
Malfunction Indicator Lamp (SERVICE ENGINE SOON) and related parts	The Malfunction Indicator Lamp (SERVICE ENGINE SOON) does not illuminate right after the ignition switch is turned to the "ON" position	3
	The Malfunction Indicator Lamp (SERVICE ENGINE SOON) remains illuminated and never goes out	4
Starting	Cranks, won't start	5
	Starts up and dies	6
	Hard starting	7
Idling stability (improper idling)	Unstable idle (rough idle, hunting)	8
	Idle speed is high (improper idle speed)	9
	Idle speed is low (improper idle speed)	10
Idling stability (engine stalls)	When the engine is cold, it stalls at idle (die out)	11
	When the engine is hot, it stalls at idle (die out)	12
	The engine stalls when accelerating (pass out)	13
	The engine stalls when decelerating	14

TROUBLE SYMPTOMS		INSPECTION PROCEDURE
Driving	Hesitation, sag or stumble	15
	Acceleration shock	16
	Deceleration shock	17
	Poor acceleration	18
	Surge	19
	Knocking	20
Dieseling (Run-on)		21
Too high CO and HC concentration when idling		22
IM240 test failure	Transient, mass emission tailpipe test failure	23
	Purge flow test of the evaporative emission canister failure	24
	Pressure test of the evaporative system failure	25
Generator output voltage is low (approximately 12.3 volts)		26
Fans (radiator fan, A/C condenser fan) are inoperative		27
Power supply system and ignition switch-IG system		28
Fuel pump system		29
Ignition switch-ST system and transmission range switch system		30
Ignition circuit system		31
A/C system		32

PROBLEM SYMPTOMS TABLE (FOR YOUR INFORMATION)

ITEMS		SYMPTOM
At starting	Won't start	The starter cranks the engine, but there is no combustion within the cylinders, and the engine won't start.
	Starts up and dies	The engine starts, but then engine soon stalls.
	Hard starting	Engine starts after cranking a while.
Idling stability	Hunting	Engine speed doesn't remain constant; changes at idle.
	Rough idle	Usually, a judgement can be based upon the movement of the tachometer pointer, and the vibration transmitted to the steering wheel, shift lever, body, etc.
	Incorrect idle speed	The engine doesn't idle at the correct speed.
	Engine stall (die out)	The engine stalls when the foot is taken from the accelerator pedal, regardless of whether the vehicle is moving or not.
	Engine stall (pass out)	The engine stalls when the accelerator pedal is depressed.

ITEMS		SYMPTOM
At driving	Hesitation Sag	"Hesitation" is the delay in response of the vehicle speed (engine speed). This occurs when the accelerator is depressed in order to accelerate from the speed at which the vehicle is now traveling, or a temporary drop in vehicle speed (engine speed) during such acceleration. Serious hesitation is called "sag".  AKX01361AB
	Poor acceleration	Poor acceleration is inability to obtain an acceleration corresponding to the degree of throttle opening, even though acceleration is smooth. Also the inability to reach maximum speed.
	Stumble	Engine speed increase is delayed when the accelerator pedal is initially depressed for acceleration.  AKX01362
	Shock	The feeling of a comparatively large impact or vibration when the engine is accelerated or decelerated.
	Surge	This is slight acceleration and deceleration feel usually felt during steady, light throttle cruise. Most notable under light loads.
	Knocking	A sharp sound during driving, which sounds like a hammer striking the cylinder walls. It makes poor driveability.
At stopped	Run on ("Dieseling")	The condition in which the engine continues to run after the ignition switch is turned to the "LOCK" (OFF) position. Also called "dieseling".

DATA LIST REFERENCE TABLE

M1131152002593

⚠ CAUTION

- **When shifting the selector lever to D range, the brakes should be applied so that the vehicle does not move forward.**
- **Driving tests always need two persons: one driver and one observer.**

*NOTE: *1: In a new vehicle [driven approximately 500 km (311 mile) or less], the mass airflow sensor output value is sometimes 10% higher than the standard value.*

*NOTE: *2: The injector drive time represents the time when the cranking speed is at 250 r/min or below when the power supply voltage is 11 volts.*

*NOTE: *3: In a new vehicle [driven approximately 500 km (311 mile) or less], the injector drive time is sometimes 10% longer than the standard time.*

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NOTE: Refer to the section of the DIAGNOSTIC TROUBLE CODE PROCEDURES or the SYMPTOM PROCEDURES, GALANT service manual (Pub No. MSSP-009B-2007), for the details of the inspection procedure.

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
A/C compressor relay	93	A/C compressor relay	• Engine: warming up, idling • A/C switch: "OFF"		OFF	Procedure No. 32
			• Engine: warming up, idling • A/C switch: "ON"	A/C compressor clutch is not operating	OFF	
				A/C compressor clutch is operating	ON	
A/C SW1	76	A/C switch	• Engine: warming up, idling • A/C switch: "OFF"		OFF	Procedure No. 32
			• Engine: warming up, idling • A/C switch: "ON"	A/C compressor clutch is not operating	OFF	
				A/C compressor clutch is operating	ON	
Absolute load value	72	Absolute load value	Engine: warming up	Engine idling	10 – 20%	–
				2,500 r/min	10 – 20%	
				Revving engine	Load value increases according to amount of revving.	
Airflow sensor	10	Mass airflow sensor*1	• Engine coolant temperature: 80 – 95°C (176 – 203°F) • Lights, electric cooling fan and all accessories: "OFF" • Transaxle: "P" range	Engine is idling	1,300 – 1,620 mV	–
				2,500 r/min	1,600 – 1,970 mV	
				Engine is revved	Increase in response to revving	

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
Airflow sensor	AA	Mass airflow sensor*1	• Engine coolant temperature: 80 – 95°C (176 – 203°F) • Lights, electric cooling fan and all accessories: "OFF" • Transaxele: "P" range	Engine is idling	1.3 – 5.3 g/s	–
				2,500 r/min	5.0 –13.0 g/s	
				Engine is revved	Increases in response to revving	
APP sensor (main)	11	Accelerator pedal position sensor (main)	Ignition switch: "ON"	Release the accelerator pedal	735 – 1,335 mV	Code No. P2122, P2123
				Depress the accelerator pedal gradually	Increases in response to the pedal depression stroke	
				Depress the accelerator pedal fully	4,000 mV or more	
APP sensor (main)	BE	Accelerator pedal position sensor (main)	Ignition switch: "ON"	Release the accelerator pedal	15 – 25%	Code No. P2122, P2123
				Depress the accelerator pedal gradually	Increases in response to the pedal depression stroke	
				Depress the accelerator pedal fully	80% or more	
APP sensor (sub)	12	Accelerator pedal position sensor (sub)	Ignition switch: "ON"	Release the accelerator pedal	435 – 1,035 mV	Code No. P2127, P2128
				Depress the accelerator pedal gradually	Increases in response to the pedal depression stroke	
				Depress the accelerator pedal fully	3,600 mV or more	

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M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
APP sensor (sub)	BF	Accelerator pedal position sensor (sub)	Ignition switch: "ON"	Release the accelerator pedal	9 – 19%	Code No. P2127, P2128
				Depress the accelerator pedal gradually	Increases in response to the pedal depression stroke	
				Depress the accelerator pedal fully	74% or more	
Barometric pressure sensor	BB	Barometric pressure sensor	Ignition switch: "ON"	Engine stopped [At altitude of 0 m (0 ft.)]	101 kPa (29.8 in.Hg)	Code No. P2228, P2229
				Engine stopped [At altitude of 600 m (1,969 ft.)]	95 kPa (28.1 in.Hg)	
				Engine stopped [At altitude of 1,200 m (3,937 ft.)]	88 kPa (26.0 in.Hg)	
				Engine stopped [At altitude of 1,800 m (5,906 ft.)]	81 kPa (23.9 in.Hg)	
Brake light switch	74	Brake light switch	Ignition switch: "ON"	Depress the brake pedal fully	ON	–
				Release the brake pedal	OFF	
Calculated load value	73	Calculated load value	Engine: warming up	Engine: idling	10% – 30%	–
				2,500 r/min	10% – 30%	
Closed throttle position switch	84	Closed throttle position switch	Ignition switch: "ON"	Depress the accelerator pedal	OFF	–
				Release the accelerator pedal	ON	
Cranking signal	79	Cranking signal (ignition switch-ST)	Ignition switch: "ON"	Engine: stopped	OFF	Procedure No. 30
				Engine: cranking	ON	

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
Crankshaft position sensor	2	Crankshaft position sensor	• Engine: cranking • Tachometer: connected		Engine speeds displayed on the scan tool and tachometer are identical.	Code No.P0335
			Engine: idling	Engine coolant temperature is –20°C (–4° F)	1,275– 1,475 r/min	
				Engine coolant temperature is 0°C (32°F)	1,220 – 1,420 r/min	
				Engine coolant temperature is 20°C (68°F)	1,200 – 1,400 r/min	
				Engine coolant temperature is 40°C (104°F)	1,150 – 1,350 r/min	
				Engine coolant temperature is 80°C (176°F)	600 – 800 r/min	
ECT sensor	6	Engine coolant temperature sensor	Ignition switch: "ON" or with engine running	Engine coolant temperature is –20°C (–4° F)	–20°C (–4°F)	Code No. P0117, P0118
				Engine coolant temperature is 0°C (32°F)	0°C (32°F)	
				Engine coolant temperature is 20°C (68°F)	20°C (68°F)	
				Engine coolant temperature is 40°C (104°F)	40°C (104°F)	
				Engine coolant temperature is 80°C (176°F)	80°C (176°F)	

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
EGR step motor	31	EGR valve (stepper motor)	• Engine coolant temperature: 80 – 95°C (176 – 203°F) • Lights, electric cooling fan and all accessories: "OFF" • Transaxle: "P" range	Engine is idling	2 – 8 Step	Code No. P0403
				2,500 r/min	2 – 8 Step	
Engine control relay	95	Engine control relay	Ignition switch: "ON"		ON	–
ETV relay	96	Throttle actuator control motor relay	Ignition switch: "ON"		ON	–
EVAP. emission purge SOL. duty	49	Evaporative emission purge solenoid duty	Engine: warming up with Open loop drive condition, without EVAP leak monitor		1% or more	–
Fuel pump relay	97	Fuel pump relay	Ignition switch: "ON"		OFF	–
			Engine:cranking		ON	
Ignition switch	85	Ignition switch (IG1)	Ignition switch: "ON"		ON	–

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
Injectors	17	Injectors*2	Engine: cranking	When engine coolant temperature is 0°C (32°F)	74 – 94 ms	–
				When engine coolant temperature is 20°C (68°F)	26.9 – 46.9 ms	
				When engine coolant temperature is 80°C (176°F)	7 – 13 ms	
		Injectors*3	• Engine coolant temperature: 80 – 95°C (176 – 203°F) • Lights, electric cooling fan and all accessories: "OFF" • Transaxle: "P" range	Engine is idling	1.3 – 3.3 ms	
				2,500 r/min	1.0 – 3.0 ms	
				When engine is suddenly revved	Increases	
Intake air temperature sensor	5	Intake air temperature sensor	Ignition switch: "ON" or with engine running	Intake air temperature is –20°C (–4° F)	–20°C (–4° F)	Code No. P0112, P0113
				Intake air temperature is 0°C (32°F)	0°C (32°F)	
				Intake air temperature is 20°C (68°F)	20°C (68°F)	
				Intake air temperature is 40°C (104°F)	40°C (104°F)	
				Intake air temperature is 80°C (176°F)	80°C (176°F)	

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION	INSPECTION PROCEDURE NO.
ISC learned value (A/C OFF)	19	Idle speed control learned value (at A/C OFF)	Ignition switch: "ON" • The learning value is shown, which compensates the idle speed control throttle opening degree (the throttle valve opening degree). • " –128 Step" means "the fully closed side" and "128 Step" means "the fully open side".	–128 to 128 Step (Display range)	–
ISC learned value (A/C ON)	20	Idle speed control learned value (at A/C ON)	Ignition switch: "ON" • When A/C is in "ON" position, the learning value is shown, which compensates the idle speed control throttle opening degree (the throttle valve opening degree). • "-128 Step" means "the fully closed side" and "128 Step" means "the fully open side".	–128 to 128 Step (Display range)	–
Knock retard	32	Knock retard	Engine: warming up, sudden racing	According to acceleration, knock retard is increased.	–
Learned knock retard	33	Knock control learned value	Ignition switch: "ON" • The learning value is shown, which compensates the ignition time based on the knock sensor. • "0%" means "retard angle" and "100%" means "advance angle".	0 – 100 % (Display range)	–
Long term fuel trim (bank 1)	26	Cylinder 1, 4 long-term fuel trim	Engine: warming up, 2,500 r/min without any load (during closed loop)	– 12.5 to 12.5%	Code No. P0171, P0172
Long term fuel trim (bank 2)	27	Cylinder 2, 3 long-term fuel trim	Engine: warming up, 2,500 r/min without any load (during closed loop)	– 12.5 to 12.5%	Code No. P0174, P0175

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
MAP sensor	8	Manifold absolute pressure sensor	Ignition switch: "ON"	Engine stopped [At altitude of 0 m (0 ft.)]	101 kPa (29.8 in.Hg)	Code No. P0107, P0108
				Engine stopped [At altitude of 600 m (1,969 ft.)]	95 kPa (28.1 in.Hg)	
				Engine stopped [At altitude of 1,200 m (3,937 ft.)]	88 kPa (26.0 in.Hg)	
				Engine stopped [At altitude of 1,800 m (5,906 ft.)]	81 kPa (23.9 in.Hg)	
			Engine: warming up, idling		16 – 36 kPa (4.7 – 10.6 in.Hg)	
			When engine is suddenly revved		Manifold pressure varies	
Neutral switch	87	Neutral switch	Ignition switch: "ON"	Selector lever: "N"	ON	–
				Selector lever: except "N"	OFF	
Normally closed brake switch	89	Normally closed brake switch	Ignition switch: "ON"	Depress the brake pedal	OFF	–
				Release the brake pedal	ON	
Oil control valve (bank 1)	98	Engine oil control valve	Engine: warming up	Engine is idling	OFF	–
				4,500 r/min	ON	

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
Oxygen sensor (bank1 sensor1)	AC	Cylinder 1, 4 heated oxygen sensor (front)	Engine:warming up (Air/fuel mixture is made leaner when decelerating and is made richer when revving)	When the engine is running at 4,000 r/min, decelerate suddenly.	0.2V or less → 0.6 – 1.0V (After several seconds have elapsed)	Code No. P0131, P0132, P0133, P0134
				When engine is suddenly raced	0.6 – 1.0V	
			Engine:warming up (the heated oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the PCM.)	Engine is idling	Voltage changes repeatedly between 0.4V or less and 0.6 –1.0V.	
				2,500 r/min		
Oxygen sensor (bank1 sensor2)	AD	Cylinder 1, 4 heated oxygen sensor (rear)	Engine: warming up	Transaxle: "L" range	0 and 0.6 – 1.0V	Code No. P0137, P0138
				Drive with wide open throttle		
				Engine: 3,500 r/min or more		
Oxygen sensor (bank2 sensor1)	AE	Cylinder 2, 3 heated oxygen sensor (front)	Engine:warming up (Air/fuel mixture is made leaner when decelerating and is made richer when revving)	When the engine is running at 4,000 r/min, decelerate suddenly.	0.2V or less → 0.6 – 1.0V (After several seconds have elapsed)	Code No. P0151, P0152, P0153, P0154
				When engine is suddenly raced	0.6 – 1.0V	
			Engine:warming up (the heated oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the PCM.)	Engine is idling	Voltage changes repeatedly between 0.4V or less and 0.6 – 1.0V.	
				2,500 r/min		
Oxygen sensor (bank2 sensor2)	AF	Cylinder 2, 3 heated oxygen sensor (rear)	Engine: warming up	Transaxle: "L" range	0 and 0.6 – 1.0V	Code No. P0157, P0158
				Drive with wide open throttle		
				Engine: 3,500 r/min or more		

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M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
Power steering switch	83	Power steering pressure switch	Engine: idling	Steering wheel stationary	OFF	Code No.P0551
				Steering wheel turning	ON	
Power supply voltage	1	Power supply voltage	Ignition switch: "ON"		Battery positive voltage	Procedure No. 28
Radiator fan control relay (high)	100	Radiator fan relay, condenser fan relay	Ignition switch: "ON"		OFF	–
			Carry out the actuator test to revolve the fan at high speed.		ON	
Radiator fan control relay (low)	101	Fan control relay	Ignition switch: "ON"		OFF	–
			Carry out the actuator test to revolve the fan at low speed.		ON	
Relative TP sensor	BC	Relative throttle position sensor	• Remove the intake air hose at the throttle body • Disconnect the throttle position sensor connector, and then connect terminals numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658. • Ignition switch: "ON"	Fully close the throttle valve with your finger	0 – 5%	–
				Fully open the throttle valve with your finger	88% or more	
Short term fuel trim (bank 1)	28	Cylinder 1, 4 short-term fuel trim	Engine: warming up, 2,500 r/min without any load (during closed loop)		– 25 to 25%	Code No. P0171, P0172
Short term fuel trim (bank 2)	29	Cylinder 2, 3 short-term fuel trim	Engine: warming up, 2,500 r/min without any load (during closed loop)		– 25 to 25%	Code No. P0174, P0175
Spark advance	16	Ignition timing advance	• Engine: warming up • Timing light is set (to check actual ignition timing)	Engine is idling	2 – 18 °CA	–
				2,500 r/min	28 – 48 °CA	

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M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
Target EGR step motor	BA	Target EGR valve (stepper motor)	• The target duty ratio of the EGR valve driving is shown. • "0%" means "fully closed EGR valve" and "100%" means "fully opened EGR valve".		0 – 100% (Display range)	–
Target ETV value	59	Throttle actuator control motor target value	Engine: warming up • The target opening degree of the throttle valve is shown. • "0 V" means "fully closed throttle valve" and "5 V" means "fully opened throttle valve".		0 – 5 V (Display range)	–
Target idle speed	3	Target idle speed	Engine: idling	Engine coolant temperature is –20°C (–4°F)	1,275 – 1,475 r/min	–
				Engine coolant temperature is 0°C (32°F)	1,220 – 1,420 r/min	
				Engine coolant temperature is 20°C (68°F)	1,200 – 1,400 r/min	
				Engine coolant temperature is 40°C (104°F)	1,150 – 1,350 r/min	
				Engine coolant temperature is 80°C (176°F)	600 – 800 r/min	
Throttle actuator	58	Throttle actuator control motor	Engine: warming up • The target opening degree of the throttle valve is shown. • "0%" means "fully closed throttle valve" and "100%" means "fully opened throttle valve".		0 – 100% (Display range)	–

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
TP sensor(main)	13	Throttle position sensor (main)	• Remove the intake air hose at the throttle body • Disconnect the throttle position sensor connector, and then connect terminals numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658. • Ignition switch: "ON"	Fully close the throttle valve with your finger	300 – 700 mV	Code No. P0122, P0123
				Fully open the throttle valve with your finger	4,000 mV or more	
			Engine: warming up, idling	No load	500 – 660 mV	
				A/C switch: "OFF" → "ON"	Voltage varies	
				Shift lever: "N" → "D"		
TP sensor(main)	AB	Throttle position sensor (main)	• Remove the intake air hose at the throttle body • Disconnect the throttle position sensor connector, and then connect terminals numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658. • Ignition switch: "ON"	Fully close the throttle valve with your finger	5 – 15%	Code No. P0122, P0123
				Fully open the throttle valve with your finger	80% or more	

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M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
TP sensor (main) learned value	14	Throttle position sensor (main) mid opening learning value	This item shows the throttle valve opening learning value when the vehicle enters into the limp home mode.			–
TP sensor (sub)	15	Throttle position sensor (sub)	• Remove the intake air hose at the throttle body • Disconnect the throttle position sensor connector, and then connect terminals numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658. • Ignition switch: "ON"	Fully close the throttle valve with your finger	2,200 – 2,800 mV	Code No. P0222, P0223
				Fully open the throttle valve with your finger	4,600 mV or more	

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION	INSPECTION PROCEDURE NO.
TP sensor(sub)	BD	Throttle position sensor (sub)	• Remove the intake air hose at the throttle body • Disconnect the throttle position sensor connector, and then connect terminals numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658. • Ignition switch: "ON"	Fully close the throttle valve with your finger	45 – 55%	Code No. P0222, P0223
				Fully open the throttle valve with your finger	80% or more	
Vehicle speed	4	Vehicle speed	Drive at 40 km/h (25 mph).		Approximately 40 km/h (25 mph)	–

GENERAL SCAN TOOL (GST) MODE 01 REFERENCE TABLE

M1131156000113

The description in this section is not used for the vehicle for Russia.

ACTUATOR TEST REFERENCE TABLE

M1131152501625

*NOTE: *: Continues for 27 minutes. Can be released by pressing the CLEAR key.*

NOTE: Refer to the section of the DIAGNOSTIC TROUBLE CODE PROCEDURES or the SYMPTOM PROCEDURES, GALANT service manual (Pub No. MSSP-009B-2007), for the details of the inspection procedure.

M.U.T.-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	DRIVE CONTENTS	INSPECTION REQUIRMENT	NORMAL CONDITION	INSPECTION PROCEDURE NO.
A/C relay	16	A/C compressor clutch relay	A/C compressor clutch relay turns from OFF to ON.	Ignition switch: "ON"	Clicks when A/C compressor clutch is driven.	Procedure No. 33
EVAP. emission purge SOL. Valve	10	Evaporative emission purge solenoid	Solenoid valve turns from OFF to ON.	Ignition switch: "ON"	Clicks when solenoid valve is driven.	Code No. P0443
FUEL PUMP	9	Fuel pump	Fuel pump operate and fuel is recirculated	Ignition switch: "ON" / Listen near the fuel tank for the sound of fuel pump operation	Sound of operation is heard	Procedure No. 29
Ignition timing 5 BTDC	11*	Basic ignition timing	Set to ignition timing adjustment mode	• Engine: idling • Connect timing light	5°BTDC	–
No. 1 injector	1	Injectors	Cut fuel to No. 1 injector	Engine: warm up, idle (cut the fuel supply to each injector in turn and check cylinders which don't affect idling.)	Idling becomes unstable	Code No. P0201
No. 2 injector	2		Cut fuel to No. 2 injector			Code No. P0202
No. 3 injector	3		Cut fuel to No. 3 injector			Code No. P0203
No. 4 injector	4		Cut fuel to No. 4 injector			Code No. P0204
Radiator fan (high)	12	Radiator fan, A/C condenser fan	Drive the fan motor	Ignition switch: "ON"	Radiator fan and A/C condenser fan rotate at high speed.	Procedure No. 27
Radiator fan (low)	13				Radiator fan and A/C condenser fan rotate.	
VVT oil control valve	17	Engine oil control valve	Engine oil control valve turns from OFF to ON	Engine: warming up, 2,000 r/min	The engine speed is changed.	Code No. P1021

CHECK AT THE POWERTRAIN CONTROL MODULE (PCM)

M1131153600688

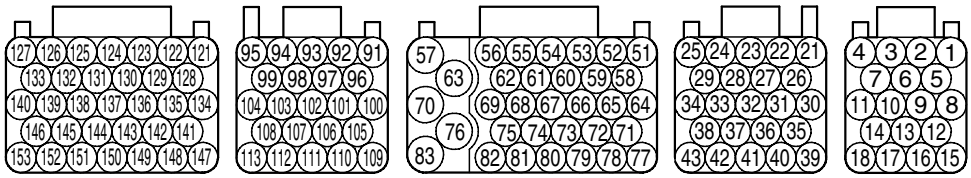
1. Disconnect the PCM connectors B-19, B-20, B-21, B-22 and B-23, and connect check harness special tool MB991923 between the PCM connectors.

2. Measure the voltage between each check harness connector terminal and check harness connector ground terminal (No. 25 or No. 29).

TERMINAL VOLTAGE CHECK CHART

*NOTE: *: The average voltage through an analog voltmeter is described in this service manual (because the average voltage is too stable to be shown on a digital voltmeter).*

Check Harness Special Tool MB991923 Connector Terminal Arrangement



AK203309AB

TERMINAL NO.	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)		NORMAL CONDITION
5	Fan control relay (high)	Ignition switch: "ON"		B+
		Carry out the actuator test to revolve the fan at high speed.		1 V or less
6	Fuel pump relay	Ignition switch: "ON"		B+
		Engine: idling		1 V or less
10	Fan control relay (low)	Ignition switch: "ON"		B+
		Carry out the actuator test to revolve the fan at low speed.		1 V or less
21	Sensor supplied voltage	Ignition switch: "ON"		4.9 – 5.1 V
68				
26	Accelerator pedal position sensor (main)	Ignition switch: "ON"	Release the accelerator pedal	0.735 – 1.335 V
			Depress the accelerator pedal fully	4.0 V or more
27	Accelerator pedal position sensor (sub)	Ignition switch: "ON"	Release the accelerator pedal	0.435 – 1.035 V
			Depress the accelerator pedal fully	3.6 V or more
30	Power supply voltage applied to accelerator pedal position sensor (main)	Ignition switch: "ON"		4.9 – 5.1 V
42	Backup power supply	Ignition switch: "LOCK" (OFF)		B+
43	Ignition switch-IG	Ignition switch: "ON"		B+
51	Power supply	Ignition switch: "ON"		B+
64				
52	MFI relay (power supply)	Ignition switch: "LOCK" (OFF)		B+
		Ignition switch: "ON"		1 V or less

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TERMINAL NO.	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)		NORMAL CONDITION
78	Power steering pressure switch	Engine: warming up, idling	When steering wheel is not turned	B+
			When steering wheel is turned	1 V or less
79	Cylinder 2, 3 heated oxygen sensor (front) offset voltage	Ignition switch: "ON"		0.4 – 0.6 V
80	Cylinder 1, 4 heated oxygen sensor (front) offset voltage	Ignition switch: "ON"		0.4 – 0.6 V
81	A/C compressor clutch relay	• Engine: idling • A/C switch: OFF→ ON (A/C compressor is operating)		B+→ 1 V or less as A/C clutch cycles
83	Ignition switch-ST	Engine: cranking		8 V or more
91	Cylinder 2, 3 heated oxygen sensor (front)	Engine: warming up, 2,500 r/min		0.5 ←→ 1.4 V (changes repeatedly)
92	Cylinder 1, 4 heated oxygen sensor (front)	Engine: warming up, 2,500 r/min		0.5 ←→ 1.4 V (changes repeatedly)
93	Engine coolant temperature sensor	Ignition switch: "ON"	When engine coolant temperature is –20°C (–4°F)	3.9 – 4.5 V
			When engine coolant temperature is 0°C (32°F)	3.2 – 3.8 V
			When engine coolant temperature is 20°C (68°F)	2.3 – 2.9 V
			When engine coolant temperature is 40°C (104°F)	1.3 – 1.9 V
			When engine coolant temperature is 60°C (140°F)	0.7 – 1.3 V
			When engine coolant temperature is 80°C (176°F)	0.3 – 0.9 V
94	Power supply voltage applied to throttle position sensor	Ignition switch: "ON"		4.9 – 5.1 V
96	Cylinder 2, 3 heated oxygen sensor (rear)	• Transaxle: "L" range • Drive with wide open throttle • Engine:3,500 r/min or more		0 and 1.0 – 1.5 V alternates
97	Cylinder 1, 4 heated oxygen sensor (rear)	• Transaxle: "L" range • Drive with wide open throttle • Engine:3,500 r/min or more		0 and 1.0 – 1.5 V alternates

TERMINAL NO.	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)		NORMAL CONDITION
98	Throttle position sensor (sub)	• Remove the intake air hose at the throttle body • Disconnect the throttle position sensor connector, and then connect terminals numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658. • Ignition switch: "ON"	Fully close the throttle valve with your finger	2.2 – 2.8 V
			Fully open the throttle valve with your finger	4.6 V or more
99	Throttle position sensor (main)	• Remove the intake air hose at the throttle body • Disconnect the throttle position sensor connector, and then connect terminals numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658. • Ignition switch: "ON"	Fully close the throttle valve with your finger	0.3 – 0.7 V
			Fully open the throttle valve with your finger	4.0 V or more
102	Manifold absolute pressure sensor	Ignition switch: "ON"	At altitude of 0 m (0 ft.)	3.8 – 4.2 V
			At altitude of 600 m (1,969 ft.)	3.5 – 3.9 V
			At altitude of 1,200 m (3,937 ft.)	3.3 – 3.7 V
			At altitude of 1,800 m (5,906 ft.)	3.0 – 3.4 V
		Engine: warming up, idling		0.6 – 1.4 V
		When engine is suddenly revved.		Voltage varies
103	Crankshaft position sensor	Engine: cranking		0.4 – 4.0 V*
		Engine: idling		2.0 – 3.0 V*

TSB Revision

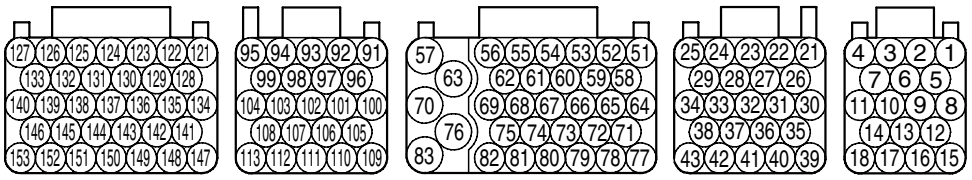
TERMINAL NO.	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)		NORMAL CONDITION
104	Camshaft position sensor	Engine: cranking		2.0 – 4.8 V*
		Engine: idling		3.0 – 4.0 V*
105	Cylinder 2, 3 heated oxygen sensor (rear) offset voltage	Ignition switch: "ON"		0.4 – 0.6 V
106	Cylinder 1, 4 heated oxygen sensor (rear) offset voltage	Ignition switch: "ON"		0.4 – 0.6 V
107	Intake air temperature sensor	Ignition switch: "ON"	When Intake air temperature is –20°C (–4°F)	3.8 – 4.4 V
			When Intake air temperature is 0°C (32°F)	3.2 – 3.8 V
			When Intake air temperature is 20°C (68°F)	2.3 – 2.9 V
			When Intake air temperature is 40°C (104°F)	1.5 – 2.1 V
			When Intake air temperature is 60°C (140°F)	0.8 – 1.4 V
			When Intake air temperature is 80°C (176°F)	0.4 – 1.0 V
108	Mass airflow sensor	Engine: revving		Voltage increase in response to revving
110	Engine oil pressure switch	Engine: warming up, idling		1 V or less
		Engine: 4,500 r/min		B+
122	Power supply voltage applied to throttle actuator control motor	Ignition switch: "ON"		B+
123	Throttle actuator control motor relay	Ignition switch: "ON" → "LOCK" (OFF)		1 V or less → B+ → 1 V or less
125	Cylinder 2, 3 heated oxygen sensor heater (front)	Engine: warming up, idling (15 seconds after starting engine)		9 – 11 V*
		Engine: revving		9 – 11 V* → B+ (momentarily)
126	Cylinder 1, 4 heated oxygen sensor heater (front)	Engine: warming up, idling (15 seconds after starting engine)		9 – 11 V*
		Engine: revving		9 – 11 V* → B+ (momentarily)
128	Engine oil control valve	Engine: warming up, idling		B+
		Engine: 4,500 r/min		1 V or less → 4.0 – 10 V* (After a few seconds pass)

TERMINAL NO.	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)	NORMAL CONDITION
131	Generator FR terminal	• Engine: warming up, idling (radiator fan: stopped) • Headlight: OFF to ON • Rear defogger switch: OFF to ON • Stop light switch: OFF to ON	Voltage drops
132	Generator G terminal	• Engine: warming up, idling (radiator fan: stopped) • Headlight: OFF to ON • Rear defogger switch: OFF to ON • Stop light switch: OFF to ON	Voltage rises
137	Cylinder 2, 3 heated oxygen sensor heater (rear)	Engine: warming up, idling	1 V or less
		Engine: revving	B+
138	Cylinder 1, 4 heated oxygen sensor heater (rear)	Engine: warming up, idling	1 V or less
		Engine: revving	B+
141	Throttle actuator control motor (–)	• Ignition switch: "ON" • Accelerator pedal: fully closed → fully opened	Decreases slightly (approximately 2 V) from battery voltage.
147	Throttle actuator control motor (+)	• Ignition switch: "ON" • Accelerator pedal: fully opened → fully closed	Decreases slightly (approximately 2 V) from battery voltage.
142	EGR valve (Stepper motor coil <A1>)	Ignition switch: "LOCK" (OFF) → "ON"	5 – 8 V* (changes about three seconds repeatedly)
136	EGR valve (Stepper motor coil <A2>)		
130	EGR valve (Stepper motor coil <B1>)		
124	EGR valve (Stepper motor coil <B2>)		
149	Evaporative emission purge solenoid	Ignition switch: "ON"	B+
		Engine: warm up, 3,000 r/min (within 3 minutes after the engine starting sequence is completed)	Voltage drops

TERMINAL NO.	INSPECTION ITEM	INSPECTION CONDITION (ENGINE CONDITION)	NORMAL CONDITION
151	Ignition coil – No. 1 (ignition power transistor)	Engine: 3,000 r/min	0.3 – 3.0 V*
143	Ignition coil – No. 2 (ignition power transistor)		
150	Ignition coil – No. 3 (ignition power transistor)		
148	Ignition coil – No. 4 (ignition power transistor)		
153	No. 1 injector	• Engine: warming up, idling • Suddenly depress the accelerator pedal	From 9 – 13 V* momentarily drops slightly
146	No. 2 injector		
140	No. 3 injector		
139	No. 4 injector		

TERMINAL RESISTANCE AND CONTINUITY CHECK

PCM Harness Side Connector Terminal Arrangement



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TERMINAL NO.	INSPECTION ITEM	NORMAL CONDITION (INSPECTION CONDITION)
25 – Body ground	PCM ground	Continuity (2 Ω or less)
29 – Body ground	PCM ground	
34 – Body ground	PCM ground	
38 – Body ground	PCM ground	

TERMINAL NO.	INSPECTION ITEM	NORMAL CONDITION (INSPECTION CONDITION)
69 – 93	Engine coolant temperature sensor	14 – 17 kΩ [when engine coolant temperature is –20°C (–4°F)]
		5.1 – 6.5 kΩ [when engine coolant temperature is 0°C (32°F)]
		2.1 – 2.7 kΩ [when engine coolant temperature is 20°C (68°F)]
		0.9 – 1.3 kΩ [when engine coolant temperature is 40°C (104°F)]
		0.48 – 0.68 kΩ [when engine coolant temperature is 60°C (140°F)]
		0.26 – 0.36 kΩ [when engine coolant temperature is 80°C (176°F)]
69 – 107	Intake air temperature sensor	13 – 17 kΩ [when intake air temperature is –20°C (–4°F)]
		5.3 – 6.7 kΩ [when intake air temperature is 0°C (32°F)]
		2.3 – 3.0 kΩ [when intake air temperature is 20°C (68°F)]
		1.0 – 1.5 kΩ [when intake air temperature is 40°C (104°F)]
		0.56 – 0.76 kΩ [when intake air temperature is 60°C (140°F)]
		0.30 – 0.45 kΩ [when intake air temperature is 80°C (176°F)]
51 – 125	Cylinder 2, 3 heated oxygen sensor heater (front)	4.5 – 8.0 Ω [at 20°C (68°F)]
51 – 126	Cylinder 1, 4 heated oxygen sensor heater (front)	4.5 – 8.0 Ω [at 20°C (68°F)]
51 – 128	Engine oil control valve	6.9 – 7.9 Ω [at 20°C (68°F)]
51 – 137	Cylinder 2, 3 heated oxygen sensor heater (rear)	11 – 18 Ω [at 20°C (68°F)]
51 – 138	Cylinder 1, 4 heated oxygen sensor heater (rear)	11 – 18 Ω [at 20°C (68°F)]
141 – 147	Throttle actuator control motor	0.3 – 80 Ω [at 20°C (68°F)]
51 – 142	Stepper motor coil (A1)	20 – 24 Ω [at 20°C (68°F)]
51 – 136	Stepper motor coil (A2)	
51 – 130	Stepper motor coil (B1)	
51 – 124	Stepper motor coil (B2)	
51 – 149	Evaporative emission purge solenoid	30 – 34 Ω [at 20°C (68°F)]
51 – 153	No. 1 injector	10.5 – 13.5 Ω [at 20°C (68°F)]
51 – 146	No. 2 injector	
51 – 140	No. 3 injector	
51 – 139	No. 4 injector	

ON-VEHICLE SERVICE

EVAPORATVE EMISSION VENTILATION SOLENOID CHECK

M1131012800365

The description in this section is not used for the vehicle for Russia.

SPECIFICATION(S)

GENERAL SPECIFICATION(S)

M1131000201068

ITEM		SPECIFICATION
Throttle body	Throttle bore mm (in.)	60 (2.4)
	Throttle position sensor	Hall element type
	Throttle actuator control motor	DC motor type, having brushes
Powertrain control module (PCM)	Identification model No.	E6T41690
Sensors	Mass airflow sensor	Heat sensitizing type
	Barometric pressure sensor	Semiconductor type
	Intake air temperature sensor	Thermistor type
	Engine coolant temperature sensor	Thermistor type
	Heated oxygen sensor	Zirconia type
	Accelerator pedal position sensor	Hall element type
	Transmission range switch	Contact switch type
	Camshaft position sensor	Magneto resistance element type
	Crankshaft position sensor	Magneto resistance element type
	Knock sensor	Piezoelectric type
	Power steering pressure switch	Contact switch type
	Manifold absolute pressure sensor	Semiconductor type
	Engine oil pressure switch	Contact switch type
Actuators	Multiport fuel injection (MFI) relay	Contact switch type
	Fuel pump relay	Contact switch type
	Throttle actuator control motor relay	Contact switch type
	Injector type and number	Electromagnetic type, 4
	Injector identification mark	IDH322S
	Engine oil control valve	Duty cycle type solenoid valve
	Exhaust gas recirculation (EGR) valve	Stepper motor type
	Evaporative emission purge solenoid	Duty cycle type solenoid valve